

An application guideline for the fair value accounting of biological assets

by

MARILENE VAN BILJON

submitted in accordance with the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in the subject

ACCOUNTING SCIENCES

at the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: PROF D SCOTT

CO-SUPERVISOR: PROF HC WINGARD

JUNE 2016

Dedications

'An application guideline for the fair value accounting of biological assets' is dedicated to my loving husband and best friend, Fanie van Biljon.

Character, not circumstance, makes the person.

Booker T. Washington

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION TO THE STUDY	1
1.1 Background information	1
1.2 Problem statement	6
1.3 Research objectives	7
1.4 Thesis statement	8
1.5 Purpose of the study	9
1.6 Significance of the study	10
1.7 Research framework, design and method	12
1.7.1 Theoretical framework	14
1.7.2 Research design	15
1.7.3 Research methods	16
1.7.3.1 Sampling	16
1.7.3.2 Instrumentation	18
1.7.3.3 Data collection	20
1.7.3.4 Data analysis	22
1.8 Limitations of the study	23
1.9 Definitions	25
1.10 Structure of the study	26
CHAPTER 2: CLARIFYING THE CHALLENGES OF FAIR VALUE ACCOUNTING ON BIOLOGICAL ASSETS	28
2.1. Introduction	28
2.2. Theoretical framework	28
2.3. The importance of and accounting on agriculture	33
2.4. Inconsistencies in the accounting treatment and reporting on biological assets	35
2.4.1. South Africa	36
2.4.2. Asia	38
2.4.2.1 Kazakhstan	40
2.4.2.2 Malaysia	41
2.4.2.3 Philippines	41
2.4.2.4 Russia	41
2.4.2.5 Turkey	43
2.4.3. Australia	45
2.4.4. Europe	47
2.4.4.1 Czech Republic	47
2.4.4.2 Georgia (Eurasia)	48

2.4.4.3	Greece	49
2.4.4.4	Latvia	49
2.4.4.5	Portugal	51
2.4.4.6	Republic of Lithuania	51
2.4.4.7	Romania	51
2.4.5.	United States of America	52
2.4.6.	Brazil	52
2.4.7.	International studies on challenges on biological asset reporting	53
2.5.	Fair value accounting principles.....	57
2.6.	Challenges of fair value accounting	60
2.6.1.	Importance of an accounting standard to the users for financial statements	60
2.6.2.	Importance of the organisation's environmental impact	62
2.6.3.	Ethical values of the compilers of financial reports	65
2.6.4.	Manipulation of financial results	66
2.6.5.	Variety of valuation models	67
2.6.6.	Communication challenges	68
2.6.7.	Technical expertise.....	70
2.6.8.	Valuation cost	70
2.6.9.	Auditor assessment and evaluation.....	71
2.7.	Accounting and market developments	72
2.7.1.	Bearer plants is recommended to form part of property, plant and equipment and not biological assets	72
2.7.2.	Compiling financial statements in line with the requirements of IFRS 13: Fair value	75
2.7.3.	The impact of emission trading on the accounting for agricultural activities	76
2.7.4.	Developments in non-accounting spheres that will impact on financial reporting	77
2.8.	Summary and conclusion.....	79
 CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY		80
3.1	Introduction.....	80
3.2	Cognitive theory	80
3.3	Research design	84
3.4	Research methods	87
3.4.1	Sampling and pilot study	88
3.4.2	Research instrument	89
3.4.2.1	Closed questionnaires	90
3.4.2.2	Open-ended questionnaires	92
3.4.2.3	Interviews	96
3.4.3	Data collection	97
3.4.3.1	Data required.....	98
3.4.3.2	Importance of data.....	119
3.4.3.3	Location of data	119
3.5	Data analysis.....	120
3.5.1	Creating flow charts	121
3.5.2	Use of computer packages and confidentiality.....	121

3.5.3	Understanding the data	122
3.5.4	Grounded theory analysis.....	122
3.6	Sensitivity of information	130
3.7	Limitations.....	130
3.8	Ethical considerations and clearance from the Research Ethics Committee of the College of Accounting Services	131
3.9	Summary and conclusion.....	133
CHAPTER 4: THE EMPIRICAL RESEARCH PROCESS AND OUTCOMES		135
4.1	Introduction.....	135
4.2	Phase one: Purposive sampling	136
4.2.1	Purposively selected countries	136
4.2.2	Identification of sample organisations	141
4.3	Phase two: Annual report content analysis.....	141
4.3.1	Main operations of the organisation	143
4.3.2	Applied accounting framework	146
4.3.3	Significance of biological assets held.....	150
4.3.4	Aggregate fair value gains/losses disclosure	151
4.3.5	Biological asset description	154
4.3.6	Groups and quantities of biological assets held	157
4.3.7	Valuation method applied	159
4.3.8	Biological asset challenges	163
4.3.9	Accounting policy.....	164
4.3.10	Notes to the financial statements	164
4.3.11	Bearer and consumable biological assets	168
4.4	Phase three: Closed and open-ended questionnaires	169
4.4.1	Closed questionnaires	170
4.4.1.1	Main operations of organisation	172
4.4.1.2	Accounting for biological assets	174
4.4.1.3	Valuing the biological assets	178
4.4.1.4	Valuation challenges experienced.....	184
4.4.2	Open-ended questionnaires	186
4.4.2.1	Operations of the organisation	187
4.4.2.2	Nature and purpose of biological assets	188
4.4.2.3	Initial recognition and measurement	188
4.4.2.4	Subsequent valuation	189
4.4.2.5	Valuers	190
4.4.2.6	Factors considered in fair value calculations	190
4.4.2.7	Biological asset valuation and reporting challenges	191
4.4.3	Results of the contextualisation of the questionnaires	191
4.4.3.1	Main operations of organisations and the significance of its biological assets	191
4.4.3.2	The nature and purpose of biological asset reporting	192
4.4.3.3	Valuing biological assets	192
4.4.3.4	Valuation challenges	193
4.4.3.5	Accounting for biological assets	194

4.5	Phase four: Interviews with various user groups	195
4.5.1	Auditors.....	198
4.5.1.1	Interview questions.....	198
4.5.1.2	Interview outcome	199
4.5.2	Accountants and financial statement compilers	202
4.5.2.1	Interview questions.....	202
4.5.2.2	Interview outcome	203
4.5.3	Academics and researchers	208
4.5.3.1	Interview questions.....	208
4.5.3.2	Interview outcome	208
4.5.4	Individuals charged with governance	210
4.5.4.1	Interview questions.....	210
4.5.4.2	Interview outcome	210
4.5.5	Accounting standard setters and regulatory bodies	216
4.5.5.1	Interview questions.....	216
4.5.5.2	Interview outcome	216
4.5.6	Owners, other users and investors	218
4.5.6.1	Interview questions.....	218
4.5.6.2	Interview outcome	218
4.5.7	Summarised interview contextualisation	223
4.6	Summary and conclusion.....	226
4.6.1	Main operations of the researched organisations and the applicability of IAS 41	227
4.6.1.1	Main operations categorisation on the stock exchange markets	228
4.6.1.2	Assessment of available reports per agricultural sector.....	228
4.6.2	Significance of biological assets held	228
4.6.3	Prioritising internal reporting.....	228
4.6.4	Notes to the financial statements	229
4.6.5	IAS 41 disclosure requirements.....	229
4.6.6	Valuation of biological assets	229
4.6.7	Usefulness of accounting policies	230
4.6.8	Valuation challenges	230
4.6.9	Reconcile qualitative and quantitative data	230
4.6.10	Accounting for bearer plants.....	231

CHAPTER 5: DEVELOPMENT AND VERIFICATION OF THE APPLICATION GUIDELINE **232**

5.1.	Introduction.....	232
5.2.	Applicability of IAS 41	233
5.3.	Researched accounting policies and valuation guidance per sector.....	235
5.4.	Users' expectations on accounting policies	236
5.5.	Valuing biological assets.....	238
5.5.1	Valuation factors that informs fair value accounting	238
5.5.2	Valuation assumptions	239
5.5.3	The life expectancy of biological assets	240
5.5.4	Valuation frequency	242
5.5.5	Valuation documentation	242

5.6.	Disclosure notes to the financial statements	243
5.6.1	Valuation background	244
5.6.2	Asset performance	244
5.6.3	Price index	244
5.6.4	Qualitative and quantitative reconciliations	245
5.6.5	Environmental changes	245
5.6.6	Elaborated comparative information	245
5.6.7	Financial ratios	245
5.6.7.1	Capital adequacy ratio	246
5.6.7.2	Solvency	246
5.6.7.3	Biological asset turnover ratio	246
5.6.7.4	Liquidity	247
5.6.7.5	Return on assets	247
5.6.7.6	Biological asset data	247
5.7.	Industry examples researched and available IFRS 13 guidance	248
5.8.	Accounting developments	248
5.8.1	Accounting for bearer plants	248
5.8.1.1	Identifying bearer plants	249
5.8.1.2	Determining the useful lives of the bearer plants	250
5.8.1.3	Retrospective accounting and journal entries	251
5.8.1.4	Bearer plants reporting in the public sector	253
5.8.2	Available IFRS 13 guidance	254
5.8.3	Environmental reporting	254
5.8.4	Operational impact of land claims	260
5.9.	Verification of the application guideline	260
5.9.1	Purposively selected evaluators	261
5.9.2	Analysis of the assessor's feedback	262
5.10.	Summary and conclusion	262
CHAPTER 6: CONCLUSION OF THE STUDY		265
6.1	Introduction	265
6.2	Summary of the research	265
6.2.1	Objectives of the study and the research problem	266
6.2.2	Contextualising the challenges of fair value accounting on biological assets	266
6.2.3	Research design and methodology	267
6.2.4	The empirical research process and outcomes	267
6.2.4.1	Main operations of the researched organisations and the applicability of IAS 41	268
6.2.4.1.1	Main operations categorisation on the stock exchange markets	268
6.2.4.1.2	Assessment of available reports per agricultural sector	269
6.2.4.1.3	Significance of biological assets held	269
6.2.4.1.4	Prioritising internal reporting	269
6.2.4.2	Notes to the financial statements	269
6.2.4.3	IAS 41 disclosure requirements	271
6.2.4.4	Valuation of biological assets	271
6.2.4.5	Usefulness of accounting policies	271
6.2.4.6	Valuation challenges	272
6.2.4.7	Reconcile qualitative and quantitative data	272

6.2.4.8	Accounting for bearer plants	273
6.2.5	Development and verification of the application guideline	273
6.3	Research conclusion	274
6.4	Contribution of the study.....	275
6.5	Revisiting the established cognitive theory	276
6.6	Revisiting the research objectives	277
6.7	Recommendation from results	278
6.8	Areas identified for further research	280
LIST OF TABLES AND FIGURES.....		281
BIBLIOGRAPHY		283
ANNEXURES A – Q (electronically on disc)		
ANNEXURE R.....		315

Acknowledgements

Jesus Christ's blessings and the inspiring promise of Proverbs 16:3 made this thesis possible: "Commit to the Lord whatever you do, and your plans will succeed."

Professors Scott and Wingard, thank you for your guidance, patience and support. I am truly honoured to have had the privilege to work closely with great academics in such an exciting learning experience.

The language editing and skills transfer of Marti Gerber is greatly appreciated. Thank you for the encouragements and kind words during the review of the thesis.

The hours that I was able to spend on this dissertation was made possible by my loving, supporting husband and best friend Fanie. Thank you for the motivation and the interest in my study.

Declaration

Student number: 35528249

I declare that **AN APPLICATION GUIDELINE FOR THE FAIR VALUE ACCOUNTING OF BIOLOGICAL ASSETS** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

Marilene van Biljon

Date

Summary

Title of thesis

An application guideline for the fair value accounting of biological assets

Reporting in terms of the principles of IAS 41, or equivalent, did not result in comparable financial results in the industry. This is mainly due to valuation challenges experienced and the significant costs of these valuations, contributing to the theoretical gap addressed in this study, where the cognitive theory was applied to determine how to improve the consistency, validity and reliability of the fair valuing of biological assets. The knowledge gap is a result of the inconsistent application of the requirements of IAS 41 which results in incomparable financial results which impairs the decision-making of the users of such information. The results of the study were analysed and contextualised to develop an application guideline to assist the financial statement compilers to present results to users that will enhance their decision-making. This guideline is the result of an investigation on the industry trend and standards on how to value, disclose and report on biological assets in the annual reports; an assessment of the valuation challenges experienced, the valuation factors considered and the frequency thereof; an analysis of the valuation inputs applied and a contextualisation of the various users' expectations when these financial results are assessed. Such assessment included an inductive content analysis, further grounded theory contextualisation and grouping of the results into a guideline that was tested on various users to ensure the usefulness and validity thereof. The purpose of the study and the developed guideline is to determine how to improve the consistency, the validity and the reliability of the fair valuing of biological assets to derive at informing, comparable, decision-enhancing balances in a cost efficient manner when detailed information is presented.

Keywords: fair value, biological assets, agriculture, guideline, financial statement users, decision enhancing information, consistency, comparability, International Accounting Standard (IAS) 41, Generally Recognised Accounting Practice (GRAP) 27, accounting challenges, valuation models.

CHAPTER 1

INTRODUCTION TO THE STUDY

1.1 Background information

Agricultural activities cannot be detached from the operational processes that comprise the purchasing, transformation, harvesting and the associated sale of produce or offspring (IASB, 2014a:1; Bayboltaeva, Makulova, Abaeva, Alibekova & Bolysbayeva; 2015:217; Demir, 2015:56). These operational processes are recorded and valued to allow agriculturalists to control budgets, increase production, meet financial obligations and drive profits (Vukmirovic, Arsenovic, Lalic & Milovanovic, 2012:723; Bayboltaeva, *et al.* 2015:211). To allow agriculturalists and other users a comparative review and analysis of the financial results, a uniform criterion on how to record and report on the operational activities should exist (Aryanto, 2011:1; Pike and Chui, 2012:77; Duman, Özpeynirci and İçerli, 2012:119; Rozentăle and Ore, 2013:57; Baigrie, 2014:2; Mates, Grosu, Hlaciuc, Bostan, Bunget, Domil, Moraru & Artene; 2015:705). This established criterion will drive the accounting of activities and transactions for performance management, cash flows analysis and the identification of potential business risks (Pike and Chui, 2012:77; Athanasios, Stergios & Laskaridou; 2010:221; Duman, *et al.* 2012:119; Rozentăle and Ore, 2013:57; Bayboltaeva, *et al.* 2015:211). It will further allow a comparison to other farming enterprises and organisations for benchmarking and overall assistance in the decision-making process (Aryanto, 2011:1; Vukmirovic, *et al.* 2012:724; Rozentăle and Ore, 2013:57-58; Marsh, Austin & Fisher, 2013:79; Mates, *et al.* 2015:710).

Accounting standards have been developed as the required criterion to record farming activities to provide fairly presented results to the financial statement users. The 'farming accounting criterion' standard is the Generally Recognised Accounting Practice (GRAP) 27 and the International Accounting Standard (IAS) 41. GRAP 27 and IAS 41 prescribe the accounting treatment to record the initial purchase of the biological assets, to account for the biological transformation, to value and report on

the biological assets and to derecognise the assets at the point of harvest when the inventory is recognised (ASB, 2012:7; IASB, 2013a:A1169).

Accounting standards were developed to detail the requirements of how and when transactions should be recorded (Vukmirovic, *et al.* 2012:724; ASB, 2012:7; IASB, 2013a:A1169; IASB, 2014a:1). The recording of these transactions and the reporting thereon is regarded as financial accounting. Deegan and Unerman (2011:32) define financial accounting as a 'process involving the collection and processing of financial information to assist in the making of various decisions by many parties internal and external to the organisation'. Their definition refers to the investors, suppliers, lenders, employees, government, customers and the community as parties interested in the business operations. Consistency in the financial reporting processes of organisations, supported by a uniform valuation and disclosure technique will ensure that financial information can be compared with that of other organisations (Azevedo, 2007b:9; Deegan and Unerman, 2011:102; Duman, *et al.* 2012:120; Rozentâle and Ore, 2013:57,62; Marsh, *et al.* 2013:82,83; Baigrie, 2014:16; Gonçalves and Lopes, 2015:5). The harmonization of financial reporting therefore enhances comparability of financial information as the degree of variation of information is restricted (Azevedo, 2007a:2; Deegan and Unerman, 2011:102).

Harmonisation of financial reporting in the agricultural sector is driven by GRAP 27, IAS 41 and section 34 of the International Financial Reporting Standards (IFRS) for Small and Medium-sized Enterprises (SMEs). GRAP 27 was specifically developed to account for biological assets in the public sector (ASB, 2012:4). IAS 41 details the prescriptions that are applicable to private enterprises with public accountability, with the IFRS for SMEs available for private sector farmers with no public accountability (IASB, 2009a:200). GRAP 27 and IAS 41 are based on the fair value accounting principles (ASB, 2012:9; IASB, 2015:A1349), whereas the IFRS for SMEs grants the financial statement compiler an option between fair value accounting and the cost method. The fair value accounting principles are applicable since 1 January 2003 (IAS 41); 1 April 2009 (GRAP) and 9 July 2009 (IFRS for SMEs) respectively (IASB, 2015:a1355; ASB, 2012:16; IASB, 2009a:204). The concept of accounting for biological assets should be well known in the accounting spheres, yet it is not

consistently applied by organisations (Rozentāle and Ore, 2013:57; Baigrie, 2014:23).

This is an area of extending the theory, or contributing additional theoretical insights to the body of existing knowledge on this theoretical area as the methods applied to fair valuing biological assets have been compared in studies, but studies were not identified where such valuation methods and their underlying considerations were analysed in conjunction with the unique user requirements in their decision-making process to provide guidance to the industry in the form of an application guideline.

A study by Elad and Herbohn (2011:94) demonstrated that those organisations that adopted IAS 41 in Australia, France and the United Kingdom applied various techniques to value their biological assets. These included net present value (29%), historic cost (23%), fair value (16%), an independent valuation (13%), market prices for similar assets (13%), recent market prices (5%) and the lower of cost and net realisable value (1%).

Baigrie (2014:75) analysed the application of IAS 41 on the listed South African companies and concluded that only 38% of listed organisations considered the principles of fair value on adjusted market prices or industry data to value biological assets at the point of harvest. 50% of the listed organisations based their valuations on future cash flows; 6% applied the cost less accumulated depreciation method and 6% did not disclose their valuation methods (Baigrie, 2014:75). The public sector valuation of biological assets in South Africa is also inconsistent as it is based on the modified cash basis of accounting (50%), recognition at the point of sale (20%), accounted as held for sale assets (10%), expensed (10%) and fair value (10%) (Van Biljon, Scott & Wingard, 2013:62; Scott, Wingard & Van Biljon, 2016:3141).

Maina (2010:174) investigated the challenges experienced by SMEs in Kenya to account for biological assets at a fair value. He found that the most significant challenge experienced in the valuing is the unavailable market information needed to derive at a fair value. His study is supported by a study performed by Schutte and Buys (2011:199) on the IFRS for SMEs which concluded that specialised activities like agriculture were of moderate importance to organisations as they are involved in

alternative activities and do not necessarily apply fair value accounting on biological assets. These gaps in applied and theoretical knowledge persist, despite the guidance document on IFRS for SMEs, module 34, necessitating the limited organisations that operate with biological assets to apply the principles of fair value accounting to it (IASB, 2009a:7; IASB, 2013c:1). In circumstances where market information is not available IFRS for SMEs allows for the biological assets to be accounted at cost less accumulated depreciation and impairments yet the produce should be valued at the unavailable fair valued market information (IASB, 2009a:28; Baigrie, 2014:44).

Accounting for SMEs in Russia remains a challenge according to Burykin, Klichova, and Bremmers (2011:131). Their study found that the information gathered, compiled and disclosed to comply with IAS 41 is of no use to the Russian users of financial statements, as the principles of IAS 41 and the accounting standards applied in the Russian Federation differ. The study further concluded that the adoption of IAS 41 is not attempted as the substantial costs of implementation exceed the expected economic benefits construed to the organisation (Burykin, *et al.* 2011:131; Pike and Chui, 2012:79; Baigrie, 2014:14). Consequently, the financial statements of the Russian Federation organisations and those of the European Union cannot be compared, adding to the gap in the theoretical knowledge.

IAS 41 drives the fair valuing of biological assets as it requires biological assets to be measured (initially and at the end of each reporting date) at fair value less any costs to sell the biological asset (Riley, 2002:1; ASB, 2012:9; Vukmirovic, *et al.* 2012:724; IASB, 2013a:A1170;). The only exemption granted on the fair value accounting is stated in paragraph 30 of the standard - allowing for the accounting of a biological asset at cost less accumulated depreciation and impairments only on initial recognition when the fair value of that biological asset cannot be measured reliably (Riley, 2002:2; ASB, 2012:11; IASB, 2013a:A1172). The initial standard required that where active markets exist for biological assets and produce, those prices be used to determine the fair value. Instances where active markets do not exist for a particular biological asset required that the fair value be determined by evaluating information on the most recent market transaction prices (adjusted for significant changes in the economic circumstances), adjusted market prices for similar assets or sector

benchmarks (deleted paragraphs 17 to 21) (Riley, 2002:2; IASB, 2009a:201; IASB, 2009b:20; ASB, 2012:10).

Contributing to the gap in the theoretical knowledge, the lack of market information causes management in all economic sectors to create their individual assumptions and basis for calculation (Azevedo, 2007b:11; Rozentāle and Ore, 2013:58; Baigrie, 2014:16; Leão and Amborzini, 2014:99; Gonçalves and Lopes, 2015:2), especially as IAS 41 provides no guidance on the valuation methods and factors to be considered to derive at a fair value (Marsh, *et al.* 2013:85). This impairs the comparability of financial information (Baigrie, 2014:24). There are also other factors identified by Deegan and Unerman (2011:121) that impairs the comparability of financial information even if it is compiled on the same accounting standard. They found that differences in the taxation systems of countries impacts on the calculations of supporting transactions; that political influences impacts on the financial reporting as regulators prescribe the information to be disclosed; there are modifications to accounting standards at a national level by regulatory bodies and there are differences in how accounting standards are implemented, monitored and enforced (Deegan and Unerman, 2011:121). It can be concluded that the international adoption of a prescribed accounting standard may be applied in diverse manners, resulting in the adoption of various valuation models that constitutes incomparable financial results, resulting in the knowledge gap identified in this study (Azevedo, 2007a:2; Maina, 2010:174; Aryanto, 2011:2; Ossip, 2011:11; Elad and Herbohn, 2011:94; Pike and Chui, 2012:77; Dunman, *et al.* 2012:119; Rozentāle and Ore, 2013:57; Baigrie, 2014:24). The International Accounting Standards Board aimed to address the fair valuing challenges by developing IFRS 13 to guide the valuation of assets in an inactive market (IASB, 2013b:A488; IASB, 2014b:2).

IFRS 13 was developed as a guide on the determination of fair values for the components of the financial statements (IASB, 2013b:A488; Marsh, *et al.* 2013:82; Baigrie, 2014:3). Fair value is defined in IFRS 13 as the price that market participants on the measurement date would be paid to transfer a liability, or be received to sell an asset (IASB, 2013b:A491). Fair value measurement should take into account the highest and best use of an asset regardless of the actual use thereof (IASB, 2013b:A493). To determine the highest and best use, market information is needed

as the value of the asset should be maximised, even if the intention of the organisation is not to sell it in a market. The implications of IFRS 13 are that the maximum value of the biological asset should be determined when financial statements are compiled (PwC, 2011a:1). Should a farmer hold ostrich as a tourism attraction, the valuation of the non-financial assets (ostrich and farm) cannot merely be based on a single market value. Other possible uses for these assets, like selling the ostrich meat and the eggs, should be explored to determine what the highest and best use is for the assets. It is unknown whether the guidance provided in IFRS 13 had a positive impact on the industry as the standard only has an effective date of 1 January 2013, especially as the standard requires fair value to be driven by market information and not an 'entity-specific measurement' (IASB, 2014b:2).

To enhance comparability of biological assets at a fair value, the principles of IFRS 13 and the conceptual framework for financial reporting should be integrated, as done in the developed application guideline where the theoretical guidance provided by these standards, the information needs of the users of financial statements and the biological asset accounting requirements of IAS 41 were empirically analysed and contextualised. The conceptual framework requires financial results to be comparable, verifiable, timely and understandable in order to be useful (IASB, 2013e:72). It further states that a 'single measurement basis for all assets and liabilities may not provide the most relevant information for users of financial statements' (IASB, 2013e:11) and that financial reporting imposes costs that should be defensible by the benefits ensued from reporting the required information (IASB, 2013e:21; Baigrie, 2014:43).

As the valuation of biological assets imposes costs for an organisation, the study should explore the information required to disclose the biological assets on a comparable, fairly presented and cost effective manner, where the benefits of the valuation outweighs the cost thereof (IASB, 2013e:113; Baigrie, 2014:43).

1.2 Problem statement

This study determines how to improve the consistency, including the validity and reliability, of the fair valuing of biological assets. As argued in the introduction (1.1),

although IAS 41 prescribes the accounting treatment to harmonise financial reporting on biological assets, the inconsistent application of the standard results in incomparable financial results which impairs decision-making by the users thereof, a theoretical gap to which this study makes an original contribution. (Baigrie, 2014:75; Elad and Herbohn, 2011:94; Ossip, 2011:11; Burykin, *et al.* 2011:131; Chebac and Onica, 2009:32; Pike and Chui, 2012:89; Rozentāle and Ore, 2013:58; Antonio and Bassetti, 2014:19; Mates, *et al.* 2015:706).

1.3 Research objectives

In determining how to improve the consistency of the fair valuing of biological assets to produce decision-enhancing financial results to the users, the study's main objective was to collect, analyse and contextualise data on the biological asset valuation methods applied in the industry to determine how to improve the consistency, validity and reliability of the information presented to the financial statement users. The information needs of the various users groups were further analysed whereafter an application guideline, based on the research results from the study, was developed to assist the financial statement compilers to apply the principles of fair value accounting of biological assets (Hofstee, 2010:86). To evaluate and test the application guideline it was distributed to a selection of individuals. The results were contextualised to confirm that the application guideline assisted the compilers and users of financial statements to report consistent, valid and reliable financial results.

The application guideline was informed by the following sub-objectives:

- An identification and analysis of the recent developments on the accounting of biological assets that might impact on the methods used to account for these assets. These developments were considered in the application guideline to ensure that the compilers of the financial statements received guidance on how to address the requirements derived from these developments;
- An analysis of the challenges experienced by organisations to comply with the requirements of fair value accounting of biological assets. These detailed challenges acted as a practical device during the study as it guided the research to

address these specific problems. Solutions to these problems were included in the application guideline;

- An analysis of the disclosure requirements of IAS 41 to address the industry's valuation challenges experienced. This will assist the financial statements compilers as it can be regarded as a checklist and/or tool to ensure compliance with IAS 41.

1.4 Thesis statement

This study centred on the following thesis statement:

The consistency, including validity and reliability, of fair valued biological assets can be improved when the quantitative and qualitative indicators required in the users' decision-making process are available in an application guideline.

Since the fair value requirements of IAS 41 and GRAP 27 are not consistently applied the financial results of biological assets cannot be reliably compared. Decision makers might be misled, resulting in poor management and possible financial losses as fair value adjustments to these assets impacts on the net financial performance of organisations. The development of a guideline to assist financial statement compilers to apply the fair value accounting principles might result in consistent and comparable biological asset disclosure. Scholars within this field may review the guidelines as a modest contribution to the financial accounting sphere as the applied cognitive theory determined how to improve the consistency, the reliability and the validity of the fair valuing of biological assets while the information needs of the various user groups to the financial statements were analysed to align it to the financial reporting requirements. This ensured that the purpose of financial statements – to provide useful information to the users thereof – is herewith promoted in the financial accounting sphere. Decision makers, management and investors can therefore make conversant conclusions centred on the industry's financial results.

1.5 Purpose of the study

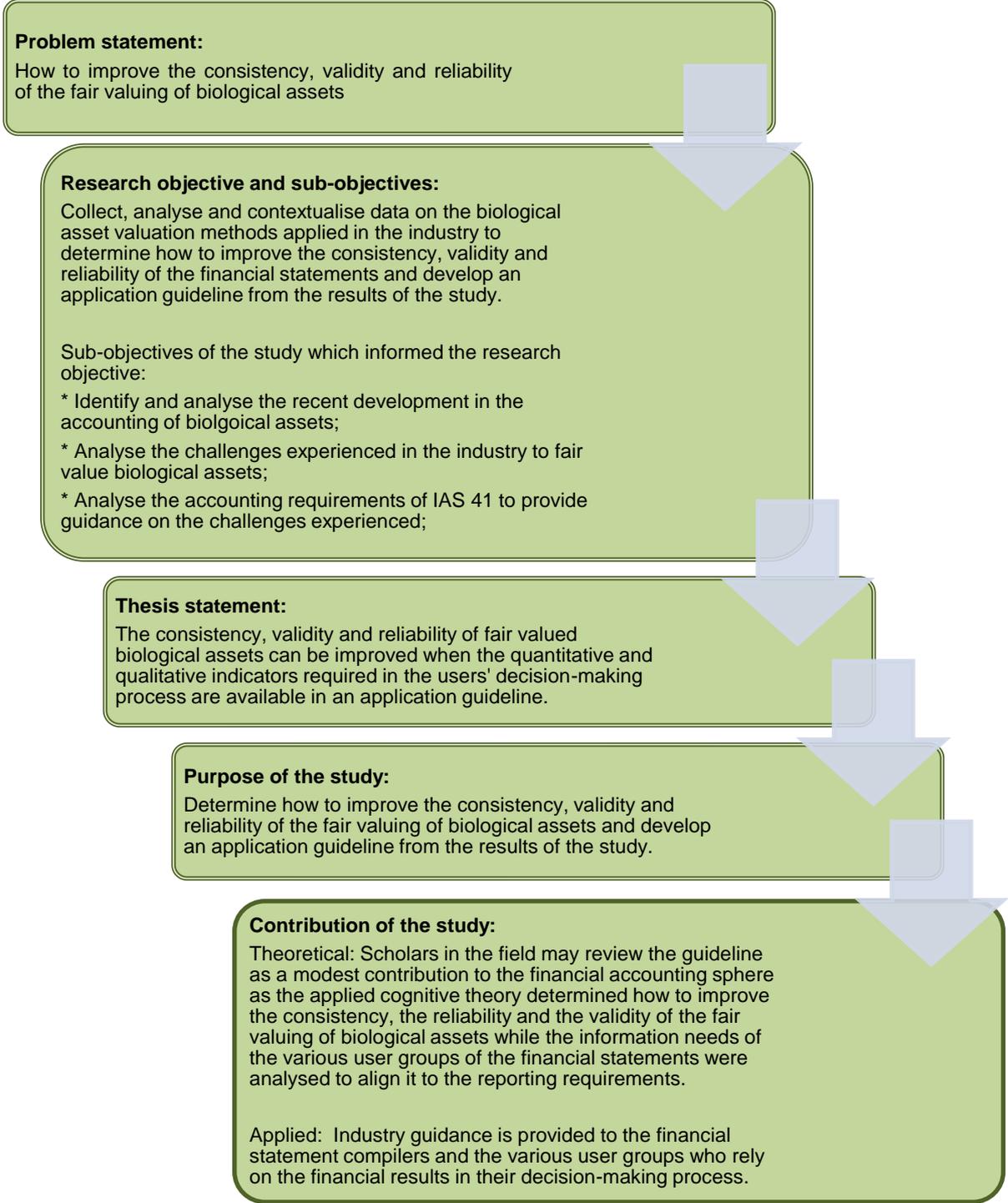
The purpose of this study was to determine how to improve the consistency, which includes the validity and reliability, of the fair valuing of biological assets. The research results informed the development of an application guideline to assist financial statement compilers to comply with the requirements of IAS 41, GRAP 27 and the fair value principles of IFRS for SMEs. This application guideline is regarded as a tool or checklist to instruct the consistent, reliable and valid fair valuing and the related disclosure of biological assets. This guideline specifies the specific challenges experienced by organisations linked to the theoretical guidance on how to attend thereto.

The application guideline incorporated the expectations and recommendations from various financial statement user groups. These users provided valuable insight into their relevant consideration of biological asset information disclosure and their required extent of detail required thereon. Inputs were obtained from accountants and auditors on industry challenges and norms to be incorporated into the application guideline to enhance IAS 41 compliance. The application guideline was distributed to a sample of user groups for validation to ensure that it address the specific disclosure requirements to assist in decision-making.

The application guideline can assist the private sector compilers of financial statements with IAS, or the public sector to comply with GRAP. In a South African context, the Accounting Standards Board (ASB) is responsible for setting the standards of GRAP. The ASB is not responsible for assisting the public sector with the implementation of GRAP standards or to provide guidance on the underlying accounting transactions. The National Treasury is responsible to promote and enforce transparency and effective management in Government, which includes the implementation of GRAP standards and specifically to assist the public sector with accounting guidelines (IASB, 2013a:1). Assistance can be provided to the public sector to comply with the requirements of GRAP 27 by submitting the application guideline to the National Treasury for distribution.

Sections 1.1 to 1.5 was summarised in figure 1.1 to provide a graphical outlay of this study.

Figure 1.1: Illustrating the research study



Source: Research result

1.6 Significance of the study

Evidenced in the study on the challenges experienced on the reporting of biological assets, the developed accounting standards are not applied uniformly (Elad and

Herbohn, 2011:94; Duman, *et al.* 2012:120). Notwithstanding the application of the requirements of IAS 41 and GRAP 27, the fair value of biological assets is determined on inconsistent valuation bases (Elad and Herbohn, 2011:94; Rozentāle and Ore, 2013:57; Baigrie, 2014:75). The inconsistent application of the requirements of the accounting standards prohibits a reliable comparative review and analysis of the activities and financial results that impacts on decision-making (Azevedo, 2007b:8; Pike and Chui, 2012:77; Marsh, *et al.* 2013:85).

There are organisations that opt not to implement the requirements of IAS 41 due to the complexity or costly exercise of doing so (Azevedo, 2007b:3; Chan, 2013:1; Baigrie, 2014:74; Gonçalves and Lopes, 2015:14). If organisations find the current requirements of IAS 41 too complex to implement it may be a daunting task to keep abreast of all the amendments to the standard due to the annual review thereof. The accounting standard and related requirements on how to account for biological assets will be affected by these developments as it may impact on the financial reporting and disclosure of the fair value of biological assets. Expected amendments and additional requirements to IAS 41 will complicate the standard further which may discourage the implementation thereof. Recent developments include:

- IAS 41 currently requires bearer and consumable biological assets to be disclosed on the financial statements. The standard setters are amending the standard to further distinguish between bearer plants and bearer livestock. Bearer plants will be recognised as property, plant and equipment and will not form part of biological assets but be recognised as property, plant and equipment for reporting periods starting on or after 1 January 2016 (Azevedo, 2007a:5; IASB, 2013d:10; AASB, 2013:12; Chan, 2013:2; BDO New Zealand, 2013:2; MASB, 2013:1; Baigrie, 2014:3,18; Gonçalves and Lopes, 2015:2; IASB, 2015:A1344);
- IFRS 13: Fair Value, has an effective date for financial periods starting on or after 1 January 2013. In terms of this standard the highest and best use of biological assets should be determined to substantiate the calculated fair value (Riley, 2002:1; Phillips, Drake & Luehlfing, 2010:11; PwC, 2011a:1; Pike and Chui, 2012:77; IFRS Foundation, 2013a:24; IASB, 2013b:A488; IFRS Foundation, 2013b:7; Baigrie, 2014:4; IASB, 2014b:2);

- the accounting for emission trading schemes will impact on the agricultural environment as the published discussion paper focus on how these schemes should be accounted for and what the impact of livestock methane gasses, animal excrement and fertiliser use is (Wingard, 2001:194; PwC, 2011b:1; Downsborough, Shackleton & Knight, 2012:2; EFRAG, 2013:1); and
- the manufacturing of biofuel and the land redistribution process impacts on the agricultural environment and will have an effect on the accounting for the biological assets (Barton, 1978:1; Adams, Cousins & Manona,1999:21; Hall and Williams, 2000:7; Krug, 2001:5; Ortmann, 2005:290; Berstein, 2005:24; Lahiff and Cousins, 2005:130; Visagie and Prasad, 2006:ii; Atkinson and Büscher, 2006:463; Hammar, 2010:396).

The inconsistent application of the accounting standard and the developments stated support the need to determine how to improve the consistency, including validity and reliability, of the fair valuing of biological assets. The results of the study were presented in an application guideline to assist with the accounting of biological assets. Especially since the principles of IAS 41 and GRAP 27 are not presently producing comparable financial results. The application guideline will not only assist the compilers of financial statements but also the users thereof as it will outline the underlying challenges and requirements that inform the published results, allowing the users insight to the industry challenges. The guideline can assist to analyse the practical challenges linked to the theoretical prescribed standards. This application guideline will assist the compilers of financial statements to recognise, measure, value and disclose biological assets on a basis that provides reliable and comparable results.

1.7 Research framework, design and method

To determine how to improve the consistency, validity and reliability of the fair valuing of biological assets and to contextualise such results into an application guideline to assist the industry, the study was performed as follows:

- a literature review was performed to investigate the challenges, norms, theories and accounting guidance that exist on the fair valuing of biological assets. It

conceptually contextualised the challenges of fair value accounting and revealed the willingness of the industry to apply these principles. Knowledge gaps identified by academics which informed this study include

- (a) The differences between the country specific accounting standards applied and IAS 41 results in incomparable biological assets results (Marsh, *et al.* 2013:85);
- (b) Unavailable market information results in incomparable results on biological assets (Mates, *et al.* 2015:705);
- (c) Users of financial information may find fair valued reports difficult to understand due to the complexity of accounting standards (Pike and Chui, 2012:89); and
- (d) Financial results in the agricultural sector are incomparable due to the application of various evaluation methods (Rozenāle and Ore, 2013:65).

The review of IAS 41 causes changes to the statement when it is updated. These updates or planned developments were analysed to determine what the effect thereof were on the fair valuing of biological assets. This analysis ensured that guidance on the anticipated changes were included in the application guideline;

- empirical research via a questionnaire was done to gather information on the unique challenges experienced by organisations that need to adhere to the fair value principles. These challenges were analysed using the grounded theory method of coding and flowcharts while a content analysis was done on the qualitative, narrative data to determine why the challenges exist, the complexity of the challenges, the number of organisations facing the same challenge and how these challenges came about;
- the literature and accounting standard were analysed by means of content analysis followed by a process of coding in terms of the grounded theory to formulate guidance to address the challenges experienced by the organisations. By linking the challenge to the theoretical requirements and providing practical solutions to the challenges through the grounded theory method an application guideline was developed from this study.

The comprehensive process underlying the procedures detailed was done as follows:

1.7.1 Theoretical framework

'The usefulness of financial information is enhanced if it is comparable, verifiable, timely and understandable' (IASB, 2013e:72). Financial results on biological assets will therefore be useful to decision makers if those results can be compared to that of other organisations (Chebac and Onica, 2009:33; Aryanto, 2011:1; Rozentāle and Ore, 2013:58, Marsh, *et al.* 2013:82,83; Baigrie, 2014:29). Prior studies performed clarified that the fair value methods applied to measure biological assets are not consistent (Maina, 2010:174, Elad and Herbohn, 2011:94; Burykin, *et al.* 2011:131; Pike and Chui, 2012:79; Rozentāle and Ore, 2013:58,60; Gabriel and Ştefea, 2013:101; Marsh, *et al.* 2013:82,83; Baigrie, 2014:23).

From the studies consulted, it is evident that challenges are experienced to apply the requirements of IAS 41 and GRAP 27 (Maina, 2010:174, Elad and Herbohn, 2011:94; Burykin, *et al.* 2011:131; Pike and Chui, 2012:79; Rozentāle and Ore, 2013:58,60, Van Biljon, 2013:115; Gabriel and Ştefea: 2013:101; Marsh, *et al.* 2013:82,83; Baigrie, 2014:23). To identify and analyse these challenges research was conducted on the financial statements of the organisations that hold/operate in biological assets. An analysis of the organisations' annual reports, with specific focus on the accounting policies and biological asset disclosures, was performed, comparing results to allow an identification of the specific guidance needed in the industry to apply fair valuing principles.

To complement the identified industry challenges further inputs on the users' expectations of financial reports, the usefulness of biological asset disclosure in annual reports and academic guidance was collected from auditors, accountants, academics and researchers, financial statement compilers, stakeholders of the organisations, accounting standard setters, regulatory bodies, owners of the organisations, other users of financial information and investors.

These inputs and recommendations were detailed in the application guideline to assist the industry to improve the consistency, validity and reliability of the fair valuing of biological assets.

The incomparable financial statements and the related industry challenges might be a result of the mental representations of the compilers thereof due to the applications and reporting procedures followed in the past (Berkeley, 2015). As each financial statement compiler and user will interpret information in the light of existing knowledge of the IAS 41 requirements, the exposure to fair valued valuations, the significance of the biological assets, the exposure to various valuation techniques and their organisation's willingness to apply fair value reporting, knowledge-seeking may be restricted. Expanding knowledge enhanced the financial reporting process as stated by Berkeley (2015):

'Cognitivist teaching methods aim to assist students in assimilating new information to existing knowledge, and enabling them to make the appropriate modifications to their existing intellectual framework to accommodate that information.'

The application guideline address the requirements of the various users of financial statements to detail their unique cognitive processes applied in their data analysis (Grant and Osanloo, 2014:15). The elaborated users' requirements enhanced the knowledge of the financial statement compilers to allow them to produce decision-enhancing financial reports that are consistent, valid and reliable with results of other organisations.

1.7.2 Research design

This is an inductive, empirical, qualitative study as it is based on external evidence on the challenges experienced to fair value biological assets (Explorable, 2009:1; Baigrie, 2014:51; Mojtahed, Baptista Nunes, Tiago Martins & Peng; 2014:87) conversed via questionnaires and interviews (Mojtahed, *et al.* 2014:88; Turner, 2010:756; Reischauer, 2015:289). The inductive study required creativity and flexibility during the content analysis and coding through the grounded theory method. As this study does not analyse fixed data and numbers or behaviours, quantitative research methods could not be applied as it would not produce a contextualisation of the narrative information that informed the challenges to the valuation methods experienced (Carter and Little, 2007:1316; Denzin, 2009:147). The qualitative research method was therefore applied in this study.

This qualitative study focused on the individual challenges experienced by organisations and the unique disclosure requirements and expectations of the users of financial reports, analysed by means of inductive content analysis techniques. Qualitative research allowed for the in-depth analysis, coding and contextualising of the responses received from the participants targeted via the questionnaires (Trafford and Leshem, 2008:96,171; Explorable, 2009:1; Hofstee, 2010:116,123; Thani and Wessels, 2011:78). The method was considered to be flexible to allow for the interpretation of participants' responses; further allowing the researcher to 'emphasise difference by making overdrawn contrast' with the standard (Seale, 1999:466).

Sandelowski (2000:335) defines descriptive qualitative research as 'researchers seeking to describe an experience or event select what they will describe and, in the process of featuring certain aspects of it, begin to transform that experience or event'. Johnson and Onwuegbuzie (2004:18) detailed the strengths of qualitative research as the use of a hypothesis, the discovery derived at during the study and the detailed exploration performed during the research. As the study focused on the interpretation, and industry challenges to fair value biological assets, the descriptive qualitative research method provided the results required to analyse the challenges experienced to inform the development of the application guideline (Johnson and Onwuegbuzie, 2004:20). Qualitative research assisted the researcher to analyse the data and responses provided by participants in the study, where interviews were open-ended to allow for the detailed feedback required to analyse the core of the experienced issues (Sandelowski, 2000:339). The descriptive qualitative research method was therefore considered the best method to address the hypothesis of this study (Trafford and Leshem, 2008:97).

1.7.3 Research methods

1.7.3.1 Sampling

In the pilot study, a random sample of organisations that hold biological assets were researched online and their annual reports for the 2012 to 2014 financial periods were requested or downloaded. Inductive content analysis was performed thereon to

analyse the industry challenges in applying the accounting principles prescribed in IAS 41. These challenges were further analysed through the grounded theory method with the use of coding and flowcharts whereafter it was linked to the content analysed theoretical guidance and inputs from users of financial statements.

For the purposes of this study, the users of financial statements were grouped into 10 (ten) categories. These users were contacted by means of questionnaires, and where required was followed up with interviews, to determine their expectations and recommended changes to current biological asset disclosures. The researcher explained the nature, scope and context of the research study to the users of financial statements to ensure feedback from all categories as each have the desired subject knowledge to ensure that this study is valid and reliable (Morse, Barrett, Mayan, Olson & Spiers, 2002:17; Mojtahed, *et al.* 2014:88; Turner, 2010:756). The information needs identified by the various user groups were analysed by means of grounded theory analysis to allow a grouping of the information expectations. Further coding was performed thereon to allow a comprehensive qualitative analysis of the information required by users in their assessment of financial results and in further decision-making.

A sample size of 50 organisations' annual reports was considered appropriate as the study involved the qualitative contextualising of information informing challenges and was not merely a statistical or quantitative study (Sandelowski, 2000:338; Morse, *et al.* 2002:17). The detailed qualitative content analysis on these annual reports was similarly reinforced by the inputs from the interviews with the ten groups of financial statement users, where the grounded theory method allowed a comprehensive analysis of their information needs. The developed application guideline was distributed to a sample of financial statement users for their assessment, inputs and the testing of the usefulness thereof. Their feedback was analysed by means of content analysis whereafter improvements were made to the application guideline to ensure that it improved the consistency, validity and reliability of the fair valuing of biological assets.

Sensitivity of information: The financial statements of listed organisations and government are publicly available. Financial information on private organisations and

additional data, documentation and information required on listed organisations in this study was obtained directly from participants where required. This information was not used for purposes other than for the analysis in this study. The information was not disclosed to individuals that are not involved in the development of the application guideline to report biological assets at a fair value, unless where written approval was obtained from the participants to do so (Hofstee, 2010:118; Trafford and Leshem, 2008:100).

Ethical considerations: The study was based on data obtained from third parties and it was done in terms of an official qualification at UNISA. Ethical clearance was obtained from the appropriate committee at the university to support the research (Trafford and Leshem, 2008:100; Hofstee, 2010:118). The information obtained from organisations in the course of this study was not used for purposes other than the development of the application guideline to fair value biological assets. The information was not disclosed to individuals that were not part of this study lacking the written consent of the participants.

1.7.3.2 Instrumentation

Method: Preference was given to the use of structured questionnaires with open-ended and closed questions. Questionnaires were chosen as the method of collecting data as studies on fair value principles were performed by Maina and Munjanja who successfully conducted their research with this method (Maina, 2010:124; Munjanja, 2008:108). The questionnaires were constructed as an electronic working paper to allow electronic circulation and feedback. The assessment of the feedback was done electronically on Microsoft Excel as a checklist, in conjunction with the online survey tool, Survey Monkey, to allow the researcher to track outstanding questionnaires and to perform follow-ups or interviews with respondents. Questionnaires were distributed by means of Microsoft Outlook and Survey Monkey.

The benefits of the use of questionnaires included the broad spectrum of financial statement user groups that can be used in the study, the unique feedback that was obtained, the possible willingness of the respondents to apply the application

guideline once developed and the timely collection of information. As stated under the detailed limitations, the researcher acknowledged that feedback on the questionnaires might have been limited and that delays might have been experienced in receiving feedback. However, this did not impact on the reliability of the study.

The pilot study identified the unique industry challenges experienced to account for biological assets in terms of IAS 41. The identified challenges, the industry norm of disclosure, the applied accounting policies and the extent of detail disclosed informed the questionnaires and interviews circulated and conducted with the user groups of the financial statements (Mojtahed, *et al.* 2014:87; Mitropolitiski, 2015:2). Data on the expectations and observations of the user groups of the financial statements was obtained through a combination of questionnaires and interviews. This was a result of the political and social status of the individuals who were consulted in the study.

The questionnaires and electronic communication were done with the use of Microsoft Outlook, Microsoft Word and Microsoft Excel. These applications informed the research with unique detailed feedback from the respondent that allowed the researcher to evaluate the individual challenges and the recommended disclosures and to address it in the application guideline. With the analysis of the unique challenges, followed by an assessment of the developed application guideline, the financial statement users assisted to make the application guideline a working document to support and enhance decision-making (Hofstee, 2010:122).

The method was considered adequate for the purposes of this study as it was performed reliably, was based on the approved requirements of an international accounting standard, and was performed without time restrictions (Hofstee, 2010:124). Care was taken to ensure that the analysis performed on the gathered questionnaires, online communication and interviews was not biased and that the questions used represented the actual requirement of this study.

Pilot study: Inductive content analysis was done on the annual reports of 50 organisations reporting on the financial affairs from 2012 to 2014. The content analysis comprised a review of the nature of biological assets held by the

organisation, the basis of valuation that was adopted and whether challenges were experienced to apply the fair value principles. The use of content analysis methods was considered the most appropriate research method to analyse the information underlying the financial results of organisations as it involves an establishment of categories which can be extrapolated and counted when applied in a particular text (Silverman', 2013:64). The inductive content analysis was followed up by the grounded theory method in the open-ended questionnaires and the interviews as this method allowed for qualitative inquiry on the content analysis findings. The annual report analysis in the pilot study could not be performed on the grounded theory method as qualitative inquiry could not be performed on the collected data when the underlying valuation methods and the related challenges were not first analysed and understood (Silverman, 2013:67). Similarly, narrative analysis could have provided qualitative data analysis but this method is more concerned with insight into how accounting practices makes sense than the perception, focus and broader processes and actions explored through the grounded theory method (Silverman, 2013:81). The pilot study guided the research to formulate the research questionnaires to the financial statement user groups. It also assisted the researcher in developing the application guideline with the identified challenges.

1.7.3.3 Data collection

Data required: The financial statements of organisations holding biological assets were required to perform an inductive content analysis of how these assets are valued and disclosed. Details on the unique challenges experienced by organisations that apply fair value accounting of biological assets also needed to be understood and analysed. The background information to transactions, the accounting policies and the factors contributing to the challenges experienced were further analysed from the integrated results published in the annual report. Where further clarity was required on the operations of the organisation, additional reports was requested or interviews were conducted with the organisation's financial statement preparers. The interviews established a relationship with the organisation to allow for detailed sharing of information to conceptualise the challenges experienced while coding could be done in terms of the grounded theory method on the collected qualitative

data (Sandelowski, 2000:338; Creswell and Miller, 2000:128; Akhavan and Dehghani, 2015:18).

Based on the inductive content analysis of the annual reports, the identified challenges and shortcomings were addressed in the various questionnaires to the ten financial statement user groups. Their recommendations and concerns on the challenges and the fair valuing of biological assets were obtained by means of electronic questionnaires and interviews. Their recommendations and concerns were coded through the grounded theory method which appraised the development of the application guideline. This guideline was circulated to a sample of the user groups for endorsements and apprehension.

A qualitative research approach was followed in this study. This approach allowed the researcher to perform immediate follow-ups with the respondents when clarity, extensive information or additional data was required (Sandelowski, 2000:338). Such follow-ups and an analysis of narrative data would not have been possible if the quantitative research process was followed, which concerns itself with behaviour and numbers rather than meaning and words (Silverman, 2013:4). The process of verifying the adequacy and reliability of the collected data could be performed immediately as the data was received to ensure that the research was based on trustworthy information (Morse, *et al.* 2002:17).

Importance of data: The financial statements assisted the researcher to identify the methods applied by organisations to apply fair value accounting. The data was considered as reliable, complete and accurate as organisations are subject to auditing principles before publishing an annual report. The financial statements directed the researcher to the accounting policies, the principles applied in valuing the assets and the background to the challenges experienced. This underlying information was vital to this study as the inductive content analysis and interpretation thereof provided detailed information on what guidance the industry requires to apply fair value accounting of biological assets (Creswell and Miller, 2000:128).

Despite the fact that the challenges identified in the inductive content analysis directed the development of the application guideline, the expectations of the

financial statement user groups explored through the grounded theory coding strengthened the usefulness thereof. Their recommendations detailed the industry norms, the decision makers' expectations and the overall usefulness of the information disclosed versus the information quality required to enhance usefulness and comparability.

Location of data: The information required was obtained from the official website of the sampled organisations. Where the required information was not published, it was requested from the financial departments and/or individuals at the organisations.

The electronic questionnaires were transmitted directly to the financial statement user groups to establish a communication channel. Telephonic follow-ups, further electronic e-mail communication and interviews were required to obtain their inputs in this study, especially from the unique user groups.

The information and documentation was shared with the researcher via Microsoft Outlook as it was time efficient. Sharing information with online tools allowed the researcher to include organisations abroad in the study as the study should not focus on the challenges of a single country. This ensured that the application guideline addressed the uniform challenges experienced by all organisations subject to compliance with IAS 41.

1.7.3.4 Data analysis

Analysis of data: The valuation basis, the methods applied to account for biological assets, the accounting policy analysis, the challenges experienced in reporting on biological assets and the information disclosed in the financial report were summarised on Microsoft Excel per organisation as the data was received to allow for inductive content analysis and later coding in terms of the grounded theory method. Immediate interpretation of this data was required, as emphasised by Sandelowski, to allow for follow-ups (2000:338). It also allowed the researcher to link the challenges experienced to the requirements of the informing standards, IAS 41 and GRAP 27 and to include the findings and concerns in the user groups' questionnaires or semi-structured interview questions (Morse, *et al.* 2002:18; Reischauer, 2015:281). Microsoft Excel tools like pivot tables, charts, tables of

figures, formulas, conditional formatting and grouping tools allowed the researcher to first perform an inductive content analysis and later coding of additional data collected which supports the financial reports and to contextualise the data to identify unique challenges experienced by the organisations, overlapping concerns and possible trends. The outcome of the inductive financial statement analysis formed the basis of the application guideline that was developed. The qualitative content analysis on the financial statements further instructed the questionnaires to be distributed to the financial statement user groups (Sandelowski, 2000:338).

The user groups' recommendations and concerns were detailed on Microsoft Excel to allow contextualisation of the feedback received. The overlapping inputs and unique recommendations were identified for incorporation in the application guideline by means of coding in the grounded theory method. As stated by Sandelowski (2000:338) the qualitative research was characterised by the 'simultaneous collection and analysis of data whereby both mutually shape each other. Qualitative content analysis was similarly reflexive and interactive as researchers continuously modify their treatment of data to accommodate new data and new insights about those data'. The development of the application guideline was therefore a simultaneous process to the collection of inputs from the financial statement user groups to allow for follow-up communication.

The user group findings were incorporated into the application guideline, compiled in Microsoft Word. The finalised application guideline was submitted to a sample of financial statement user groups for validation. Such approval might encourage organisations to use the application guideline to improve the consistency, validity and reliability of the fair valuing of biological assets (Creswell and Miller, 2000:128).

1.8 Limitations of the study

The study had the following limitations:

The study could only be performed on organisations that operate and account on biological assets and were therefore limited to a sample of organisations operating in agricultural activities and biological transformation, willing to participate in the study.

The application guideline was developed based on the requirements of the internationally prescribed IAS 41 and did not take into account the individual taxation, political and other influences that impacted on the financial reporting of an individual country. The application guideline is a uniform guiding document to report on biological assets at a fair value.

The financial statements, the accounting policies and the challenges that restrict organisations from complying with the requirements of fair value accounting of biological assets was analysed based on the annual reports of organisations. Limited disclosure necessitated the researcher to contact the organisation for clarity via an online questionnaire. The unwillingness of the selected organisations to partake in the study, limited feedback on the questionnaires and delays in responding on the questionnaires could restrict the background needed to analyse the unique challenges experienced by the organisations. The questionnaires were structured with clear, simple questions to produce a clear and concise document but were aimed at accounting professionals with the required financial knowledge. Explanations, additional information and assistance could be provided to ensure that the required financial information was gathered for the purposes of this study.

As part of verifying the validity of the developed application guideline, it was sent to a sample of organisations to apply the guideline. The users' assessment of the guideline was required by the researcher to ensure that the application guideline was a reliable document that would improve the consistency, validity and reliability of fair valuing biological assets. To verify that the information contained in the developed application guideline was reliable, comments thereon was obtained from academics and accounting professionals. To obtain the required input caused limited time delays.

The limitations placed on this study did not affect the relevance or reliability of the application guideline that was developed to improve the consistency, validity and reliability of the fair valuing of biological assets.

1.9 Definitions

The following definitions formed an integral part of this study:

Agricultural activity refers to the management of the biological transformation (process of growth, degeneration, production and procreation that results in a change in the biological asset) of a biological asset for sale, distribution or the conversion into an agricultural produce (ASB, 2012:7; IASB, 2012; IASB, 2014a:1; IASB, 2015:A1347).

The harvested product of the biological asset is the *agricultural produce* (ASB, 2012:7; IASB, 2013a:A1169; IASB, 2015:A1347).

A living plant used in the 'production or supply of agricultural produce; is expected to bear produce for more than one period; and has a remote likelihood of being sold as agricultural produce, except for incidental scrap sales' is a *bearer plant* (IASB, 2015:A1347).

Biological asset 'is a living animal or plant' (ASB, 2012:7; IASB, 2014a:1; IASB, 2015:A1347).

The process of growth, degeneration and production that causes changes in a biological asset is referred to as the *biological transformation* of the biological asset (ASB, 2012:7; IASB, 2012:1; IASB, 2013a:A1169; IASB, 2015:A1348).

The price that will be received to sell an asset or that will be paid to transfer liabilities between market participants at a specific measurement date is the *fair value* of the asset (ASB, 2012:7; IASB, 2013a:A1170).

The detachment of produce from a biological asset or group of biological assets (group of similar biological assets) that ceases the life of the biological asset is *harvest* (ASB, 2012:7; IASB, 2013a:A1169; IASB, 2015:A1348).

1.10 Structure of the study

The remainder of this study is detailed as follows:

Chapter 2: Clarifying the challenges of fair value accounting on biological assets

Chapter two details a literature review on the accounting standards on biological assets, fair value accounting, the changes and developments that impacts on the accounting and the challenges experienced to report biological assets at a fair value. The chapter also detail the differences and similarities in the accounting standards prescribed to account for biological assets.

Chapter 3: Research design and methodology

The nature of the financial information that was analysed in this study, the period covered by this information and the criteria for selecting the information are stated in this chapter. The required data to be analysed with content analysis techniques was obtained via content analysis of annual reports, questionnaires and interviews. The methods used to select the samples of organisations operating with biological assets to be included in this study and the rationale to the population to be tested was also detailed. The interview structure and the targeted participants were delineated.

Chapter 4: The empirical research process and outcomes

The unique challenges experienced by organisations in complying with the requirements of IAS 41 were detailed based on the annual report analysis. An analysis of the inputs received in the questionnaires and interviews were narrated. Guidance provided to comply with the principles and requirements of fair value accounting of biological assets were linked to the industry challenges. The expectations and recommendations from the various user groups, gathered by means of interviews, of financial statements were detailed and analysed.

Chapter 5: Development and verification of the application guideline

The results from the previous chapters were contextualised in this chapter. The application guideline was described and developed here. Based on the outcome of the study, recommendations was detailed on measures that should be implemented by organisations to adhere to the requirements of IAS 41 when updated or modified

by accounting standard setters. The developed application guideline was provided to a sample of organisations and users to provide inputs and recommendations on the usefulness of the guideline. These inputs were analysed and compared to ensure that the developed guideline assist the financial statement compilers and users to report on biological assets in terms of the requirements of IAS 41.

Chapter 6: Conclusion of the study

The contextualised results from the previous chapters assisted to develop an application guideline to improve the consistency, validity and reliability of the fair valuing of biological assets in terms of the requirements of IAS 41. Possible recommendations arising from this study and areas for further research were also detailed.

CHAPTER 2

CLARIFYING THE CHALLENGES OF FAIR VALUE ACCOUNTING ON BIOLOGICAL ASSETS

2.1. Introduction

The theoretical framework of the study is outlined in this chapter, detailing that the lack of an application guideline for the fair valuing of biological assets consequences incomparable financial results (Burnside, 2005:6; Maina, 2010:174; Ossip, 2011:11; Burykin, *et al.* 2011:131; Elad and Herbohn, 2011:94; FASB, 2011:1; Van Biljon, *et al.* 2013:61; Rozentăle and Ore, 2013:57; Gonçalves and Lopes, 2014:2; Baigrie, 2014:75). Decisions derived thereon may be impaired, biased and may influence operations destructively, necessitating the establishment of an application guideline (Burnside, 2005:6; Azevedo, 2007b:9; Chebac and Onica, 2009:32; Pike and Chui, 2012:89; Rozentăle and Ore, 2013:58; Muhammad and Ghani, 2013:23; Antonio and Bassetti, 2014:19; Álvarez, Grecco, Formigon, & Geron, 2014:4).

Chapter two contextualise the accounting principles and challenges of researched countries that inform the inconsistency of biological asset reporting. The importance of fair value accounting to users of financial information is detailed as it informs the later research conducted in chapter four and the development of the application guideline in chapter five. The market developments impacting on biological asset reporting, like the accounting for bearer plants, environmental reporting and non-financial pressures caused by land claims are also explored.

2.2. Theoretical framework

The development of the application guideline is based on the cognitive research theory. This theory is concerned with the development of a person's thought process and how it influences our understanding of accounting and the application thereof (Berkeley, 2015:1). The theoretical framework is based on the following perceptions identified in studies on biological assets (own emphasis):

Agriculture and social responsibility is important to the users of financial information:

“Prudence must be shown in managing living species and natural resources, so that immeasurable riches provided by the nature can be preserved and passed on to the following generations. Business institutions have been long recognised as major exploiters of natural resources causing ecosystems degradation. For that reason, it is fair enough if global companies are required to bear greater responsibility in achieving the goal of sustainable development.” (Sudana, et al. 2014:4)

Agricultural activities are limited to individuals and small organisations:

“Farmers usually prepare account in order to comply with tax framework and subsidies.” (Athanasios, et al. 2010:221)

“In a world context, few are the countries that have specific accounting standardization on agriculture, even as this activity was always associated with small or medium size farms, with the only objective to get family income.” (Azevedo, 2007b:2)

Accounting for biological assets has not received much attention and is considered a fairly new concept:

“IAS 41 has been applied for more than 7 years in several countries and will be adopted in countries that now in the process of convergence with IFRS... there are also countries that have not yet adopted IAS 41 in the process of its convergence with IFRS such as India, Malaysia and Indonesia. These are an indication that there is something wrong with IAS 41.” (Aryanto, 2011:3)

“Even though agriculture is important to the global economy accounting standard setters have paid little or no attention to accounting for agricultural products. There was no uniform system of financial reporting for agriculture producers in the United States prior to the farm crisis in the 1980s as the industry was focussed on production, marketing or tax reporting rather than decision-making.” (Marsh, et al. 2013:79)

“In the past, accounting for agriculture sector did not receive much attention from accounting researchers, practitioners, and standard setters.” (Clavano, 2014:2)

Financial reporting is driven by management and is important to the users of such information:

“We recommend that accountants and finance analysts must play a meaningful role to keep directors and management on their toes.” (Mgbodille and Onah, 2014:94)

“Transparency in financial reporting has always been considered positive from the standpoint of financial statement users, but not necessarily something for which management has striven.” (Phillips, et al. 2010:11)

“The motivation to contribute is important, in that, it gives employees the opportunity to release their potential and apply their own resources, by taking initiative and acting creatively in order to achieve organisational goals.” (Mitonga-Monga, et al. 2012:5391)

Financial statements are vital in the decision-making process:

“The development of small and medium enterprises in agriculture makes a fundamental change in the formulation of accounting and reporting which is one of the main sources of information allowing their users to make managerial and economic decisions.” (Bayboltaeva, 2015:211)

“Although agriculture is an important part of the world economy, accounting in agriculture still has many shortcomings. The adoption of IAS 41 “Agriculture” has tried to improve this situation and increase the comparability of financial statements of entities in the agricultural sector.” (Feleagá, et al. 2012:415)

A change is needed in how accounting principles are applied:

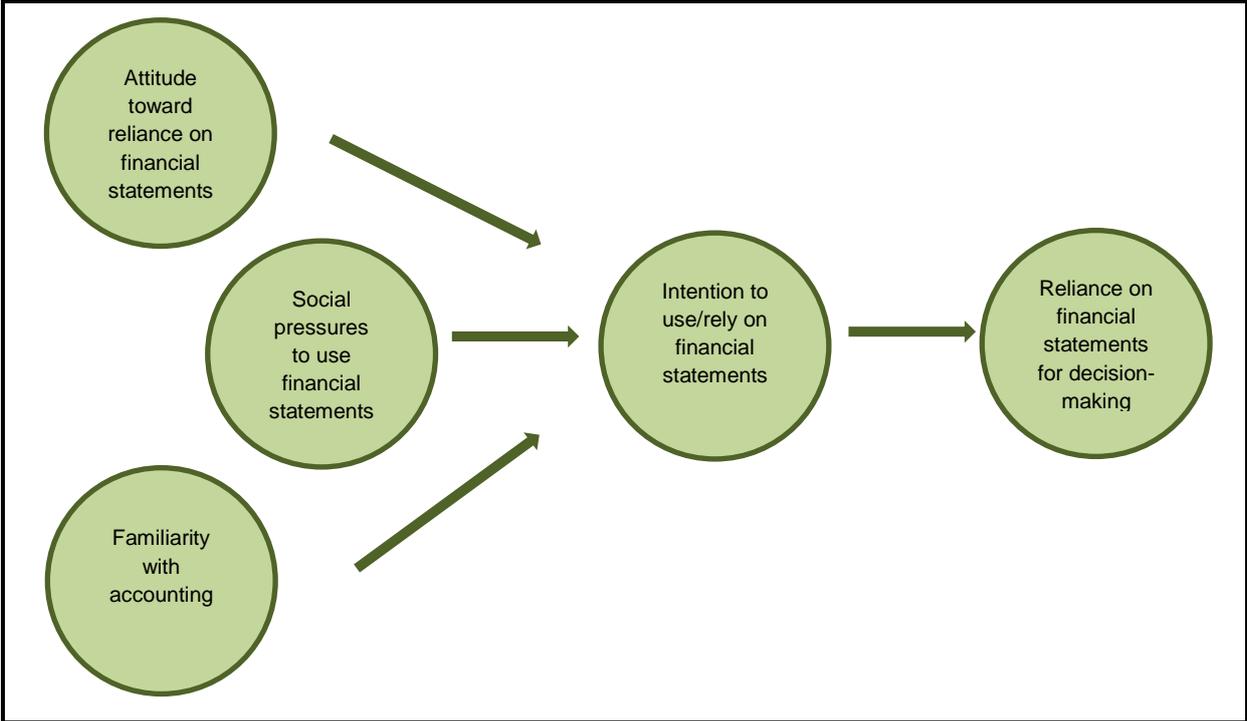
“need to step up on a higher level, in order to improve the fair value valuation methods and to minimize the negative aspects, regarding management subjectivism and production forecast, and to maximize his strengths.” (Gabriel and Ștefea, 2013:103)

“It is necessary to improve accounting and tax regulations in order to be able to adequately measure the increasing efficiency of agricultural resources. Quality of accounting information enables improvement of financial and tax incentives system.” (Vukmirovic, et al. 2012:727)

“Although agriculture is an important part of the world economy, accounting in agriculture still has many shortcomings. The adoption of IAS 41 “Agriculture” has tried to improve this situation and increase the comparability of financial statements of entities in the agricultural sector.” (Feleagá, et al. 2012:415)

From the stated perceptions, the formulated cognitive theory of this study is: *Biological assets accounting principles was introduced much later than other accounting principles. This may be as agricultural activities have mainly been performed by smaller organisations or individuals who did not publish their financial statements and prioritised taxation regulation compliance. As such, financial statement users may not have been interested in the performance of these organisations. As it was not necessarily a priority to compare the financial results to those of other organisations or to make operational decisions therefrom, accountants was not expected to compile comparable financial results for the industry. The increased importance of the financial statements to the users thereof now requires accountants and management to amend their thought processes to produce comparable and informative financial statements to the users thereof.*

Figure 2.1: Theory of planned behaviour adapted to financial statement reliance



Source: Pike and Chui, 2012:82

Figure 2.1 illustrates how the attitude of the accountants and the users of financial statements and their knowledge of IAS 41 will guide their valuation methods, impacting on the reliance on the financial results and the decisions derived therefrom. The illustration supports the cognitive theory applied in this research as a change in the thought process of financial statement compilers and the related users may enhance the quality of decisions made from such reports.

The perceptions and the attitudes of the accountants that report on biological assets were further explored to comprehend the valuation methods applied in various countries and the related challenges experienced thereon as the application guideline developed in chapter five is informed by the industry’s challenges and perceptions. The application guideline developed in this study will assist the industry to comprehend the assumptions, valuation methods and the application of the financial principles regulated in IAS 41, as the study reviewed the applied accounting practices as well as the accounting practices that are expected to be followed by the users of the financial reports in terms of the IAS 41 standard.

2.3. The importance of and accounting on agriculture

Agricultural activity is associated with biological asset reporting. To determine whether all fauna and flora are required to be reported in the scope of IAS 41, the following definitions were explored:

Biological asset 'is a living animal or plant' (ASB, 2012:7; IASB, 2015:A1347).

Agricultural activity refers to the management of the biological transformation (process of growth, degeneration, production and procreation that results in a change in the biological asset) of a biological asset for sale, distribution or the conversion into an agricultural produce (ASB, 2012:7; IASB, 2015:A1347).

Animals and plants included in the scope of the International Accounting Standard 41 (IAS 41) and the Generally Recognised Accounting Practise 27 (GRAP 27) needs to undergo managed agricultural transformation to be classified as biological assets. Unmanaged biologically transformed animals or plants are not regarded as biological assets (Burnside, 2005:27; ASB, 2012:6). Managed agricultural transformation and the accounting thereof are therefore imperative to this application guideline development.

Agricultural processes not only stand central to the recognition of biological assets, but have a significant impact on the development, growth and financial performance of any organisation and country operating in biological assets or farming activities (Mates and Grosu, 2008:457; Muhammad and Ghani, 2013:16). Prior studies highlight the importance of this economic sector and financial reporting:

- Agriculture is a complex, key sector for the economic development of a country (Azevedo, 2007a:3; Vukmirovic, *et al.* 2012:723, Cronjé, 2013:8; Demir, 2015:52). The accounting information produced in this sector should enable the users to improve financial and tax decisions to effectively measure the efficiency of the overall performance of the country (Vukmirovic, *et al.* 2012:727).
- Agricultural activities promote commercial trade and employment in rural areas and therefore improve the quality of living in such areas (Harriss-White,

2008:554; Bohušová, Valouch & Svoboda, 2012:1; Rozentale and Ore, 2013:57; Malomane, 2013:2,41).

- Agricultural production decreases due to factors like incorrect accounting policies, climate changes, dry seasons, land settlements and an increase in population growth, whereas the importance of scientific agricultural processes and stockbreeding increased (Harriss-White, 2008:549; Duman, *et al.* 2012:118,119,124; Malomane, 2013:140). Contrary to the agricultural production decrease, the demand for food increased and attention is to be paid to the quality and nutrition of the food produced (Harriss-White, 2008:549; Duman, *et al.* 2012:118,119,124; Malomane, 2013:140).
- In the Lake Nakivale wetland, Uganda, total land use was transformed from cattle to crop farming (Kamukasa and Bintooro, 2014:58). As the agricultural use of land directly contribute to the feeding of families, the traditional crop farming is evolving in developing countries to fight hunger. The financial activities are not currently documented by these farmers. In recording the agricultural activities in accordance with the requirements of IAS 41, the farming operations can be analysed to assist with the farming operations in other developing countries.
- Organisations need a competitive edge and can never stop improving their operations and the ability to attract investors (Lottering and Dick, 2012:1; Esterhuizen, Schutte & Du Toit, 2012:1; Koopman, 2012:22; Muxanǰcbkka; 2015:1). As such, financial reports produced by organisations should allow the users of the financial statements to reliably compare the operations of the organisation to that of other entities (Macedo, 2012:19; Gonçalves and Lopes, 2015:5; Stonciuviene, Zinkevinciene & Martirosianiene, 2015:62). Comparative financial results will also assist management to seek knowledge of how to address challenges and to gain decision enhancing information from other organisations (Lottering and Dick, 2012:8; Esterhuizen, *et al.* 2012:4; Musarat, Sarwar & Azhar, 2014:2; Gonçalves and Lopes, 2015:5).
- Marchington's view, as cited by Mitonga-Monga *et al.*, emphasise the importance of compiling financial information that will address the needs of the individual users thereof: 'People are no longer expected to accept decisions without having some opportunity to influence the final outcome' (Mitonga-Monga, Coetzee & Cilliers, 2012:5389). Agricultural decisions taken by

management should be influenced by investors, producers and any other stakeholders in the management process (Huffman, 2013:22). The comprehensive decision-making process where management, stakeholders and investors can contribute in the assessment of information to derive at a management strategy to control the business emphasise that financial information is important to various influencers and should be consistent and comprehensive to enhance the decision maker's evaluation.

- The biological asset accounting standard enhancements allows for agricultural activities to be recorded, tax returns to be completed, transactions to be acquired with financial services providers, profits to be managed and decisions to be taken by the users of financial information (Azevedo, 2007a:5; Duman, *et al.* 2012:119; Muhammad and Ghani, 2013:23).
- Biological assets can be held by an organisation to derive both an economic and a non-economic benefit, where economic benefits will centre on the expected profits to be generated, and the non-economic benefit address the religious or spiritual benefits and the social utilities where public produce generation is aimed at poverty reduction or scientific research (Stonciuviene, *et al.* 2015:63).

The economical and developmental impact of the agricultural sector can be directly linked to the financial results reported by the relevant organisations and data regarding the feeding of nations. The significance of the accounting principles that regulates the financial treatment of the agricultural processes is emphasised by the growing need for food production and subsequent financial investment required.

2.4. Inconsistencies in the accounting treatment and reporting on biological assets

The International Accounting Standard (IAS) 41 was developed to regulate the recognition, recording, valuation and disclosure of managed agricultural transformed living plants and animals (Monea and Cotlet, 2008:3), to enhance the qualitative disclosure in financial reports and to drive corporate governance of relevant listed organisations (Clavano, 2014:2). GRAP 27 and IPSAS 27, regulating the public sector, is based on the requirements of IAS 41, with the exclusion of tax implications

as government do not pay taxes (Van Biljon, 2013:14,40). Disregarding the requirement to apply the fair value principles of the standards, the implementation thereof and the valuation principles applied are not consistent (Gonçalves and Lopes, 2014:2) as identified in the prior studies performed on the researched countries that operate and reports on biological assets. The researched studies explored the accounting on the six continents (the Antarctic was not included in the scope of this study as it was regarded as a non-biological asset reporting continent). The researched countries were selected due to their published challenges experienced in reporting on biological assets:

2.4.1. South Africa

In South Africa three accounting standards prescribe the treatment of biological assets. IAS 41 is the international regulated standard prescribed to private organisations with public accountability. The Generally Recognised Accounting Practice (GRAP) 27 regulates the reporting in the public sector and section 34 of the International Financial Reporting Standards (IFRS) for Small and Medium-sized Enterprises (SMEs) regulate the smaller organisations (ASB, 2015:3). A comparison between the requirements of GRAP 27 and IAS 41 (IFAC, 2008:3; Van Biljon, *et al.* 2013:72) confirms that the fair valued biological assets reported by public and private sector organisations should be comparable as the standards originated from indistinguishable principles. Section 34 of the IFRS for SMEs grants the compilers of the financial statements an option between the fair value and the cost method (Bohušová, Valouch & Svoboda, 2012:2,9; Kurnaiwan, Mulawarman & Kamayanti, 2014:6; Baigrie, 2014:44). As IFRS for SMEs are based on the principles of IAS 41 all South African financial reports should be comparable (FASB, 2011:6).

Baigrie (2014) performed an analysis on the stock exchange listed organisations in South Africa that reports on biological assets. Her study concluded that the valuation methods applied to determine the reportable values of biological assets are not consistent and do not result in compliance with the requirements of IAS 41 (Baigrie, 2014:71,75). The study discovered that organisations reporting only on plants, use two methods to value biological assets: 22% applied fair value principles that consider adjusted market prices or available industry date and 78% of the

organisations valued the assets in terms of future cash flows. Organisations that only reports on livestock relied more on adjusted market prices (56%) than the expected future cash flows (22%). Livestock traders included the use of cost adjusted with accumulated depreciation and impairments (11%) as a valuation method, while 11% did not disclose the selected valuation method (Baigrie, 2014:75). The qualitative disclosure requirements of IAS 41 was also not adhered to by the listed organisations, as 87% of the disclosure requirements were reported on by plant holding organisations compared to the 67% compliance by the livestock traders (Baigrie, 2014:80).

Inconsistent biological asset valuation methods were identified in the public sector. From the investigated ten entities a total of 50% applied the modified cash basis of accounting; 20% recorded the biological assets only when it is ready for sale, 10% records biological assets when it is identified as ready for sale and classified as such on the financial records, 10% records the transaction price of the actual purchase or sale as an expense and 10% applied GRAP 27 (Scott, *et al.* 2016:141; Van Biljon, 2013:115). The financial statements produced in the public sector cannot be compared to that of either the private sector or other public sector entities when the valuation methods applied by entities differ (Van Biljon, 2013:134).

The Accounting Standards Board conducted a review of the accounting treatment of biological assets by government entities and identified inconsistencies in the prescribed application of GRAP 27 (ASB, 2014:6-11):

- The South African National Bio Diversity Institute manages all national botanical gardens. The entity does not account for any biological assets as they declare that the quantities cannot be determined.
- The South African National Parks manage biodiversity and heritage assets. The entity does not account for biological assets yet disclosed the estimated quantities per specie in a supplementary conservation report to the financial statements.
- The National Research Foundation consists of the National Zoological Gardens of South Africa, the Institute of Aquatic Biodiversity and the South African Environmental Observation Network. These entities did not account for biological assets as a cost price, active market, the restrictions of trade and the exotic nature

of the animals makes valuation impractical. The type of animals and related quantities are detailed in the notes to the financial statements.

- Cape Nature is responsible for biodiversity conservation. The entity did not account for biological assets but detailed a separate State of Biodiversity Report to outline the conservation status of animals and plants.
- City of Tshwane municipality controls nurseries and game reserves for recreational purposes. Biological assets were accounted and reported in terms of GRAP 27. Game was valued as property, plant and equipment; livestock valuations were based on market prices and nursery plants were recognised as inventory.
- Mangaung Metropolitan municipality is responsible for conservation of endangered species and education on their conservations. All biological assets were accounted for as heritage assets.
- The Department of Agriculture, Forestry and Fisheries, responsible for sustainable management and efficient use of resources, reported their operations on the modified cash basis of accounting. The forests were measured by considering the marketable timber and the age thereof.
- The Department of Rural Development and Land Affairs aims to provide equitable land and economic development. The modified cash basis of accounting was applied to disclose biological assets as “tangible capital assets” in the notes to capital assets.
- The North West Parks and Tourism Board is responsible for the conservation of fauna and flora. Fauna was not accounted for as it was deemed non-cash generating, whereas game was valued at annual published average auction prices in terms of GRAP 27.

The inconsistency in the valuation of biological assets in South Africa impedes the comparability of financial statements in the public and private sectors.

2.4.2. Asia

The International Public Sector Accounting Standards Board (IPSASB) developed the International Public Sector Accounting Standard (IPSAS) 27, *Agriculture*, on the principles of GRAP 101; thus IAS 41 (IPSASB, 2011:5; Van Biljon, 2013:14,84). The

IPSAS 27 regulates the public sector specific agricultural activities’ recognition, measurement and disclosure principles (IPSASB, 2011:209; Van Biljon, 2013:24; ASB, 2015:3; IPSASB, 2015:1).

From a study performed by Pasha (2011:1) on the Asian countries that opted to implement the requirements of IPSAS 27, it is evident that the valuation bases used to fair value the biological assets are inconsistent. The table below summarise the findings from Pasha (2011:1) where his study outlines that the cash-basis of accounting is the preferred valuation method.

Table 2.1: IPSAS application in Asian countries

Country	Accounting basis applied
Afghanistan	In the process of adopting the cash-basis IPSAS
Malaysia	Applying the cash-basis IPSAS
Nepal	Applying the cash-basis IPSAS
Sri Lanka	Applying the cash-basis IPSAS with the goal of implementing accrual accounting
India	Limited application of cash-basis IPSAS combined with accrual standards on IPSAS

Source: Pasha, 2011:1

The Asian public sector financial results will not be comparable to the financial results prepared based on the IAS 41 fair value principles as the cash-basis of accounting only recognises biological assets when there is an outflow of funds. Progeny, deaths and increased value due to biological transformation is not recognised under the cash-basis of accounting principles (IPSASB, 2011:13–15). Accrued biological assets recorded in India, where biological assets purchased or sold on credit are recognised, may deter the comparability of the financial results with that of the other Asian countries that apply the cash-basis of accounting. The cash-basis of accounting treatment of biological assets is not in line with the accrual accounting requirements of either IAS 41 or GRAP 27.

In turn, the organisational results will not be comparable to those of government funded agricultural operations. Sergeeva (2015:144) explored the accounting treatment of government assistance provided on the agricultural projects in Asia. The assistance entails public loans, subventions and subsidies that are utilised as special purpose funds to implement agricultural projects (Sergeeva, 2015:147). The government assistance is accounted for in terms of the requirements of IAS 41 (Sergeeva, 2015:146) in a separate form to the financial statements, as a “statement of purpose funds”. The statement of purpose funds details the subsidies received in relation to the distribution of the government’s agricultural budget and the extent of subsidy conditions met (Sergeeva, 2015:147). From the available information it is unclear as to whether the biological assets are recognised in the statement of purpose funds or elsewhere on the financial statements, as Sergeeva (2015:147) states that ‘it is important to bring the national accounting practices in comparability with the practice of Western countries, which need to improve accounting, introduce progressive forms and methods of accounting’. The use of a separate statement to account for agricultural programmes will enhance comparability of activities and may assist decision makers to assess the sustainability and performance of such programmes.

2.4.2.1 Kazakhstan

Bayboltaeva *et al.* explored the accounting procedures of peasant farm enterprises to recommend a model of simplified accounting (Bayboltaeva, *et al.* 2015:212). Their study details registers prescribed for individual entrepreneurs by the National Financial Reporting Standards that includes cash statements, inventory statements, remuneration statements, fixed asset history and depreciation and more, which can address the accounting challenges experienced by peasant farmers as a guide for financial reporting (Bayboltaeva, 2015:213). These registers will improve the applied accounting methods and provide a simplified accounting system to the farmers. The financial results will not be comparable with peasant farmers in other countries as the assets are recorded as fixed assets at the original cost thereof (Bayboltaeva, 2015:215).

2.4.2.2 Malaysia

The principle of accounting for bearer biological assets in terms of IAS 16 and consumable biological assets in terms of IAS 41 was implemented in Malaysia under the Malaysian Accounting Standard (MAS) 8. In terms of MAS 8 organisations can value their biological assets either on the amortisation method as a benchmark for any pre-cropping costs or a capital maintenance method (Muhammad and Ghani, 2014:17). MAS 8 defines pre-cropping costs as costs incurred on the replanting of crops prior to their maturity and includes land preparation, road expenditure, drains, plants, the planting of crops, fertilisers, irrigation and cropping labour (Muhammad and Ghani, 2014:18). IAS 41 was adopted in Malaysia allowing the application of MAS 8 until 2014 due to the challenges experienced with unavailable market information for bearer biological assets, the costs of the fair valuing of the assets that exceeds the benefit thereof and the lack of the required knowledge required to value the bearer biological assets (Muhammad and Ghani, 2014:19). Evidence was not obtained that full compliance with the requirements of IAS 41 has been actioned after 2014.

2.4.2.3 Philippines

A study by Clavano (2014:5) performed on the extent of compliance with IAS 41 by agricultural companies in the Philippines focussed on the factors that influence the valuation of the biological assets. The study concluded that that auditors and accountants consider the fair valuing of biological assets a challenge while auditors identified the size of the agricultural firm to affect the valuation method applied. The bearer biological assets like banana and coconut plantations applied the fair value principles of IAS 41, whereas the consumable biological asset sectors that include piggery, poultry and livestock opted to account on the cost basis (Clavano, 2014:6). It appears that the industry is led by the perception of the auditors and their acceptable level of compliance with the fair value principles of IAS 41.

2.4.2.4 Russia

Financial reports compiled in Russia is not comparable to those of other organisations as the Russian accounting standards are not in line with IAS 41 (Burykin, *et al.* 2011:131). The study by Burykin *et al* stipulate that Russian

organisations might be able to attract investors when the principles of IAS 41 is applied as it will produce comparable financial results that will enable investors to make informed decisions (Burykin, *et al.* 2011:131). Compiling these 'comparable financial results' will bring on additional costs for the organisations over which investors might lose control and the benefits of the required disclosure might not exceed the costs thereof (Burykin, *et al.* 2011:131). The current Russian accounting standards do not provide decision enhancing financial information that assist in the management of the organisation since the tax accounting and financial accounting is based on different standards and rules (Burykin, *et al.* 2011:132).

The Russian accounting standards lends itself towards a rule-based accounting framework where the economic results of the transactions are not disclosed to the users of the reports (Burykin, *et al.* 2011:132). Fair value accounting principles lends itself to principles to value biological assets to provide qualitative and quantitative information that is comparable with other organisations (Burykin, *et al.* 2011:134). There is a desire to have accounting standards on a principle-based framework, assisted by a guideline for the users and compilers to implement the requirements of IAS 41, as a rule-based framework does not allow for fair value accounting (Burykin, *et al.* 2011:132).

The application guideline to fair value the biological assets that will be developed in this study will, as suggested by the work of Burykin *et al.* (2011:132), have no intention to act as a rule-based guide or set of accounting rules. The principles of the fair value accounting will merely be analysed and detailed to guide the compilers of the financial statements.

Notwithstanding the international requirement to apply the principles of IAS 41, countries like the Czech Republic (Sedláček, 2010:59). Romania (Feleagá, *et al.* 2012:415) and Russia (Burykin, *et al.* 2011:131) apply accounting standards developed to address the country specific regulatory requirements established.

2.4.2.5 Turkey

The fair value principles of accounting for biological assets were adopted in Turkey as the Turkish Agricultural Activities Standard (TAS) 41 (Duman, *et al.* 2012:118). The application of TAS 41, based on the principles of IAS 41, however not consistent is considered the foundation of fair value accounting by Duman *et al.* (2012:118). Duman *et al.* contextualised all the prior studies performed on biological asset accounting in Turkey to outline problems and challenges that have been experienced as a pathway for other countries to assist in their application of fair value accounting:

- Study by A. Ozulucan and A. Deran: Biological assets are classified per their primary use, where breeding animals are regarded as fixed assets and livestock is classified as circulating assets. Different measurement methods were found to be applied in the industry to record the circulating assets and a uniform chart of account does not exist for the recording of circulating assets (Duman, *et al.* 2012:126).
- Study by O. Faruk: Various methods are applied to measure biological assets that are regarded to be within the scope of the agricultural standard. These include a value derived from an active market, the latest trade price, the price of similar assets or the net cash flow methods (Azevedo, 2007a:21; Mates and Grosu, 2008:460; Duman, *et al.* 2012:126).
- Study by O. Faruk Demirkol: Fair value is regarded as a change in the price and physical condition of biological assets. Organisations that focus on a specific activity regard fair value measurement to be unimportant (Duman, *et al.* 2012:123).
- Study by H. Usual and T. Top: Biological assets/circulating assets include bovine animals when held as feeding animals while breeding animals are classified as fixed assets. Depreciation on dairy cattle commences in the year in which they can start producing milk with the breeding stock only depreciating from the year in which they can start to breed (Duman, *et al.* 2012:125).

From the studies analysed it is evident that a clear distinction between biological assets and property, plant and equipment do not exist in Turkey. Furthermore, the standard allows a variety of methods that can be applied to calculate the fair value of

the biological assets where depreciation on the biological assets and property, plant and equipment are not in line. The application of the fair valuing principles of TAS 41 appears to be inconsistent based on the standard specific studies that were performed. A reflexion of the complexity and size of organisations revealed:

- Study by S.B Arzova and A.P Arsoy: Agricultural activities are mainly performed by small and medium enterprises and require simpler accounting standards. The financial reporting of IAS 41 is too complex and costly for small enterprises to comply with (Azevedo, 2007b:3; Duman, *et al.* 2012:127; Kurniawan, *et al.* 2014:4).
- Study by S.H. Tokay and A. Deran: Reliable information can be produced on agricultural processes on the financial and physical situations by accounting for agriculture, allowing the decision makers to evaluate the financial status, tax, performance, and cost and to compare information in the market (Duman, *et al.* 2012:123).

The financial results of small and medium enterprises cannot be compared with that of listed enterprises when the accounting standards that are applied are inconsistent. In situations where these small and medium enterprises base their biological asset valuations on the available market information, the results will be comparable with IAS 41 compliant valuations. The complexity of the valuations may restrict the small and medium enterprises to apply cost principles in their valuation calculations (Burnside, 2005:41; Azevedo, 2007b:3; Demir, 2015:62). The implication of unique taxation systems was further researched:

- Study by S.H. Tokay and A. Deran: The tax regulations of Turkey do not regulate the capitalisation of biological assets. The regulations merely requires capitalisation at cost on acquisition with no subsequent valuations or measurements. The tax regulations will only consider the profits or losses derived at from circulating assets at the point of sale thereof (Duman, *et al.* 2012:126).
- Study by Tuncez, H.A.: The tax system requires the biological assets to be depreciated per the schedules of useful lives published by the Ministry of Finance. The accounting standards prescribe direct depreciation as the loss in value is directly expensed (Duman, *et al.* 2012:124).

The financial results of organisations are mainly compiled to address the needs of the users thereof; especially that of a tax regulatory body. The compilation of financial results is regarded as a costly exercise that will be performed by organisations to first address the legal tax requirements of Turkey, before meeting those objectives set by international accounting standard setters (Demir, 2015:62).

It is evident from a survey performed in 12 cities that the cost measurement and reporting could not be done on agricultural activities as the tax requirements were the first consideration. This demonstrates that the calculation of agricultural costs, income and profits is regarded as an impossible task in Turkey according to Duman, *et al.* (2012:128). Reporting on the agricultural activities in terms of the measurement of performance and policies were not considered to be an easily understandable procedure in Turkey, regardless of their claim to be the industry example for the application of fair value accounting of biological assets (Duman, *et al.* 2012:128).

2.4.3. Australia

In Australia the principles of fair value accounting was applied before the standard setters formally approved the concept of fair value accounting. A standard to regulate self-generating and regenerating assets, AASB 1037, was developed and implemented from 30 June 2001 (Williams and Wilmshurst, 2008:par.1.0; Bohušová, Svoboda & Nerudová, 2012:522). AASB 1037 required the compilers of the financial statements to determine the value of assets on either (Williams and Wilmshurst, 2008:par.2.0):

- *‘the most recent net market price of the same or similar assets;*
- *the net market value of related assets;*
- *the net present value of cash flows expected to be generated discounted at a current market-determined rate, which reflects the risk associated with those assets; or*
- *cost’.*

Regardless of the fair value principles applied to value the assets, a variety of methods were used to determine the value of forest assets (Williams and Wilmshurst, 2008:par.3.0). The study by Williams and Wilmshurst refers to the valuation methods

applied in Australia to value assets before and after the formal adoption of AASB 1037. The study refers to an analysis by Herbohn in 1998, with a follow up in 1999, who found that various methods and procedures were applied to report on biological assets. Herbohn performed a post-standard-implementation review in 2006 and again concluded that management applied a variety of methods to account for the forests, with preference to the net present valuing thereof (Burnside, 2005:37; Herbohn and Herbohn, 2006:176). The reviews performed by Herbohn is an indication that regardless of whether a formal standard has been established and approved the adoption thereof remains the responsibility of the individual organisation that reports on the financial activities. A survey conducted by Williams and Wilmshurst (2008:par.5.0) concluded that the following methods are applied to account for biological assets in Australia:

Table 2.2: Categories and measurement methods adopted in Australia to value biological assets

Category	Grapes & vines	Native forest	Plantation	Other timber	Other orchards	Total
Net market value in an active and liquid market	6	-	3	-	1	10
Recent net market value for same or similar assets	1	-	-	-	-	1
Net market value of related assets	3	-	2	-	-	5
Net present value of expected cash flows	8	2	8	2	2	22
Cost	10	-	4	-	1	15
Independent valuation	3	-	1	-	-	4
Director's valuation	4	-	1	-	-	5
Total	35	2	19	2	4	62

Source: Williams and Wilmshurst, 2008:par.5.0

Table 2.2 illustrates that the financial information derived from the various methods applied to value the biological assets are based on diverse cognitive experiences.

Financial statements compiled using the cost method, being 15 of the 62 organisations that were evaluated, cannot be compared to the updated, market information that is disclosed by 10 of the 62 organisations as historical information will be compared with updated fair values. Based on the continued use of the cost model the adoption of AASB 1037 and the subsequent AASB 141, effective from 1 January 2005, did not encourage fair valued biological asset reporting in Australia.

2.4.4. Europe

2.4.4.1 Czech Republic

In the Czech Republic, the valuation of the biological assets is regulated in the Czech accounting legislation (Sedláček, 2010:61) which allows the following basis for the calculation of the initial cost:

- the purchase price of the biological assets;
- the reproduction price of the biological assets;
- the factory costs representing the cost of production of self-produced inventory;
or
- the factory costs representing the cost of production of long-term assets.

The subsequent valuation of the biological assets need to consider the predictable risks and expected losses that influence the performance of the biological assets. This valuation need to account for depreciation on the biological assets, irrespective of whether the organisation realises a profit or loss (Sedláček, 2010:62). The biological asset value disclosed on the financial statements will therefore be the purchase price reduced with the expected losses and accounted depreciation (Sedláček, 2010:62; Bohušová, Valouch & Svoboda, 2012:7). This method of valuing the biological assets do not account for the biological transformation thereof. The 'idle' period from date of planting to harvest date is not accounted for in the financial records (Sedláček, 2010:62). Where direct costs are incurred for the growing of plants, the costs are capitalised to the biological asset (Sedláček, 2010:62; Bohušová, Svoboda & Nerudová, 2012:522,531).

The principles applied in the Czech Republic for the valuation of biological assets indicate that the cost model is used for the valuation (Buhošová; Valouch & Svoboda, 2012:11). The biological transformation process is not accounted for on plants (Sedláček, 2010:64). In accounting for the biological transformation progression of animals, the fattening of young animals is calculated by capitalising the cost per kilogram of the growth grain fed to the animals on a daily basis. Fair valuing of biological assets is not applied in the Czech Republic and financial results are not comparable with that of other countries (Sedláček, 2010:65).

2.4.4.2 Georgia (Eurasia)

Despite the lack of well-developed markets and available active market data, IAS 41 forms the basis of biological asset valuations in Georgia (Sabauri and Kharabadze, 2015:350,355). Sabauri and Kharabadze (2015:355) developed a databank to guide biological asset valuers to rely on agricultural market information in instances where active markets and the related market information are unobtainable. Their database applies the agricultural market information detailed below to inform fair value:

Table 2.3: Agricultural market information databank

Agricultural market information considerations 					Derived fair value
Price information obtained from relevant organisations and agencies as at reporting date	Apply data supplied by ministries, departments and services – collect information on the average market prices from: <ul style="list-style-type: none"> • Georgian Ministry of Agriculture and its information centres • The national information system for agriculture to use in projections • The Georgian National Department of Statistics Apply the product exchange data obtained from: <ul style="list-style-type: none"> • International produce exchanges • Produce exchange unions 	Apply current data supplied by the information agencies and centres	Apply data supplied by an independent assessor	When all price related information is unavailable or unreliable apply inflation or available prices.	Active market prices on similar goods adjusted for differences are calculated. The latest transaction price, if the economy has not materially changed, is calculated. The sector price per product or the land assigned for a certain biological asset is calculated.

Source: Sabauri and Kharabadze, 2015:357 (layout amended as original data is presented in a flowchart)

The use of available agricultural information in Georgia will assist the valuers to consider consistent inputs when using the recommended databank as a guide to determine market information. Such financial results will not be comparable to those of other countries.

Their study applauds standard inputs to calculate individual 'food products' like calves, piglets, lamb and stallion. The use of this standard approach to value 'food products' may assist individual farmers in all countries to develop a basis to value their biological assets (Sabauri and Kharabadze, 2015:358). This concept will be explored in this study and be included in the application guideline.

2.4.4.3 Greece

Athanasios *et al* (2010:222) considered the agricultural activities of Greece unique to that of the rest of Europe as farms are mainly family owned, small-sized, have limited accounting and financial training, have limited record keeping with a disregard for non-cash transactions like inventories and prepayments, operate on a cash-based system and reports only for tax purposes. Their study recommend an improvement in the record keeping and accounting of farming activities, that are consistent with 'agro-economic data and sustainable-logic plans' to improve farm management (Athanasios, *et al.* 2010:222). The cash based financial results of Greek organisations will be incomparable with IAS 41 informed valuations.

2.4.4.4 Latvia

Grege-Staltmane (2010:53) studied the accounting of forest agriculture activities in Latvia. His study details that markets for timber are limited and as such the cash flow method is considered to be the most reliable valuation method to value the biological assets. He emphasises that quantitative disclosures are vital to assist the users to grasp the information underlying the cash flow valuation and the distinction between the mature and immature biological assets (Grege-Staltmane, 2010:54-55). In terms of the Latvian accounting principles applied, Grege-Staltmane (2010:56) highlights that biological assets are either disclosed as fixed assets at cost (property, plant and equipment) or as biological assets at a fair value. His view is that disclosure of these

assets as a uniform classification of biological assets contains advantages and disadvantages to the users thereof detailed in the table below:

Table 2.4: Advantages and disadvantages of IAS 41 in the Latvian accounting system

Advantages	Disadvantages
Standing timber can be evaluated closer to its real value;	Additional costs may occur when paying for valuation services;
Shows the enormous value of the forest;	Calculations are based on assumptions;
Reveals the valuation methodology;	A lot of extra work;
Improves the balance sheet, because forest assets are recorded at their fair value and not at their purchase value;	It is complicated to compare assets of two forest companies because different assumptions and calculation methods are used;
Harmonisation of financial reports;	It is impossible to estimate an exact value of the growing forest;
More transparency;	Some requirements should be more clearly set out;
More comparability.	The slightest error in the calculations may significantly affect the result.

Source: Source: Grege-Staltmane, 2010:56

The advantages outlined by Grege-Staltmane in table 2.4 illustrate that a uniform valuation method to account for biological assets will harmonise reporting and enhance comparability. He states in his study that ‘no unified valuation methodology for forest properties as well as no unified requirements for forest appraisers has been created’ (Grege-Staltmane, 2010:57).

2.4.4.5 Portugal

A study was done on 225 companies to investigate the correlation between the size of a company and their knowledge of the requirement of IAS 41 reporting. It originated from the general assumption that smaller organisations cannot deal with the complexity of IAS 41. Azevedo (2007b:18) concluded that the size of the organisation did not influence either the implementation of IAS 41 or the knowledge thereof. Other challenges like the lack of active markets, unrelated market prices (Azevedo, 2007b:11), the difficulty of reporting in terms of IAS 41 (Azevedo, 2007b:12) and the variety of valuation methods (Azevedo, 2007b:13) were reported as industry challenges that restricts the fair value reporting on biological assets.

2.4.4.6 Republic of Lithuania

The IAS 41 equivalent, Business Accounting Standard (BAS) 17 is applied in the Republic of Lithuania. BAS 17 allows the valuer an option between the fair value measurement and the use of purchase or production cost. The study performed on the preferred valuation method confirmed that 14% of accountants and only 34% of the business entities applied fair value principles (Stonciuviene, *et al.* 2015:64). It may be the cognitive trend of the accountants that drives the valuation method of choice to remain the cost model.

2.4.4.7 Romania

Romanian financial reporting classifies biological assets in categories of fixed assets and current assets (Feleagá, Feleagá & Ráileanu, 2012:416). The fixed assets are accounted on the same principles as all other tangible assets at cost less accumulated depreciation/amortisation (Feleagá, *et al.* 2012:416). Alternatively the assets are disclosed as current assets, categorised as inventory. Young animals used for breeding, fattening animals, bee colonies and production animals are all classified and accounted for as inventory (Feleagá, *et al.* 2012:416). The inventory, therefore the biological assets, is measured at the lower of cost and net realisable value (Feleagá, *et al.* 2012:4170). It is evident that IAS 41 has not been adopted in Romania. The main reasons are the tax considerations of the country, the limited number of specialists in agricultural accounting, the lack of guidelines to value

biological assets and the cost of recognising the biological assets at a fair value (Feleagá, *et al.* 2012:417; Mates, *et al.* 2015:714).

Mates *et al.* (2015:714) confirmed that the challenges identified by Feleagá *et al.* are still applicable as their study concluded that agricultural organisations reduce the importance of fair value measurement as they favour historical cost reporting since market prices are not available, ensuing incomparable financial results.

2.4.5. United States of America

The fair value measurement, as per IAS 41, does not take into consideration that biological assets do not all appreciate or get sold. This generalisation and the 'lack of a systematic system of determining fair value' produce incomparable financial statements among countries and industries according to Marsh *et al.* (2013:82-83). It is appreciated that uniformity becomes more difficult as the different countries develop their individual agricultural guidance. A major reporting difference identified with the US GAAP, is that it requires the classification of agricultural assets and products as inventory or alternatively an inclusion of biological assets as property, plant and equipment (Marsh, *et al.* 2013:84; Huffman, 2013:10). Such biological asset classification will not enable the users of financial statements to reliably compare financial information of the industry, purely due to the definition and valuation variances applied in the reporting process (Marsh, *et al.* 2013:85).

2.4.6. Brazil

The study by Da Silva, Nardi and Ribeiro (2015:25) on Brazilian organisations reporting on biological assets reported that 58% of them applied the discounted cash flow method, 23% used market values and 19% disclosed historical cost values.

The organisations that applied the discounted cash flow method used parameters that cannot be observed in a market and can therefore not be vetted by users of the information. Furthermore, the discount rate applied in the valuation was not disclosed to enable the users to assess the performance of the biological assets (Da Silva, *et al.* 2015:19). Likewise the valuations based on market values did not disclose their assumptions to derive such values in their financial statements to allow users and

assess the valuations (Da Silva, *et al.* 2015:6). As the valuation of biological assets in Brazil is not transparent and may vary substantially between organisations, it is not comparable and does not contribute to objective decision-making.

2.4.7. International studies on challenges on biological asset reporting

An international study performed on 389 organisations, covering 27 countries, reporting on IFRS in the 2011 to 2013 financial years concluded that the fair valued biological assets are more value-relevant for firms with high disclosure levels (Gonçalves and Lopes, 2015:22). Investors value the biological assets independently from the level of disclosure as consumable biological assets usually have available market prices to allow an independent calculation of values reported, while bearer biological assets have a greater impact on investors when high levels of disclosure is provided (Gonçalves and Lopes, 2015:23). The study found discrepancies on the mandated IAS 41 disclosure requirements, recommending an improvement by organisations to eliminate ambiguity in the interpretation of financial results to enhance comparability (Gonçalves and Lopes, 2015:17).

An earlier study by Gonçalves and Lopes on 270 listed international firms' compliance with the disclosure requirement of IAS 41 concluded that the firms' biological asset intensity, the size of the firm and the ownership concentration impacted on the disclosure compliance (Gonçalves and Lopes, 2014:23). Their study supports the research findings that the biological asset valuations are costly and driven by the users of the financial statements.

As contextualised in the studies on fair value accounting, the financial reports produced to report on the biological assets are incomparable and inconsistent. The variety of valuation methods imposes the incomparable financial results. Table 2.5 (alphabetical ranking of countries) outlines a summary of section 2.3:

Table 2.5: Summary of the valuation challenges experienced in various countries

Country	Accounting framework	Challenges experienced
Asia	IPSAS 27 <i>Fair value</i>	Financial reports are compiled on the cash basis of accounting, with limited consideration of accrual accounting. Fair value reporting was not identified.
Australia	AASB 1037 <i>Fair value</i>	Preference is lend to the consideration of the net present value of the biological assets to determine the fair value of forests; the cost method to value grapevines and the net present value to value orchards.
Brazil	Brazil GAAP <i>Fair value</i>	The discounted cash flow is the valuation method of choice with limited consideration of the available market values.
Czech Republic	Country specific standard	The cost model is used based on the purchase price, the reproduction costs or the factory costs. The value of animals is adjusted by the value of each kilogram grain fed on a daily basis. The valuation is based on cost less expected losses and accumulated depreciation.
Georgia	IAS 41 <i>Fair value</i>	Inactive and unavailable market information restricts fair value reporting.
Greece	Cash basis	Farms are family owned and small; there is limited accounting and financial knowledge and training, record keeping is limited and reporting is mainly done for tax purposes.
Kazakhstan	Cost	Limited accounting and recordkeeping restricts financial reporting.
Latvia	Fair value and cost	Reporters have an option to disclose animals and plants as biological assets at a fair value or as property, plant and equipment at cost. Preference is lend to the cash flow method of valuation.

Country	Accounting framework	Challenges experienced
		Limited available market information and a lack of a uniform methodology to value biological assets.
Malaysia	IAS 41 and MAS 8 <i>Fair value</i>	Limited market information to value bearer biological assets, excessive costs of fair valuing assets, limited knowledge to value bearer assets hinders IAS 41 compliance.
Philippines	IAS 41 <i>Fair value</i>	Bearer biological assets are valued at fair value and consumable biological assets at cost. Auditors found a correlation between the size of the firm and the valuation method applied.
Portugal	IAS 41 <i>Fair value</i>	Inactive markets; unavailable market information; the difficulty to report in terms of IAS 41 and the variety of valuation methods impair comparability.
Republic of Lithuania	BAS 17 (based on IAS 41) <i>Fair value</i>	The compiler has an option to measure the biological assets at a fair value, the purchase price or the production price. Accountants prefer the cost model and they appear to be leading the industry.
Romania	Country specific standard	The biological assets are either recognised as inventory or property, plant and equipment. The inventory is valued at the lower of cost or net realisable value and the property, plant and equipment at a depreciated cost model. Preference is lend to apply the cash flow model to value the biological assets included as inventory. Financial reports are compiled for tax purposes; there are limited specialists to assist with fair value accounting; a lack of guidelines; unavailable market information and the excessive costs of performing valuations restrict fair value accounting.
Russia	Country specific standard	Rule-based accounting principles are applied in Russia with no consideration of fair valuing.

Country	Accounting framework	Challenges experienced
South Africa	IAS 41 GRAP 27 IFRS for SME	Inconsistent valuation methods applied results in incomparable financial statements.
Turkey	IAS 41 <i>Fair value</i>	Valuation challenges include the classification of breeding stock as fixed assets and the livestock as circulating assets. These classes are considered separately when depreciation is applied thereto. The variety of valuation methods impairs comparability and the reporting organisation's opinion of fair value accounting correlates with the application thereof. Fair value accounting is considered complex, especially for smaller organisations. The tax reporting requirements are not in line with fair value principles and it is costly for organisations to compile two reports.
United States	US GAAP <i>Fair value</i>	The biological assets are classified either as inventory or property, plant and equipment.
International	IAS 41 <i>Fair value</i>	Bigger firms tend to comply more with the disclosure requirements of IAS 41 as it is too costly for smaller firms. Fair value accounting is often informed by the users' need therefore.

Source: Research summary

Table 2.5 details that although IAS 41, or an equivalent standard, is prescribed for 70% (12 of the 17) of the researched countries, the challenges experienced in its application results in incomparable financial statements. The principles of fair value accounting remain important and a key concept of IAS 41 that should be addressed to produce comparable and informed values on biological assets.

2.5. Fair value accounting principles

Argilés, Blandón and Monllau (2013:8) performed a study to evaluate the differences in profits, volatility, profitability and accounting manipulation when applying historical cost *versus* fair value measurement principles on biological assets. Their study concluded that the valuation method applied did not impact on any of the investigated areas and proposes the application of fair value principles as it does not entail unaffordable complexities and was regarded as useful and more widespread in the accounting environment. The application of the fair value principles on a class of asset/liability can therefore assist to compile comparable financial information (FASB, 2006:4; FASB, 2011:6; Rouse, 2012:3; Álvarez, *et al.* 2014:4).

The strict requirement to value all biological assets on the same valuation basis may obscure the financial results according to Stonciuviene, *et al.* (2015:66,69), as they recommend that organisations should be allowed to choose whether biological assets are to be fair valued or considered at historical cost, linked to the valuation requirements of inventory, when the unique economic conditions, the intended purpose of holding the biological assets, the geopolitical conditions, the agribusiness considerations and the taxation system of that organisation has been taken into account. Historical costs disclosure and detailed explanations on the fair value adjustments ought to be extensive to allow investors and other users to assess the organisation's results, clearly indicating the impact on the organisation's profits or volatility (Argilés, *et al.* 2013:8; Stonciuviene, *et al.* 2015:67). In countries like Russia (Burykin, *et al.* 2011:131), Romania (Mates, *et al.* 2015:714), the Czech Republic (Sedláček, 2010:64) and Australia (Williams and Wilmshurst, 2008:par.5.0) where the cost method is preferred, such elaborated qualitative disclosures may enhance decision-making.

The valuation of biological assets at a fair value cannot be compared to the financial results of biological assets valued at cost (FASB, 2006:4; FASB, 2011:6; Rouse, 2012:2; Argilés, *et al.* 2013:8; Mates *et al.* 2015:710). Comparability of financial results is further complicated when the information disclosed in the financial statements is not consistent to that of other organisations (Álvarez, *et al.* 2014:4). To enhance the comparability of the reported financial results with that of prior periods and those of other entities the International Accounting Standard on the presentation

of financial statements, IAS 1, aims to dictate the basis for financial statements presentation (IASB, 2013e:par.1). With comparability amongst the key priorities for the standard setters, the standard detail additional qualitative characteristics that should be adhered to in order to compile harmonised financial statements (IASB, 2009a:12; IASB, 2013c:chapter 3; Gonçalves and Lopes, 2015:17):

Table 2.6: Qualitative characteristics that harmonise financial statements

Qualitative characteristic	Harmonisation effect
Understandability	Users with a reasonable knowledge of accounting and the operational activities of the organisation should be able to understand the information that is disclosed in the financial statements.
Relevance	The users' economic decisions should be influenced by the information that is disclosed in the financial statements as it details information on the operational events and evaluations.
Materiality	Financial information that will affect or influence decisions taken by the users of financial statements should not be omitted.
Reliability	Information disclosed in the financial statements should not contain errors, should not be biased and should be faithfully presented.
Substance over form	Transactions should be presented in accordance with their substance and not their legal form.
Prudence	A degree of caution and neutrality should be applied when judgements are made to compile the financial statements.
Completeness	The financial statements should not omit information that will result in the financial information that is disclosed to be false, misleading, irrelevant or unreliable.
Comparability	The financial position and performance of financial statements must be comparable between organisations to evaluate information and identify consistency and trends.

Qualitative characteristic	Harmonisation effect
Timeliness	The information included in the financial statements should be relevant to the decision period and should not be delayed.
Balance between benefit and cost	The cost to compile and provide information should not exceed the benefit that will be derived from obtaining and disclosing the financial information.

Source: IASB, 2009a:12

Financial statements are harmonised when the characteristics detailed are considered in conjunction with the principles of the appropriate accounting standard to be applied on a class of assets/liabilities. A study performed in 2010 (Phillips, *et al.* 2010:25) established that corporate managers prefers principle-based accounting standards whereas investors and creditors lean towards rule-based standards. This conclusion can be reinforced in that principle-based accounting disclosures allow management the flexibility to conclude on the management estimates and fair value disclosures. Principle-based accounting, thus fair value accounting in terms of IAS 41 (Pike and Chui, 2012:78,79), will focus on the reporting of the economic circumstances at the date of reporting (Aryanto, 2011:1). The lack of a solid valuation basis supports the investors and creditors' preference to the rule-based reporting as it eliminates manipulation and encourage comparable financial results.

Supplementary to the principle *versus* rule-based accounting preferences, Pike and Chui (2012:77) analysed the accounting conceptual framework from a user's perspective. Their study quoted that the conceptual framework was 'formed with the intention of providing the backbone for principle-based accounting standards'. They conversely criticised the conceptual framework as they outlined that financial reporting was considered to be inadequate to guide standard setting as it does not focus on principle-based accounting standards (Pike and Chui, 2012:78). In their study they evaluated the five main characteristics of financial information, being: understandability, relevance, reliability, comparability and consistency (Aryanto, 2011:1; Pike and Chui, 2012:77) to determine whether the conceptual framework provides an adequate foundation to accounting standards. Their study concluded that

reliable financial information, being objective, verifiable and mostly based on historical cost accounting influence the user's tendency to rely on financial information.

It is evident that principle-based accounting and the relevance of financial information forms the basis of fair value accounting (Aryanto, 2011:1). With users electing to support the 'known' relevant financial information, the financial reporters are left with no option but to standardise procedures to produce relevant, reliable and economic decision-making reports. With consideration of the qualitative characteristics to harmonise financial statements the users can compare financial results to make informed decisions.

2.6. Challenges of fair value accounting

The International Accounting Standard (IAS) 41 was developed to detail the requirements of how and when to account for biological assets. As the standard does not detail how the valuation should be performed, inconsistencies in the implementation of the standard results in incomparable financial statements (Maina, 2010:174; Elad and Herbohn, 2011:94; Ossip, 2011:11; Burykin, *et al.* 2011:131; Van Biljon, *et al.* 2013:62; Gonçalves and Lopes, 2014:6; Scott, *et al.* 2016:147). Literature detailing the challenges experienced in the biological asset valuation and the related reporting was studied and reported on as follows:

2.6.1. Importance of an accounting standard to the users for financial statements

Chebac and Onica (2009:33) defines a biological assessment (valuation) as a 'more simple operation of weighing and measuring; it is a complex process of estimating the value'. They found that the valuation of biological assets can be regarded as an economic evaluation assessment as it is regarded as a process that establishes the structure of the financial statements via a 'set of techniques, processes and methods which determines the value of a group of goods, assets or business' (Chebac and Onica, 2009:33). This economic valuation definition of the researchers demonstrates the importance of business and as such, the decision makers or users of financial information.

Users are interested in the actual market values of biological assets as it demonstrates the exchangeable price thereof in a competitive market. Investors and evaluators of the financial information need to gain information on the obligations of the organisation, the change of operations, the financial strength of an organisation, the resources for funding, how funds were invested and the impact of all items on the profit and performance (Landsman, 2006: 9; Azevedo, 2007b:9; Chebac and Onica, 2009:33; Huffman, 2013:4; Gonçalves and Lopes, 2015:5). Relevant and credible information is required by the users and as such the application of different accounting models and valuation processes will not produce the required information (Chebac and Onica, 2009:36). The general fair valuing methods as considered in this research outlines that the use of estimates will impact on the credibility of the produced information and that the application of various valuation methods impairs the comparability of financial results (Azevedo, 2007a:2; Chebac and Onica, 2009:42; Macedo, 2012:60; Bohušová, Svoboda & Nerudová, 2012:531; Baigrie, 2014:16; Gonçalves and Lopes, 2015:17). To strengthen biological asset disclosure, a classification thereof based on the useful life and the intended trading purposes, categorised as current and non-current assets and disclosed as bearer and consumable biological assets, ought to be presented to improve decision-making (Stonciuviene, *et al.* 2015:69).

Olugbenga and Atanda (2014:87) regard the investors as the primary users of financial statements (Schutte and Buys, 2011:191; Huffman, 2013:1). They argue that the value relevance of an accounting standard is directly affected by the correlation amongst the market value of an item and its corresponding accounting number that is derived therefrom. As such they interpret accounting standards to affect the numbers disclosed on the financial statements, thus influencing the users of the information (Huffman, 2013:1; Olugbenga and Atanda, 2014:88). It is important to apply this established relationship amongst the market values of an item to the considered importance of an accounting standard by investors. Biological assets traded in an active market will be subject to the requirements of IAS 41 and such valuations will be reflected by the investors. In the absence of market information on biological assets the investors might not regard the requirements of IAS 41 as a decision enhancing factor (Azevedo, 2007b:9,11; Baigrie, 2014:18).

The financial results are not only useful to investors but stakeholders like creditors, management, suppliers, credit providers and government. Likewise, farm failure prediction and the related decisions thereon are vital to policy makers and owners (Athanasios, *et al.* 2010:221; Bayboltaeva, *et al.* 2015:211). The results of the applied valuation method will inform the biological asset values to be published in an organisations' annual report. Decision-making by the users of financial information; an evaluation of overall performance of the organisation; the comparison of agricultural sector performance and the overall value of an organisation is therefore directly affected by the application of the chosen biological asset valuation method (Rozentāle and Ore, 2013:57; Musarat, *et al.* 2014:2; Eksvärd, 2014:320). Essentially Rozentāle and Ore (2013:57) highlighted that the principles of IAS 41 will be more important and decision-enhancing when the value of the biological assets is significant to the users of such information. The applied valuation method may therefore be informed by the stakeholders' decision-making methods.

2.6.2. Importance of the organisation's environmental impact

Annual reports are to address the information needs of the different users of the information, hence not limited to financial information. The belief that the 'biological world, which supports human life, has and continues to be compromised by destructive human behaviour' (Samkin, Schneider & Tappin, 2014:531), causes the negative impact of human and organisational actions on the environment to become important to stakeholders. As stated by Samkin, *et al.* (2014:528), the disclosure of biodiversity assessment information in South Africa may be of no value to users yet may hold medicinal value to a traditional herbalist interested in the financial results of the entity. Their study argues that biodiversity information disclosure forms a vital part of the reported results of an organisation, due to the impact on ecosystems and the perception that organisations are accountable for their actions that impacts on the environment (Samkin, *et al.* 2014:529; Bowen and Aragon-Correa, 2014:110). Accordingly environmental disclosures are included in the annual reports. Samkin *et al.* (2014:528,529) evaluated these disclosures and found that apart from Denel Limited, the Global Reporting Initiative and the International Council on Mining and Minerals annual reports neglect disclosures that clarify the impact of organisational

activities and business on biodiversity. An increased focus on biodiversity-related reporting may circumvent tension with stakeholders who focus thereon, especially since the *Deepwater Horizon* oil spill in the Gulf of Mexico which drew attention thereto, according to Samkin *et al.* (2014:529).

Biodiversity interested users of financial statements will be guided by their conviction and ecological values when assessing outcomes. To grasp these ecological values the study by Samkin *et al.* detailed the deep/intermediate/shallow ecology taxonomy (2014:535). An understanding of the ecological taxonomies will assist the financial statement compilers to value the biological assets in line with the ecological importance assigned thereto for the users.

Table 2.7: Deep/intermediate/shallow ecology taxonomy

Deep ecology	Intermediate ecology	Shallow ecology
Non-anthropocentric	Anthropocentric	Anthropocentric
All life (human and non-human) has intrinsic value.	Higher order animals have values in their own right.	Humans viewed as being separate from nature and are the only source of value.
The value of biodiversity is not dependent on its usefulness to humans.	The value of biodiversity is dependent on its usefulness to humans.	The value of biodiversity is dependent on its usefulness to humans.
Richness and diversity of life forms contribute to value and are themselves valuable.	Nature is valued as a means to human ends – conservation of resources for the welfare of present and future generations.	Nature is valued as a means to human ends – conservation of resources for the welfare of present and future generations.
Present human interference with non-	Humans should maintain their present lifestyle	Humans should maintain their present lifestyle

Deep ecology	Intermediate ecology	Shallow ecology
human world is excessive and worsening and needs to be changed.	uninterrupted other than making a few minor changes.	uninterrupted other than making a few minor changes.
Focus on fixing causes, rather than symptoms.	Can lead to short term focus – fixing symptoms rather than underlying causes.	Can lead to short term focus – fixing symptoms rather than underlying causes. Reliance on Technological fixes – pollution control, industry regulation, recycling, replacing fossil fuels with biofuels. Extension of moral community to include favoured species such as animals that resemble humans, species that are cute, furry or impressive and natural features that have special significance to humans.
Preservation of unspoiled wilderness areas, as well as environmental restoration of native species and degraded wilderness areas.	Conservation of biodiversity is undertaken for its own value, but not where human needs would be compromised.	Conservation of biodiversity is undertaken not for its own sake but because of its value to humans.
Economic sustainability.	Economic growth.	Economic growth.
Even serious human	Human concerns are	Human concerns are

Deep ecology	Intermediate ecology	Shallow ecology
concerns should sometimes lose out to environmental values.	paramount.	paramount.

Source: Samkin, *et al.* 2014:535

The study by Samkin *et al.* (2014:533) outlines that the intermediate and the shallow ecology theories consider instrumental values to be assigned to plants and animals. This ‘value-in-use by human’ mind-set may dictate the preferred valuation method on biological assets. The shallow and the intermediate ecology theory applications regard nature as a means to an end, used for economic growth and valued in terms of the importance and usefulness to humans. These users will focus on the impact of the reporting organisation in terms of pollution and resource depletion (Samkin, *et al.* 2014:533) and may not show much interest in the actual values of the biological assets. Reporting in terms of these ecology theories may result in financial results incomparable to other organisations as these biological assets are valued only with the environmental impact for human sustainability in mind.

Deep ecology theorists will regard all living plants and animals to have intrinsic value. Their focus on the preservation of wilderness and the environmental restoration will create a higher value of nature and biological assets. Values assigned by the deep ecological theorists will not be based on the same principles, beliefs and economic considerations as considered by intermediate and shallow theorists. The calculated value of biological assets dictated or influenced by deep ecology theorists cannot be compared with the results influenced by other theorists (Samkin, *et al.* 2014:533).

2.6.3. Ethical values of the compilers of financial reports

The ethical values of accountants were questioned when Lever Brothers overstated profits by applying questionable accounting methods to value market securities (Mgbodille and Onah, 2014:93). The Enron fall resulted in an accusation that accounting firms and accountants cause and/or contribute to the financial scandals (Kenawy and Elgany, 2009:88; Said and Al-Tarawneh, 2013:65–67). Further thereto the accountants of African Petroleum covered up credit facilities, Alpha Merchant

Bank were involved in market manipulations and accounting problems, improper accounting methods applied failed Quest International and sales inflation by Xerox resulted in fines of millions of dollars (Mgbodille and Onah, 2014:93). Regardless of the class of asset/liability subject to manipulation or error caused by these ethical reservations, the accounting profession established itself as a standard-regulated industry that can be regarded in a positive light.

Fitcher, as cited by Mgbodille and Onah (2014:92) states that the behaviour of professional groups, like accountants and finance, often follows a pattern of interaction as the members will place pressure on each other to adhere to recognised standards (Seloane, 2010:41; Koopman, 2012:30). A recommendation from the study is that accountants and finance analysis are to keep directors and management 'on their toes' as a 'combination of skill with integrity will uplift ethical and cultural standard without affecting creativity and initiative' especially as accountants 'deal in, interpret and recommend financial matters relating to the economy of a nation' (Mgbodille and Onah, 2014:90; Sudana, Sukoharsona, Ludigho & Irianto, 2014:1). As such, the application guideline to value the biological assets may assist the professional field to guard themselves as the "best practise".

2.6.4. Manipulation of financial results

Gabriel and Ștefea (2013:101) are pro the fair valuing of biological assets in order to produce comparable information to the users of financial information. They acknowledge that the methods of fair valuing create an opportunity for earnings to be manipulated yet concluded that an improvement to these valuation methods can maximise the strength of IAS 41 (Seloane, 2010:39; Gabriel and Ștefea: 2013:101; Bowen and Aragon-Correa, 2014:110; Álvarez, *et al.* 2014:4; Gonçalves and Lopes, 2015:6). These researchers state that the provisions of IAS 41 cover all possible valuation situations and concluded that if IAS 41 is applied accordingly, the model to value biological assets will be objective. They acknowledge that the objectivity and relevance of the actual valuation process might not be demonstrated. Hence, an improved valuation method is required to minimize the management subjectivism and production forecasts (Gabriel and Ștefea: 2013:103). Da Silva, *et al.* (2015:6) uphold this view as their study confirmed that the application of fair value accounting

principles allows management a discretion to influence the accounting results of the reporting organisation. The ethical dilemma and manipulation opportunities dreaded by the users of the financial results can be minimised when the inconsistent valuation methods applied to fair value biological assets is addressed in a guideline.

2.6.5. Variety of valuation models

Studies on the problems and solutions on the valuation of biological assets detail that a range of measurement principles exist that can be applied by accountants. As such, incomparable financial statements are produced in the agricultural sector; impacting on managerial decisions and an analysis of the financial performance of an organisation (Athanasios, *et al.* 2010:221; Rozentăle and Ore, 2013:58; Kurnaiwan, *et al.* 2014:8; Álvarez, *et al.* 2014:4; Demir, 2015:63). The valuation methods regarded as generally accepted in the agriculture industry include the use of inflation adjusted transfer prices, cost, replacement values, sale values and discounted values (Rozentăle and Ore, 2013:59).

The comparability can be enhanced with the diminishing of the variety of approaches to the available methods to value the sector (Herbohn and Herbohn, 2006:175; FASB, 2011:6; Macedo, 2012:60; Rouse, 2012:5; Rozentăle and Ore, 2013:58; Baigrie, 2014:2; Gonçalves and Lopes, 2015:2,5,17). Financial indicators of organisations trading in the agricultural sector can then be compared within the sector to contribute towards further planning and the economic decisions required (Rozentăle and Ore, 2013:59). A solution suggested by Rozentăle and Ore (2013:64) to the variety of valuation methods is to apply the discounted cash flow method to value the biological assets (Leño and Ambrozini, 2014:99). They argue that the discounted cash flow method will emphasise the actual cash flow of a firm to investors which will allow them to make informed decisions about the competitors, the sector indicators, the potential risks and the untapped potential of the firm (Rozentăle and Ore, 2013:65). The uncertainty of an organisation's cash flow and the strength of the actual cash flow of organisations to which the results are to be compared are questioned as projected cash flows are uncertain. In addition, it is doubtful whether the valuation of biological assets at a discounted cash flow model will result in usable and reliable information for users other than investors of the

financial statements. The use of the discounted present value of the future cash flows as a method to value biological assets is favoured in the study by Jaijairam (2013:2). Leño and Ambrozini (2014:99) favour the discounted cash flow valuation method, with the discount rate linked to the Arbitrage Pricing Theory as the rate of return. With organisations applying different discount rate factors in the use of the discounted cash flow method, the comparability of the valuations are questionable (Leño and Ambrozini, 2014:99; Muhammad and Ghani, 2014:20; Stonciuviene, *et al.* 2015:66).

The compilers of financial information base their valuation of biological assets on the available and most appropriate measurement base to produce meaningful results to the users. The compilers may be instructed or prescribed by users as to which measurement basis to apply in the valuation. Compilers are to be objective to produce meaningful reports that are based on fair value principles that are in line with the conceptual framework.

The conceptual framework for financial reporting outlines that the financial results should be useful to the users of the financial statements (IASB, 2013e: 7,9,11,12,19,20,21,23,27,32,49,57,68,72). Olugbenga and Atanda (2014:86) emphasised that the purpose of accounting information is focussed on the need of the users of such information (Schutte and Buys, 2011:190). Should the inconsistent application of the valuation measurement of IAS 41 not impact on the users of financial statements, it can be concluded that this inconsistency does not result in unreliable information for those users of the financial statements.

2.6.6. Communication challenges

Cronjé (2013:1,6) states that accounting can be regarded as a scientific discipline where 'communication in accounting is also problematic' as there is tension between objectivism and subjectivism. He states that objectivists can find a firm ground for knowledge that can determine the nature of reality, rationality and truth whereas subjectivists consider everything to be related to another (Cronjé, 2013:2). As annual reports are regarded as the 'most important products of accounting' he analysed it and found the statutory financial disclosures to be directed by objectivism while the contextual financial reporting is leaning more towards subjectivism (Cronjé, 2013:2).

His analysis is important for the consideration of this study as it clarifies that the users of financial statements will adopt different paradigms when analysing the financial statements. He refers to this scenario as 'persons speaking different languages' (Cronjé, 2013:4). The use of different paradigms will result in incomparable financial and statutory disclosures amongst entities and countries (Cronjé, 2013:8), causing destructive communication. Despite the language 'barrier', Cronjé recommends a translation process where the historical top-down approach is applied to resolve the communication dilemma. This approach originates from the fact that accounting principles and accounting standards are set by the accounting regulators and rolled down to the accounting profession, thus a top-down system (Cronjé, 2013:6,7). The contextual disclosures that are included in the annual report are regarded to be driven by stakeholders to assist users with decision augmenting information. The study performed by Cronjé, recommends the following disclosures as characteristics of corporate annual reports that serves as remedies to the accounting communication challenge (Cronjé, 2013:14–20):

- descriptions and explanations should be used more in corporate reports to explain numerical data and enhance understandability of information;
- social responsibility should be accepted by the reporting entity and the entity should include disclosures on the effect of the products or services on the environment;
- the special needs of stakeholders should be taken into account to ensure that meaningful information is included in the annual report that acts as a feedback system between management and stakeholders;
- even though stakeholders have a legal right to credible information, the cost of providing the information should be borne in mind by management;
- colour presentations and disclosures enhance the usefulness of information;
- graphs, tables and comparisons ease the understanding of financial information;
- a consistent financial reporting method and disclosure outlay should be used to allow the users to compare results from one year to another and inter-entity;
- qualitative disclosures should not be based on emotions;

- information disclosed should not merely be forward-looking but should also provide meaningful information on the results reported.

The compilers of financial information can consider the recommendations by Cronjé (2013:14–20) to produce an annual report that bridge the communication gap between the disclosed values and the users' understanding of the presented 'accounting jargon'. The suggested remedies may be included in the guideline to be developed in this study to enhance the understandability and value of IAS 41 to the users of the annual reports.

2.6.7. Technical expertise

The study performed by Duman, *et al.* (2012:129) concluded that the agricultural activities cannot be conducted effectively when the owners, directors, accountants and accounting firms are not educated and trained to value the biological assets. The experience, knowledge and expertise to value biological assets are required to produce fair valued information and focus on sustainability (Azevedo, 2007a:21; Sudana, *et al.* 2014:1). As these skills may be scarce, they further recommended a standard chart of accounts to be availed to the organisations that need to report on the biological assets for standardisation. The accounting standards alignment to the legal and tax regulations may guide and ease the compilers of the financial information (Duman, *et al.* 2012:129; Demir, 2015:62). The guide on the valuation of biological assets can assist the owners, directors, accountants and accounting firms to effectively share knowledge and expertise to ease the valuation complexity.

2.6.8. Valuation cost

Given the inconsistent valuation of biological assets, users of financial statements are to be mindful of the costs associated with such valuation, as the conceptual framework for financial reporting requires the benefits to outweigh the costs of reporting (Burnside, 2005:38; Aryanto, 2011:1; IASB, 2013e:21,113; Baigrie, 2014:14).

Cost considerations will direct the compilers and users of financial statements to apply a valuation method to fair value biological assets that will direct their decisions and interests. The value relevance of IAS 41 to the users of the financial statements can be evaluated and justified when the valuation costs and the benefits of such valuation will impact on the accounting information presented (Olugbenga and Atanda, 2014:88; Baigrie, 2014:14). If a cost benefit outweighs the valuation principles of IAS 41, the users might prefer to have biological assets valued at a more decision enhancing method for disclosure in the financial statements (Aryanto, 2011:3; Olugbenga and Atanda, 2014:88).

With consideration of the costs of valuing biological assets and the related benefits of such valuation, the users of financial statements analyse the operations of the organisation and assess the information presented. The method applied by the reporting organisation to fair value its biological assets seem to be analysed independently from other organisations when the costs and benefits are considered by the users. The comparability of financial statements appears to be less important to users when costs of financial information disclosure exceed related decision-making benefits (IASB, 2013e:72).

2.6.9. Auditor assessment and evaluation

As 'the final product of the financial statements is the independent auditors report' (Antonio and Bassetti, 2014:21; Said and Khasharmeh, 2014:2) the external auditors of the organisation need to satisfy themselves that the valuation method applied to disclose the biological assets at a fair value complies with the requirements of IAS 41 (Clavano, 2014:3). The challenges explored in prior studies on the valuation methods, did not impact on those audit opinions expressed by the independent auditors of the examined organisations (Elad and Herbohn, 2011:105; Aryanto, 2011:3; Macedo, 2012:61; Clavano, 2014:5). As the independent auditors need to assess the information provided by management to satisfy them that the financial data presented will comply with the requirements of the prescribed standard it is concluded that additional financial information and qualitative reports may be compiled to support the valuation methods applied (Pike and Chui, 2012:77; Marsh, *et al.* 2013:84; Antonio and Bassetti, 2014:21; Said and Khasharmeh, 2014:2).

The compilation of additional reports may not address the application of the principles of IAS 41 to fairly present the biological assets (Mates and Grosu, 2008:461; Chebac and Onica, 2009:33). Management may be in a position to manipulate the financial information to mislead the users of the financial statements and disguise it in these additional reports (Landsman, 2006:1; Kenawy and Elgany, 2009:84; Phillips, *et al.* 2010:11,19; Seloane, 2010:39; Dube, 2011:61; Rozentăle and Ore, 2013:61; Gabriel and Ștefea: 2013:101,103, Jaijairam, 2013:4, Antonio and Bassetti, 2014:21; Asien and Nuri, 2014:33, Stonciuviene, *et al.* 2015:65). The additional financial reports and qualitative information can be prepared by management to outline controls and measurement information on the biological assets (Chebac and Onica, 2009:33). This presentation may exert control mechanisms over the assets and imply cost control. The presence of these controls may act as a risk management endeavour to support the methods applied in the valuation process that can be assessed and evaluated (Namazi, 2013:42). It can be concluded that the auditors will assess the methods and assumptions applied by management to compile financial statements that address the principles of IAS 41 individually to test compliance with this standard.

2.7. Accounting and market developments

Recent developments that may impact on the financial reporting and disclosure of the fair value of biological assets, in addition to the current valuation requirements, include:

2.7.1. Bearer plants is recommended to form part of property, plant and equipment and not biological assets

A biological asset is a living animal or plant (ASB, 2012:7; IASB, 2013a:A1169). Biological assets can be classified as either consumable biological assets or bearer biological assets (Lefter and Roman, 2007:16; ASB, 2012:12; IASB, 2013a:A1173; IFRS foundation, 2013b:3; Gonçalves and Lopes, 2014:4; Kurniawan, *et al.* 2014:5). In terms of IAS 41 consumable biological assets will be harvested as produce and will be sold as inventory. Examples provided are livestock held for meat production, maize, wheat and fruit like apples. Bearer biological assets are those biological

assets that are not held to be consumed. The tree on which the apples grow, the cow held for milk production and the grape vines grown to harvest grapes from are classified as bearer biological assets (Baigrie, 2014:18; Gonçalves and Lopes, 2015:1; IASB, 2015:A1347).

Bearer biological assets will be sub-classified as either bearer plants or livestock as recommended in the exposure draft issued by the International Accounting Standards Board (IASB, 2013d:10; AASB, 2013:12; MASB, 2013:1) on 26 June 2013. The exposure draft defines a bearer plant in paragraph 5 as a plant that is used in the production or supply of agricultural produce which is expected to bear produce for more than one financial period and that will not be sold as a living plant or harvested as produce (Baigrie, 2014:4). The amended IAS 41, with the effective date of the amended standard for annual periods beginning on or after 1 January 2016, incorporated the distinction between bearer and consumable biological assets (IASB, 2015:A1355). Henceforth, the apple tree and grape vines will be classified as property, plant and equipment (Aryanto, 2011:4; BDO New Zealand, 2013:2; Baigrie, 2014:4; Gonçalves and Lopes, 2015:1; IASB, 2015:A1347) and it will be subject to the requirements of annual depreciation, impairment reviews and the recognition, measurement and disclosure requirements of IAS 16 (Aryanto, 2011:4; Chan, 2013:2; AASB, 2013:8, IFRS foundation, 2013b:4; MASB, 2013:1, BDO New Zealand, 2013:2; Muhammad and Ghani, 2013:18; Baigrie, 2014:18). The value of property, plant and equipment should be reported honestly to investors (Sun and Xu, 2010:199) and as such requires impairment assessments to consider the freedom of the markets and the uncertainty of the whole economy (Sun and Xu, 2010:199). Productive biological assets will be assessed for impairment as it would 'enhance the decision serviceability of the accounting information, and maximally protect the disclosure subject of the accounting information' (Sun and Xu, 2010:200).

The fruits (grapes or apples) of the bearer plant will remain under the scope of IAS 41, biological assets (IASB, 2015:A1347). Maize and wheat will also be treated in terms of IAS 41 as the whole plant is harvested as produce (BDO New Zealand, 2013:2). Likewise, plants that are cultivated for sale like a nursery do not separate produce from the bearer plant and will be classified as biological assets (BDO New Zealand, 2013:2; MASB, 2013:1, IASB, 2013d:12; IASB, 2015:A1348).

IAS 41 paragraphs 43–45 (ASB, 2012:12; IASB, 2013a:A1173) currently encourages the inclusion of a description and the carrying value of the consumable and bearer biological assets of each group of biological assets in the notes to the financial statements (IFAC, 2008:1; Monea and Cotlet, 2008:7). This encouragement does not equate to a requirement as evident in the study by Van Biljon (2013:158). The split between the bearer and consumable biological assets and the related valuation thereof have not been done by organisations as the principles of IAS 41 have not been adopted. Organisations might experience difficulty in complying with the valuation and reporting differentiation between these classes of biological assets as the narrative disclosure thereof was not prioritised in prior periods.

Major challenges will be experienced to account for biological assets with unavailable information at hand (Muhammad and Ghani, 2014:19). An accounting policy and guide need to be developed to assist the users and compilers of the financial statements to classify, measure, value and disclose the biological assets and bearer plants in the financial records (Stonciuvienė, *et al.* 2015:62).

The amended IAS 41 was studied by Stonciuvienė, *et al.* (2015:64) who support the view that bearer animals are to be regarded and treated as bearer biological assets to avoid a distortion of the fair value profits/losses. As biological assets are to be classified as either current or non-current, the disregard for the correct classification will distort solvency and asset turnover ratios, impacting decision-makers. Their study further recommend that a classification of non-mature and mature assets should be disclosed, informing the split between current and non-current assets (Stonciuvienė, *et al.* 2015:64). Although further analysis is required by the International Accounting Standards Board, Stonciuvienė, *et al.* (2015:64) queries the inclusion of bearer biological assets as property, plant and equipment under IAS 16. It is doubtful whether these assets fit the purpose of IAS 16 where assets are held as a tool in the production of agricultural produce versus IAS 41 where the asset ‘multiplies’ and bears ultimate income for organisations.

The amended IAS 41 strives to enhance financial reporting by addressing the industry’s concerns raised to fairly report on biological assets. The publicly

accountable organisations will from 1 January 2016 produce financial statements that distinguish between bearer and biological assets. As GRAP 27 has not followed suit, the financial statements of the public and the private sectors will be incomparable.

2.7.2. Compiling financial statements in line with the requirements of IFRS 13:

Fair value

Accounting standards were developed to standardise the accounting treatment and reporting in the financial statements. Fair value accounting was introduced when the Generally Accepted Accounting Practise (GAAP) was replaced with the International Financial Reporting Standards (IFRS) and related International Accounting Standards (IAS). As stated by Phillips *et al.* (2010:11) the shift to IFRS was and is bound to create obstacles and challenges to make financial reporting transparent and flexible, and is not necessarily something desired by management, who prefers principle-based standards, but is needed to set a uniform standard. The Financial Accounting Standards Board (FASB) was criticised for setting rule-based accounting standards as a foundation of qualitative characteristics to produce reliable, consistent, comparable and understandable information (Pike and Chui, 2012:77; IFRS Foundation, 2013a:24). Regardless of the criticism, IFRS is principle-based to prescribe fair value accounting for standardisation, allowing results to consider actual economic circumstances. Nonetheless, the industry lacks guidance on the fair valuing (Mates and Grosu, 2008:458; IASB, 2013b:A488).

IFRS 13 aims to guide financial statement compilers to determine fair value (FASB, 2011:10; IASB, 2013b:A488,A530). IFRS 13 defines fair value as a market-based measurement, implicitly restricting organisations to apply entity-specific measurement bases (IASB, 2014b:2). Fair value should consider assumptions that market participants will apply under current market conditions to derive at a fair value to maximise the use of observable inputs and result in consistent inputs applied by all market participants (IASB, 2014b:2). IFRS 13 brought on a new requirement for consideration in the valuation of biological assets as the highest and best use of an asset should be determined regardless of the actual use of such asset (FASB, 2006:9; PWC, 2011a:1; FASB, 2011:147; Macedo, 2012:7; IASB, 2013b:A491; IFRS foundation, 2013b:5,7; Baigrie, 2014:3).

The highest and best use of an asset might be significantly different from the actual use of the asset (IFRS foundation, 2013b:7). To value a biological asset at a value significantly different than the actual economic benefit that will be derived from it will have accounting implications (IFRS Foundation, 2013b:7). The impairments and fair value adjustments calculated in the process of fair valuing the biological asset will impact on the financial performance of the organisation and will place it in a better financial position. A further concern raised with the IFRS Interpretations Committee in March 2013 is that the application of the highest and best use of a group of assets, like land and biological assets, will be done on a residual value of the land. This residual value might cause the fair value of the biological assets to be minimal or nil when this method is applied (IFRS Foundation, 2013b:7). The committee provided guidance with reference to paragraph BC73 of IFRS 13 stating that where a non-financial asset is used in a manner different from its highest and best use this fact should be disclosed in the financial statements. It should be substantiated by the reasons that the method of use differs (IFRS Foundation, 2013b:9).

The additional requirements set to calculate the highest and best values and the disclosures of these facts in the financial statements cannot be avoided. As detailed, the compilers of the financial statements have already been experiencing challenges to disclose biological assets at fair value. These additional requirements on fair valuing biological assets will complicate the compliance with IAS 41 further. Missing market information is an existing challenge in the valuation of biological assets and will impact on the calculation of the highest and best values. The requirements of IFRS 13 will obscure compliance with IAS 41 and GRAP 27 yet more.

2.7.3. The impact of emission trading on the accounting for agricultural activities

Evidenced by the study of Wingard (2001:194) 'conventional accounting is developing to include environmental considerations' as individuals and organisations became more aware of the effects of operations on the environment. Regulators developed legislation to sustain the environment, placing accountability on the organisations to take the appropriate care. The International Financial Reporting and

Interpretations Committee (IFRIC) developed IFRIC 3 'Emission rights' that was released in December 2004. This standard was withdrawn in June 2005 by the International Accounting Standards Board (IASB) as it was not endorsed to be applied in the Europe. In December 2007 the IASB reconsidered the accounting for emission rights with formal reactivation of this project in December 2012 (PwC, 2011b:1; EFRAG, 2013:1). In 2013 the 'Emissions Trading Scheme draft comment paper' was published by the European Financial Reporting Advisory Group (EFRAG). The purpose of this draft comment paper is to set a tool to reduce industrial greenhouse gas and emissions. The proposal requires that organisations recognise an allowance in the financial records to cover the emissions.

The discussion paper details a current debate on how the emission rights should be classified in the accounting records. Arguments are set to recognise it as financial asset; others believe it to be inventory and even intangible assets (EFRAG, 2013:2). The extent of accounting for emission trading schemes is yet unknown. Though it can cause financial information to be based on more assumptions when methane from livestock and possible animal excrement or fertiliser use will be included in the scope of this standard (PwC, 2011b:1). Likewise the impact of forests to fight climate change may result in a benefit to the farmer that can result in a possible asset. The use of fuel for agricultural mechanisation might again cause a liability. The effect of climate change, the possible impact of emissions on conservation, a sensitive agricultural environment and limited water might also need to be considered by these standard setters (Downsborough; *et al.* 2012:2). Regardless of the extent of the standard that is currently being established and the classification outcome on how it would be disclosed, there will be an impact on the agricultural sector's financial reporting.

2.7.4. Developments in non-accounting spheres that will impact on financial reporting

- Alternative energy became a solution to South Africa's energy crisis. Solar water heating, wind turbines and biofuel are the current contributors to alternative renewable energy. Biofuel is manufactured from maize, sugar cane, soy beans, cassava and oil seeds (Visagie and Prasad, 2006:ii). All these

commodities are grown and produced in the agricultural environment and is covered by the definition of a biological asset (ASB, 2012:7). To account for the planting, the biological transformation and the harvesting of these commodities the principles of IAS 41 need to be applied (Lefter and Roman, 2007:16). The compilers of financial statements therefore need to be able to recognise, measure and disclose the biological assets on the financial statements.

- Land reform and the related redistribution of land impacts on the agricultural environment. Challenges will be faced when agricultural land is redistributed to non-farmers that cease the production of commodities (Hall and Williams, 2000:7, Harriss-White, 2008:550). Alternative measures need to be implemented by government and the private sector to sustain and secure food for the country (Adams, *et al.* 1999:21; Ortmann, 2005:290; Berstein, 2005:24; Malomane, 2013:140; Essendi, 2014:69). It may result in more extensive food programmes being undertaken by government to fight hunger (Barton, 1978:1; Atkinson and Büscher, 2006:463; Hammar, 2010:396; Malomane, 2013:140; Essendi, 2014:69), especially since population growth result in an increased demand for the tilling and optimisation of agricultural land and produce (Krug, 2001:5). This will impact on the biological asset accounting and reporting in the public sector, where GRAP 27 is currently not complied with (Van Biljon, *et al.* 2013:61).
- The redistribution of land might result in private farmers losing their land (Hammar, 2010:396). A financial crisis might be experienced by these farmers and organisations if the land was prearranged as a security on a production loan or mortgage. The compilers of financial statements should be able to calculate the total value of these biological assets and land 'given up' with these transactions. Should there be arrangements in place to allow for the 'dishonoured owner' to utilise the land to continue operations in return for lease payments on the land, the accountant should be in a position to value the biological assets accordingly (Lahiff and Cousins, 2005:130). The principles of IFRS 13 to calculate the highest and best use of the asset, especially if ownership of these non-financial assets do not vest in one owner.

The developments stated support the need for an application guideline to be developed to assist with the accounting of biological assets. Expected amendments

and additional requirements to IAS 41 will complicate the standard further which may discourage the implementation thereof.

2.8. Summary and conclusion

The cognitive theory applied in this study – the underdevelopment of agricultural financial processes, the reporting thereon and the unimportance of financial results in decision-making by the users thereof, resulted in incomparable financial results on biological assets – were detailed in this chapter.

Literature studies on the reporting on biological assets were explored to identify the industry norms, the valuation methods applied and the challenges experienced in such reporting. Inconsistent and incomparable financial results are produced in the industry due to the variety of valuation methods applied and the challenges experienced to value the biological assets.

The challenges experienced to fairly report on biological assets, being the importance of decision-enhancing information to the users of the reports; the importance of environmental reporting to the users of the financial statements; the ethical behaviour of the reporting industry; the risk of manipulating financial data; communication challenges; a lack of technical expertise to value and account for the assets; the excessive costs to perform biological asset valuations and the perception of the auditors expressing an opinion on the valuation methods applied, were contextualised to inform the focus areas of the research required in chapter four of this study.

The developments impacting on the valuing and reporting of biological assets were contextualised to allow further research therein in chapter four and a consideration thereof in the developed application guideline in chapter five. These developments considered the reporting on bearer plants, the importance of environmental reporting for decision-making by the users of the financial reports and the impact of land claims on the agricultural operations undertaken.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The cognitive theory developed in chapter two was explored through qualitative, empirical research. This qualitative research design was substantiated with the accompanying research methods, addressing the sampling methods and the execution of the pilot study.

This empirical research study was performed in four phases, where phase one, as the pilot study, determined the purposively selected research sample. Phase two was content analyses of annual reports of the purposively selected organisations selected in phase one. Closed and open-ended questionnaires were utilised in phase three, while phase four focussed on data collection by means of interviews. The data collection requirements, importance of the required data and the location thereof were detailed to comprehend the importance of each phase of this study.

The procedures applied to analyse the collected data, by means of coding and flowcharts; the computerised programs required to analyse the data; the confidentiality of the data; understanding the collected data and the consideration of the grounded theory method were discussed to comprehend the research methodology of this study. The sensitivity of the required data, the limitations of this study and the ethical considerations that needed to be recognised throughout this study were further addressed

3.2 Cognitive theory

As detailed in section 2.2 the cognitive theory directed the study to obtain data on the methods, assumptions, calculations, challenges and decisions taken by accountants and management in their valuing of the assets. This research was therefore concerned with descriptive data and the interpretation thereof and not the actual values itself. Boeije (2013:11) classifies the interpretation of narrative data as qualitative research, with the aim to 'describe and understand a phenomena through

flexible methods that produce rich, descriptive data that need to be interpreted through identification and coding of themes and categories leading to findings that can contribute to theoretical knowledge and practical use'. Silverman (2013:4) categorised research as either qualitative or quantitative. Quantitative research is concerned with the use of numbers and behaviour whereas qualitative research focusses on the analysis of words, conceptual meanings and detailed case studies (Whittemore, Chase & Mandle, 2001:524; Silverman, 2013:4). Silverman (2013:5) regards flexibility, speculative theories, and subjectivism as characteristics of qualitative research methods, with quantitative methods featuring as fixed, objective and more abstract. In this study the use of fixed data and the analysis of numbers and behaviours will not contextualise the unique challenges experienced in the valuation of biological assets. Qualitative research methods were preferred over quantitative methods as the latter would not produce a contextualisation of narrative information for further analysis (Carter and Little, 2007:1316; Denzin, 2009:147).

The analysis of narrative procedures, methods, calculations, assumptions and challenges experienced in the valuation of biological assets required that the researcher almost simultaneously collected data and analysed it to create the flexibility for follow-ups with the respondents. This ensured that the analysis of information is per the understanding and actual implemented process of the respondent. This was an inductive study (Merriam, 2002:5; Trafford and Leshem, 2008:96) as it required creativity and flexibility when analysing data (Whittemore, *et al.* 2001:526). Constant data collection and analysis created a research cycle where 'each cycle fuels the next one in order to build knowledge' (Merriam, 2002:5; Carter and Little, 2007:1317; Boeije, 2013:13).

An analysis of the individual 'cycles' feeding each other to account for and value biological assets were achieved with qualitative research methods as its 'greatest strength' (Silverman, 2013:413) was the 'ability to analyse what actually happens in naturally occurring settings'. With qualitative research methods addressing the 'how' and the 'what' of identified problems the contextualising of data is a benefit of this method. An advantage of qualitative research methods is that it allows rich descriptions and the contextualising of information. The interrelationship between the

elements uncovered the ‘how’ and the ‘why’ to the valuation challenges and techniques on biological assets (Silverman, 2013:437).

As the unique organisational challenges experienced in the valuation of biological assets needed to be contextualised in relation to the business operations; user’s expectations; and the valuation judgements, table 3.1 illustrates the extended characteristics of the qualitative research method that incorporates the detailed descriptive analysis.

Table 3.1: Characteristics of qualitative research

Some simple characteristics of qualitative research
Often begins with a single case, chosen because of its convenience or interest;
Often studies phenomena in the context in which they arise through observation and/or recording or the analysis of printed and internet material;
Hypotheses are often generated from the analysis rather than stated at the outset;
There is no agreed way to analyse your data. Multiple research models exist such as grounded theory, constructionism and discourse analysis; and
Where numbers are used, these are usually in the form of simple tabulations designed to identify deviant cases and not to lead to statistical correlations or tests.

Source: Silverman, 2013:5

To interpret the assumptions, procedures, methods, calculations and challenges experienced by organisations to value biological assets, the context of the processes were analysed and recorded. This study focussed on the underlying information that informs the valuations done in organisations. The accountants, auditors, management and users of the financial statements have their unique expectations of valuations, and naturally about this study. Silverman states that different audiences have different expectations of qualitative research (table 3.2) and that the researcher should be mindful of such expectations to produce a quality research product.

Table 3.2: Audiences and their expectations of qualitative research

Audience	Expectation
Academics	Theoretical, factual or methodological insights
Policy-makers	Practical information relevant to current policy issues
Practitioners	A theoretical framework for understanding clients better; factual information; practical suggestions for better procedures; reform of existing practices
The general public	New facts; ideas for reform of current practices or policies; guidelines for how to manage better or get better service from practitioners or institutions; assurances that others share their own experience of particular problems in life.

Source: Silverman, 2013:422

In this study the main audience was the practitioners involved in the valuation of biological assets. They are the knowledgeable parties that can provide detailed information on the key concepts needed to be analysed. These practitioners contributed significantly as their daily procedures/methods already applied were documented and conveyed for analysis in this study. The researcher had the opportunity to assess the respondent’s valuation procedures to contextualise the industry norms and challenges. By consulting practitioners there was a familiarity with the requested information. This had an advantage as the ‘research method allows rich descriptions of everyday practice which enable practitioner audiences imaginatively to juxtapose their own every day practises with the research description’ (Silverman, 2013:437). Qualitative research methods targeting practitioners had the added benefit to influence the practitioners directly involved in the study as well as those practitioners that will read and find an interest in the outcome of the study (Silverman, 2013:426), contributing to the developed cognitive theory.

In a qualitative research project, the researcher might influence the outcome of the research when the knowledge and experience of the researcher were used as direction of the study, i.e. ignoring objectivity. Horsburgh (2003:308) states outright that qualitative research cannot be detached from the researcher as he/she is an

integral component of the undertaken study. The researcher was actively aware of the objectivism required to be maintained during the research process as actions and decisions taken by the researcher impacts on the 'meaning and context of the experience under investigation'. A mitigating control established to ensure that a reliable and verifiable research study was produced, was to document every step of the research process. Such documenting allows for the contextualisation of the data on interpretations, meanings, evidence and conclusions reached (Horsburgh, 2003:309; Freeman, deMarrias, Preissle, Roulson & St.Pierre, 2007:26). Research rigour to mitigate incorrect interpretations to enhance the reliability and the validity of the study included the safekeeping of all audit trails, coding consistency checks, confirmed all interview results with the participants, corroborated information and the use of updated financial information (Morse, *et al.* 2002:2). Audit trails included the factors considered by the researcher on the rationale to decisions taken as it was acknowledged that these trails cannot justify the responsiveness or sensitivity of data to others (Morse, *et al.* 2002:7). The constant rigour ensured that this study was considered worthwhile as it demonstrates truth, applicability, consistency and neutrality (Morse, *et al.* 2002:4). Furthermore, the researcher was responsive, accommodated changing circumstances, was sensitive and ensured correct interpretation by summarising responses received to contribute to a credible study (Morse, *et al.* 2002:5).

3.3 Research design

The development of an application guideline to fair value biological assets was a study of external documentation submitted by research participants via questionnaires. It was thus an empirical, descriptive, qualitative study of the underlying documentation and detailed industry challenges. A qualitative study of this nature allows the in-depth analysis, contextualisation of narrated information and the immediate follow-up on uncertainties. Overdrawn contrasts of the data analysed and the challenges experienced to fair value biological assets (Seale, 1999:466; Merriam, 2002:5; Trafford and Leshem, 2008:98; Hofstee, 2010:113–114) were detailed as an application guideline for the industry.

The strength of a qualitative study was that the hypothesis could be explored throughout the research to guide the follow-up questions and related analysis of information. The use of questionnaires were considered the best research method to obtain the required data as it allowed the elicitation of information from knowledgeable research participants who were presumed to have the information needed. These knowledgeable participants acted as a representation of a larger group and assisted the researcher to sufficiently develop the application guideline (Trafford and Leshem, 2008:98; Hofstee, 2010:113–114).

Questionnaires had the advantage that it allowed for the use of open and closed-ended questions. A combination of questions assisted the research to limit the participant's time required to respond to closed-ended questions and allowed for detailed descriptions and background in open-ended questions. Questionnaires could be used to obtain sensitive information by applying closed-ended question techniques that limited the participant's exposure.

The distribution of questionnaires via email to the participants was fast, reliable and allowed for follow-up communication. The traditional mail via the Post Office might have interrupted the research when delays were experienced with striking officials, the mail was not delivered timely to the addressed participant and follow-up communication could have been lost or delayed. Email transmission allowed the researcher to address a comprehensive group of respondents in a time efficient manner. There was a disadvantage on the use of questionnaires in that the researcher might have blindly compare information received from a diverse range of respondents and make overdrawn conclusions on the information at hand. Caution were exercised to ensure that the information gathered in this research project was sufficiently coded, contextualised and clarified with participants before concluding and generalising.

Information on the background to the accounting methods and techniques applied to fair value biological assets and the insight into the challenges experienced to apply such valuation was also achieved through interviews and content analysis (Thani and Wessels, 2011:79). Such interviews gave the researcher the opportunity to analyse the detailed background to challenges and users' expectations of financial reports

(Sandelowski, 2000:338; Creswell, 2003:4; Turner, 2010:756). Interviews and content analysis were not used as single research methods, but rather mixed with the use of questionnaires. Questionnaires allowed for faster and structured feedback whereas interviews allowed immediate follow-ups on uncertainties with the respondent. Interviews might have delayed the research as the travel expenses increase the resources needed in this study, the additional time required to arrange interviews and language barriers that might exist. As such interviews were not selected as the only research method. Preference was given to person-to-person interviews, yet electronic interviews by means of Skype, email communication and telephonic interviews were utilised to enhance the success of the interview process. Content analysis allowed the researcher to analyse the valuation methods applied to get insight information in the transaction history of events but did not give the researcher the contextualisation and the finer explanations on why methods were applied and why management preferred certain techniques over other available methods. The combined use of questionnaires, interviews and content analysis was the most suitable, cost-saving, time-efficient and fitting research method to obtain the required input required for the study (Trafford and Leshem, 2008:98; Hofstee, 2010:113–114).

Interviews were used to obtain the inputs from the decision makers on their recommendations on biological asset disclosure. Interviews were regarded as a “hands-on inquiry” and were regarded as a strong research design (McCaslin and Scott, 2003:448). Interviews allowed the researcher to understand the experiences of the various user groups in their assessment of financial information and were regarded as a suitable research method as it was successfully applied by Eksvärd in her research on sustainable agriculture (Merriam, 2002:4; Eksvärd, 2014:312; Akhavan and Dehghani, 2015:18). The use of the questionnaires, the content analysis of the financial statements and the integration with the results from the interviews with various user groups provided a holistic assessment of the disclosure requirements on agricultural activities (Merriam, 2002:5; McCaslin and Scott, 2003:448; Akhavan and Dehghani, 2015:18). The interviews allowed the researcher to build concepts and perform immediate follow-ups with the respondents (Merriam, 2002:5). Care were taken to not be biased or to pre-apt responses as the purpose of the interview was to understand and analyse the implementation challenges and

related recommendations from the participant's perspective (Merriam, 2002:6; Denzin, 2009:150). The collective use of content analysis of the financial information published by organisations, supported by the completion of questionnaires by subject-knowledgeable individuals and the interview of various user groups on the published information assisted the researcher to contextualise the industry's users' behaviour (Seale, 1999:473; Creswell, 2003:4; Reischauer, 2015:281).

3.4 Research methods

As detailed in the problem statement, the non-existence of an application guideline for the fair value accounting of biological assets resulted in the inconsistent implementation and disclosure of these assets (Maina, 2010:174; Ossip, 2011:11; Burykin, *et al.* 2011:131; Elad and Herbohn, 2011:94; Van Biljon, 2013:115; Rozentāle and Ore, 2013:57). To develop an application guideline the valuation methods applied by organisations, the assumptions, techniques and judgements and the unique challenges experienced in the valuation process were documented and analysed. Such analysis identified the overarching principles, challenges and circumstances that hinder valuations. This was developed into an application guideline for the industry.

This study was performed in four phases:

- In the first phase the researcher contacted the accounting authority/accounting body/audit regulator/accounting standard setter of a sample of ten countries to request a comprehensive list of organisations that apply or are required to apply the principles of IAS 41 or equivalent. Phase one served as the pilot study in this research.
- The researcher selected a sample of organisations, identified in phase one, and researched them online. The annual reports of these organisations were downloaded and when not available, requested. A studied sample of 50 organisations reporting on the 2012 to 2014, and where available 2015, financial years were considered to be a sufficient research sample. Should subsequent financial reporting be available, it was considered in the study. In the event of insufficient responses in phase one, the farming operations of the

selected countries were researched to allow the identification of organisations that operates with biological assets.

- A computerised questionnaire via Survey Monkey was send to the researched organisations (phase two) to determine how the organisations account for and value biological assets. The questionnaire determined whether the organisations experienced challenges in the fair valuing of biological assets. Where participants were willing to detail their unique challenges an open-ended questionnaire was communicated to obtain detailed background, calculations, assumptions and narrative descriptions on the valuation methods and challenges experienced.
- The users of financial statements were categorised into ten groups for the purposes of this study. These were: 1. Auditors; 2. Accountants; 3. Academics and researchers; 4. Financial statement compilers; 5. Governance; 6. Standard setters; 7. Regulatory bodies; 8. Owners; 9. other users and 10. Investors. Interviews were conducted with individuals from each of these purposively selected groups. The ten groups of purposively selected users were interviewed to collect data on the users' expectations of financial reports and their recommendations on reporting improvements to enhance decision-making.

Based on the outcome of the challenges, techniques and expectations of the industry the researcher developed an application guideline to assist with the accounting treatment and valuation of biological assets at a fair value. This guideline were distributed to a sample of users for further recommendations to ensure that the application guideline assists the valuers and the users to produce decision enhancing fair valued financial statements.

3.4.1 Sampling and pilot study

The requirements of IAS 41 are only applied by organisations that hold or operate in biological assets. As such, the population to this study were the organisations required to comply therewith. As the population needs a homogenous characteristic, operating in biological assets, research should be done on organisations that have the probability of such reporting. Purposive sampling, thus non-probability sampling,

can therefore be done by the researcher to identify organisations that holds biological assets. A qualitative research project allows for the purposive sampling of organisations, so organisations that did not hold or operated in biological assets were excluded from this study (Carter and Little, 2007:1318; Boeije, 2013:35).

To determine the population, the accounting regulators/accounting standard setters/accounting bodies regulating the accounting profession of ten purposive selected countries were contacted to request a list of organisations required to apply the requirements of IAS 41 (Boeije, 2013:35; Saris and Gallhofer, 2014:9). The identified organisations were researched and contacted to obtain their annual reports for content analysis. Where the contacted accounting body were not able to provide the researcher with the list of IAS 41 reporting organisations, the farming operations of the country was researched. Therefrom the leading agricultural organisations of the researched country were identified to allow inclusion in this study. A sample of 50 annual reports covering the financial periods from 2012 to 2014, and where available 2015, was considered a representative sample for the qualitative content analysis in this study. Where subsequent financial reports were available for research, it was included in the study.

The annual report analysis detailed the accounting policies, the valuation method and the disclosure outlay and related priority of the researched organisations. This allowed the researched to identify the industry trend, the challenges experienced, and the consistency of organisational reporting and across organisations. The information gathered in the content analysis directed the questionnaires and the interviews that form the remainder of this study.

3.4.2 Research instrument

The data required consisted mainly of detailed descriptions, narrative background to valuation methods, techniques, transaction background and narrated challenges experienced by organisations in the valuation of biological assets. Required data was descriptive, detailed and communicated by knowledgeable individuals with experience to relay the valuation methods and accounting principles (Merriam, 2002:5).

3.4.2.1 Closed questionnaires

The sample of organisations researched in the pilot study were contacted by means of a structured, closed questionnaire to reveal specific measures and accounting treatments applied on the valuation of biological assets (Boeije, 2013:35). The questions were clear, concise and straight forward. The questionnaires were aimed at the informed financial professionals responsible for financial reporting of the biological assets that could provide explanations and additional information and assistance to the study. Annexure J details the closed questionnaire developed in this study.

The annual reports analysed via content analysis in the pilot study were expected to disclose the minimum qualitative information to comply with IAS 41. The detailed background and underlying importance of biological assets were not disclosed. Therefore questionnaire aimed to identify it as well as the nature of biological assets held, the valuation technique, the frequency of valuations, individual responsible for valuations, valuation challenges and the organisations' willingness to participate further in this study. The industry valuation trend could be identified with an analysis of the responses to the closed questions (Creswell, 2003:9; Bowen, 2005:218). The direction of the trend was more important for the purposes of this study than the actual value of the biological asset as the researcher were able to determine compliance with the requirements of IAS 41 linked to a financial indicator on non-complying organisations.

With clarity on the type of biological assets held, the purpose of holding such assets, the accounting treatment thereof and whether the organisation was willing to participate in the study, the researcher transmitted open-ended, technical questions by means of questionnaires to the participants (Creswell, 2003:9; Trafford and Leshem, 2008:99; Hofstee, 2010:115–116; Saris and Gallhofer, 2014:9).

The sampling methodology was purposive; thus directed at the participants that held or operated in biological assets. Their valuation methods and challenges were individually analysed to meet the objectives of this study (Horsburgh, 2003:311) with

each organisation providing a large amount of information (Boeije, 2013:36). This qualitative research study aimed to determine an industry norm of the valuation techniques, methods and challenges on biological assets where replicate findings were avoided (Freeman, *et al.* 2007:25; Boeije, 2013:36). This sample selection method ensured that the research project was objective and not influenced by the researcher as the researcher were not able to randomly select or predetermine which organisations to include in the study (Saris and Gallhofer, 2014:9).

The use of questionnaires allowed the researcher to include a broad spectrum of organisations in the research. The questionnaire explained the nature, scope and context of the study to allow the organisations to make an informed decision on whether or not to participate (Saris and Gallhofer, 2014:4). Questionnaires caused minimal discomfort for the participants and were considered time efficient and convenient and it did not bear costs to the research participants (Saris and Gallhofer, 2014:64).

The study was delayed when questionnaire responses were not received necessitating follow-ups thereon. In this qualitative study, the relevance and quality of the information was regarded more important than the actual sample size, so limited feedback did not restrict the research project and did not impact negatively on the development of the application guideline. Silverman (2013:70) emphasises that qualitative studies should not concern itself too much on the sample size to be tested as theoretical sampling is more important than the sample size itself (Carter and Little, 2007:1318; Freeman, *et al.* 2007:29). He clarifies that theoretical sampling is a process of constantly collecting new data to verify hunches and to fill the knowledge gaps identified in the grounded theory coding approach. The process of constantly collecting data should end when the study does not yield new information; i.e. when labels (from the coding process) are saturated with data (Sandelowski, 2000:338; Morse, *et al.* 2002:10; McCaslin and Scott, 2003:448; Silverman, 2013:71). The researcher performed follow-ups on unresponded questionnaires and developed procedures to identify additional organisations that adhere to/are required to adhere to IAS 41 where the sample to the study were considered a scope limitation. However, such limitation did not occur (Trafford and Leshem, 2008:99; Hofstee, 2010:115–116).

Survey Monkey allowed for on-line assessments, tracking of outstanding questionnaires and immediate follow ups with respondents. Follow up questions were be distributed via Microsoft Outlook when corroborating documents and additional information was required (Trafford and Leshem, 2008:99; Hofstee, 2010: 115–116).

3.4.2.2 Open-ended questionnaires

Questionnaires allowed the research participants to document the requested information; devoted time to accurately relay the information requested and produced reliable information on the actual valuations performed in their organisations (Hofstee, 2010: 115–116; Saris and Gallhofer, 2014:4). The use of questionnaires allowed the participants to rework responses into a structured process relay as it allowed ample time to rethink, reread and consider the procedures applied. Especially as participants differed in their ability and willingness to respond to questions considered personal or difficult to interpret. Open-ended questions had an advantage of allowing the participant to express their thought process, knowledge and opinions. The analysis of the feedback required time and procedures to confirm the correct interpretation of the results with the participant (Hofstee, 2010:122). The use of questionnaires had a disadvantage in that it restricts physical interaction with the respondents. This was mitigated by including background information to the study as introduction on the questionnaires. Follow up communication, telephone interaction, Skype interviews and email transmissions for the collection of corroborating documentation built trust with respondents and assisted to serve as alternative for the lack of physical interaction (Hofstee, 2010:132–134). Annexure K details the open-ended questionnaire developed in this study.

Questionnaires were attractively designed and presented in a professional manner. The logo of Unisa was included to promote the document as official communication. The questionnaires were not cluttered, it was as short as possible to minimise boredom and inconvenience to research participants. It was believed that the less inconvenient a questionnaire was to complete (thus short, concise, easily understood, direct, limited use of abbreviations and with audience specific accounting jargon) the more inclined a research participants would be to respond thereto

(Hofstee, 2010:132–134). The questionnaire was neutrally designed. This avoided the influencing of the response by the researcher. It was subjective and did not contain personal, controversial or discomforting questions. As the study did not focus on neutral information, such options were not included in closed questions (Hofstee 2010:134). The completed questionnaire was submitted to Unisa for approval before distribution to prospective research participants. Responses to the questionnaires were limited and delayed. A control was to send a reminder of the outstanding questionnaire to the prospective participant.

The use of questionnaires in this study was considered the best suitable research instrument to collect additional qualitative data to supplement the content analysis on the annual reports. By limiting the study to a content analysis, the unique challenges and background or history to the underlying transactions and the management assumptions applied to the valuation would not have been known. These important factors would then have been excluded from this study. This study therefore aimed to corroborate and expand on the information analysed during content analysis to enhance the reliability of the study. The elaborated data allowed the researcher to apply cognitive judgement and a rationale of the industry's valuation techniques (Morse, *et al.* 2002:3; Hofstee, 2010:115; Saris and Gallhofer, 2014:47). The researcher focussed on the trustworthiness of the information throughout the study to limit any threats that might have impacted on the reliability at conclusion (Seale, 1999:467; Morse, *et al.* 2002:4; Denzin, 2009:149).

The respondent had the opportunity to emphasise the demographic variables that impacts on their valuation process. These variables included their country's unique tax laws, accounting regulatory prescriptions and the organisation's dependence on agriculture (Saris and Gallhofer, 2014:47).

Subjective variables that were considered in the questionnaire included the importance of biological assets to the respondent, the importance of agriculture and the related agricultural processes, the preferences of the accounting treatment applied and the expectations created on how the fair valuing of biological assets might impact on the financial results of the organisation (Turner, 2010:756; Saris and Gallhofer, 2014:47). Objective variables included in the questionnaires concentrated

on the knowledge of the valuers, the quantities to be valued and the procedures applied to value the biological assets. The respondent's descriptive feedback on the questionnaires granted them the opportunity to detail their assertions and views on the relationship between their challenges and unique transactions and the methods applied to value the biological assets. This subjective view was useful to the study as trends were identified on how the industry resolves their valuation challenges (Saris and Gallhofer, 2014:43).

The researcher was polite at all times and paid attention to the structuring of sentences and the correct use of grammar to demonstrate commitment and professionalism throughout this study (Saris and Gallhofer, 2014:66,115). As questionnaires do not require the presence of the interviewer or researcher the questionnaires' introduction, content and structure reflected a professional communication mode (Saris and Gallhofer, 2014:48). The questionnaires were developed and transmitted by means of electronic transmission through Survey Monkey, assisted by Microsoft Outlook for the collection of detailed organisational documents as corroboration to the responses provided, where required (Saris and Gallhofer, 2014:99). The order of the questions was presented in a logical manner. Consideration was given to the quality of the questions and a professional and clear layout with easily understood "English questions" as language barriers might have restricted the respondents to correctly interpret the questions (Saris and Gallhofer, 2014:148). The questionnaires avoided double-barrelled requests in so to focus on one area per question by posing clear and direct questions and the use of simple, understandable questions. To restrict the researcher from influencing the responses, assumptions were not included in the questionnaires (Saris and Gallhofer, 2014:83). The questionnaires aimed to focus on the specific research areas detailed in table 3.3.

Table 3.3: Focus areas of the questionnaire

Focus area	Application in this study
Which/ Preference	<ul style="list-style-type: none"> • The respondent's preferred method to value biological assets; • The respondent's attitude towards the application of fair valuing principles on biological assets; and • The respondent's preferred accounting treatment of biological assets.
What/Subject	<ul style="list-style-type: none"> • The respondent's motive to accounting for the biological assets; • The respondent's behaviour towards agriculture, agricultural transformation and the valuation of biological assets; and • The subjective and objective considerations applied by the respondent when accounting for and valuing biological assets.
How	<ul style="list-style-type: none"> • The procedures established by the respondent to account for biological assets; • The methods developed to value the biological assets; • The demographic considerations that impact on the valuation of the biological assets, like taxation laws, language, accounting regulatory requirements; • The opinion of the stakeholders and users of financial information on the valuation methods applied on biological assets; and • The quantity of biological assets held and valuation methods ad frequency.
Intensity	<ul style="list-style-type: none"> • The reasons for not applying fair value principles of IAS 41; • The expected changes to the financial results when the requirements of IAS 41 is applied; • The challenges experienced by the organisation to apply the fair valuing principles on biological assets; and • The respondent's solution to the experienced challenges.

Source: Saris and Gallhofer, 2014:72

3.4.2.3 Interviews

The various users of financial statements were analysed and categorised into ten groups to represent the various interests parties have in financial information (Turner, 2010:757). The groups were based on user groups identified in studied literature: investors, suppliers, lenders, employees, government, customers, community, academics, policy makers, practitioners, the general public, owners, creditors, business partners and stock markets (Sedláček, 2010:59; Deegan and Unerman, 2011:32; Silverman, 2013:422; Mitropolitski, 2015:3; Stonciuviene, *et al.* 2015:64). The identified groups were assessed and collapsed to base this research on the following ten user groups:

1. Auditors;
2. Accountants;
3. Academics and researchers;
4. Financial statement compilers;
5. Governance;
6. Standard setters;
7. Regulatory bodies;
8. Owners;
9. Other users; and
10. Investors.

These user groups are researched and a purposive sample of two individuals was selected from each group to interview. Interviews took approximately one hour. The interviews were conducted at a place convenient for the participant and in the chosen interview model, i.e. in-person, telephonically, via email communication or with Skype. It was important that the participant was comfortable with the interview model to allow the participant to respond openly by accommodating them emotionally (Turner, 2010:757; Mitropolitski, 2015:3). Telephonic interviews, Skype sessions and email correspondence allowed the researcher to conduct the research on interested participants and not limit the research to local users as travel time and funds would have impact negatively on the study.

Interviews were conducted in English and were tape recorded. Individual interviews were performed to ensure that the participants could portray their views and

recommendations and not be influenced by the opinions of others, requiring a defence of one's opinion (Mitropolitski, 2015:5). A notebook was used to take notes with caution used to not avoid eye contact with the participants, to not miss out on information relayed and to not make sudden unexpected movements that might have impacted on the responses relayed (Mojtahed, *et al.* 2014:93; Mitropolitski, 2015:7). Interviews was semi-structured, to allow the participant to relay their personal opinions and recommendations on the interview questions (Reischauer, 2015:287). Semi-structured interviews gave freedom to both the participant and the researcher and it allowed for immediate follow-up questions to be posted and, where needed, clarity on posed questions (Mojtahed, *et al.* 2014:87; Reischauer, 2015:287). As the qualitative interview was a complex research method, care were taken to understand the relayed information in the manner it was intended by the participant. As such, the posed answers were typed up by the researcher after the interview and shared with the participant to ensure that the captured information was a true reflection of their opinions (Mojtahed, *et al.* 2014:87) to avoid the personal interpretation of words and phrases and focus on the intended perceptions (Sandelowski, 2000:335; Denzin, 2009:150; Mojtahed, *et al.* 2014:88). Annexure L details the interviews conducted in this study.

This qualitative research study was performed by using content analysis, questionnaires and interviews to obtain the required data to develop the application guideline to fair value biological assets. The limitations identified with the use of these research tools did not impact on the reliability or comprehensiveness of the study (Hofstee, 2010:116).

3.4.3 Data collection

The development of an application guideline to fair value biological assets was based on the assessment and contextualisation of the unique challenges experienced by organisations, their valuation procedures, assumptions, judgements and calculations to address these challenges and the users' expectations of such financial reports. The study detailed comprehensive findings on good quality data collected from the participants (Hofstee, 2010:117). To produce good quality research findings the collection of data and the analysis thereof was done simultaneously (Morse, *et al.*

2002: 7; Horsburgh, 2003:311) – especially as it immediately allowed follow-ups and clarity required to address the research objective (Merriam, 2002:14).

The integrity of the data was ensured by documenting the information as the true reflection of the information communicated by the respondents (Freeman, *et al.* 2007:26). This ensured that the subjective meaning of the information was conveyed (Sandelowski, 2000:336; Horsburgh, 2003:2130). The detailed explanations and narrative information on the valuation challenges experienced was corroborated to audited or approved financial statements and the audit report.

3.4.3.1 Data required

To assess the valuation methods, assumptions and underlying challenges in the fair valuing of biological assets, the following data was required:

Table 3.4: Data required for the execution of this study

Data required	Purpose of collecting data for this study
Objective variables	
Management judgement’s and assumptions applied in the valuation of the biological assets	<p>To record, value and account the biological assets in the financial records of an organisation management will assess whether the organisation controls the biological assets, whether future economic benefits will accrue to the organisation as a result of these biological assets and determine the value of these assets (ASB, 2012:9).</p> <p>As part of the initial recognition management will assess the present location and condition of the assets to determine the fair value (IASB, 2013b:A491). The test for control of the asset are considered on the legal ownership, the costs to sell the assets, the grouping of the assets, the market prices and the cost of acquiring the assets (ASB, 2012:10). The assets can be recorded in the financial records after these considerations.</p>

Data required	Purpose of collecting data for this study
	<p>IFRS 13 should also be considered in the initial recognition and recording of the biological assets. IFRS 13 requires the valuer/management to consider the ‘market participant’s ability to generate economic benefits by using the assets in its highest and best use or by selling it to another market participant that would use the asset in its highest and best use’ (IASB, 2013b:A493). In the consideration of the highest and best use of the asset, the asset’s legal (legal restrictions, zoning), financially feasible (adequate income, cash flows, costs of conversion, return on investment) and physical (location or size) use should be considered and detailed by management. This ‘highest and best use’ value is calculated from the perspective of the market participants regardless of the actual or intended use of the biological assets (IASB, 2013b:A494).</p> <p>The reasoning, assumptions, the transactional background, the market indicators, the various uses of the biological asset and the factors considered by management to account for the biological assets clarified the various inputs considered in the initial recording of these assets. Recognition trends could be identified and the solutions applied by organisations to recognise the assets might resolve the challenges experienced by other organisations.</p> <p>Importance of data: The accounting policies and the unique input factor considerations on how and when to account for biological assets were detailed by the compiler of the financial statements. This clarified their interpretation of such policies. It was important for the purposes of this study that the researcher understood the valuer’s/management’s interpretation of the accounting treatment in relation to IAS 41. This assisted to</p>

Data required	Purpose of collecting data for this study
	<p>establish whether the challenges experienced by the organisation to fair value the biological assets were addressed by solutions applied by others.</p> <p>Location of data: The assumptions, judgements and other valuation considerations were detailed by the compiler of the financial statements or the valuer or management. The information was obtained directly from the research participants via Microsoft Outlook or Survey Monkey responses.</p> <p>Strength of data required: The assumptions, estimates and judgements applied was documented by the compiler or valuer. As this information was not documented in the financial statements an understanding thereof clarifies why management did what was done and how this impacted on the valuation process.</p> <p>Weakness of data required: Management might not have documented all the considerations and estimates applied in the valuation process. As the information required was based on their real-time experiences and knowledge application, the researcher would not know if the relayed information was incomplete.</p> <p>Sufficiency of data: The information was documented by the valuer based on valuations already performed. The financial statements and accounting policy were analysed and linked to the judgements and estimates documented.</p> <p>Quality of the data: The information was obtained first handed from the valuer or compiler of the financial statements. He/she</p>

Data required	Purpose of collecting data for this study
	<p>had subject knowledge of accounting and valuations and would interpret and relay the technical jargon used in IAS 41. The accounting policies approved with the financial statements contextualised the data.</p> <p>Completeness of data: As the judgements and estimates applied informed the value of the biological assets, the approved and/or audited financial statements and accounting policies corroborated the information communicated.</p>
<p>Preferred valuation method; and Procedures applied to value the biological assets</p>	<p>GRAP 27, paragraph 14, requires that biological assets 'shall be measured on initial recognition and at each reporting date at its fair value less costs to sell, except where fair value cannot be measured reliably'. To determine the fair value various methods like the net present value; the historic cost; the market prices of similar assets; an independent valuation; recent market prices for the biological asset or even the lower of cost and net realisable value (Elad and Herbohn, 2011:94). These methods cannot merely be criticised when IFRS 13 defines fair value as 'the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date' (IASB, 2013b:A491).</p> <p>IFRS 13 provides guidance on the valuation method as paragraph 61 clarifies: 'An entity shall use valuation techniques that are appropriate in the circumstances and for which sufficient data are available to measure fair value, maximising the use of relevant observable inputs and minimising the use of unobservable inputs' (IASB, 2013b:A500). IFRS 13 guides the valuation method further as three 'widely used valuation techniques' are identified: (a) market approach; (b) cost approach; and the (c) income approach (IASB, 2013b:A501).</p>

Data required	Purpose of collecting data for this study
	<p>The standard does not aim to prescribe the valuation method and technique to be applied to fair value biological assets. Instead, it guides management through an assessment and judgement process to evaluate the conditions and factors that impact on their biological assets.</p> <p>The valuation method applied by management were detailed to allow the researcher to analyse the assumptions, techniques, the actual method of valuation and the challenges experienced in the valuation process. The data was contextualised to determine the market trends and to assist organisations that apply similar methods and assumptions to address their experienced challenges.</p> <p>Importance of data: The valuation method/technique, the step-by-step procedures followed and the actual application of the valuation method were detailed to clarify how the organisation performs valuations. An analysis of the valuation methods clarified the organisation’s interpretation of fair value in terms of IAS 41. These valuation methods were linked to the challenges as the procedures applied by one organisation might address the challenges experienced by another.</p> <p>Location of data: The valuation methods were summarised in the accounting policy included in the financial statements of the organisation. The underlying techniques and the finer details of exactly how the valuation process was done should be documented by the research participant in response to the questionnaires as this detailed information informed the contextualisation of the accounting policy itself. The response was submitted via Survey Monkey and where the documents exceed the allowable size, via Microsoft Outlook.</p>

Data required	Purpose of collecting data for this study
	<p>Strength of data required: The valuation method applied on the biological assets was documented and explained by the compiler of the financial statements or the valuer of such assets. The detailed description of the valuation method clarified exactly how the biological assets were valued as it did not form part of the financial statements.</p> <p>Weakness of data required: The valuation method was explained by the valuer of the biological assets. Procedures applied or factors considered might not have been documented and this oversight would not be known by the researcher.</p> <p>Sufficiency of data: To document the valuation method applied in a step-by-step procedure manual, the derived financial results could be analysed and contextualised. Valuations were mainly performed on the available market information and with the assessments and judgements considered by the valuer. With clarity on the applied accounting treatment and the procedures followed, the accounting policy and financial statements could be better understood.</p> <p>Quality of the data: IAS 41 prescribes that biological assets should be disclosed at a fair value, and IFRS 13 highlights three commonly used valuation methods, i.e. market values, the cost consideration and the expected income approach. As there are no procedural steps informing exactly how management is to go about the actual valuation, this information was needed to address the challenges experienced by other organisations to guide them through the valuation process. The information was obtained 'first-hand' from the valuer to ensure the reliability thereof.</p>

Data required	Purpose of collecting data for this study
	<p>Completeness of data: The fair valuing procedures were scrutinised by the researcher to analyse whether it is logical and concludes at the actual valuation. Any uncertainties were followed up with the valuers.</p>
<p>Qualifications and expertise of the valuer</p>	<p>The fair valuing of biological assets requires subject knowledge, experience, organisational knowledge and background to the underlying transactions where the biological assets were recorded. Depending on the valuation technique/method applied to fair value the biological assets, the valuer is expected to have knowledge about the markets in which the biological assets are traded, the costs of the biological assets and the expected income to be generated from the use/sale of these assets (IASB, 2013b:A501).</p> <p>For the purposes of this study, the academic qualifications of the valuer, his/her experience and his/her relationship with the organisation was established to determine if organisations had the capacity and skills in-house to value the biological assets. Trends on the experience and qualifications required to perform valuations were determined.</p> <p>Importance of data: The verification of the expertise and formal qualifications of the valuers and his/her relationship with the organisation allowed the researcher to determine the industry trend on who performs valuations. It could be established whether organisations have a shortage of in-house skills and expertise; whether the outsourcing contributed to the valuation costs exceeding the related benefit thereof and thus the non-implementation of IAS 41; and what qualifications were required to perform the valuations in these organisations. It was believed that a majority of the challenges experienced by</p>

Data required	Purpose of collecting data for this study
	<p>organisations in the valuation of biological assets were informed by the lack of expertise or qualifications to perform such valuations.</p> <p>Location of data: The valuer’s expertise, qualifications and the relationship with the organisation were detailed by the respondent via Survey Monkey. Except where there was reasonable doubt on the expertise and/or qualifications, it would not be vetted as it might have deterred the relationship with the research participant.</p> <p>Strength of data required: A challenge identified from prior studies on the valuation of biological assets was the technicality and subject knowledge required thereon. The verification of this challenge was done directly with the valuers when establishing the required skills, expertise and qualification required for these valuations.</p> <p>Weakness of data required: As the study did not aim to discredit individuals or interrogate their methods, the qualifications held were not corroborated to academic qualifications. The researcher needed to be sensitive in the request for this information to not create the impression that the work performed by the organisation was incorrect, insufficient or in any manner discredited in this study.</p> <p>Sufficiency, quality and completeness of data: The information communicated by the valuer/financial statement compiler were accepted as complete and correct as the study did not aim to discredit the work of these professionals. The aim of the verification of the qualifications held was merely to identify the applied skills, whether skill shortages existed and</p>

Data required	Purpose of collecting data for this study
	the industry trend in the qualifications and expertise required for such valuations.
Quantities to be valued	<p>The variety and quantities of each biological asset to be valued will determine whether organisations can value single biological assets categories or a more complex combination thereof.</p> <p>Importance of data: It was believed that organisations with higher quantities and/or groups of biological assets would refrain from outsourcing such valuation and would develop the required skills in-house as higher quantities would result in higher valuation costs. It was also important to establish whether more than one valuation technique/method was used if there are multiple groups of biological assets. The use of various methods/techniques to value certain biological assets might address the challenges experienced by other organisations.</p> <p>Location of data: The number of biological assets held might be disclosed on the financial statements. As this disclosure was encouraged and not required by IAS 41, this information might not be available to the researcher from corroborating documentation. The respondent needed to document the types and quantities of biological assets held to assist the researcher. The information was communicated via the questionnaire response on Survey Monkey or could alternatively be submitted via Microsoft Outlook.</p> <p>Strength, quality and completeness of data required: The quantities of biological assets and the number of asset groups guided the researcher to focus more on the organisations that holds more/a bigger variety of biological assets. The</p>

Data required	Purpose of collecting data for this study
	<p>information was obtained directly from the valuer/compiler of the financial statements.</p> <p>Weakness of data required: The valuer/compiler of the financial statements might not disclose the quantitative and descriptive information on biological assets in the financial statements to allow corroboration of the data. This disclosure was merely recommended and not required in IAS 41.</p> <p>Sufficiency of data: Organisations that only holds a limited number of biological assets might opt not to apply fair value principles due to the immateriality or insignificance of the asset value.</p>
<p>Frequency of valuation</p>	<p>GRAP 27 paragraph 14 (ASB, 2012:9) requires the fair valuing of biological assets at each reporting date. As a minimum, organisations are required to perform annual valuations of their biological assets for disclosure in their financial statements. The standard further requires that organisations should determine the fair value of the agricultural produce at the point of harvest. As such, if the harvesting period is not aligned to the financial reporting period, the organisation will have to apply fair valuing methods to biological assets at a minimum twice per year (ASB, 2012:9). Organisations are not restricted to apply fair values to biological assets more frequently. Should the organisation's stakeholders or management have preference to have these assets valued on a monthly basis/quarterly basis such valuations may enhance the decision-making by the users of such information.</p> <p>Importance of data: It was believed that organisations that perform more frequent valuations would develop or hire the required valuation skills compared to those that perform the</p>

Data required	Purpose of collecting data for this study
	<p>valuations purely for reporting purposes. The latter might use the expertise of a consultant. The solutions to the challenges experienced by organisations that perform more frequent valuations would be addressed immediately as and when they occurred due to the frequency of the process.</p> <p>Location of data: The valuation frequency would be documented and indicated by the respondent to the questionnaire on Survey Monkey. Should the organisation apply a detailed process of continuously applying fair values on biological assets, those procedures were evident from their description of the valuation process and their accounting treatment thereof.</p> <p>Strength of data required: The frequency of the valuation of biological assets were documented by the valuer and were corroborated with the accounting policy and the calculations documented. Organisations that value the biological assets more frequently had established procedures, guidelines and accounting methods to comply with their user’s reporting requirements.</p> <p>Weakness of data required: To understand the accounting treatment of the biological assets the detailed transactions recorded on the financial system benefitted the researcher to understand how the organisation values the assets. However, the respondent might have been reluctant to provide such detailed information.</p> <p>Sufficiency, quality and completeness of data: The number of valuations performed by the research participant in a reporting period were indicated and vetted against the</p>

Data required	Purpose of collecting data for this study
	approved accounting policy.
Demographic variables	
Tax laws of the country	<p>In Turkey the tax regulations require that only the costs of biological assets on acquisition is regarded as the capitalisation costs of biological assets. No subsequent measurement is required (Duman, <i>et al.</i> 2012:126) and these assets are depreciated per schedules prescribed by their Minister of Finance (Duman, <i>et al.</i> 2012:124). Similarly, in Romania the tax laws require the recognition of biological assets at the costs thereof (Feleagá, <i>et al.</i> 2012:417). As the valuation of biological assets is a costly exercise (Duman, <i>et al.</i> 2012:127; Kurniawan, <i>et al.</i> 2014:4) organisations will value their biological assets in accordance with the tax requirements and will not consider the fair value requirements of IAS 41/GRAP 27.</p> <p>Importance of data: The unique tax requirements that impacted on the valuation of the biological assets were established as it clarified why the organisation demonstrated their preferences, valuation methods and accounting treatment. An understanding of the tax system assisted the researcher to contextualise the organisation’s valuation methods and preferences and link it to their challenges experienced.</p> <p>Location of data: The tax regulations of a country would be an approved Government document. The respondent was able to provide such regulations as an extract or complete document to the researcher via Microsoft Outlook. The respondent’s interpretation of the tax requirements were detailed in the response on Survey Monkey.</p> <p>Strength of data required: The tax law applicable to the</p>

Data required	Purpose of collecting data for this study
	<p>respondent with an interpretation thereof allowed the researcher to establish if tax impacted on the valuation of the biological assets.</p> <p>Weakness of data required: The interpretation of the applicable tax legislation were detailed by the respondent to allow a comprehensive understanding of such requirements for the researcher. It might have been incomplete or incorrect. The researcher needed to study the provided tax legislation to analyse the provided interpretation where it influenced the valuations.</p> <p>Sufficiency of data: The application guideline is not be country specific and did not consider the unique tax requirements of a country. To understand why organisations chose the valuation methods and procedures they apply, information on the tax system were analysed to ensure that the organisation considers the fair value principles in accordance with IAS 41.</p> <p>Quality and completeness of the data: The taxation applicable to a country was a published, approved document. Such document were obtained, or an extract thereof to corroborate the information communicated by the respondent.</p>
Accounting regulator prescriptions	<p>The Czech Republic accounting prescriptions requires that biological assets are accounted at a fair value on initial recognition. The subsequent values are based on the initial recorded value reduced with the expected losses and depreciation (Sedláček, 2010:62; Bohušová, Valouch & Svoboda, 2012:7). The biological transformation of these assets are not measured or accounted for (Sedláček, 2010:62).</p>

Data required	Purpose of collecting data for this study
	<p>Organisations subject to the country unique accounting prescriptions would deviate from the requirements of IAS 41 if those accounting prescriptions contradicted the standards. The contradicting requirements were detailed to correctly analyse the accounting treatment requirements.</p> <p>Importance of data: Challenges experienced by the organisations with unique accounting requirements were distinguished from the normal challenges on the IAS 41 application. The study did not develop a country specific accounting guide, but a universal approach to adhere to IAS 41.</p> <p>Location of data: Country specific accounting regulations were communicated to those organisations in an instruction/legislation via textbook, guides, instruction notes or similar formats. These documents were availed to the researcher in response to the questionnaires via Microsoft Outlook.</p> <p>Strength of data required: The accounting regulations were external, approved laws/regulations and were not prepared by the respondent. The information was thus neutral. This study focussed on the interpretation of these instructions.</p> <p>Weakness of data required: Unique accounting prescriptions exempted the organisation from compliance with IAS 41. Where these organisations fair value biological assets they were included in this study. However, if another valuation method was applied, the organisation was excluded when the unique prescriptions cannot link to IAS 41.</p>

Data required	Purpose of collecting data for this study
	<p>Sufficiency, quality and completeness of data: Accounting prescriptions were legislated or regulated and were a third party document, not influenced by the respondent.</p>
<p>Organisation's dependence on agriculture; importance of agriculture; and importance of biological assets</p>	<p>Organisations with a great/significant dependence/involvement in agriculture will have detailed procedures and prescriptions on the valuation and reporting of biological assets. Likewise, their users of financial reports and investors will have a greater interest in the performance of those assets. These users will rely on the performance results in their decision-making process and to develop their competitive edge over similar organisations (Lottering and Dick, 2012:1; Esterhuizen, <i>et al.</i> 2012:1; Koopman, 2012:22; Macedo, 2012:19; Musarat, <i>et al.</i> 2014:2).</p> <p>Importance of data: Organisations dependent on agricultural processes had a structured accounting process to value biological assets. These organisations set the trend in the development of the application guideline to address the industry valuation challenges.</p> <p>Location of data: The main operations, dependence on agriculture and importance of biological assets were subjective information documented by the respondent on the questionnaires, transmitted via Survey Monkey. The importance/dependence of the respondent were considered and linked to similar assessments by their users of the financial statements. The main operations of the organisation were corroborated to the annual report of the organisations.</p> <p>Strength of data required: The primary functions and the operations that impacted on the biological assets were communicated by the respondent in the questionnaires. With</p>

Data required	Purpose of collecting data for this study
	<p>knowledge of the extent of the biological assets and its impact on the main operations, the researcher determined whether the biological assets' valuation would have a significant impact on the decisions made by the users thereof.</p> <p>Weakness of data required: The primary operations of the organisations might not evolve around biological assets or their transformation, yet agricultural processes might be a vital operation or responsibility of that organisation. This should have been indicated by the respondent.</p> <p>Sufficiency of data: The annual reports of the organisations included an overview of the main, and most significant operations, of the organisation to corroborate data.</p>
Subjective variables	
<p>Fair value of biological assets expectations; and organisation's attitude/knowledge of fair value principles</p>	<p>Financial statements and the underlying valuation of biological assets are prepared to address the decision-making needs of the users thereof (Schutte and Buys, 2011:190; IASB, 2013e:7,19,68; Olugbenga and Atanda, 2014:86). If an expectation exists that a change in the biological asset's valuation method can strengthen the organisation's operations, generate additional income, enhance decisions or benefit the organisation otherwise, such valuation method will be applied.</p> <p>IFRS 13 (IASB, 2013b:A500) supports this expectation as the standard allows the use of a valuation technique that is appropriate in the circumstances 'for which sufficient data are available to measure fair value, maximising the use of relevant observable inputs and minimising the use of unobservable inputs'. The standard requires that the valuation technique applied be used consistently and only to be changed if a new technique will result in a more equal or representative fair value</p>

Data required	Purpose of collecting data for this study
	<p>of such assets (IASB, 2013b:A501).</p> <p>Importance of data: The users of the financial information considered the costs of valuating the biological assets to determine whether the benefits derived from this valuation exceeded the costs thereof (Olugbenga and Atanda, 2014:88). Where the valuation costs outweighed the benefits of fair value accounting such valuations might not be undertaken. The fair valuing of biological assets might thus be disregarded merely due to the costs thereof.</p> <p>Location of data: Subjective information was obtained from the research participant in response to the questionnaires on Survey Monkey. The information was a relay of the emotional/professional/behavioural documented view of the respondent.</p> <p>Strength of data required: Subjective data was obtained to evaluate the emotions, feelings, preferences and thoughts of the valuers of the biological assets. This information was obtained to determine whether the feelings and emotions impact on the organisation's willingness and ability to apply the principles of IAS 41.</p> <p>Weakness of data required: As subjective information was based on the feelings, emotions, preferences and thoughts of individuals, their responses were based on their ability to distance themselves from the valuation process.</p> <p>Sufficiency, quality and completeness of data: The researcher requested the respondent to submit documentary proof of their considerations, the valuation costs and the</p>

Data required	Purpose of collecting data for this study
	assessment of the available data in the valuation process. Such data were used to corroborate the subjective information received.
Challenges experienced in the valuation process; challenges experienced in the accounting for biological assets and the organisation's solutions to the identified challenges	<p>The industry experience challenges to apply the fair value principles on biological assets. These challenges might be unique, country specific, a result of the laws/regulations, or a result of transactional interpretation or a lack of information. As identified in chapter two, industry challenges included, but are not limited to:</p> <ul style="list-style-type: none"> • The impact of the biological asset/agricultural process on the environment and the destruction of nature (Samkin, <i>et al.</i> 2014:531); • The ethical behaviour of the valuer and the accounting personnel (Kenawy and Elgany, 2009:88; Said and Al-Tarawneh, 2013:65,67); • The variety of available valuation methods resulted in incomparable financial statements produced in the agricultural sector, impacting on the comparability and the decision-making process (Rozentāle and Ore, 2013:58; Kurnaiwan, <i>et al.</i> 2014:8); • There is a lack of experience, knowledge and expertise to value biological assets in the industry (Sudana, <i>et al.</i> 2014:1); • The fair valuing of biological assets is an expensive exercise and users of the financial information may opt to disclose the assets on a different valuation basis when the benefits of such valuation do not exceed the costs thereof (Burnside, 2005:38; Olugbenga and Atanda, 2014:88); • The valuation method applied was considered by the external auditors of the organisation to satisfy them of the adequacy thereof. The auditor's preferred method would guide or instruct the valuation methods of the organisation

Data required	Purpose of collecting data for this study
	<p>(Antonio and Bassetti, 2014:21; Said and Khasharmeh, 2014:2).</p> <p>Importance of data: The valuation challenges experienced were documented by the valuer/accountant to allow an analysis thereof to determine whether it is unique or an industry trend.</p> <p>Location of data: Subjective information was obtained from the questionnaire's respondent. The information was a relay of the emotional/professional/behavioural view of that respondent. The challenges experienced by the organisations to apply the principles of fair value might have be supported by documentation on the unique transaction or event.</p> <p>Strength of data required: The challenges experienced by the organisation on valuing biological assets were documented to determine the extent of the challenges and how they impacted on the valuation process. The valuer/financial statements compiler needed to clarify why the challenges arose and how the organisation addressed them.</p> <p>Weakness of data required: As subjective information was based on the feelings, emotions, preferences and thoughts of individuals, the information communicated was based on the respondent's ability to distance him/herself emotionally from these challenges.</p> <p>Sufficiency, quality and completeness of data: The researcher requested the respondent to submit substantiating documentation on the challenges where practically possible.</p>
Procedures	Importance of data: The step-by-step procedures applied to

Data required	Purpose of collecting data for this study
<p>applied to account for biological assets</p>	<p>value biological assets needed to be detailed by the respondents. This was analysed to determine if the techniques and procedures of one organisation might address the limitations and challenges experienced by another. Solutions to the identified challenges were drafted and included in the application guideline.</p> <p>Location of data: Documented procedures followed by the respondents' organisation were submitted via Survey Monkey or Microsoft Outlook.</p> <p>Strength of data required: The researcher focussed on the information obtained as part of the 'preferred valuation method' but with a greater focus on the emotional relay thereof. If the research participant did not include the detailed step-by-step procedures as part of the earlier response it was requested.</p> <p>Weakness of data required: The research participant might experience the step-by-step detailing as duplication if sufficient time and energy was applied to respond to the earlier fields.</p>
<p>Opinion of stakeholders/users of financial statements on the valuation methods applied; and expected changes to the financial results with the application of IAS 41/GRAP 27</p>	<p>Importance of data: It was valuable to attain the stakeholders and the financial statement user opinions on the principles and requirements of IAS 41; specifically how they expected or experienced these requirements to affect their financial reports. This user perspective were analysed to establish if the users of the financial statements understood the principles of fair valuing biological assets.</p> <p>Location of data: Subjective information was obtained from the respondent on Survey Monkey. It was a relay of the emotional/professional/behavioural documented view of the valuation methods, changes and effect of biological assets on</p>

Data required	Purpose of collecting data for this study
	<p>the financial reports.</p> <p>Strength of data required: The attitude, emotions and fair value expectations of the stakeholders/users of the financial statements reflected whether the users regard the valuation as vital and decision enhancing. As these users informed the financial statements, a lack of understanding of IAS 41 might cause the organisation not to apply fair value principles.</p> <p>Weakness of data required: As the users of the financial statements might not have knowledge or an appreciation for the fair valuing of the biological assets, it might not have been considered.</p> <p>Sufficiency, quality and completeness of data: The emotions/feelings of the users of financial statements were established by allowing them to respond to the questionnaires.</p>
Reasons for not applying IAS 41/GRAP 27	<p>Importance of data: Where the organisation did not apply the fair valuing principles of IAS 41, it was beneficial to understand why it was not considered.</p> <p>Location of data: The reasons why IAS 41 was not applied were documented by the respondent in the questionnaires. This was a relay of the emotional/professional/behavioural view on why fair valuing of biological assets was not done.</p> <p>Strength of data required: The attitude and emotions of the stakeholders/users of the financial statements and their expectation of the fair valuing of biological assets reflected their reasons for not implementing the requirements of IAS 41. These could be contextualised with the challenges experienced in the industry to correctly link challenges and possible</p>

Data required	Purpose of collecting data for this study
	<p>solutions identified.</p> <p>Weakness of data required: As the financial statement users might not have knowledge or an appreciation for fair value accounting they might not have considered the impact thereof.</p> <p>Sufficiency, quality and completeness of data: The subjective emotions/feelings of the users and other stakeholders of financial statements were evaluated.</p>

Source: Research result

The data required in the execution of this study, allowed the researcher to analyse the valuation methods and techniques of biological assets, the valuation procedures applied, the unique challenges experienced and the solutions to these challenges that were developed in the industry. The required data was regarded sufficient to develop an application guideline to assist the industry to fair value biological assets.

3.4.3.2 Importance of data

The accounting policies, financial statements, audit reports, annual reports, valuation methods, techniques, procedures, calculations and the documented challenges with solutions were vital for analysis in this study. The documentation was interpreted by the valuer, management or the compiler of the financial statements to clarify the estimates and judgements to the researcher. The importance of each document considered in this study was detailed in table 3.4.

3.4.3.3 Location of data

The accounting policies, financial statements, audit reports, annual reports, tax regulations and the accounting prescriptions were approved, existing documents. It was requested from the respondents to corroborate their questionnaires responses. These documents were the property of the respondent’s organisation and were treated with confidentiality. The researcher aimed to obtain the financial

documentation for a period covering three financial years (2012 to 2014) if that respondent had been applying fair valuing for the said period.

The valuation methods, techniques, the procedures followed, the underlying valuation calculations and the challenges experienced therein were documented by the respondent in the questionnaire. The unique estimates, judgements, transaction analysis and understanding of events were detailed by the respondent to allow analysis thereof.

The requested explanations and factual information were transmitted to the research participants via a questionnaire on Survey Monkey. The responses were documented and returned via this online tool. For the submission of company and other external documents, the respondents transmitted the information via Microsoft Outlook. The benefits of these online tools were the timely submission of documentation in a typed format to avoid the decoding or interpretation of handwriting. The document transmission was basically at no cost for the respondent to partake in the study. The use of questionnaires and the electronic communication associated therewith allowed the researcher to invite international companies in the questionnaires. A disadvantage of questionnaires was that poor responses were received. This was managed by the researcher in follow-up communication.

3.5 Data analysis

Data analysis was defined by Jorgensen, as quoted by Boeije (2013:76), as the 'breaking up, separating, or disassembling of research materials into pieces, parts, elements or units. With facts broken down into manageable pieces, the researcher sorts and sifts them, searching for types, classes, sequences, processes, patterns or wholes. The aim of this process is to assemble or reconstruct the data in a meaningful or comprehensive fashion'. The respondent's feedback on the questionnaires and the corroborating documents, from Survey Monkey and Microsoft Outlook, and the responses to the interviews were turned into evidence by means of a thorough analysis thereof (Hofstee, 2010:117).

3.5.1 Creating flow charts

In this qualitative research study, the open-ended descriptive information collected needed to be understood, contextualised and analysed. The researcher had to follow a process of simultaneous collection and analysis of information to allow a process of constant comparison of the respondent's feedback in relation to each other as well as to the requirements of IAS 41. Boeije (2013:124) highlights that this process of constant comparison will ensure that the analytical thinking in this qualitative study will strengthen it as immediate follow-ups can be done and needed clarity can be sought. The information relayed by the respondents was contextualised to understand the total valuation process applied per organisation rather than comparing the procedures followed step-by-step. This contextualisation allowed the researcher to create a flow chart or decision tree on the valuation procedures per organisation and applied in the industry (Boeije, 2013:124). The use of these visual research tools highlighted the knowledge gaps and stimulated a thought process on how these shortcomings could be addressed. These visual tools further developed into diagrams and tables to assist with the interpretation of the established procedures. The organisational valuation flowcharts were compared to identify overlapping procedures. This highlighted possible improvements and solutions to challenges experienced.

3.5.2 Use of computer packages and confidentiality

Microsoft packages were used to detail the narrative feedback on all questionnaires responses. Overlapping narrative descriptions and procedures were identified by extracting phrases, sentences, paragraphs or references to specific laws, regulations, accounting requirements or prescribed processes (Carter and Little, 2007:1319). These similarities assisted to identify similar thought processes and challenges experienced (Boeije, 2013:142). The use of these packages further assisted with filing, sorting, editing, archiving, coding, retrieving and the search for documentation. Responses and organisational documentation received were saved in folders per organisation to ensure that the information per respondent was kept as a unit. These folders were named after the relevant organisation to ensure easy and fast retrieval thereof. The documentation was not edited and was kept in the original format it was submitted as. For safety reasons, where documentation were submitted

in an editable format, like Microsoft Word/Microsoft Excel, these documents were saved as PDF documents by the researcher as an additional document to ensure that the information was not edited in the course of this study. Information analysed by the researcher were extracted from the original documents by means of copying the required information and using a new/blank document to analyse information. The analysed data was renamed to ensure that the extracted information was not confused with the original documents. The folder where the organisational documentation was stored was password protected to ensure the confidentiality thereof. Where the researcher needed to print these documents, it was stored in a locked cabinet.

3.5.3 Understanding the data

This qualitative study's main purpose was to understand how, why and when the valuations of biological assets were performed. This detailed how the valuation process was influenced by the established valuation procedures and the related interpretation thereof (Sandelowski, 2000:335). The authenticity of these methods, interpretations and estimates detailed by the respondents were more important than the inclusion of a vast sample size (Silverman, 2013:43). The study did not aim to achieve instructed sample coverage to represent the population, but focused on the quality of data obtained (Freeman, *et al.* 2007:27). These authentic responses were broken down, compared and analysed to establish the meaning of each step followed as part of a critical thinking process (Whittemore, *et al.* 2001: 534). This entailed open-mindedness towards new techniques and procedures that addressed the industry challenges; an examination of a variety of ideas, interpretations and opinions on the application of the valuation method; persistence in the process of looking for answers to the knowledge gaps in the valuation process and prudence in deriving at conclusions to the industry challenges (Seale, 1999:470; Bowen, 2005:211).

3.5.4 Grounded theory analysis

The critical thinking process was informed by the use of the grounded theory research method (Whittemore, *et al.* 2001: 534; McCaslin and Scott, 2003:449; Bowen, 2005:211; Carter and Little, 2007:1318). Silverman (2013:67) defines grounded theory as a 'method of qualitative inquiry in which researchers develop

inductive theoretical analyses from their collected data and subsequently gather further data to check these analyses (Creswell, 2003:18; Reischauer, 2015:290). The purpose of grounded theory was theory construction, rather than description or application of existing theories'. The grounded theory method allowed the researcher to analyse the narrated information obtained to immediately request additional data to fill knowledge gaps as data collection and analysis is a simultaneous process (Sandelowski, 2000:336; Merriam, 2002:7; Creswell, 2003:14; McCaslin and Scott, 2003:448).

The open-ended questionnaire and interview responses were studied by means of the narrative analysis of documentation research method. To ensure that the grounded theory approach best addressed this study, the differences between these theories were detailed in table 3.5.

Table 3.5: Grounded theory versus narrative analysis research methods

Grounded Theory	Narrative Analysis
The method is concerned with the perception of the research participants and focus on the meaning of responses and documentation received	The method focus on the actions taken and examines the underlying activities of such action
Grounded theory methods moves beyond the studied case to allow the researcher to make generalisations on the findings	Narrative analysis methods seek to preserve and interrogate a particular incident studied and do not make generalisations or move beyond the investigated case.
The grounded theory will corroborate the documented information received with additional documentation or facts as a simultaneous research process.	Narrative analysis is based on the analysis of the respondents constructed feedback on the questionnaires and their own experiences in relation thereto.

Source: Silverman, 2013:81

The analysis of the detailed questionnaires responses focussed on the perceptions, the meaning of the responses and moved beyond the valuation methods applied to determine the underlying causes for the valuation methods selected; the users of the information; and solutions to the challenges experienced in the industry (Sandelowski, 2000:335). As such, the grounded theory method was the best research method to achieve the objective of this study. The breaking down of information into manageable and understandable units was done by coding it. Silverman quoted Charmaz and Bryant to explain coding as follows: ‘Coding means that we attach labels to bits of data to distil it and give us a handle for comparing data. Our nascent ideas point to areas to explore during subsequent data-collecting’ (Silverman, 2013:68). Coding was considered a practical tool to analyse the documented feedback (McCaslin and Scott, 2003:449). Table 3.6 details the practicalities of coding data (Silverman, 2013:68):

Table 3.6: Practicalities of coding information

Practicality	Why this is important for the execution of this study
Highlight a word/line/sentence/ paragraph and label it	<p>The steps and/or procedures applied by organisations to value biological assets can be highlighted and extracted to allow the researcher to identify the industry trend of the valuation procedures applied.</p> <p>The challenges experienced by organisations in the valuation process can be highlighted to identify overlapping industry challenges.</p> <p>The opinions, judgements, estimates, considerations, users, preference to valuation methods and reasons for not applying fair value principles can be easily extracted when unique words/lines/sentences are identified as overlapping response.</p>
Labels can be descriptive and conceptual	<p>The labels assigned to the unique words/sentences identified can be adjusted to address the challenge or methods applied in the valuation process. This will allow</p>

Practicality	Why this is important for the execution of this study
	quick and effective retrieval of labels from analysed data. When labels are restricted in size or description, additional time and analysis are required to contextualise each scenario.
Pick out single words for summing up or select phrases, or sentences	Subject jargon or references to the requirements of IAS 41/GRAP 27 can be effectively used to provide a précis of analysed information.
Labels can be modified to phrases to allow for contextualisation	Further analysis of information, the filling of knowledge gaps and the linking of vast amount of data will allow the researcher to return to coded labels and modify and elaborate on such labels if required.

Source: Silverman, 2013:68

The coding of the narrative information obtained from respondents allowed effective and efficient analysis of the responses. Silverman (2013:69) advises that even though the ‘participant’s voice’ needs to be retained when information is analysed, the researcher does not need to stick to the exact phrases used. The researcher was allowed to modify and contextualise responses with specific caution not to lose the facts or causing confusion. The process of coding and continuous analysis was regarded as a constant comparative tool to modify or broaden the theory development (Sandelowski, 2000:337; Bowen, 2005:218). This theoretically based analysis was performed as a systematic approach (Silverman, 2013:72) as detailed in table 3.7.

Table 3.7: Successful coding and analysis procedures

Procedures for coding and analysis	Application of the suggested procedures for the purposes of this study
Initial coding and memo writing	The line-by-line, questionnaire-answer-by- questionnaire-answer coding of the feedback received by the respondents will be done to identify codes, repetition and trends. The codes will be

Procedures for coding and analysis	Application of the suggested procedures for the purposes of this study
	<p>analysed to determine if knowledge gaps exists. If detected, the respondents will be required to clarify information to fill these gaps. The coding will be altered and updated where trends are identified and saturation of feedback is identified. Notes will be documented by the researcher on each step of the research process undertaken (Morse, <i>et al.</i> 2002:10).</p> <p>The following steps will enhance the coding process (Silverman, 2013:83-84):</p> <ol style="list-style-type: none"> 1. Engage in close, detailed reading of the questionnaires received: <ul style="list-style-type: none"> • Look for key, essential, odd, interesting facts or texts and focus on repetition of information and striking and unusual facts; • Make notes and diagrams on any printed documentation or write notes on electronic documentation to guide and structure the thought process; • Do not get influenced or biased by the information obtained to make the respondent's information categories be derived at as a result of your own. 2. Carefully read information to label your data and archive systematically: <ul style="list-style-type: none"> • Label the key facts, the striking, odd and interesting information relayed; • Label similar facts or data with the same label to identify the trends of valuation procedures, techniques, estimates or challenges experienced; • Link the developed labels to the challenges and valuation methods identified from the prior studies to find the

Procedures for coding and analysis	Application of the suggested procedures for the purposes of this study
	<p>industry trend;</p> <ul style="list-style-type: none"> • Be cautious not to duplicate labels. With the identification of a new label, review the existing labels to first determine whether the existing labels cannot be expanded or reworded to include the new identified challenge or valuation step. Should the newly identified information not fit in the existing labels, new labels are created. <p>3. Reflect on why you have done what was done:</p> <ul style="list-style-type: none"> • Maintain a list of the identified labels and include comments and notes on what information fits together and why the factors were considered to be related. <p>4. Review and refine labels and the practise of labelling:</p> <ul style="list-style-type: none"> • Document all the data and ideas collected under each label and indicate that the information is coherent and what their key dimensions are; • Avoid creating new labels that can be incorporated into existing labels as labels that address similar facts may cause confusion in the analysis of such information. Evaluate the exceptions identified and consider detailed descriptive labels; • The process of evaluation, adjusting and modification of labels should be regarded as a continuous process as each valuation method and procedure identified will either link to existing facts or create the window to explore new valuation techniques. A constant label review process will be undertaken in the analysis of the information. <p>5. Key labels should be supported by secondary labels to</p>

Procedures for coding and analysis	Application of the suggested procedures for the purposes of this study
	<p>indicate the relationship between data:</p> <ul style="list-style-type: none"> Adjustments to labels may not cover newly identified facts as a comprehensive factual review when the new information merely explains the central key label identified. Labels can be linked to each other to clarify their relationship and to demonstrate patterns and sequences in the valuation techniques, procedures and the challenges experienced. This procedure is vital to the development of the application guideline as the challenge experienced by one organisation may be resolved as a result of the solutions developed by another organisation.
Focussed coding and memo writing	<p>Each question response will be coded and the key issues will be selected. Constant comparison of newly received information with existing information will be done to identify trends, knowledge gaps and a saturation of information. As the data receipt and analysis is a simultaneous process immediate follow-ups and clarity can be done if needed. Notes will be detailed by the researcher and ideas and theories will be developed and refined throughout this process.</p>
<p>Collect new data via theoretical sampling</p> <p>Continue to code data gathered</p>	<p>Sampling will be done based on the procedures documented under the 'sampling and pilot study' section. As the sampling is purposively and aimed at a specific focus group, the results of such questionnaire and the related analysis will yield fruitful information for the purposes of this study. Additional organisations may be identified throughout the course of this study to be included in the sample as this inclusion may further develop theories and yield contributing information to the development of the application guideline (Carter and Little, 2007:1318).</p>
Sort and integrate	Refine the links between the codes and the identified categories

Procedures for coding and analysis	Application of the suggested procedures for the purposes of this study
memos	of information to such an extent that concepts and theories can be drafted and developed from this analysis.

Source: Silverman, 2013:72

Once all data coding were finalised and the labels have been studied, linked to challenges experienced, users' expectations and with all trends identified, the information was documented in charts and tables to detail the results of the study. This qualitative content analysis based on the grounded theory research method formed a comprehensive analysis to link the challenges experienced on the fair valuing of biological assets, in terms of IAS 41, to the solutions provided by the respondents to the study. This comprehensive analysis allowed the researcher to draft an application guideline where the challenges are linked to the suggested solutions (informed by the industry) and to the applied valuation techniques and procedures already established in the industry. This application guideline was distributed to a sample of financial statement users for their comments and recommendations. They provided feedback on the user friendliness, understandability and comprehensiveness of the application guideline. A review of the inputs and criticism on the application guideline were done to ensure that the application guideline served the purpose it was intended for. Based on the inputs received, the application guideline was reworked and updated to address the shortcomings. The application guideline was submitted to preparers of financial statements, members of the Accounting Standards Board or the Accountant General of South Africa to attempt a review of this guideline. Where feedback was obtained, the application guideline was improved with the suggestions, comments and concerns noted by these accounting bodies. Limited feedback did not impact negatively on this study.

It was acknowledged that the grounded theory research method had been criticised for the failure to 'acknowledge implicit theories which guide work at an early stage' (Silverman, 2013:73). This shortcoming was avoided if the terms and definitions used in this study as well as the assumptions developed and tested throughout the study

was sufficiently documented to clarify the implicit meaning of conclusions and all factors considered to derived at such conclusion.

3.6 Sensitivity of information

The financial statements of public and listed organisations were available for review on organisations' websites and in their published annual reports. This study required the underlying procedures, methods, calculations and assumptions made by management to derive at the values disclosed in the financial statements and may include private organisations. As such information was obtained from the organisation's accounting and/or auditing department requested in the questionnaires. The procedures, methods, calculations and assumptions applied by organisations were regarded as sensitive and were kept confidential as organisations might have a competitive edge in the market. In addition, to build trust with the respondents, the researcher ensured that the information provided by the participating organisations were only used for the purposes of this study and did not disclose it to any individual and/or organisation that was not involved in this research project.

3.7 Limitations

The purpose of this study was to develop an application guideline to assist in the fair valuing of biological assets. Therefore the study focussed on organisations that held and/or operated in biological assets. The population and related samples to this study were limited to such organisations (Hofstee, 2010:117).

The application guideline is a universal documented approach and did not consider the individual tax laws, political influences and other country-specific requirements that might have contradicted the requirements of IAS 41/GRAP 27. The application guideline is in line with the accounting requirements of the accounting standards to provide a uniform guideline to all organisations.

The accounting regulators/standard setters might not be in a position to provide the researcher with a comprehensive list of organisations that reports on biological assets; with their contact details to allow the researcher to establish the population of

this study. Alternative procedures needed to be performed to identify such organisations, like contacting the appropriate accounting/regulating bureau or body that could identify the listed organisations that might possibly hold/operate in biological assets. The governmental auditors' institutions might have been in a position to disclose the public entities and departments that held biological assets and applied the principles of GRAP 27.

Limited feedback on the questionnaires distributed during the pilot study resulted in delays. The researcher had to send follow-up requests for questionnaires to be completed to obtain constructive feedback. In the pilot study, there were limited organisations that indicated their willingness to participate further in this study to which the questionnaires could be transmitted.

Feedback on the questionnaires were delayed due to the time and effort required to complete the open-ended questions. Limited feedback was obtained from organisations while organisations could also withdraw due to operational pressure and the inability to commit time and effort to the completion of the questionnaire. Although the samples might have been limited as a result of the limitations considered, the outcome of the study was not negatively impacted as the grounded theory approach and the detailed analysis allowed by the qualitative research method provided comprehensive quality data to develop the application guideline (Bowen, 2005:218).

The developed application guideline to fair value the biological assets was send to a sample of financial statement users for further inputs. Limited feedback did not impact negatively on this study as the study leaders at Unisa are more than knowledgeable to provide their inputs and guidance on the developed document (Bowen, 2005:212).

3.8 Ethical considerations and clearance from the Research Ethics Committee of the College of Accounting Services

This study was performed as part of a formal qualification at the University of South Africa (Unisa), as detailed in annexure C. As the information required to perform this

study was obtained from organisations that are not associated with the University, the participants to this study needed to be assured of the confidentiality of the information they availed during the course of this study (Bowen, 2005:213; Trafford and Leshem, 2008:100; Hofstee, 2010: 118).

This research project had various phases wherein third parties were contacted where the contacted parties needed to be assured of their rights: The accounting boards/regulators/standard setters was contacted to determine the population; sampled organisations were contacted to obtain their financial statements and underlying documentation; closed questionnaires were transmitted to the sampled organisations; interested participants were send an open-ended questionnaire, interviews were conducted with various user groups to the financial statements and the developed guideline was shared with selected users. The letters addressed to the standard setters/accounting regulators, the closed questionnaires, the open-ended questionnaires and the interview questions were drafted and submitted to the study leaders for approval by the study leaders and final approval by the Research Ethics Review Committee of the College of Accounting Sciences at Unisa (Bowen, 2005:214; Trafford and Leshem, 2008:100; Hofstee, 2010:118; Boeije, 2013:47).

A cover letter was addressed to participants to this study detailing that participation to this study was voluntary and that participants could withdraw from the study at any given time without any implications or loss, effect on their business reputation or their professional status (Boeije, 2013:45; Silverman, 2013:97). This letter detailed that information obtained by the researcher in this study would not be used for any other purposes and would not be disclosed to individuals and/or organisations not involved in this study, without the written consent of the participant (Bowen, 2005:214). The letter emphasised that the privacy and personal information of the research participants would be protected by (Boeije, 2013:46):

- collecting data for the purposes of this study from a unique email address, only used for the purposes of this study, whereto only the researcher has access;
- storing the electronic information, documentation and email transcripts between the research participant and the researcher on a personal computer at the residence of the researcher, which was password protected;

- backing up the electronic data from the personal computer to an external media which was locked in a filing cabinet;
- digital protection of all research material used in the course of this research by means of password protections; and by
- not disclosing the identity of the participating organisation in the study and by not quoting the organisation directly in the study which might result in conclusions reached by readers of this study, unless the organisation provides written consent and requires acknowledgement for their contribution to this study (Bowen, 2005:214).

Written consent for the participation in this study was obtained from each research participant when the research participant indicates his/her willingness to partake in the detailed open-ended questionnaire (Bowen, 2005:214; Boeije, 2013:45). The completed consent form accompanied the detailed questionnaire that followed the pilot study as the researcher had an obligation to outline the nature of the data collection and the purpose for which the data would be used to the participants. The researcher had an obligation to ensure that the participants were placed in a situation where they could evaluate and decide on the risks and benefit of this study and whether or not they want to participate (Silverman, 2013:97; Boeije, 2014:45). Mutual trust was established with the research participants as the researcher committed herself to the ethical requirements of Unisa and performed all procedures necessary to protect research participants from harm and any confidentiality breaches (Bowen, 2005:214; Silverman, 2013:97).

3.9 Summary and conclusion

Chapter three detailed how the cognitive theory developed was explored through qualitative research methods in this empirical study. This qualitative research design was motivated with the accompanying research methods that were applied, being content analysis, questionnaires and interviews. The purposive sampling applied in the four phases of this empirical study was described.

The four research phases addressing the research objectives of this study were detailed in this chapter. In phase one, as the pilot study, the purposive sample of the

study was selected by selecting a sample of ten countries and contacting the relevant accounting regulators to identify organisations reporting on biological assets. These organisations' annual reports were obtained and analysed in phase two by means of content analysis. The results from the content analysis informed the focus of the questionnaires and the interviews performed in phases three and four respectively. An analysis of the four research phases informed the application guideline that was developed in chapter five.

The chapter further detailed what data was required to execute this study, the importance of the data and where the data was located. The procedures applied to analyse the collected data, by means of coding and flowcharts; the computerised packages used to analyse the data; the confidentiality of the data and the consideration of the grounded theory method were detailed. The sensitivity of the required data, the limitations of this study and the ethical considerations that needed to be recognised throughout this study were further conversed.

CHAPTER 4

THE EMPIRICAL RESEARCH PROCESS AND OUTCOMES

4.1 Introduction

Chapter four details the empirical research process and outcomes in addressing the industry challenges to account for and report on biological assets. The empirical research was performed in four phases, i.e.:

- In phase one the ten countries and the respective organisations reporting on biological assets to be studied were identified using a purposive sample selection process.
- In phase two a content analysis was done on the researched organisations' annual reports to study the industry trends on the operations conducted by the organisations.
- Phase three investigates the valuation techniques, frequency, technical expertise required, the valuation methods and challenges experienced by means of closed, followed by detailed open-ended questionnaires. The results from the content analysis (phase two) and the questionnaires informed the focus of the interviews conducted in phase four.
- In phase four, interviews were conducted with purposively selected user groups of the financial statements to allow the challenges identified to be linked to industry expectations and trends to develop the application guideline. The interviews were tailored to determine the information needs and disclosure requirements on biological assets per user group.

The results from phases one to four, informed the application guideline developed in chapter five as the industry trends could be analysed in relation to the specific user needs and the regulating accounting standard to guide the compilers of financial statements to produce comparable, decision-enhancing reports.

4.2 Phase one: Purposive sampling

In phase one the accounting regulators, accounting standard setters and/or accounting regulating bodies of ten purposively selected countries were contacted to obtain a list of organisations that reports on biological assets. It was also ensured that ethical clearance that may be applicable in the selected countries was addressed. The objective of phase one was to determine the sample of 50 organisations to be researched in phase two.

4.2.1 Purposively selected countries

In selecting a sample of ten countries to examine, a reflection of the leading agricultural exporting countries, the BRICS association and countries that have adopted the International Financial Reporting Standards (IFRS) transpired to entrust that the purposively selected countries represent the industry norm adopted on biological asset reporting that could act as an indicative theoretical population (Carter and Little, 2007:1318; Hofstee, 2010:117).

Agricultural exporting countries were considered as they would be involved in agricultural processes, the biological asset transformation and the related reporting that will afford information on how the biological assets are classified and accounted for. Table 4.1 details the identified leading agricultural produce exporting countries that informs the first tier to the population to this study:

Table 4.1: The world’s top 10 agriculture exporting countries of 2014

Country	Million Dollars
United States of America	\$42 826
France	\$24 262
Netherlands	\$19 780
Germany	\$13 842
United Kingdom	\$11 613
Canada	\$10 107
Australia	\$ 9 824
Italy	\$ 9 446
Belgium	\$ 9 013
Spain	\$ 6 621

Source: Maps of the world, 2015

The second tier of the population deliberated the BRICS association. The BRICS associated countries, being Brazil, Russia, India, China and South Africa, were included as they have the economic potential to influence the world economy (Global Sherpa, 2015). The third and final tier focussed on countries that already report in terms of IFRS. A study by Pricewaterhouse Coopers (PWC, 2014) evaluated the various countries’ accounting framework and the requirement to adhere to IFRS. The outcome of the study identifying the IFRS compliant countries was considered for sample selection (annexure A) as follows:

- The study performed by Pricewaterhouse Coopers was summarised in a table format to group IFRS complying countries with Excel filters, as detailed in annexure A.
- All countries that are either IFRS compliant, US GAAP compliant or EU IFRS/GAAP compliant have been considered as IFRS compliant countries, as these standards are based on the principles of the IASB instructed IFRS.
- Where the listed financial statements are required to be compiled on IFRS the respective cells in Excel was selected and colour shaded for swift identification. The same procedure was performed on the non-listed organisations.

- As a final step, the IFRS compliant countries for listed and non-listed organisations were identified by colour shading the relevant country. The IFRS compliant countries were then considered for sample selection.

The populations' three tiers were compared to detect coinciding countries. Table 4.2 details the leading agricultural exporters of table 4.1 that coincides with the IFRS compliant countries reported in annexure A:

Table 4.2: IFRS compliant agricultural produce exporting countries

Continent	Country	IFRS requirement for listed companies	IFRS version to comply with
Europe	Italy	√	EU adopted IFRS.
Europe	Netherlands	√	EU adopted IFRS.
Europe	Spain	Only required for consolidated financial statements for listed companies	EU adopted IFRS.
Europe	United Kingdom	Required for consolidated financial statements only (allowed for separate financial statements).	EU adopted IFRS.

Source: Summarised from the study performed by PWC, 2014

An analysis of the second tier of the population confirmed that none of the BRICS countries were leading agricultural exporters while only South Africa coincided as full IFRS compliant country per annexure A. As only five purposively selected countries corresponded in the various tiers an evaluation on the remaining IFRS compliant countries and BRICS countries to attain the required sample was done:

Table 4.3: IFRS compliant countries included in the purposive sample (neither top agricultural exporters nor BRICS category)

Country	IFRS status	IFRS version	Reason for inclusion in study
Canada	IFRS is only required for listed companies	IASB published IFRS.	<p>Canada was a leading agricultural exporting country. Although not all organisations report in terms of IFRS, the consolidated financial statements and financial statements of listed companies were IFRS compliant.</p> <p>Agricultural exporting was driven by large and listed organisations and the non-compliance with IFRS on non-listed companies would not influence the outcome of this study.</p>
United States	Not compliant	Apply US GAAP or IFRS	Listed organisations were not legally obliged to adhere to the principles of IFRS. The local US GAAP was applied by all organisations, listed and non-listed. As US GAAP was considered to be an equivalent to IFRS, the accounting treatment applied will be consistent. The United States was also a top ten agricultural exporting country and would have detailed information on biological assets for use in this study.
New Zealand	Compliant	IASB published IFRS and local IFRS	New Zealand was not regarded as a top ten agricultural exported nor part of the BRICS countries, but it was full IFRS compliant for both listed and non-listed organisations. The accounting principles adopted in this country would assist in the development of the accounting guideline developed in this study.

Country	IFRS status	IFRS version	Reason for inclusion in study
Brazil	Compliant	IASB published IFRS	<p>Brazil forms part of the BRICS association and was therefore an influencer of the economy. Brazil prescribed IFRS for listed companies and developed their own, Brazilian GAAP, accounting standards to be applied by non-listed organisations.</p> <p>The adoption of a local GAAP on non-listed organisations would not impact on the outcome of this study, as the valuable information to be obtained from the listed companies would contribute to this study.</p>
Australia	Required for consolidated financial statements only.	Local IFRS adopted	<p>IFRS was only required for listed companies in Australia. As Australia was a top ten exporting agricultural country, it was anticipated that the exporting organisations would be listed and therefore IFRS compliant. The non-adoption of IFRS by non-listed organisations would not negatively impact on this study.</p>

Source: Summarised from the study performed by PWC, 2014

At concluding a comparison of the top ten agricultural exporting countries, the BRICS association and the IFRS compliant countries, and after documenting the reasons to the purposive selection of the additional countries, the final purposive sampled countries that form the base of the remainder of this study are:

Table 4.4: Summary of the ten purposively selected countries

No.	Country selected
1	Italy
2	Netherlands
3	Spain
4	United Kingdom
5	South Africa
6	Canada
7	United States
8	Brazil
9	Australia
10	New Zealand

The remainder of this study was performed on the selected countries detailed in table 4.4.

4.2.2 Identification of sample organisations

The stock exchange websites of the purposively selected countries were visited to identify organisations listed in the food/agricultural/farming industry to be considered in this research. A total of 100 organisations were selected, as detailed in annexure F, as it was assumed that annual reports may not be available from all selected organisations. The organisations’ official websites were visited to download the available annual reports and contact details. Phase one was concluded after the 10 purposively selected countries and the related 100 organisations to be researched in this study was identified and verified. The obtained annual reports were evaluated and the results were detailed and reported on as part of phase two of this study.

4.3 Phase two: Annual report content analysis

The 100 organisations detailed in annexure F were researched online to gain knowledge on their operations and to download their annual reports. Where the information was unobtainable online, the organisation was contacted to request same.

A total of 53 organisations were researched as 47 did not avail their financial reports (table 4.5). The 53% success rate accomplished was considered adequate to address the objectives of this study.

Table 4.5: Sampled organisations: Availability of annual reports per country

Country	Organisations selected	Annual reports obtained	Limitation of scope	% Available annual reports
Australia	13	9	4	69%
Brazil	6	5	1	83%
Canada	5	4	1	80%
Italy	6	0	6	0%
Netherlands	8	4	4	50%
New Zealand	8	5	3	62%
South Africa	24	14	10	58%
Spain	3	0	3	0%
United Kingdom	15	9	6	60%
United States of America	12	3	9	25%
TOTAL	100	53	47	53%

Source: Research result

Annual reports on the organisations based in Italy and Spain, both from the IFRS tier, could not be obtained. These countries could thus not be researched. A total of 75% of organisations based in the United States of America (agricultural leader) and 50% of those based in Netherlands (IFRS) are further excluded due to unavailable annual reports. The countries selected from the IFRS compliant tier had the greatest percentage of unavailable annual reports while the agricultural leaders’ limitation was expected to be greater due to the competitiveness of the market. The publishing of annual reports by the BRICS associates demonstrated sound financial reporting and the related availing of such reports to users.

The annual reports of the 53 organisations were contextualised and analysed as follows:

4.3.1 Main operations of the organisation

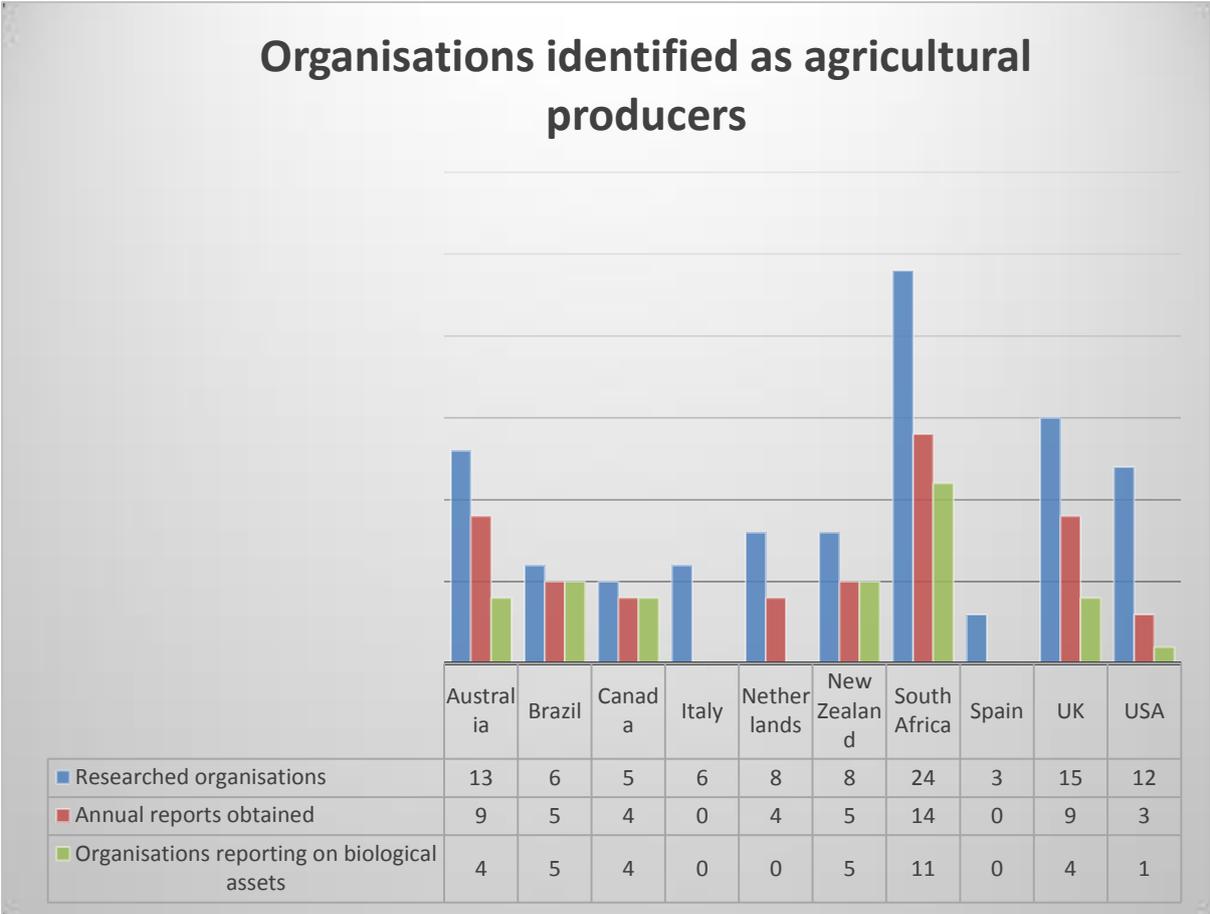
The nature of the business, as required by IAS 41 paragraph 46 (IASB, 2015:A1353) and the main operations of the organisations, as detailed in the annual reports, were documented and assessed to establish if the main operations of the organisation necessitate reporting on biological assets:

By contextualising the contents of 154 annual reports of the 53 organisations, obtained (reporting on the financial results of 2012 to 2015, where some organisations could not avail reports for all the reporting years) it was concluded that not all organisations listed as food producers or farming enterprises per their main trading operations hold biological assets.

Seventeen organisations reported their 'biological assets involvement' as inventory in their annual reports, one of which actually produces and grows seeds and were considered to control the plants and manage its biological transformation to ultimately be sold. The other organisations opted to act as 'middleman' between the smaller farming enterprises and individuals that produces the animals and plants. The financial reports of the biological asset producers delivering to these enterprises were requested from the reporting organisations and were researched online, but could not be obtained. The performance of the producers cannot be assessed or researched and there is a probability that financial reports are not compiled for these smaller producers. This may be linked to the cognitive theory affirming that smaller organisations and individuals will only report for taxation purposes and that the application of IAS 41 may be too technical to apply. In addition, the categorisation of the main activities of organisations as listed on the stock exchange markets are considered misleading to the users of financial information when the organisation do not trade in farming operations.

The remaining 34 organisations' main activities correlated with their stock exchange listing and their biological assets were disclosed accordingly. An overall summary of the organisations selected, annual reports obtained for use in this study and a further comparison with organisations actually operating with biological assets are demonstrated in figure 4.1.

Figure 4.1: Organisations identified as agricultural producers actually reporting on biological assets



Source: Research result

Figure 4.1 illustrates that from the financial statements obtained (53) only 64% actually held and reported on biological assets (34 organisations). 30% of the researched organisations (16) prefer to act as the middleman between the farmers and the markets, which could have a negative effect on the farmers when they are not paid market related prices for their goods to enrich the middleman. Moreover, it appears that the 19 organisations (35%) that do not hold and report on biological

assets may be incorrectly listed or categorised on the stock exchange markets as their main activities were linked to agriculture and/or farming activities.

The financial statements obtained from Brazil, Canada and New Zealand (all 100%) correctly classified their operations on the stock exchange markets and reported on the biological assets held. Of the 14 annual reports obtained from South Africa a total of 11 organisations held biological assets (79%). The activities of Australia (44%), United Kingdom (44%), the United States of America (33%) and the Netherlands (0%) are below the observed average of 64% which indicates that organisations might mislead stakeholders when their main operations are incorrectly reported.

The conclusions drawn on figure 4.1 and the analysed limitation of scope per country and agricultural industry as detailed in annexure P confirmed that from the 53 organisations' annual reports analysed, all organisations dealing with livestock (Australia, New Zealand and the United Kingdom), fruit (New Zealand, South Africa and the United Kingdom), forestry (South Africa), poultry (Australia and South Africa), horticulture (Canada and New Zealand) and sugarcane (Brazil, South Africa and the United Kingdom) classified their animals and plants as biological assets and reported accordingly thereon.

- In the grapevine sector Australia, New Zealand and South Africa reported on their biological assets but the United Kingdom did not classify their grapevines as biological assets.
- In the vegetable sector (horticulture) Australia did not report on their plants as biological assets whereas Brazil, Canada and the United States of America reported thereon.
- Agricultural reporting, including mainly crop production, in Brazil and Canada recognised the biological assets. South Africa and Australia partly considered the biological assets while the United Kingdom had not reported thereon.
- For other agricultural traders, covering tobacco production, seed production, and poverty alleviation amongst others, the United Kingdom partly considered reporting on biological assets while South Africa did not consider such reporting.

- Neither Australia, the United Kingdom nor the United States of America reported on dairy related activities.

Biological asset reporting appears to be somewhat neglected in the grape and vegetable sectors whereas the dairy, agricultural and other “mixed” industries had no biological asset reporting. Biological asset reporting was enforced in Brazil, Canada, New Zealand and South Africa while Australia, the Netherlands and the United Kingdom reported limited activities under the scope of IAS 41. Italy and Spain could not be assessed in this study due unavailable online documentation and a neglect of information requests.

The remainder of the procedures were performed on the 34 organisations that reported on biological asset, equating 88 annual reports. As the 17 organisations that reported their activities as inventory and the two whom acted as project implementers did not consider the requirements of IAS 41, it could not be further considered in this research.

4.3.2 Applied accounting framework

The purposively selected organisations should adhere to IAS 41. The notes to the financial statements were scrutinized to confirm the reporting framework adopted by the researched organisations. Despite the non-disclosure of the accounting framework by one researched organisation, IAS 41 or an equivalent was applied by the organisations. IAS 41 prescribe the reporting of biological assets in the Statement of Financial Position, whereas IAS 1 paragraphs 60–62 (IASB, 2014c:A754) requires assets to be classified as either current or non-current based on the period in which the organisation anticipate the asset to be realised. An analysis was done to determine how the 34 investigated organisations classify their biological assets in the Statement of Financial Position, as summarised in table 4.6.

Table 4.6: Classification of biological assets per agricultural sector

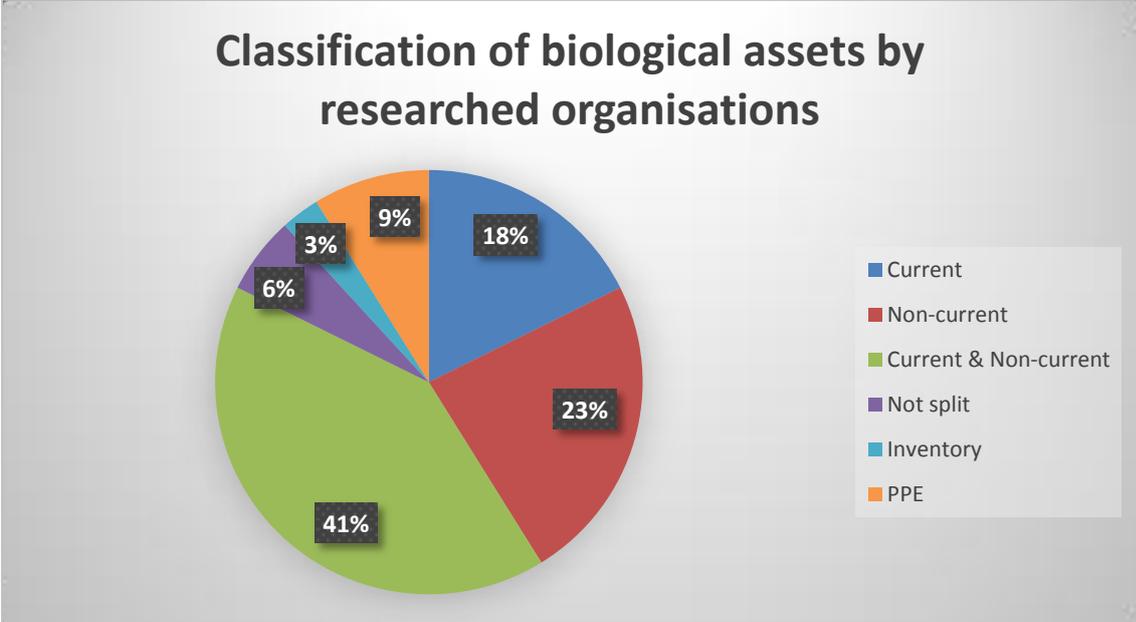
Trading category	Current	Non-current	Current & non-current	Not split	Inventory	PPE	Total
Agriculture (general)	2		2			2	6
Dairy							0
Forestry		1				1	2
Fruit			4				4
Grain							0
Grapevines		3					3
Horticulture			1		1		2
Livestock	2		2				4
Other trades		1					1
Poultry	2		1				3
Sugarcane		2	3	1			6
Vegetables		1	1	1			3
Total	6	8	14	2	1	3	34

Source: Research result

Table 4.6 validates that the fruit industry consistently distinguishes between current- and non-current biological assets and accordingly the grape industry reports on non-current assets. There was no consistency in the other sectors as the general agricultural activities were either recorded as current assets by 33% of the organisations, classified as current and non-current by another third, 33% and 33% reporting thereon as property, plant and equipment. Forestry activities were either reported as non-current biological assets or were reported as property, plant and equipment. The general horticulture sector either splits the classification or merely reports on inventory, whereas the livestock and poultry industries distinguished between current assets and a split of non-current and current assets. The sugarcane and vegetable sectors were divided as reporting was merely on current assets, non-current assets and a split thereof. Apart from the grape and fruit sectors, there was no consistency in the reporting of biological assets in the Statement of Financial

Position. The results of table 4.6 was summarised in figure 4.2 to illustrate the overall industry consideration on distinguishing between current and non-current biological assets:

Figure 4.2: Classification of biological assets per agricultural sector



Source: Research result

Fourty-one percent of organisations reporting on biological assets distinguish between current and non-current biological assets as guided by IAS 1 (IASB, 2014c:A754). The differentiation provides valuable information to users as the liquidity assessments are affected by it. The main operations of the organisation and the nature of the biological assets may necessitate organisations to disclose their biological assets as either (23%) non-current, (18%) current or as (9%) property, plant and equipment. An error was identified in the 3% of organisations reporting their biological assets directly as inventory, contravening the accounting guidance of IAS 41 (IASB, 2015:A1349).

Conclusions from table 4.6 and figure 4.2 include:

- Agriculture sector: Biological assets held for less than 12 months like crop was classified as current assets while other multi-year assets were disclosed as non-current assets. The classification was thus considered to be correct.

- Forestry sector: As forestry activities are multi-year programmes it is classified as non-current biological assets or included in property, plant and equipment. Even though the classification of forests is not consistent the reporting on non-current assets were considered correct.
- Fruit production: Fruit production contains the non-current element of the multi-year trees and the growing fruits as current assets and therefore the classification was considered accurate.
- Grapevines: Grapevines are multi-year crop and classified as non-current biological assets. The grapes were not disclosed as current biological assets.
- Horticulture/general: The grown plants were classified as inventory but as it meets the definition of biological assets should have been disclosed as a current biological asset.
- Livestock trading: Livestock production consists of breeding stock and stock for slaughter and can be classified as non-current and current assets. The differentiation was therefore considered accurate.
- Other agricultural productions: As information on this biological asset was not available the nature thereof could not be analysed.
- Poultry: Poultry farming is classified as current and non-current biological assets as the flock consists of broiler stock and breeding stock. The short lifespan of breeding stock for egg production and actual breeding justified the classification thereof as current biological assets by two organisations. One organisation regards the breeding stock as non-current in nature. The inconsistency in the differentiation of the biological assets impacts on the comparability of financial results.
- Sugarcane: 50% of the sugarcane producers split the roots and the growing cane and disclose it separately as non-current (roots) and current (growing cane) stock. 33% of the organisations merely classified the sugarcane as one biological asset and disclosed it as a non-current asset while no split was considered by the other organisation. The sugarcane sector is not consistent in their evaluation of whether the assets are current or non-current.
- Vegetables/horticulture: The multi-year trees were separated from the growing fruit and the biological assets were classified as current and non-current by nature. The classification was therefore considered adequate.

There is no industry trend detailing a split between current- and non-current biological assets included in the Statement of Financial Position.

4.3.3 Significance of biological assets held

The significance of the biological assets in relation to the total assets per organisation was calculated in this section. The biological asset value was expressed as a percentage of the gross assets per organisation, per financial year. Where the biological asset holding exceeded 20% the organisation was regarded a significant biological asset holder. The results of the calculations are summarised as follows:

Table 4.7: Summary of organisations with biological assets exceeding 20% of total assets held: 2012 to 2015

Organisation	2012	2013	2014	2015
Australian Agricultural Company Limited	43%	40%	35%	38%
Adecoagro	* ¹		21%	*
Precious Woods	*	21%	22%	*
Bono Farm Investments Pty Ltd	*	59%	41%	*
Illovo Sugar Limited	22%	22%	23%	24%
Kangela Citrus Farms (Pty) Ltd	80%	85%	55%	62%
SAFE commercial Pty Ltd	59%	49%	21%	*
Tongaat Hulett Limited	20%	22%	21%	21%
Asian Citrus Holding Limited	30%	30%	25%	*
Associated British Foods PLC	30%	30%	25%	*

Source: Research result

Table 4.7 was summarised as follows:

- Australian Agricultural Company Limited, Illovo Sugar Limited, Kangela Citrus Farms (Pty) Ltd and Tongaat Hulett Limited have significant biological assets in all four financial years (2012 to 2015).

¹ * The financial report is not available for the reporting period.

- SAFE Commercial (Pty) Ltd, Asian Citrus and Associated British Foods have significant biological asset holdings from 2012 to 2014. Bono Farm Invest (Pty) Ltd also has significant biological assets and 2013 was their first year of operation.

The above listed organisations were classified as major biological asset holders for the purposes of this study. In section 4.3.10 their consideration of the disclosure requirements of IAS 41 were tested, where after it was concluded that there is not a direct correlation between the significance of the biological assets held and the organisation's extent of compliance with IAS 41.

4.3.4 Aggregate fair value gains/losses disclosure

IAS 41, paragraph 40 (IASB, 2015:A1352) requires that organisations disclose the 'aggregate gain or loss arising during the current period on initial recognition of biological assets and agricultural produce and from the change in fair value less costs to sell of biological assets'. As the total fair value losses and gains might influence user's decisions the notes to the financial statements were examined to establish whether the aggregate fair value adjustments have been disclosed.

Table 4.8: Organisations reporting on the aggregate fair value gains or losses in the notes to the financial statements

Organisation	Country	Fair value gains/losses
Australian Agricultural Company Limited	Australia	√
Australian Natural Proteins Limited	Australia	X
Australian Vintage Limited	Australia	Limited
Farm Pride Foods Limited	Australia	X
Adecoagro	Brazil*	X
Brasil Agro	Brazil	√
Cosan Limited	Brazil	X
Precious Woods	Brazil	Cost basis
São Martinho	Brazil	√

Organisation	Country	Fair value gains/losses
Bevo Agro Incorporated	Canada	X
Bunge Limited	Canada	X
Glencore	Canada	Cost basis
Sunora Foods Incorporated	Canada	Inventory
Agria Corporation	New Zealand	√
BayWa Ag	New Zealand	√
Landcorp Farming Limited	New Zealand	√
Silver Fern Farms	New Zealand	√
Treasury Wine Estate	New Zealand	√
Astral foods	South Africa	√
Bono Farm Investments Pty Ltd	South Africa	X
Distell	South Africa	√
Illovo Sugar Limited	South Africa	√
Kangela Citrus Farms (Pty) Ltd	South Africa	√
Mondi Group	South Africa	√
Oos-Kaap Boerdery & Graanhandelaars (Edms) Bpk	South Africa	X
RCL Foods	South Africa	√
SAFE commercial Pty Ltd	South Africa	X
SAFE farm exports Pty Ltd	South Africa	X
Tongaat Hulett Limited	South Africa	√
Agriterra Limited	United Kingdom	√
Asian Citrus Holding Limited	United Kingdom	√
Associated British Foods PLC	United Kingdom	√
Unilever	United Kingdom	X
Olam	USA	√

Source: Research result

Table 4.8 illustrates that 19 researched organisations, constituting 56%, disclosed their aggregate fair value gains or losses as required by IAS 41 (IASB, 2015:A1352).

Eleven organisations did not disclose any fair value adjustment data to allow the users to interpret the value change on the biological assets and one organisation had limited disclosure. As the biological assets are accounted for at cost by two organisations and as inventory by another these annual reports did not consider fair value principles. The significance of the biological assets held by the 15 defaulting organisations were assessed to establish whether the users of their financial statements may be negatively impacted by the non-adherence with the requirements of IAS 41, paragraph 40 (IASB, 2015:A1352):

Table 4.9: Aggregate fair value losses/profits not disclosed on annual reports in relation to the significance of biological assets

Organisation	Fair value gains/losses	Significance of biological assets			
		2015	2014	2013	2012
Australian Natural Proteins Limited	X	-	0%	0%	0%
Australian Vintage Limited	Limited	7%	7%	7%	8%
Farm Pride Foods Limited	X	-	13%	12%	13%
Adecoagro	X	-	21%	17%	17%
Cosan Limited	X	-	0%	0%	4%
Precious Woods	Cost	-	22%	21%	19%
Bevo Agro Incorporated	X	-	2%	2%	2%
Bunge Limited	X	-	3%	2%	2%
Glencore	Cost	-	0%	0%	0%
Sunora Foods Incorporated	Inventory	-	0%	0%	0%
Bono Farm Investments Pty Ltd	X	-	41%	59%	20%
Oos-Kaap Boerdery & Graanhandelaars (Edms) Bpk	X	2%	0%	0%	0%
SAFE commercial Pty Ltd	X	-	21%	49%	59%
SAFE farm exports Pty Ltd	X	-	15%	-	-
Unilever	X	-	0%	0%	-

Source: Research result

The users of financial information of the organisations that value biological assets at cost might not be impacted negatively as the assets relate to long-term forests and general agricultural activities. Users may need additional disclosures to comprehend the asset status and the market conditions thereof.

Where the biological assets constitutes a significant portion of the total assets, thus exceeding 20% for this study, the non-disclosure of the aggregate fair value profit or loss may negatively impact on the user's decisions; especially when the liquidity and asset ratios are used to inform operational, financial and investing decisions. As the fair value change affects the total equity and assets held by the organisation, the biological assets value might result in more desirable working capital ratios (current assets minus current liabilities); a better current ratio (current assets divided by current liabilities), the return on assets (net income divided by average total assets) and a positive debt-equity ratio (total debt divided by equity). The significant biological assets held by Bono Investments (Pty) Ltd (41% and 59%) and by SAFE Commercial (Pty) Ltd (21%; 49% and 59%) may therefore be misstated when the aggregate fair value profits or losses are not separately considered by investors and other financial users. Users should be allowed to form decisions on useful and decision-enhancing information.

4.3.5 Biological asset description

IAS 41, paragraph 41 (IASB, 2015:A1352) requires that organisations should detail a description of all groups of biological assets held. Such disclosure may be either narrative or a quantified description. To analyse the compliance with paragraph 41, the notes to the financial statements were analysed to confirm that the biological asset description has been disclosed. Such description will direct the required accounting treatment and may impact on decisions taken by the report users.

An analysis of the notes to the financial statements confirmed that not all organisations provide detailed descriptions of the biological assets held in their operations:

Table 4.10: Organisations reporting on the description of biological assets in the notes to their annual reports

Organisation	Country	Description disclosed
Australian Agricultural Company Limited	Australia	√
Australian Natural Proteins Limited	Australia	√
Australian Vintage Limited	Australia	√
Farm Pride Foods Limited	Australia	√
Adecoagro	Brazil	√
Brasil Agro	Brazil	√
Cosan Limited	Brazil	X
Precious Woods	Brazil	√
São Martinho	Brazil	√
Bevo Agro Incorporated	Canada	√
Bunge Limited	Canada	√
Glencore	Canada	X
Sunora Foods Incorporated	Canada	X
Agria Corporation	New Zealand	√
BayWa Ag	New Zealand	√
Landcorp Farming Limited	New Zealand	√
Silver Fern Farms	New Zealand	√
Treasury Wine Estate	New Zealand	√
Astral foods	South Africa	√
Bono Farm Investments Pty Ltd	South Africa	√
Distell	South Africa	√
Illovo Sugar Limited	South Africa	√
Kangela Citrus Farms (Pty) Ltd	South Africa	√
Mondi Group	South Africa	√
Oos-Kaap Boerdery & Graanhandelaars (Edms) Bpk	South Africa	X
RCL Foods	South Africa	√
SAFE commercial Pty Ltd	South Africa	√

Organisation	Country	Description disclosed
SAFE farm exports Pty Ltd	South Africa	√
Tongaat Hulett Limited	South Africa	√
Agriterra Limited	United Kingdom	√
Asian Citrus Holding Limited	United Kingdom	√
Associated British Foods PLC	United Kingdom	√
Unilever	United Kingdom	X
Olam	United State of America	X

Source: Research result

28 organisations (82%) detailed information in their financial statements, or elsewhere in their annual reports, on the nature of their biological assets held and provided descriptions thereof to allow an understanding of such assets. Six organisations demonstrated a disregard of the requirements of IAS 41 (IASB, 2015:A1352) as they did not detail any information to allow users to gain information on the nature of their biological assets.

The materiality of the biological assets held by the defaulting six organisations was assessed to determine whether it influenced the non-compliance with IAS 41 paragraph 41 (IASB, 2015:A1352). The immateriality was confirmed as the biological assets held by four of these organisations constituted less than 1% of the total asset value. The immateriality equalled 4% and an average of 8% on the other defaulters.

Four of the defaulters categorised their biological assets as non-current—reporting that the assets are not expected to realise an economic inflow of resources in the forthcoming 12 months. The multi-year nature of the assets may therefore also influence the non-disclosure of the descriptions thereof. It is evident that the insignificance of the biological assets and the related life expectancy thereof impacts on the insertion of detailed descriptions thereon in the financial statements.

4.3.6 Groups and quantities of biological assets held

Paragraph 46 of IAS 41 (IASB, 2015:A1353) requires the non-financial measures or estimates of the physical quantities to be disclosed for each group of biological asset. As such grouping and quantities may enhance decision-making by the users, the notes to the financial reports were analysed to confirm compliance with paragraph 46:

Table 4.11: Organisations reporting on the quantities of biological assets

Organisation	Country	Groups disclosed	Quantities disclosed
Australian Agricultural Company Limited	Australia	√	√
Australian Natural Proteins Limited	Australia	√	X
Australian Vintage Limited	Australia	√	√
Farm Pride Foods Limited	Australia	√	√
Adecoagro	Brazil	√	X
Brasil Agro	Brazil	√	√
Cosan Limited	Brazil	X	X
Precious Woods	Brazil	X	X
São Martinho	Brazil	√	√
Bevo Agro Incorporated	Canada	X	X
Bunge Limited	Canada	X	X
Glencore	Canada	X	X
Sunora Foods Incorporated	Canada	X	X
Agria Corporation	New Zealand	√	√
BayWa Ag	New Zealand	√	√
Landcorp Farming Limited	New Zealand	√	√
Silver Fern Farms	New Zealand	√	√
Treasury Wine Estate	New Zealand	√	√
Astral foods	South Africa	√	X
Bono Farm Investments Pty Ltd	South Africa	√	√

Organisation	Country	Groups disclosed	Quantities disclosed
Distell	South Africa	√	√
Illovo Sugar Limited	South Africa	√	√
Kangela Citrus Farms (Pty) Ltd	South Africa	√	√
Mondi Group	South Africa	√	√
Oos-Kaap Boerdery & Graanhandelaars (Edms) Bpk	South Africa	X	X
RCL Foods	South Africa	√	√
SAFE commercial Pty Ltd	South Africa	√	√
SAFE farm exports Pty Ltd	South Africa	√	√
Tongaat Hulett Limited	South Africa	√	√
Agriterra Limited	United Kingdom	√	√
Asian Citrus Holding Limited	United Kingdom	√	√
Associated British Foods PLC	United Kingdom	√	√
Unilever	United Kingdom	X	X
Olam	United State of America	X	X

Source: Research result

Paragraph 46 was partly complied with as only 74% (25 organisations) detailed the number of biological asset groups and 65% (22 organisations) detailed the actual asset quantities held at reporting date. Six of the nine organisations (67%) that neglected disclosure of the biological asset groups did not include detailed descriptions or actual quantities to substantiate the value reported in the Statement of Financial Position.

Further analysis of the non-compliance concluded that Brazil and Canada are the main defaulting countries:

- Despite Brazil being regarded an economical driver as associate of the BRICS, 40% of the organisations did not disclose the biological asset groups held, and 60% did not detail the biological asset quantities;

- 100% of the Canadian organisations did not disclose either the group or quantities of biological assets reported on even though Canada forms part of the top ten agricultural exporting countries.

The non-disclosure of quantitative information to allow users to comprehend the biological asset value may deter the usefulness of such reports. As such the users' assessment of liquidity, the rate of return on assets, the consideration of the cash flows and the performance on the actual quantities of biological assets may be negatively impacted.

4.3.7 Valuation method applied

Elaborated information on the valuation procedures may assist users to contextualise the reported balances. Particularly as not all users of financial statements are accounting orientated, like policy makers, risk managers, owners and Chief Executive Officers. The annual reports were scrutinised and summarised per type of biological asset traded to establish whether additional valuation information is disclosed in the industry.

Table 4.12: Applied valuation method per researched organisation

Organisation	Valuation method applied	Additional disclosures	Country
Agricultural industry	Livestock		
Australian Agricultural Company Limited	Fair value by independent valuers	√	Australia
Australian Natural Proteins Limited	Fair value based on market prices	√	Australia
Agria Corporation	Fair value less costs to sell	√	New Zealand
Glencore	Fair value less costs to sell	x	Canada
Landcorp Farming	Fair value less costs to	√	New Zealand

Organisation	Valuation method applied	Additional disclosures	Country
Limited	sell		
Silver Fern Farms	Fair value based on market prices	√	New Zealand
SAFE commercial Pty Ltd	Fair value less costs to sell	√	South Africa
Tongaat Hulett Limited	Fair value less costs to sell	√	South Africa
Agriterra Limited	Fair value less costs to sell	√	United Kingdom
Agricultural industry	Poultry		
Farm Pride Foods Limited	Amortised cost	√	Australia
Astral foods	Fair value less costs to sell	√	South Africa
RCL Foods	Fair value less costs to sell	√	South Africa
Agricultural industry	Crop production		
Australian Agricultural Company Limited	Fair value less costs to sell	√	Australia
Australian Natural Proteins Limited	Fair value based on market prices	√	Australia
Brasil Agro	Fair value less costs to sell	√	Brazil
Oos-Kaap Boerdery & Graanhandelaars (Edms) Bpk	Not disclosed	x	South Africa
SAFE commercial Pty Ltd	Fair value less costs to sell	√	South Africa
SAFE farm exports Pty Ltd	Fair value less costs to sell	√	South Africa

Organisation	Valuation method applied	Additional disclosures	Country
Agricultural industry	Forestry		
Precious Woods	Amortised cost	√	Brazil
Landcorp Farming Limited	Fair value less costs to sell	√	New Zealand
Mondi Group	Fair value less costs to sell	√	South Africa
Agricultural industry	Horticulture		
Bevo Agro Incorporated	Fair value less costs to sell	√	Canada
BayWa Ag	Fair value less costs to sell	√	New Zealand
Olam	Not disclosed	x	United States of America
Sunora Foods Incorporated	Inventory valuation	x	Canada
Agricultural industry	Vineyards		
Australian Vintage Limited	Net present value of cash flows	√	Australia
Treasury Wine Estate	Fair value less costs to sell	√	New Zealand
Bono Farm Investments Pty Ltd	Fair value less costs to sell	√	South Africa
Distell	Fair value less costs to sell	√	South Africa
Agricultural industry	Fruit trees		
Adecoagro	Fair value less costs to sell	√	Brazil
Treasury Wine Estate	Fair value less costs to sell	√	New Zealand
Bono Farm	Fair value less costs to	√	South Africa

Organisation	Valuation method applied	Additional disclosures	Country
Investments Pty Ltd	sell		
Kangela Citrus Farms (Pty) Ltd	Fair value less costs to sell	√	South Africa
RCL Foods	Fair value less costs to sell	√	South Africa
Asian Citrus Holding Ltd	Fair value less costs to sell	√	United Kingdom
Agricultural industry	Sugarcane		
Brasil Agro	Fair value less costs to sell	√	Brazil
Cosan Limited	Fair value less costs to sell	√	Brazil
São Martinho	Net present value of cash flows	√	Brazil
Bunge Limited	Amortised cost	√	Canada
Illovo Sugar Limited	Fair value less costs to sell	√	South Africa
RCL Foods	Fair value less costs to sell	√	South Africa
Tongaat Hulett Limited	Fair value less costs to sell	√	South Africa
Associated British Foods PLC	Fair value less costs to sell	√	United Kingdom
Agricultural industry	Other		
Unilever	Fair value	x	United Kingdom

Source: Research result

Even though IAS 41 does not require the disclosure of additional valuation information, such reporting was evaluated in this study as the objective of financial reporting is to provide useful information to the users thereof. As organisations may

operate in multiple biological assets, the valuation method applied and the disclosure of additional underlying information to each method per type of biological asset were assessed.

Although not all organisations detailed additional valuation disclosures, it was noted that such information was disclosed for each type of asset reported on. 100% of the poultry, forests, grapevines fruit growers and sugarcane organisations detailed additional valuation considerations to enhance understanding of their valuation methods. 50% of the horticultural sector reporting organisations, 0% of the “other agricultural sectors”, 17% of the crop producers and 11% of the livestock sector did not disclose narrative information on the valuation basis applied to derive at the reported biological asset values. The inclusion of the additional narrative information demonstrates the commitment of the industry to enhance an understanding of the methods applied to derive at the reported values.

4.3.8 Biological asset challenges

The value and related performance of biological assets may be directly affected by factors like the ecological environment of the organisation; the social responsibility associated with methane gasses and pollution; restrictions on the use of land or enforced emission trading schemes on forests, as detailed in chapter two. As the disclosure of such information may assist users to make informed decisions on the performance of the biological assets, the annual reports were analysed to determine whether challenges were highlighted and disclosed. The challenges identified in the annual reports of the researched organisations were analysed to determine whether IAS 1, IAS 41 and the Conceptual Framework provides guidance on how to address same. Annexure G details such extensive process, which was further applied in chapter five to inform the application guideline.

The disclosure of challenges experienced by organisations is not a requirement in terms of IAS 41 but was assessed in this study as these challenges are unavoidable and expected by users. By disclosing elaborative information on the challenges experienced and the impact thereof on the operations, the users are empowered to make informed decisions.

4.3.9 Accounting policy

The accounting policy informs the accounting treatment in the organisation and therefore impacts on the valuation and disclosure of biological assets. The accounting policy adopted per organisation was documented in a separate Excel table for analysis. Refer to annexure H for detail on the valuation methods applied by the organisations to report on their biological assets. These accounting policies are included in the application guideline and referenced to the informing accounting standard to provide industry guidance.

4.3.10 Notes to the financial statements

IAS 41 paragraphs 50–53 outline the reconciliations and additional information that will assist users to contextualise biological asset reporting. The notes to the financial statements were analysed to determine whether elaborative information is disclosed to allow users to grasp the biological asset activities, performance and changes. Annexure I detail the biological asset note disclosures identified in the researched financial reports (in anonymous format) which was compiled as guiding document for the industry. More comprehensive disclosures were noted in the investigated 2014 to 2015 financial reports compared to those of 2012 to 2013. This may be a result of the guidance provided by IFRS 13 which requires detailed disclosures on the fair value considerations. The effect of the implementation of IFRS 13 does not fall in the scope of this study.

To assess the quality of the biological asset note disclosures to users, the compliance tested in 4.3.4 to 4.3.6 was scored and analysed. One point was awarded for each disclosure requirement met, resulting in four points equating to 100% compliance. Table 4.13 demonstrates the performance per country:

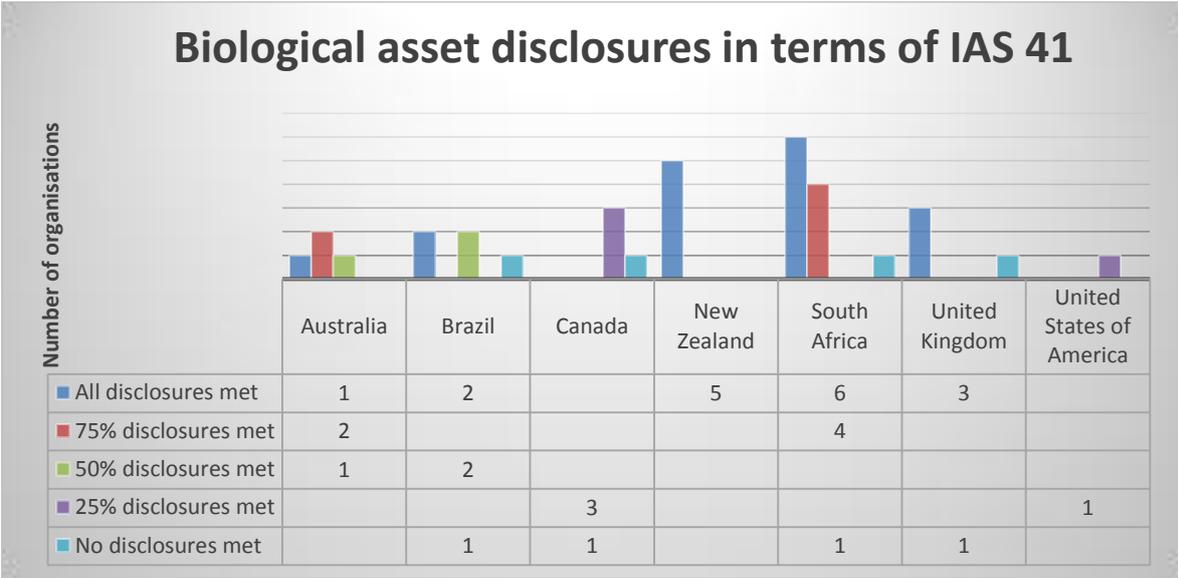
Table 4.13: Summarised disclosure compliance per country

Country	Extend of disclosure requirements met				
	100%	75%	50%	25%	0%
Australia	1	2	1		
Brazil	2		2		1
Canada				3	1
New Zealand	5				
South Africa	6	4			1
United Kingdom	3				1
United States of America				1	
TOTAL	17	6	3	4	4

Source: Research result

Merely 50% (17) of the researched organisations reporting on biological assets complied with all the disclosure requirements tested in this study, i.e. the aggregate fair value profit or loss, a description of the assets, the extent and nature of the various groups held and the underlying biological asset quantities. 18% (6) complied with three of the tested areas and the remaining 32% (11) complied with only two or less factors. To comprehend this finding further the information was detailed in figure 4.3 to demonstrate the performance per country:

Figure 4.3: Required reporting compliance per country

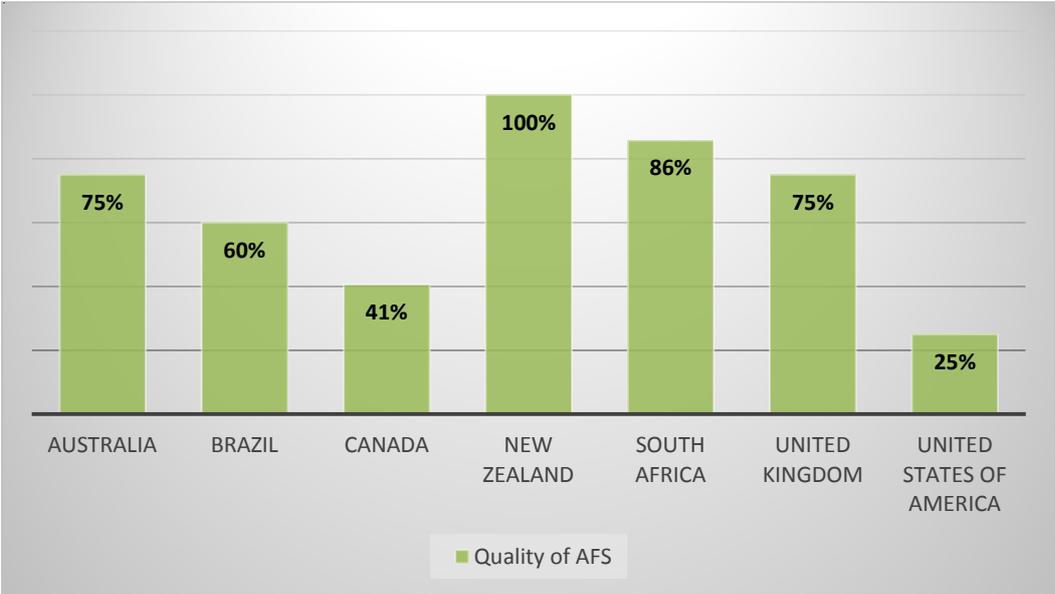


Source: Research result

Figure 4.3 illustrates that Canada and the United States of America did not rigorously consider the disclosure requirements of IAS 41 whereas New Zealand is setting the trend for biological asset disclosures. Australia, Brazil and the United Kingdom had average disclosure considerations and South Africa had a strong trend towards full compliance.

The average compliance disclosure per country was calculated to further analyse the IAS 41 consideration. The results detailed in figure 4.4 illustrates that New Zealand (IFRS compliant tier) was identified as the trend setting country with 100% of the tested disclosures included in the annual reports of the researched organisations. South Africa (BRICS association) scored a total of 86% and the United Kingdom (IFRS tier) and Australia (top 10 agricultural exporters) scored an average of 75% each. All of the researched IFRS compliant countries demonstrated high disclosure compliance whereas the lowest complying countries are both agricultural exporting leaders. The required disclosures regulated in IAS 41 are prescribed to enhance decision-making and to provide fairly presented financial statements. Organisations should therefore take responsibility to ensure that all required disclosures are detailed in their financial reports.

Figure 4.4: Overall IAS 41 compliance per country



Source: Research result

In analysing the disclosure compliance per agricultural sector, it was found that the livestock sector disclosed 100% of the tested data in their annual reports, followed by the fruit and grapevine sectors that complied 94% and 92% respectively. The poultry sector attained 83% compliance, the sugarcane and forestry sectors scored 75% each, horticulture 63% and the vegetable and agriculture (crop production) achieved a non-user informing 42%. Compliance with the disclosure requirements of IAS 41 can be strengthened in the various agricultural sectors to produce decision-enhancing reports.

The major biological asset holding organisations as identified in paragraph 4.3.3 were evaluated to determine their extent of IAS 41 disclosure compliance as it was anticipated that these organisations will be trend setters.

Table 4.14: Disclosure requirements compliance score for significant biological asset holding organisations

Organisation	% Disclosure requirements met (IAS 41)
Australian Agricultural Company Limited	100%
Bono Farm Investments Pty Ltd	75%
Illovo Sugar Limited	100%
Kangela Citrus Farms (Pty) Ltd	100%
SAFE commercial Pty Ltd	75%
Tongaat Hulett Limited	0%
Asian Citrus Holding Limited	100%
Associated British Foods PLC	100%

Source: Research result

Table 4.14 confirms that the significance of biological assets held per organisation encourages extensive information disclosure as seven of the eight organisations achieved a compliance score of minimum 75%.

It was noted that table 4.14 only includes five organisations that achieved 100% of the tested disclosure compliance. Since table 4.13 reported that a total of 17 organisations achieved full compliance the asset significance of the remainder was revisited to confirm that eight thereof had biological asset holdings of less than 10% of their total assets, with a further three constituting less than 1%. Even though the significance of the biological assets held may encourage organisations to disclose comprehensive information thereon, there is no direct correlation between detailed disclosures as the materiality of these assets.

4.3.11 Bearer and consumable biological assets

IAS 41 paragraphs 43–44 encourage the distinction between bearer and consumable biological assets to be disclosed in the notes to the financial statements. The amended IAS 41, effective 1 January 2016, requires that bearer plants be accounted for as property, plant and equipment and not biological assets (IASB, 2015:A1346). The annual reports were analysed to establish whether organisations are disclosing

the split between the bearer and consumable biological assets as it will give an indication of whether the industry reports maintain the required data to implement the reporting changes of IAS 41.

With reference to section 4.3.2 it can be concluded that a total of 14 researched organisations (41%) analysed the nature of the biological assets and the intended trading purpose thereof to effectively proportion the assets as non-current and current assets. Upon linking these 14 organisations to their particular agricultural sectors it was found that the fruit sector leads the industry as 100% of the tested organisations distinguish between their bearer and consumable biological assets. The horticulture, livestock and sugarcane sectors are 50% ready for the amended reporting whereas the agriculture (crop), poultry and vegetable sectors are 33% prepared. These sectors will need to equip themselves with the required reporting changes of IAS 41 to ensure that the biological assets are sufficiently distinguished and reported as bearer and consumable assets. No reporting split was identified on the forestry and grapevine reporting organisations.

The results from phase two informed the assessment of the usefulness of the information by the various user groups thereof as detailed in phase three.

4.4 Phase three: Closed and open-ended questionnaires

A structured, close-ended questionnaire, focussing on the classification of biological assets, the valuation method applied and the related challenges in reporting thereon was created on Survey Monkey. The questions were drafted to be clear, concise, straight-forward and aimed at professionals with knowledge of the required field to ensure that the questionnaire remains time efficient and causes the minimum discomfort for the respondents. Annexure J contains this questionnaire.

The questionnaire determines the trends of the various valuation methods applied in the industry to value the biological assets as well as the identified challenges experienced in such valuation. The individual valuation methods and related challenges will assist to determine the industry challenges as well as the industry guidance required in the application guideline. The questionnaire further seeks to

determine whether the respondents are willing to further participate in the detailed study.

4.4.1 Closed questionnaires

As detailed in 4.2.3, the initial sample of purposively selected organisations were contacted via Survey Monkey to request the completion of the closed questionnaire. As no responses were received from this procedure, as outlined in Annexure F, an alternative approach was adopted to identify organisations that can contribute to this study. Supplementing the lack of responses from the targeted prospective participants via Survey Monkey, the researcher assessed the user groups of the financial statements as detailed in phase four and chapter three.

The ten purposively selected financial statement user groups were assessed to determine which user groups can constructively contribute to the closed online questionnaire. As investors will not reveal the financial status and accounting policies of any clients they were excluded from the sample. Standard setters, academics and regulatory bodies could also not be included in this phase as they will not have operational financial involvement to provide amongst others, detailed information on the frequency of valuations and the inputs therein. The other user groups were assessed and users were identified that can contribute to the development of the application guideline.

A total of 40 purposively directed questionnaires were transmitted to the 34 selected organisations. The response rates, linked to the financial statement user groups and the countries targeted in the purposively selected sample are detailed in table 4.16:

Table 4.15: Responses received on the closed questionnaire per country

Country	User groups	Selected	Responses	Rate
Australia	Owners	2	0	0%
Brazil	Owners	2	0	0%
Canada	Owners	1	1	100%
International	Accountants	6	3	50%
Netherlands	Owners	2	0	0%
South Africa	Accountants & owners	23	20	87%
United Kingdom	Owners	2	0	0%
United States	Owners	2	0	0%
TOTAL		40	24	60%

Source: Research result

The 60% response rate on the closed questionnaire does not limit the validity of this study as the qualitative inputs received are more valuable than the quantity of responses. The response rate was further analysed in table 4.16 to illustrate the qualitative responses per broad user group of the questionnaire.

Table 4.16: Responses received on the closed questionnaire per financial statement user group

User groups	Selected	Responses	Rate
Owners, other users, governance and financial statement compilers	27	16	59%
Accountants, auditors and financial statement compilers	13	8	62%
TOTAL	40	24	60%

Source: Research result

From tables 4.15 and 4.16 it is evident that the responses from Canada (100%), South Africa (87%) and the international firms (50%) contributed in the development of the application guideline, especially as 62% of the responses were formulated by the financial departments involved in the valuation and reporting on biological assets.

The 59% responses from individuals assessing financial information in the decision-making process, being owners, customers, suppliers, individuals in charge of governance and other financial statement compilers, will assist to make the application guideline useful.

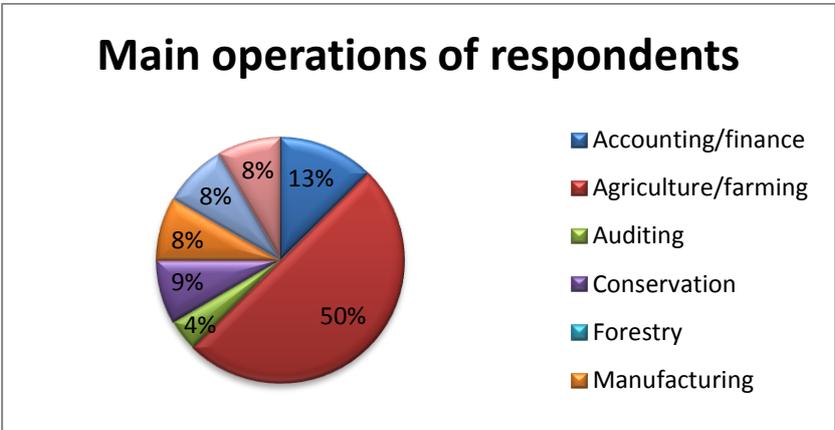
The responses from the research participants to the closed questionnaire were analysed below. The results are based on the actual feedback received.

4.4.1.1 Main operations of organisation

The main operation of an organisation is regarded as the most substantial income generating activity. The main operation was indicated by the research participants to allow the researcher to determine whether the accounting for biological assets is a priority for the organisation or its stakeholders.

When the main activity of an organisation entails biological assets, like agricultural farming operations and forestry programmes it is expected that the requirements of IAS 41 will be applied, detailed disclosures on biological assets will be included in the financial reports, the organisation will either employ or appoint experts to assist in the valuation and the respondent will be able to describe the unique challenges, if any, in valuing their biological assets.

Figure 4.5: Main operations of researched organisations in the closed questionnaire



Source: Research result

Figure 4.5 illustrates that the responses received on the closed questionnaire will contribute constructively to the development of the application guideline as 50% of the respondents are directly involved in agricultural activities, 13% represent the accountants reporting on the operations while representative feedback was received from auditors, organisations responsible for conservation of animals and plants, manufacturing activities, rural development and any other sectors. The application guideline will therefore implement the inputs from various user groups to enhance the usefulness of financial reports.

To ascertain that the primary revenue generation is derived from biological asset transformation, the annual turnover derived from biological asset trading was compared to the total revenue generated. Should the revenue derived from biological asset trade be significant to the organisation it is expected that the principles of IAS 41 will drive financial reporting and turnover will drive such compliance.

Table 4.17: Average revenue per main operation generated per sector

Sector	Revenue derived from main operations of organisation
Accounting average	68%
Agriculture average	83%
Auditing average	100%
Conservation average	71%
Manufacturing average	63%
Other average	26%
Rural development average	67%
Grand average	73%

Source: Research result

The 83% revenue derived from the main operations of the agricultural sector was linked to the significance of biological assets held by these respondents. From the 12 respondents who identified agriculture as their main activity, the biological assets'

significance in relation to all assets ranged from 2% to 62%, with an average of 21%. The types of biological assets held by these respondents were limited to three groups, with 50% of the respondents limiting operations to only group. It is evident that agricultural respondents were focussed on limited activities, thus specialisation. As such, 50% of these respondents performed monthly valuations while no valuation challenges were experienced by these valuers. Specialisation of activities may therefore drive biological asset valuations and the related reporting thereof.

4.4.1.2 Accounting for biological assets

Biological assets can be held by organisations for purposes other than biological transformation, like game farms, tourism and recreational purposes. To confirm that the organisations undertake biological asset transformation, and therefore need to comply with the requirements of IAS 41 (IASB, 2015:A1347; ASB, 2012:6) an assessment was done on the operations of the entities.

Table 4.18: Activities undertaken by organisations on biological assets

Operations of organisation	Function performed	Function not performed
Purchase or hold living plants	70%	30%
Purchase or hold living animals	65%	35%
Allow the plants and/or animals to grow for future use	83%	17%
Harvest the grown plants	57%	43%
Produce products from the animals/plants	52%	48%
Keep the animals/plants purely for conservation	13%	87%
Keep the animals/plants purely for education	4%	96%
Keep the animals/plants purely for research purposes	4%	96%
Keep the animals only for transportation purposes	0%	100%
Keep the animals/plants for entertainment purposes	0%	100%
Keep the animals/plants for recreational purposes	0%	100%
Keep the animals/plants for customs control purposes	0%	100%

Source: Research result

Where biological transformation is not monitored the animals or plants do not meet the definition of a biological asset and IAS 41 will not be applied to report thereon. Such instances include operations where animals or plants are held for research, education, transport, entertainment, recreation or customs control (ASB, 2012:6) and falls outside the scope of this study.

The active management of the biological assets by the respondents who grows it for future use (83%), harvest the produce (57%) and produce products therefrom (52%) are directly involved in biological transformation and need to consider the requirements of IAS 41. The mere purchasing of animals or plants does not constitute biological transformation.

The biological asset functions considered by the respondents in table 4.19 were analysed per respondent's feedback underlying figure 4.5 to investigate the underlying operational reason for holding the animals or plants. From this overall analysis it was found that 9% of respondents hold animals or plants purely for conservation purposes, 4% use the animals or plants in the production process and 70% hold it for agricultural biological transformation. It is expected that only the latter will report on biological assets while the conservation activities will result in the recognition of property, plant and equipment and the production organisation will account for inventory. To test the assumption, the intention of holding animals and plants were linked to the respondents' accounting treatment thereof.

Table 4.19: Accounting treatment applied by organisations on animals and/or plants

Area tested	Conservation	Agricultural production	Production process
Accounting treatment	Inventory (do not disclose animals not held for sale)	Inventory: 18% Biological assets: 82%	Inventory: 33% Biological assets: 67%
Valuation method applied	Market prices of similar assets: 50% Fair value less costs to sell: 50%	Market value of animal/plant on day of the valuation: 41% Most recent market price: 6% Market prices of similar assets: 12% Expected net cash flow: 6% Historical cost: 12% Independent valuation: 6% Management's assumptions and judgements: 6% Inventory at historical cost: 12%	Expected net cash flow: 33% Management's assumptions and judgements: 33% Independent valuation: 33%

Source: Research result

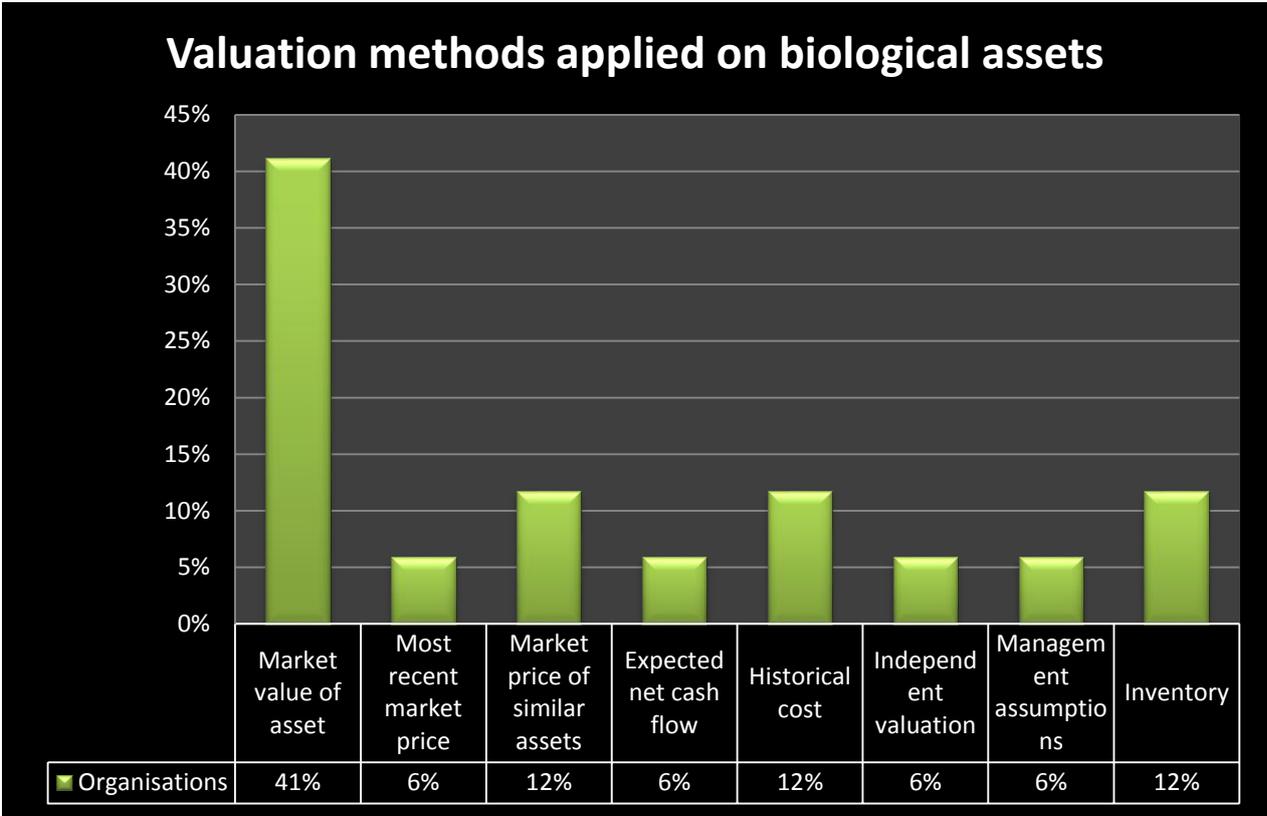
The reporting of conservation activities as inventory on the financial reports do not meet the requirements of IAS 41 or the expectation that such assets would be disclosed as property, plant and equipment (IASB, 2015:A1347; ASB, 2012:6). The valuing thereon in terms of market prices of similar assets or fair value less costs to sell is an indication that the respondents considered fair valuing the animals, despite the incorrect classification thereof. The industry may require assistance in the accounting for conservation activities.

As the organisation that directly classifies the animals as inventory, as part of the agricultural production, is involved in chicken farming it is assumed that the lifespan of the animals are considered by management in their classification of the animals. The organisation may benefit from the use of the guideline developed in chapter five

as chicken farms were investigated to determine the industry norm where it was established that other chicken farmers report on such assets as current biological assets. The available valuation methods applied to account in the agricultural production was detailed in figure 4.6 for further analysis.

The organisations reporting on their biological assets held in the production process are required to account for the biological assets until harvest whereafter the biological assets are reclassified to inventory (IASB, 2015:A1347). The organisation that reports on his production processes as inventory indicated that the main operations include conservation. As detailed information on the organisation is not available the accounting treatment cannot be evaluated, yet conservation operations should not instruct the recognition of biological assets held as inventory. Fair value considerations were applied to report on the production activities as expected cash flow, assumptions and estimates and independent valuations informed the reported values.

Figure 4.6: Valuation methods applied to account for biological assets in the agricultural sector



Source: Research result

As demonstrated in figure 4.6, 41% of respondents valued the agricultural sector biological assets by applying the market value of such asset. The market prices of similar assets, historical cost and valuation of inventory were applied by 12% each. The reporting of biological assets at a historical cost is not a preferred valuation method and these respondents may need to revisit their accounting policies (IASB, 2015:A1349). The chicken farmer reporting on his biological assets in terms of inventory may benefit from the detailed note disclosure and accounting policies detailed in annexures H and I to this study.

4.4.1.3 Valuing the biological assets

The types of biological assets and the related quantities held were analysed in terms of the significance of the biological assets held in relation to total assets. For the purposes of this analysis, only the 17 respondents who indicated that biological assets are held were considered.

Table 4.20: Significance of biological assets to tested organisations

No.	Industry	Main operations' contribution to revenue	Biological assets/ gross assets	Groups	Quantity
1	Agriculture	13%	6%	2	110 281
2	Agriculture	99%	25%	3	53
3	Agriculture	95%	15%	2	1 920
4	Agriculture	100%	21%	1	136
5	Agriculture	100%	62%	1	135
6	Other	49%	1%	9	591
7	Agriculture	61%	22%	1	1 800
8	Agriculture	100%	6%	1	580 000
9	Manufacturing	70%	25%	2	70 144
10	Conservation	41%	2%	2	Unknown
11	Manufacturing	57%	59%	2	735 000
12	Agriculture	100%	2%	1	6 111 484
13	Auditing	100%	19%	2	40
14	Rural development	100%	27%	2	405
15	Agriculture	55%	29%	3	586
16	Conservation	100%	100%	4	6
17	Agriculture	79%	23%	2	300

Source: Research result

Where the respondents' main operations contributed more than 90% of the total revenue of the organisations the biological asset significance in relation to total assets were assessed. Not all of these organisations had a significant biological asset holding as the rates fluctuated between 2% to 100%, whereas seven of the nine organisation's biological assets constituted less than 50% of their total assets. Table 4.20 further details that even though the biological assets held by an organisation may be insignificant to the gross asset value, the income derived from

such biological assets is significant to the operations. It should further be noted that, with the exception of the conservation organisation, all organisations reported on the quantities of biological assets held. Such reporting is regarded as an internal control tool to assist the organisation in their valuation of the biological assets.

With the exception of four organisations, the tested organisations mostly have either one or two biological asset types. The insignificance of the 1% biological assets held, where nine different types of biological assets are held by a tested organisation did not restrict adherence to IAS 41.

To assess the valuations performed by the respondents, the frequency of performing such calculations and the responsible valuer was determined and linked to the significance of the biological assets:

Table 4.21: Valuation frequency and valuers linked to the significance of biological assets

Industry	Biological assets /gross assets	Frequency of valuations	Valuer
Agriculture	6%	Annually	Accountant
Agriculture	25%	Monthly and annually	Production department
Agriculture	15%	Monthly and annually	Production department
Agriculture	21%	Monthly and annually	Production department
Agriculture	62%	Monthly and annually	Production department
Other	1%	Annually	Agronomist
Agriculture	22%	Annually	Board/owner
Agriculture	6%	Annually	Accountant
Manufacturing	25%	Monthly	Agronomist
Conservation	2%	Annually	Management
Manufacturing	59%	Annually	Accountant
Agriculture	2%	Monthly	Production department
Auditing	19%	Annually	Accountant
Rural	27%	Annually	Agronomist

Industry	Biological assets /gross assets	Frequency of valuations	Valuer
development			
Agriculture	29%	Annually	Accountant
Conservation	100%	Monthly	Management
Agriculture	23%	Annually	Management

Source: Research result

Table 4.21 highlights that where valuations are performed by accountants it is done only on an annual basis, regardless of the significance of the biological assets. It was anticipated that the organisation with 735 000 biological assets, equating 59% of the total assets, would require more frequent valuations than the annual calculations performed by the accountants. The challenges investigated in chapter two and the results from the annual report analysis may be a direct result of the fact that accountants seem to value biological assets annually for financial reporting purposes. Frequent valuations may assist the accountants to get a better understanding of the valuation process and involvement in such monitoring to enhance financial reporting.

Where the valuations are performed by agronomists, irrespective of the significance of the biological assets, preference was given to annual valuations as only 33% performed monthly valuations. It was noted that the organisation with the most biological assets in this category (70 144 vs. 591 and 405) performed frequent valuations. As agronomists are directly involved in the biological transformation of the assets, they are equipped with the knowledge and technical expertise to provide meaningful insight into the valuations. Frequent valuations may benefit the organisations and consideration can be given to allow these experts to perform such valuations in conjunction with the accountants to expose the latter to the technical aspects of the intricate assets.

Owners do not appear to be actively involved in the valuation of biological assets as only one was identified to do same. This valuation was performed annually. Likewise, management had a preference to annual valuations (67%). Owners and

management might consider the involvement of other valuers to enhance financial reports.

Despite the insignificance of the biological asset holding, monthly valuations were performed by the 29% respondents who indicated that the production departments perform the valuations. From further assessment, it was identified that no valuation challenges were experienced by four of these five organisations. In their valuations they have considered all the factors listed in table 4.22. Consideration of all these valuation factors may therefore assist the valuers to derive at a fair value for biological assets.

Table 4.22: Significance of valuation factors considered

Valuation factors	Frequency of consideration given to valuation factors					
	Always	Seldom	Selectively	Exceptions	Almost never	Never
Age of animal/plant	88%	0%	12%	0%	0%	0%
The location of the animal/plant	47%	24%	0%	0%	12%	18%
The condition of the animal/plant	77%	0%	12%	6%	0%	6%
The expected economic benefits to be derived from the animal/plant	88%	0%	12%	0%	0%	0%
The expected cash flow to be generated from the animal/plant	76%	0%	12%	0%	6%	6%
The expected yield to be harvested	65%	0%	6%	0%	6%	24%
The costs to sell the animal/plant	71%	6%	6%	6%	0%	12%
The quality of the animal/plant	88%	0%	6%	0%	0%	6%

Valuation factors	Frequency of consideration given to valuation factors					
	Always	Seldom	Selectively	Exceptions	Almost never	Never
The market price of the animal/plant	76%	6%	6%	0%	0%	12%
The sector prices of the specific animal/plant	65%	0%	18%	0%	6%	12%
The inputs from management on how to value the animal/plant	71%	0%	12%	0%	6%	12%
The expected harvesting date	59%	0%	12%	0%	6%	24%

Source: Research result

From table 4.22 it is evident that organisations do not consider all available factors in their valuation of biological assets. Fair value accounting specifically requires the location, condition and cost to sell biological assets to be considered in the valuation thereof (ASB, 2012:9; IASB 2013b:A491). Only 47% of organisations considered the location of the biological asset, 77% considered the condition thereof and only 71% considered the costs to sell the assets in their valuation. The valuation challenges experienced by organisations may be addressed or eliminated when organisations explore the various valuation factors in their valuation.

Of the five respondents with accounting-valuers only one considered the actual condition of the assets. The costs to sell these assets were not considered by two of the five valuers. As the condition and cost to sell assets directly impact on the reported values and as such valuation requirements are regulated in prescribed accounting standards, a consideration thereof was expected from accounting personnel (ASB, 2012:9; IASB 2013b:A491). In addition to the identified weakness, only three of the organisations considered inputs from management and other stakeholders in their valuation process, confirming that accountants may merely value biological assets for financial statement purposes and not necessarily to produce useful information.

It was noted that the respondents who did not experience valuation challenges, who considered all valuation factors and who performed monthly valuations formed a valuation team to collect inputs from informed individuals. The recommendation by the production organisations where inputs are provided by various experts in the field may thus address the biological asset valuation challenges experienced in the industry.

4.4.1.4 Valuation challenges experienced

The valuation challenges explored through the literature review in chapter two formed the basis for the investigation of whether the respondents experience similar or unique challenges. Respondents confirmed the existence of identified challenges with no additional or unique challenges detailed.

A total of 29% of the respondents did not experience any valuation challenges. The success of 80% of these respondents is due to the execution of monthly valuations, the appointing of the production unit as valuer supported by a valuation team of informed individuals from the various departments of the organisation and the consideration of all the valuation factors tested in 4.4.1.3. The valuations performed by the other 20% did not consider the location of the biological assets, the expected cash flows, the anticipated yields, the costs to sell the assets or the harvesting dates in the calculations executed by their accountant. As the audit report of this organisation was not available for examination, it cannot be confirmed that the valuation inputs were considered adequate by an independent auditor. The lack of valuation challenges may therefore be a direct result of improper reviews by the approvers and users of such information.

In assessing the valuation challenges experienced it was confirmed that the major challenge (41%) experienced by the respondents is the significant cost related to these valuations. A total lack of understanding the valuation model was experienced by 35% while the measurement of the age and the condition of the animals and plants is problematic for 24% of the respondents. None (0%) of the respondents found the valuation requirements of IAS 41 too complex to inform the fair value

reporting thereon. Figure 4.7 illustrates the significance of each valuation challenge experienced:

Figure 4.7: Challenges experienced to value biological assets



Source: Research result

The respondents indicated that the valuation principles defined by the users informs valuations (18%), that the risk of manipulation is high in fair value accounting and that they apply historical cost (18%). Organisations also do not have the expertise and experience (18%) to perform the valuations. In assessing these results from figure 4.7 in relation to the frequency of valuations performed, it was noted that 67% of respondents with challenges only performed annual valuations and furthermore considered on average 67% of the valuation factors.

An assessment of the 18% organisations that experience a challenge with the risk of manipulating fair value information confirmed that 67% performed annual valuations wherein 67% of the instances no consideration was given to the location of or the

costs to sell the biological asset while no consideration was given to the relevant biological asset sector prices. The respondents that experience a lack of expertise and experience (18%) to value the biological assets only performed annual valuations (100%). It is interesting to note that 67% of these organisations' valuations are performed by accountants whom identified that their organisation does not have the required valuation skills. Inputs from other stakeholders to assist with the valuation was not sought by 67% of these organisations to fill the knowledge gap, with a 67% disregard of any consideration of the location, condition and sector prices of the assets.

From the valuation challenge assessment it can be concluded that frequent valuations of biological assets enhance the required skills and experience to assist in the valuation process and that inputs on all the valuation factors should be obtained from various stakeholders to assist in the financial calculations.

4.4.2 Open-ended questionnaires

This phase of the study focusses on the detailed narrative accounting policies adopted by the organisation to account for and value biological assets. It requires information on procedures established to manage the assets, the journal entries passed in the accounting system, the valuation basis applied, the valuation methods used, the qualifications and experience of the valuers and an assessment of the amended IAS 41, effective 1 January 2016 on bearer biological assets. Due to the detailed narrative information required the questionnaire contains open-ended, technical questions to allow an individual analysis of the valuation methods and the related challenges experienced by the organisations, as evidenced in annexure K. Based on the willingness to participate in this phase of the study, as indicated by the respondents on the last question to the closed questionnaire, the sample could not be influenced by the researcher.

Since the responses on the closed questionnaires informed the research sample of the open-ended questionnaire, the sample equated to 13 respondents. The sample represents seven agricultural organisations, one audit firm, two conservation firms, a manufacturing firm, a rural development firm and one accounting/consulting firm. As

seven of the thirteen firms perform monthly valuations, and as eight firms relies on the valuation calculations by the production departments and the agronomists, the insight in the performed valuations by these firms were considered beneficial to the study.

The participants that opted to assist further in the study were contacted and the detailed open-ended questionnaire was transmitted for their consideration. It should be noted that off the 13 organisations, even though willingness was expressed to assist in the study, responses were not provided by all the research participants. An agricultural organisation, an auditor and an accountant assisted with the open-ended questionnaires. To formalise this participation, the 'Consent to participate in this study' form as approved by the Ethics Committee (annexure E) were signed and included as annexure N to the study. Annexure M details the comprehensive responses received from the research participants.

Some respondents opted to assist with interviews due to the comprehensiveness of the open-ended questionnaire. Other respondents provided no feedback to the questionnaire and did not respond to addressed communication. Annexure F details the correspondence trial. The comprehensive feedback from annexure M was analysed as follows;

4.4.2.1 Operations of the organisation

The main operations of the organisations were contextualised to determine whether agricultural transformation is managed which instructs the reporting in terms of IAS 41 on the living plants and animals.

As the organisations were all actively involved in the agricultural processes it was confirmed that IAS 41 should be adhered to. 67% of the respondents further indicated that the biological assets are regarded significant to the operations of the organisation as such operations cannot be conducted should these assets be removed.

4.4.2.2 Nature and purpose of biological assets

In contextualising the agricultural activities undertaken and the application of the requirements of IAS 41 thereon, the types of biological assets held, the purpose of holding it and the organisations' established procedures to manage those assets the following was noted:

- The researched organisations have sufficient data and systems in place to account for their biological assets in terms of the various groups held. It was found that the internal reporting was more comprehensive than the external reporting as internal reporting drove financial decisions whereas the external reports valued the assets at an insignificant growth stage. These challenges may be addressed when the reporting period is aligned to the lifecycle of the biological assets or alternatively in detailing the comprehensive information on the lifecycle of the various types of assets in the notes to the financial statements to enhance decision-making.
- Reports provided detailed information on leased, owned and the right to use land to provide a comprehensive outlook of the impact of the status of land on the performance of the biological assets. This was considered to be value adding information.
- As there is not a defined reporting purpose in the classification of the biological assets, the reporting burden to group biological assets in a meaningful manner superseded the purpose of financial reporting i.e. providing useful information to the users. As this organisation has computerised systems to track the progress and the transformation of the biological assets, it might be valuable for to document the judgements applied by management in their grouping assessment and provide detailed information on these assets in the notes to the financial reports. Such active monitoring of the biological transformation should further assist management in the monthly fair valuing of the biological assets.

4.4.2.3 Initial recognition and measurement

In assessing how organisations account for the biological assets with reference to the specific transaction dates, the values, the methods applied and other factors considered in such recognition, the following was noted:

- Ownerships, the determinable cost to perform initial recognition, control over the asset and the future economic benefit of the biological asset are considered in the initial recording.
- The location/geographical spread/factors and the actual condition of the biological assets are not assessed by 67% of the organisations in the valuation thereof.
- The biological assets of one researched organisation were accounted for as inventory on initial recognition of the plants, contradicting the requirements of IAS 41.

4.4.2.4 Subsequent valuation

The factors considered in the valuation calculations, the methods, assumptions and calculations applied therein and how fair value is determined on these biological assets were assessed:

- The organisations cannot exist without the biological assets yet monthly valuations are not considered vital for reporting purposes by 67% of the organisations.
- Where organisations relies on third party valuations it is only performed annually, which may be a result of the associated costs thereto.
- The organisation that performs monthly valuations reports on the biological assets on the cost model, whereas fair value reporting was considered by the other organisations.
- The fair values applied by the expert relies on the market value of farms sold in the region with similar agricultural activities as the valuation is used by the organisation to secure funding from a bank. From the detail provided it is evident that the value of the land is considered rather than the actual value of the biological assets. It is thus unclear as to whether the actual biological assets are valued.
- The growth of the actual plants has not been considered by one organisation, as management assumptions state that the 20% growth equated little biological transformation and as a result the cost model is applied. It is not clear whether

the applied assumption justifies the use of the cost model as nursery plants have a market price from early growth stages.

- Organisations have no documented procedure manual to instruct or guide the valuation of the biological assets.

4.4.2.5 Valuers

Information was gathered on the individual responsible for the valuation of the biological assets to assess the skills, knowledge and expertise required therein:

- Top management/the directors are directly involved in the valuation of the biological assets.
- Other informed individuals involved in the production process are not consulted in the valuations; this includes but are not limited to agronomists, the accountants involved in the daily processing, the production department.
- Where experts are used to value the biological assets, no evidence was provided that such valuations were assessed and approved by management and the credentials and experience of the expert could not be substantiated.

4.4.2.6 Factors considered in fair value calculations

In contextualising the valuation information, information was gathered on the accounting policy to report on biological assets, the established policies and procedures and how the users of financial reports impacts on the related reporting:

- The accounting policies applied are general in nature and mostly recite the requirements of IAS 41.
- The stakeholders are not actively involved in the organisations.
- The unique user needs are not considered when financial reports are performed as it has not been established.
- There is no consideration of reporting separately on mature and immature biological assets.

4.4.2.7 Biological asset valuation and reporting challenges

The following challenges were experienced by the researched organisations in the implementation and application of IAS 41:

- It is cumbersome to apply estimates on the anticipated yields that inform the biological asset value.
- Management requires expert skills to determine the age, health and the ability of rhinos to produce, which results in the use of estimates and available market information.
- The nursery has no practical way to value their plants and vegetables as their produce is specialised and there is no active market for it.

The identified challenges can be addressed when the valuation of the biological assets are based on the available historical trends, a consideration of the industry averages per geographical area, and by detailing all assumptions, estimates and factors applied in the notes to the financial statements. As indicated in phase four, users prefer a disclosure of detailed information to allow an independent assessment of the values derived at.

4.4.3 Results of the contextualisation of the questionnaires

In contextualising the outcomes of the closed and open-ended questionnaires, the following recommendations were noted:

4.4.3.1 Main operations of organisations and the significance of its biological assets

The biological assets held in relation to the total assets of an organisation may not be significant, yet such assets may be substantial to the operations of when it has the highest revenue contribution, or when the operations of the organisation evolve around it. Where the biological asset activities were the main revenue drivers, organisations limited the groups of assets held and demonstrated strong controls over these assets as monthly valuations are performed thereon and valuation challenges are limited. Specialisation of agricultural activities may thus enhance the valuation and reporting thereof.

4.4.3.2 The nature and purpose of biological asset reporting

Organisations have established systems and controls to monitor the biological assets, but elect to analyse such information only for internal decision-making. The internal reports were comprehensive, detailing the type of assets, the related costs thereof and the life expectancy whereas external reporting was performed by the accountants merely for financial statement purposes. As there is not a defined reporting purpose in the classification of the biological assets, the reporting burden to group biological assets in a meaningful manner superseded the purpose of financial reporting i.e. providing useful information to the users.

These challenges may be addressed when the reporting period is aligned to the lifecycle of the biological assets or alternatively in detailing the comprehensive information on the lifecycle of the various types of assets in the notes to the financial statements to enhance decision-making.

4.4.3.3 Valuing biological assets

Valuations performed by accountants are merely done annually for financial statement reporting, regardless of the materiality of such assets. Frequent valuations may assist the accountants to get a better understanding of the valuation process and involvement in such monitoring to enhance financial reporting. Valuations are mainly performed by top management and directors in smaller organisations.

Valuation inputs from informed individuals are not considered in the valuation of biological assets, like agronomists, accountants, the production unit etc. Where experts are used to value the assets, neither assessments of the qualifications and experiences of such individual nor a review of the estimates applied in the process was evident from management. From the researched organisations, those that formed a valuation team where inputs are obtained from the different individuals involved with the biological assets were able to perform monthly valuations. Furthermore, no valuation challenges were experienced in such process as all the valuation factors researched in the closed questionnaire were evaluated in their valuation.

Organisations report on the quantities of biological assets held, which informs the valuations. The valuations were affected by the non-consideration of the location of the biological asset (53%), the condition thereof (24%) and the cost to sell the asset (29%) by the valuers. Such omissions may be avoided when all the valuation factors listed in table 5.2 of this study is considered. It should be noted that informed accountants omitted a consideration of the listed valuation factors, although it is prescribed in the regulating accounting standard. Compliance with the requirements of IAS 41 was not informed by the significance of the biological assets held in relation to the total asset holding as organisations with as little as a 1% biological asset holding reported such assets.

The accounting policies were evaluated to be a recite of the IAS 41 paragraphs. It was not tailored to address the nature of their biological assets, their operations or their unique accounting consideration thereof. Financial reports are not compiled to provide useful information to the users thereof as the needs of the various users are not established and consider in such reporting. A distinction between mature and immature biological assets is also not provided to guide the users in their decision-making.

4.4.3.4 Valuation challenges

The valuation challenges identified from the literature study were experienced by the researched organisations, with no additional or unique challenges identified. The valuation cost was highlighted as the most significant challenge by 41% of the organisations, while a lack of understanding the valuation model (35%) and the measurement of the age and condition of plants and animals (24%) were emphasised. All organisations understood the valuation requirements of IAS 41 as none (0%) found the valuation requirements too complex to implement. It was noted that 67% of the organisation that experienced valuation challenges merely performed annual valuations. Frequent valuations may enhance the required skills and experience whereas a consideration of all the listed valuation factors and inputs from informed individuals will enhance the reporting thereon.

4.4.3.5 Accounting for biological assets

The active management of the biological assets by the respondents who grows it for future use (83%), harvest the produce (57%) and produce products therefrom (52%) are directly involved in biological transformation and need to consider the requirements of IAS 41. The mere purchasing of animals or plants does not constitute biological transformation yet the industry may need guidance on when the requirements of IAS 41 is applicable.

Where experts are used to value the biological assets, only annual valuations were noted, which may be a direct result of the costs associated therewith. The fair value applied by another expert on the valuation of the biological assets relied on the market value of farms sold in the region with similar agricultural activities as the valuation is used by the organisation to secure funding from a bank. From the detail provided it is evident that the value of the land is considered rather than the actual value of the biological assets. It is thus unclear as to whether the actual biological assets are valued.

The biological assets of one researched organisation were accounted for as inventory on initial recognition of the plants, contradicting the requirements of IAS 41, as these plants are grown and subject to biological transformation. In addition, the growth of the plants was not considered, as the plants were reported at cost as transformation was considered insignificant, despite the 20% growth reported in the notes to the financial statements. It is not clear whether the applied assumption justifies the use of the cost model as these nursery plants are grown as a result of special orders and the selling price is thus determinable.

Biological assets held under conservation activities were also reported as inventory on the financial reports which does not meet the requirements of IAS 41 or the expectation that such assets would be disclosed as property, plant and equipment (IASB, 2015:A1347; ASB, 2012:6). The valuing thereon in terms of market prices of similar assets or fair value less costs to sell is an indication that the respondents considered fair valuing the animals, despite the incorrect classification thereof. The industry may require assistance in the accounting for conservation activities.

An investigation on chicken farming activities revealed further that an industry norm is to differentiate between the current and non-current biological assets, while one organisation reported these items as inventory at the cost price. The guidance included in chapter five on the accounting policies implemented by other organisations and the disclosure guidance provided in annexures H and I may assist the industry to report comparable financial results.

Organisations have no documented procedure manual to instruct or guide the valuation of the biological assets.

The users' expectations on decision enhancing information disclosures required were established in phase four to allow a correlation between the available industry information and the required information.

4.5 Phase four: Interviews with various user groups

The investigated areas and the findings from phase two and three informed the interview questions of phase four to determine the importance of the disclosed information to the users thereof in their decision-making process.

This phase focussed on gathering and evaluating the inputs from various financial statement user groups on their exposure to and expectations of the valuation of biological assets and the related reporting thereon. Specific focus was given to their expectations of the financial statement disclosure and the usefulness of the information in decision-making.

The user groups of the financial statements were identified from the studied literature and grouped to allow purposive sample selection for the interviews to be performed in this study (Sedláček, 2010:59; Deegan and Unerman, 2011:32; Silverman, 2013:422; Mitropolitski, 2015:3; Stonciuviene, *et al.* 2015:64). Each user group were assessed to determine their interest in the financial reports and the interview questions were developed to address the unique needs and expectations of these user groups. A total of six interview participation questionnaires were developed to

address the purposively selected ten interview groups. The research questions were developed to address the research areas per user group as outlined in table 4.23.

Table 4.23: Interview focus area per purposively selected user group

Tested area	Auditors	Accountants & compilers	Academics	Gover- nance	Standard setters Regulatory bodies	Owners Other users Investors
Valuation method applied		√				
Unique user expectation				√		√
Importance of biological asset information to user				√		√
Benefit of fair valuing				√		√
Unique challenges		√				
Industry challenges	√	√	√			
Recommendations to address challenges	√	√	√	√	√	√
Valuation documentation	√	√				
Accounting policy enhancement	√				√	
Industry leader	√					
Impact of IAS 41 changes	√	√	√			
Guideline (assistance required)	√	√	√	√	√	√

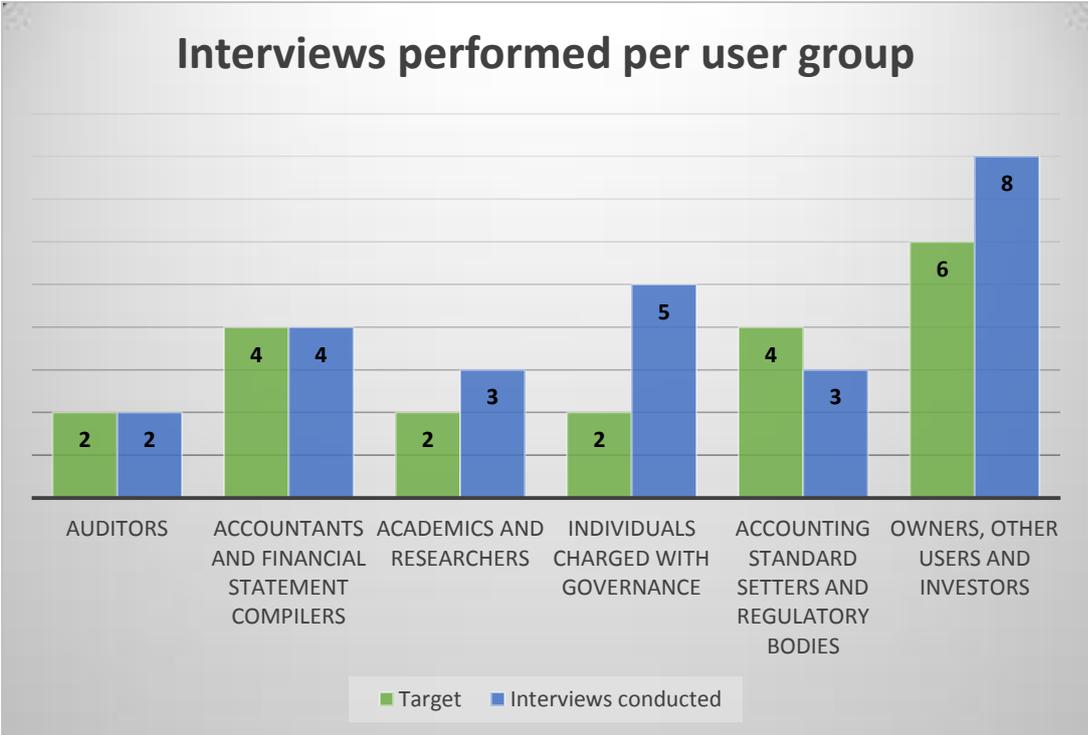
Source: Research result

The areas to be investigated per user group were addressed in the interview questionnaires developed as approved by the Ethics Committee of Unisa. As per the Ethical Clearance application, the study required a minimum of two interviews per questionnaire to allow the researcher to identify trends and user group expectations. After assessing the developed interview questions per user group, a purposive sample was selected to inform phase four. The selected individuals were contacted, as detailed in annexure F, to request participation in the study. Where the

prospective interviewees confirmed their availability, the interviews were scheduled to suit their availability and preferred communication method.

The purposively selected interviewees who informed phase four of this study covers a wide range of financial statement users which address financially orientated as well as strategic driving users.

Figure 4.8: Interviews conducted per financial statement user group



Source: Research result

From figure 4.8 it is evident that the required number of interviews was conducted per defined financial statement user group, except for the Accounting Standard Setters and Regulatory Bodies group where only three of the required four interviews were conducted. Two interviews were conducted on the Regulatory Bodies group, which highlights the deviation on the Accounting Standard Setters user group. In this purposively selected user group, the Accounting Standards Board assisted in this research while the Malaysian Accounting Standard Setters, the Australian Accounting Standards Board, the South African Institute of Chartered Accountants and the Institute of Internal Auditors rejected requests to participate in this study. The

deviation of not reaching the desired number of interviews on this user group does not negatively impact on the results of this study as additional interviews were conducted in other user groups to ensure that a comprehensive interview analysis was done.

After each interview the feedback was documented and returned to the interviewed candidate for their inputs, recommendations and final approval. Such approved transcripts are included as annexure L. The detailed research areas addressed per user group are further outlined with the related interpreted interview results.

4.5.1 Auditors

4.5.1.1 Interview questions

Auditors assess information presented in annual reports to express an audit opinion on the fair presentation thereof. Their exposure to biological assets will not necessitate the actual valuation of the assets but rather an independent overview of the calculations, methods, assumptions and disclosures presented thereon.

The interview questions were developed to identify the industry errors or challenges experienced by the auditors when compliance with IAS 41 is assessed. These challenges are then further explored by determining the recommended corrective action on how the industry should apply the fair value principles, whether in their opinion the valuation methods should be standardised, if accounting policies can be enhanced, if the reporting organisations have the required skills and experience to perform the IAS 41 informed valuations and whether the benefits of such valuation exceeds the costs related thereto. The assessment of the objectively identified industry challenges, linked to the suggested solutions thereto, can be included in the application guideline to assist the industry to address the valuation criteria and comply with the requirements of IAS 41.

To determine what information management need to document and safeguard to justify the valuation method applied on biological assets, the auditors are asked to identify the minimum documentation they would expect to substantiate such valuation. From the minimum documentation required it can be explored whether

standardised or suggested templates can be developed and included in the application guideline to assist the industry to meet the auditors' expectations.

As the biological asset valuation is informed by the organisation's accounting policies, it will be explored whether the auditors can recommend enhancements to such policies to drive compliance with IAS 41. The aim remains not to be rule-based, but allow the auditors to give their guidance on successful application of IAS 41 with an accounting policy guiding the actual valuations.

To establish whether there are organisations with excellent accounting policies, valuation methods and any related biological asset disclosures that can be included in the application guideline as an industry norm, the auditors are requested to indicate whether they have been exposed to such financial reports.

To determine the anticipated challenges on the changes to IAS 41, with reference to the classification of bearer assets as property, plant and equipment, the auditors are required to indicate same. Such anticipated challenges can be included in the application guideline to assist the industry to develop solutions thereto. Any specific guidance that can be recommended by the auditor to be included in the application guideline will be determined for inclusion therein.

4.5.1.2 Interview outcome

Auditors identified the following industry challenges that restrict compliance with the requirements of IAS 41:

- Biological asset valuation should be performed on a "zero-based" principle where the valuations are started anew in each valuation. The industry currently does not retest the opening balances based on the actual outcome to the assumptions applied in the valuation and therefore do not assess the accuracy of their adopted assumptions;
- The type and nature of biological assets should be revisited in each valuation to ensure that produce is excluded therefrom;
- The majority of audit findings are a result of a lack of guidance that is available to clients;

- The assumptions applied in the valuation are modified to address the preferences of the accountants that prepare such reports;
- The industry battles to establish whether the requirements of IAS 41 are applicable to their operational purposes. Further challenges are experienced to identify the biological assets, to measure it and to disclose it in the financial statements.

The following recommendations were made by auditors on how compliance with IAS 41 can be achieved:

- For the industry to apply the principles of fair valuing, acceptable valuation methods can be prescribed for common agricultural industries, like the Faustmann model to be applied on forest valuations;
- Guidance should be provided on the assumptions or factors to be considered in biological asset valuations. This can be presented as a checklist;
- Detailed disclosure should be provided on the unique assumptions and sensitivities used by an organisation in the valuation of the biological assets. There should also be a sensitivity analysis, as per IAS 36 *Impairments*. The disclosure of bearer plants, effective 1 January 2016, is expected to enhance comparability of financial results;
- Biological asset valuations are sufficiently performed by experts in the field but the organisations do not have the required knowledge and experience to perform the valuations. Accountants are forced to perform desktop valuations or expensive consultants are employed to derive a reporting value while training may address the challenge;
- The costs of valuations do outweigh the benefit thereof, but the peace of mind that a properly conducted valuation will provide should benefit any organisation. Such benefits should be considered and understood by management.

To substantiate the biological asset valuation, the following documentation should be compiled:

- Detail the assumptions used and how it compares to market data;
- Detail the financial models applied and the actual calculation of the fair values;

- Detail the industry norms and standards against which the organisation can be compared;
- The actual transaction information, information on the physical assets and other base data documents should be available;
- There should be a retrospective review on the prior valuations compared to the actual results to justify the assumptions applied;
- Documentation to proof the qualifications and experience of any experts used should be provided;
- The present value of the future cash flows to be generated from the asset should be detailed.

According to the auditors, the accounting policies can be enhanced to drive IAS 41 compliance as these policies are currently a replica of the IAS 41 statement. It is not tailored to outline the operational activities, considerations and assumptions applied in their operations. The policies should further be aligned to the IFRS 13 considerations and should detail the specific financial reporting procedures applied in the organisation in:

- How the income generated per type of biological asset is disclosed;
- Where the income generated per type of biological asset is disclosed;
- Where the gains and losses arising from biological assets are reported in the income statement and what impacts thereon;
- How subsequent expenses on agricultural activities are reported; and
- How the cost of the agricultural produce is presented on sale.

The auditors stated that general guidance should be detailed to the industry on how to value and report on their biological assets. More disclosure is constantly preferred to allow an understanding of the information presented.

4.5.2 Accountants and financial statement compilers

4.5.2.1 Interview questions

It is expected, from the results of the preceding research phases, that accountants and the financial statement compilers are directly involved in the actual valuation of the biological assets. The questions posed to these user groups will therefore focus on their unique valuation methods applied; their challenges experienced therein and related recommendations to address the latter.

The biological asset valuation methods applied by the organisation are detailed by the accountant whereafter their unique and the industry's valuation challenges are described. The applied valuation method and identified challenges allows the researcher to assess whether the latter is unique, correlated to the applied valuation method or an industry challenge. These challenges and applied valuation methods can be included in the application guideline to assist the industry to apply the principles of IAS 41.

Recommendations from the accountants to enforce IAS 41 compliance, the standardisation of valuation methods, the enhancement of accounting policies, whether the industry have the required expertise and experience to perform the required valuations and whether there is an actual benefit for the organisations to incur valuation costs are established to analyse in relation to user user's perceptions thereof.

To determine what documentation is available in the industry on the valuation of biological assets, the accountants are required to provide information thereon. The available information can be compared to the documentation expected by the auditors to determine whether the information needs can be met.

The anticipated challenges with the change in reporting on bearer assets are discussed with the accountants to determine the reporting impact thereof. The required guidance required by accountants to be included in the application guideline is established as the guideline aims to assist the various user groups to effectively and efficiently adhere to the requirements of IAS 41.

4.5.2.2 Interview outcome

The accountants and financial statement compilers applied the fair value principles to value biological assets, wherein the unique conditions and circumstances per type of biological asset, the growth rate, expected tonnages and selling prices per type are considered. The discounted cash flow valuation methods were applied in the fair valuing of forests.

On agricultural valuations, the accountant detailed the following unique challenges:

- The valuation process is lengthy and as such it should commence before the actual reporting date to meet deadlines;
- Independent expertise is required to perform the actual valuation and the availability of such expert may impact on the reporting deadlines;
- Valuation experts are costly and available funding often restricts such use;
- Fair value changes continuously resulting in constant valuations;
- The requirements of both IAS 12 *Inventory* and IAS 41 *Biological assets* should be considered by the accountants when reporting is done;
- Organisations may use crop for operational purposes, which is difficult to value and report on;
- Due to the grade of the produce, organisations can opt to sell the best quality to enforce profits. The use of Last-In-First-Out reporting is not allowed under IAS 12;
- The valuations required to report on operational profits to the South African Revenue Service is not in line with the valuations to be performed in terms of IAS 41.

The financial statement compiler stated that guidance is needed on the valuation per type of biological asset.

On forest valuations, challenges are experienced to calculate the weighted average cost and the exact volumes or quantities. Furthermore, as valuations relies on technical knowledge, not available in smaller organisations, less accurate values are

calculated and reported on, which impairs comparability. Smaller organisations are often limited to use experts due to the significant cost thereof.

Industry challenges identified on the fair valuing of biological assets include:

- The valuation process is costly and lengthy and as such it should commence before the actual reporting date to meet deadlines;
- Organisations may use crop for operational purposes, which is difficult to value and report on;
- The valuations required to report on operational profits to the South African Revenue Service is not in line with the valuations to be performed in terms of IAS 41;
- Banks do not consider biological asset valuations in their credit application assessments due to the volatility thereof;
- The industry needs guidance on which assumptions to consider per type of biological asset. Guidance in how to assess these assumptions is needed.

On forest-specific valuations, the challenges identified include:

- The forest valuers indicated that the methodology applied in the industry to value the biological assets is not standardised;
- The industry does not have a base valuation method to guide valuers;
- The refinement of the valuation calculations is a time consuming exercise that impacts on the period of performing the actual site inspection to that of the actual valuation date;
- The MAI (Mean Annual Increment) should be fixed per geographical area; this includes factors like the growth rate, the prevailing prices;
- The valuation model is complex.

Recommendations made by accountants and financial statement compilers to drive compliance with IAS 41 include:

- Mathematical guidance on how to do the fair valuing of biological assets per type;

- Guidance on how to amend the accounting policy and how to calculate the crop used by the organisation; like where animals graze;
- Mathematical guidance on how to value the crop not traded in an open market;
- Industrial forecasts can be detailed to assist in performance assessments;
- A checklist on which costs to consider in the valuations, with a differentiation between subsistence farmers, emerging farmers and commercial farmers;
- Align off-take agreements to the fair valuing and mathematical calculations;
- Assist with guidance on how to value crop at various growth stages;
- Consider the risks impacting on the growth and condition of the biological asset;
- To enhance comparability, a checklist can be developed to ensure that all variables are considered in the valuation to produce comparable results;
- Accounting policies should be tailored to detail the specific operational requirements and types of biological assets held by the organisation;
- Knowledge and experience exist in the industry, yet the valuation timing, the cost thereof and a lack of understanding of the requirements of IAS 41 by auditors cause challenges. A standard guide on forest valuations, like that applied in Australia and New Zealand, may benefit the valuers;
- The valuation costs of agricultural activities, according to the accountant, exceed the benefits derived therefrom when operations are small and experts are used in valuations. The related audit cost also increase when the valuation methodologies should be explained by the expert. The financial statement compilers on agriculture and forestry activities find the valuations beneficial in decision-making.

On forest specific valuations the industry can:

- Apply the Faustmann valuation method to standardise the valuation;
- Detail the key variables in a checklist to ensure that all factors are considered in the valuation;
- Disclose comparative information;
- Include detail on how the volumes were calculated;
- Standardise the content of the valuation report;

- Limit forest valuers to forest economist or an equivalent with industry specific knowledge. General valuers and accountants should not be allowed to perform such valuations;
- The Department of Agriculture has an annual survey that collect input cost data, which can be shared with the industry to standardise prices and cost considerations;
- Growers should be trained on the forest valuation models.

Documentation compiled by accountants to support the biological asset valuation includes:

- Photos, monthly reports, expert valuation reports, analysis reports on moisture, quantities per grade;
- Volume: calculation of estimate taking into account amount of trees, bunches per tree, weather conditions;
- Prices and other variables used in calculation, and reasons why they were used;
- Projected volumes, price history, activity costs for each operation and discount rate calculations should be disclosed in the financial statements;
- Determine which price to apply in the valuation;
- Accurate records on stock activity costs per compartment is needed while estimates applied on growth, rates, yields, soil and climate data should be substantiated.

Accountants expect the following challenges with the change to bearer asset reporting:

- Determining the scope of the application;
- Determining the useful life of a plant, specifically if detailed records were not kept;
- Retrospective accounting for the bearer plants and adjustments therefore;
- Consider whether the users will find the information useful and whether the amended reporting will impact on the business operations;
- Consider the additional valuation costs to be incurred and the related audit cost;

- Guidance to be provided on when the standard is applicable is needed.

Guidance can be given to the industry on the:

- Mathematical process to value all types of crop;
- Mathematical process to account for own crops used;
- Accounting policies for own crops used;
- Industrial forecasts to be disclosed;
- Cost of production per farming type to be determined;
- Mathematical calculations to determine fair value per type of user;
- Off-take agreement information to be considered in the valuation;
- Factor calculations to value crop at different growth stages;
- Risk factors should be disclosed and factored into calculations;
- Use a standard method to value the biological assets like Faustmann;
- Disclose the rationale of other methods used, detail the costs, the salvage values and the asset strip values;
- Disclose notes on the price of the biological assets at the point of sale and whether the costs was inflated with inflation;
- Detail the price at the point of sale and whether it was inflated;
- Detail activity costs and the extent to which it was included in the discounted cash flow model;
- Detail whether replanting costs were considered;
- Detail how the discount rate was determined and what the basis thereof is;
- Detail tables in the financial statements to affluence understanding;
- Detail how the volume was calculated and whether it was compared to actual volumes.

Examples should be included to provide guidance on the various assumptions considered in the valuation and how it should be applied.

4.5.3 Academics and researchers

4.5.3.1 Interview questions

Academics and researchers are not expected to have any experience in the actual valuation or disclosure of biological assets, as their profession address the theoretical evaluation thereof. As such, this user group is interviewed to share, through their research, the industry errors and challenges identified that hinders compliance with IAS 41. Their theoretical recommendations on how to address the identified challenges and how to improve financial reporting are established to be included in the application guideline. Further principles and recommendations that can be included in the application guideline are established as this detailed academic knowledge can guide the industry in the interpretation of the requirements of IAS 41 and the related disclosure thereof.

4.5.3.2 Interview outcome

Industry challenges identified by academics and researchers include:

- Biological assets are not separately disclosed in the statement of financial position;
- Valuations are not objective;
- A standard should be developed to guide how each type of biological asset should be valued;
- A valuation database does not exist to guide valuations;
- The purpose of performing valuations are not understood by the users;
- There is a lack of qualified valuers;
- The definitions applied on biological assets are not well defined;
- Valuations are not based on consistent assessments which results in incomparable and inconsistent fair values.

Researchers and academics raised the following recommendations to enhance compliance with IAS 41:

- Illustrate how to apply the standard. This includes the identification of unusual transactions, the transactional entries and the disclosure in the financial statements;
- Train accountants and auditors on the implementation of the illustration;
- Provide sample notes to financial statements to illustrate how the disclosure requirements can be met;
- Design a database to guide the parameters of the valuation and the related disclosure including the weight, the type, feeding requirements, genetic analysis, geographical area, etc.
- Allow further research to redefine all definitions and to explore risk analysis, bank credit and the value of the organisation.

Guidance is needed on what should be disclosed and how it should be valued in the amended IAS 41 as:

- The reporting of bearer plants as property, plant and equipment is considered similar to the disclosure of the non-current biological assets. There is inconsistency with this new requirement as bearer plants will be reported as property, plant and equipment and bearer animals are regarded as biological assets;
- It is not clear how the agricultural produce not yet detached from bearer plants will be accounted for and how it should be disclosed in the financial statements.

The application guideline should give consideration to:

- The presentation of information should be complete and adequate to enhance understanding of the operations;
- The benefit of fair valuing should exceed the information collecting costs;
- The objective of financial reporting should be prioritised by reporters, i.e. to provide financial information that is needed in decision-making;

- The production curve and the related variables that can impact thereon should be considered.

4.5.4 Individuals charged with governance

4.5.4.1 Interview questions

Individuals charged with governance includes, but are not limited to, Chief Executive Officers, Chief Financial Officers, the chairman of the board and audit committee, risk managers and other board or audit committee members. This user group has the responsibility to drive compliance in an organisation and to ensure good corporate governance, as directed in King III. These interview questions are therefore directed to address risk and compliance reporting, rather than financial valuations and calculations.

The biological asset information required by individuals charged with governance is established to determine whether the information needs of this user group align with the information disclosed and audited by other user groups. Furthermore, it is established to what extent the biological asset information disclosure benefits the user group and whether such fair valuing has any benefit for the organisation. The additional information required and any recommended guidance thereto is detailed for the application guideline.

4.5.4.2 Interview outcome

In organisations where a significant portion of biological assets are held and/or where these assets generate revenue, the individuals responsible for governance identified the following decision-enhancing information to be included in the annual report:

General biological asset information in relation to the operations of the organisation

- The age and life expectancy and where the assets are in their lifecycles should be detailed;
- The type and nature of the biological assets should be disclosed;

- Preference will be given to independent external valuations of the biological assets;
- Material biological asset values that are not based on market information should be subject to an internal audit to test the validity and accuracy of the assumptions applied;
- The compliance with King III should be assessed and expressed in the financial statements and where it impacts on the biological assets, such compliance should be adhered to;
- The sustainability of the farmland and the biological assets should be assessed and expressed;
- Compliance and sustainability risks should be evaluated and detailed to allow an understanding of the risk tolerance of the organisation;
- Detail the comprehensive risks that impacts on the organisation as well as the controls established to address same. This includes but is not limited to natural disasters, industry specific risks, market risks, financial risks, the risk of revenue loss due to poor biological asset performance and any legal risks associated with court cases or other legal proceedings;
- Tables with detailed explanations on the financial status of the organisation can be included in a financial report, detailing as a minimum the following ratios: return on assets, return on equity, liquidity;
- Comparative information should consider the historical performance of the organisation as well as industry performance and trends.

Detailed information required on the non-current biological assets includes:

- An indication of whether the hectares farmed changed from the prior year, with clarity on whether the operations expanded, contracted or whether other factors contributed to the capacity change;
- Detailed information on the total hectares owned, the hectares planted and the actual bearing hectares to allow an assessment of the effectiveness of the farmed hectares;
- A split of the farmed and bearing hectares to clarify the quantities that relates to old/existing biological assets versus the newly acquired/planted hectares. It

should include information on whether farmland is stable or whether replanting is required;

- Estimates applied by management in the valuation should be substantiated to allow an assessment of the variables.

Detailed information required on current biological assets includes:

- Detailed information on the quantities and the related value of the production output per type of biological asset per year to assess the effectiveness of the farmland;
- The market expectations per type of biological asset;
- The management estimates applied in the overall valuation.

Detail information on the industry specific compliance requirements:

- Applicable acts on business operations (water rights, veterinarian requirements, etc.);
- Registration with any professional bodies, and whether there are unresolved disputes: queries, claims, other issues;
- Details of litigation initiated or taken against the organisation.

Detail a consideration of the general compliance requirements:

- Human resources compliance with reference to any Commission for Conciliation, Mediation and Arbitration (CCMA) cases, compliance with the labour acts, workmen's' compensation;
- Compliance with the Income Tax and Value Added Tax Acts and whether such clearance certificates exist; and
- Health and safety checks and compliance.

The compliance information can be detailed in an oversight report illustrating that the organisation is aware of the legal requirements affecting the operations and that action is taken to ensure compliance thereto.

The fair value derived on biological assets is important for individuals charged with governance as it gives an oversight of the biological asset capacity that can be correlated to the revenue generated therefrom to assess the asset performance. To allow such assessment, detailed information should be disclosed to allow the users to contextualise the valuation model and method applied; the type of asset, the quantities, the geographical spread thereof, the ages and information on the lifecycle of each type of asset as well as the condition of the assets. Information should be detailed on the capacity of the assets, the input costs invested by the organisation, the production and the related output that generates revenue.

Detail should be provided on the lifecycle values of the various types of biological assets, especially where the reporting date is not in line with the maturity date thereof, which should include comparative information. This will assist with an overall assessment of the operations of the organisation to determine whether strategic changes should be affected, whether the assets can serve as collateral to financing required and whether environmental factors impact on the performance of the biological assets.

Fair valued biological assets should be realistic and not merely state market information applied in a valuation. Where farmers and/or organisations do not have access to open markets and the sale of these assets is not made in the open market, a reconciliation should be disclosed to demonstrate the expected fair value of the assets versus the realisable sale thereof.

The fair valuing of biological assets was experienced in a negative and positive manner by individuals charged with governance. Negative factors include the risk of manipulating estimates and values; the unrealistic value derived at on expansion programmes, like young orchards, and the impact of long-term farm investments, like netting, is not considered to demonstrate the enhanced performance of the biological assets in relation to its value.

Fair value was considered valuable in decision-making as it assist the users to assess the available collateral to secure financing; to assess the asset loss risk

based on replacement values; to assess the working capital and the related return on investments and an industry norm is set when market values are used to value biological assets to benchmark the organisation.

The users emphasised that regardless of the valuation method applied, the decision-enhancing factors to be disclosed entails:

- The varieties of biological assets held and the corresponding quantities;
- Where cultivars or animals require licenses or royalties, such information should be detailed;
- The geographical factors per site that impacts on the selling price, the economic conditions of trade, market restrictions and infrastructure limitations should be narrated;
- The valuation model applied should be detailed and explained as it is anticipated that compilers will always use the most favourable method to address the organisation's reporting intention;
- The quantities, ages, lifecycle and the current status thereof, the type, nature and sex of biological assets should be disclosed;
- Comparative information should be disclosed, covering that of the organisation and the industry; and
- Information disclosed should be easily understandable as subject specific jargon on accounting and agriculture misleads users.

Individuals charged with governance made the following recommendations to enhance decision-making on biological asset disclosure:

- Detail the hectares of arable land used for the biological assets;
- Detail whether any water rights or equivalent is held and the terms and conditions thereof;
- A comparison of the estimates applied in the valuation to the industry norms;
- Detail the hectares planted, expected yields, actual harvested crops, detailed quantities in the movement and all other information to allow an independent view of the performance of the biological assets;

- Reconcile the valuation to the biological asset factors per type to the generated output;
- Disclose the fair values as well as the actual input costs of biological assets to enhance decision-making;
- Include detail of the organisational drivers like the mission and vision, the strategic objectives, a high level risk analysis, the market share prices and their performance, the organisation's plans to grow or maintain operations; the environmental challenges and the impact thereof on the operations; the political factors that impacts on performance; known treats that will impact on stakeholders and any regulatory impact on the operations due to applicable legislation.

Individuals charged with governance detailed the following factors to be considered in the guideline:

- The criteria to be applied to distinguish between bearing and non-bearing orchards should be detailed;
- Information required to prepare management estimates on permanent orchards should be detailed;
- Establish a basic norm for the industry on what should be disclosed in the notes to the financial statements;
- Disclose the industry trends to allow a comparative review of the business in relation to the industry;
- Disclose all available information;
- Comparatives should be stated for a minimum of 3 years;
- Detail sufficient information to allow users to recalculate the values;
- A template should be developed to ensure that the index and contents of financial reports are consistent and that the format is standardised;
- A standard valuation method should be applied per type of biological asset;
- Information should be included to enhance comparability with the industry;
- A checklist should be used to report on regulatory compliance.

4.5.5 Accounting standard setters and regulatory bodies

4.5.5.1 Interview questions

Accounting standard setters will develop and prescribe the accounting standards for the industry, while the regulatory bodies will drive the implementation and compliance to such standard. These user groups will include, but is not limited to, the Accounting Standards Board, the Malaysian Accounting Standards Board, the International Financial Reporting Standards Board, the Office of the Auditor General, the Provincial Treasury, the Office of the Accountant General and the South African Institute of Chartered Accountants.

As the standard setters and the regulatory bodies will not be directly involved in the valuation and disclosure of biological assets in financial reports, the interview established recommended annual report disclosures to comply with IAS 41 and guidance on accounting policy improvement.

4.5.5.2 Interview outcome

The standard setting body believes there is sufficient disclosure guidance in GRAP 27 to guide biological asset reporting. The regulatory body indicated that organisations should not merely use the disclosure requirements of the standard as a checklist to report on biological assets, but should rather aim to disclosure sufficient and detailed information to produce financial reports that satisfies the needs of the users thereof, while also considering the materiality of the assets. Furthermore, the regulating body indicated that elaborated information should be disclosed to enhance understanding and an independent audit of the information. To add value to the audit, the following should be disclosed:

- Historical information: Information on the actual sales prices; the conditions that existed on the prior year valuation compared to the current year valuation, changes in the conditions (the expectation is that the conditions would not change more than inflation, except in severe instances like the current drought in South Africa);

- Valuation information: Market conditions and values applied as close as possible to the valuation date and explanations if not applied in the current valuation;
- Industry information: Information from independent organisations/regulatory bodies on the market prices of the relevant biological asset i.e. farmer's association;
- Reconciliations on movements: Detailed descriptions, narrative information and values on the opening balance of biological asset, each movement thereon; including but not limited to planted, purchased, harvested, transferred, destroyed, scrapped, sales, losses and the closing balance. The narrated descriptions should include information on quantities and/or hectares as well as the calculations and the detailed valuation method applied as well as the circumstances that warranted the chosen valuation method.

Biological asset information should be disclosed and detailed in the financial statements even if an active market does not exist. This includes but is not limited to information on the custodianship, the nature and type of biological assets, the quantities, movements in quantities, descriptions, the mandated function of the organisation and detailed information on why the assets have not been valued.

The regulating body suggested the following guidance to be availed to the industry:

- Prescribed bases to value each type of biological asset should be available to assist the industry. Checklists can be developed to assist with detailed disclosure;
- Information should be comparable in the industry;
- Align accounting policies to the mandated function. Link the information in the notes to the financial statements to the accounting policy to allow conceptualisation;
- Guidance on when GRAP 27/IAS 41 applies;
- Guidance on the anticipated impact of the exposure draft on the accounting for living and non-living resources issued by the Accounting Standards Board;
- Consider GRAP 103 disclosures as a guide for biological asset disclosure.

A standard valuation method should be developed per type of biological asset to enhance comparison in the industry, while guidance can be provided on when biological assets should be valued as organisations cannot account for every living animal or plant. The established procedures on how to count and value biological assets will guide the users while standard methodologies should be applied in the industry to enhance understanding and comparability.

4.5.6 Owners, other users and investors

4.5.6.1 Interview questions

The owners of organisations reporting on biological assets, mostly farmers, investors like commercial banks and other users, targeting customers, the community, suppliers, lenders, employees and project implementers are addressed in this section. The questions to these user groups were based on the same information needs as owners, other users and investors may not be directly involved or interested in the actual valuation of the biological assets, the underlying auditing principles, the drive to adhere to compliance of amongst others the King III or the actual setting of accounting standards.

The unique information required by these user groups to guide their decision-making is established, whereafter it is linked to how the applied valuation methods impacts on such decisions. It is then established whether their financial assessment of the performance of an organisation is impacted by the type of valuation method applied and to what extent, if any. Recommendations on additional disclosures that can be included in the annual report, improvements to accounting policies and their recommendation on how to account for biological assets to guide their decision-making process is further established.

4.5.6.2 Interview outcome

Farmers require information on the environmental changes and impacting factors like rainfall to inform decisions. The actual financial results and valuations are not applied in decision-making procedures

Information required by other users:

- The quantities and types of biological assets;
- All rates applied and the underlying reasons for such selection;
- Credentials on experts used;
- A comparison between the derived valued biological assets with standard rates used for tax purposes and the related market rates;
- The valuation method used and why it was chosen;
- Detail assumptions used in the valuation and justify same;
- Indicate whether the valuation model applied is consistent with that of prior years and if not, why it was amended;
- Revisit the comparative figures to demonstrate that the assumptions applied in the valuation model applied is realistic;
- The assumptions applied in the valuation should be subject to an external audit to independently verify the adequacy thereof;
- The solvency and capital adequacy ratios can be expressed in the financial statements to enhance decision-making;
- An evaluation of the cash flow performance, emphasising the biological assets' capacity linked to the income generated therefrom;
- Specialised farming activities will receive greater consideration in the credit/risk industry as resources can be allocated to drive the main income generating assets of the organisation. Such decisions can only be made if detailed information on the composition of the biological assets are disclosed;
- The collateral/security will exclude all biological asset values due to the mobility thereof and the associated risks of loss before realisation;
- Foresters need to assess the MAI per hectare and per cultivar, the site indexes, the costs per hectares, expected revenues, detailed quantities and costs relating to new hectares planted, the rate of return, the net present value, the growth index and other assumptions used;
- Frequent valuations are needed. Consider the potential crop multiplied by the expected price per ton equals estimated crop value.

Investors are interested in the underlying detailed information to the values disclosed on financial reports. The quantities per type of biological asset, the ages thereof, the species, gender and detailed descriptions are required as investors will revalue the assets based on market information to assess the reasonableness of the values reported. The valuation method should be explained to allow banks to assess the affordability and the assumptions applied therein. Preference is given to independent valuations that is included and audited in the financial statements.

The underlying factors to valuations are more important to owners than a value derived at by accountants and as such the valuation method applied to report biological assets is of no use to the owner.

Other users assess the revenue generating capacity of the biological assets in relation to the input costs, the quantities per type and the expected output. The applied valuation method was of little use to these users as their interest focussed more on the actual cost thereof and the risks that can impact on the expected output like theft, losses due to natural disasters, environmental changes etc. Input costs were the primary consideration by these users where valuations were not performed by an independent expert as in-house valuations are subject to manipulation. To assess the identified risks, other users require more frequent valuation information to be disclosed, which are to be done (for crop) at least at emerging, after flowering and at maturity. Other relevant cycles should be applied for animals.

As investors (banks) will revalue the biological assets according to their approved market rates, it is more important to disclose the biological assets' performance to the organisation's ability to generate income. For this purpose, information on the published rates, spot prices and long-term average biological asset prices can be disclosed to demonstrate the performance of the asset. Banks will not grant loans when biological assets are put forward as collateral or security. The mobility and the related risk of environmental disasters and theft/arson limits banks from granting such loans as biological assets cannot serve as free-cash flow when loan repayments defaults and a forced sale is considered. The performance of long-term crops will nonetheless be considered in relation to the value of the property in the affordability and solvency checks.

For owners, the valuation model in itself is not decision-enhancing. The underlying information on the actual transactions and farming status are applied in decision-making.

Other users did not have a preference for fair valuing as the liquidity of the organisation is influenced by such values and the resale thereof is not always in line with the valuation. Preference is given to the disclosure of the performance of each type of biological asset where the asset value is linked to the derived income.

Irrespective of the applied valuation method, investors (banks) will revalue all biological assets according to the available market information in their consideration of the free-cash flow when the affordability and solvency are assessed. As such, banks require detailed information to allow the users to revalue all biological assets according to their approved methodologies.

Farmers apply the operational curve expectancy when making operational decisions. It may be useful to provide detail thereon to indicate where in the curve the business is.

Other users identified the following information required to enhance decision-making:

- Actual input costs per type of biological asset per geographical area/production flow/intended operational purpose;
- The valuation methods and related assumptions and calculations should be audited and an opinion should be expressed thereon;
- Disclose information to allow the users to assess the performance of the organisation and the biological asset independently from the values attached thereto. Thus, how the fair values were calculated, the lifecycle of each asset, the type, operational purpose and expected and realised revenue;
- It is valuable for non-foresters to understand the actual input costs associated with forestry as revenue is only realised in 20 years. A detailed table per cultivar per stand, can be included to demonstrate the total annual and cumulative input

costs. This can be linked to the expected revenues and changes in environmental factors can be detailed and explained;

- Environmental accounting should be considered as it carries incentives for foresters;
- The type of soil, the planting dates, the soil preparation, the fertilization program, the plant population, the suitability of crop to the climate of the particular area. Continuity: has this project proved itself over a number of seasons, or is it new. Who is in charge? Is the project in a stable community? The report can use the above to verify estimates.

Decision-enhancing information required by banks includes:

- The actual input costs;
- The insured value of the biological assets;
- The replacement value of the biological assets;
- A comparable table detailing the SARS standard rates, the actual market rates and the disclosed valuation rates per type of biological asset; and
- The quantities, ages and detailed descriptions per type of biological asset.

Owners require more disclosure on the actual environmental conditions and factors that influenced the operations.

Other users recommended guidance on the following:

- Classify biological assets as current and non-current;
- Independent experts should perform valuations;
- Organisations should not be allowed to change valuation models when not justified. If changed prior results should be restated;
- Enhance financial reporting to address the needs of the various user groups thereto. Make the disclosures understandable, non-accounting jargon, improve the layout to provide plain and simple figures and terms rather than complicated fair value assumption-terminology, and detail how the valuations were done and what assumptions were considered therein;

- Indicate the tax implication of fair valuing the biological asset to allow the user to assess the effect thereof;
- Detail the quantities, market values, ages, types, purpose of holding assets, and any other information relevant to allow users to understand the context of the biological assets in the notes;
- The industry should apply only the Faustmann model to value forests.

Investors/banks encouraged the following principles to enhance comparability and consistency:

- To enhance understanding and decision-making organisations should align their reporting periods to the biological asset lifecycle, or prepare supplementary reports to that effect;
- Information reported should allow the users to understand the valuation performed. It should elaborate on the procedures followed and the underlying reasons thereto;
- Comparative information, of a minimum of three years, should be disclosed to enhance decision-making; and
- Detailed reconciliations should be performed on the quantities and values of the biological assets to allow the users to contextualise the change in quantities to the change in values. All movements should be detailed in the reconciliation.

4.5.7 Summarised interview contextualisation

Even though the accountants and the financial statement compilers apply the fair valuing principles of IAS 41 in their biological asset valuation, such value was found to be meaningless to the owners, the other users and the investors. The individuals charged with governance only considered the fair value of the biological assets in the assessment of the asset replacement risk, the return on investment and to secure financing as collateral. Apart from these assessments the fair values did not enhance decision-making of the individuals charged with governance as it was considered unrealistic as it does not consider expansion and long-term investment programmes and the values are subject to manipulation. It should be noted that although an assessment of possible biological asset collateral was considered a priority for those

individuals charged with governance, the investors (banks) explicitly stated that such assets will not be considered as collateral to loans due to their mobility, the volatility and the environmental risks associated therewith.

Biological assets should be valued, based on realistic actual conditions to assist the individuals charged with governance to assess the performance of the organisation. It should be noted that the values applied in the valuation should consider the unique circumstances of the organisation, where crops cannot be based on the SAFEX price if the organisation is located in a remote rural area with no access to markets. As required by the investors, other users and the individuals charged with governance, a detailed price index should be disclosed by all biological asset reporting organisations where the valuation reporting price, the market price, the actual cost, the spot prices, the long-term averages, the SARS rates, comparative information of the prior year and the industry trend are disclosed to enhance decision-making.

As emphasised by the accounting standard setter, the regulatory body, the academics and the other users, the compilers of financial statements should consider the objective of financial reporting, i.e. to assist users in decision-making, and as such should consider that the individuals charged with governance, the regulatory body, the owner, other users and investors all stated that the biological asset value disclosed in the financial statements is meaningless as detailed information is required to allow these users to re-perform such valuation. The detailed information required should allow the users to grasp the operational requirements of the biological assets, the capacity of the assets and the related revenue derived therefrom to guide decisions of the individuals charged with governance, other users and the investors. Disclosed comparative information was also required for a minimum of three years by the individuals charged with governance and the other users, to allow them an assessment of the performance of the biological assets. Further information required by the user groups include details of the:

- Age of the biological asset;
- The life expectancy;
- An indication of where in the life cycle the assets are;
- The nature, type, species, varieties of biological assets held;

- The quantity per type and sex of asset;
- The hectares planted, farmed, expanded, cultivated, rehabilitated;
- The rates and estimates applied in the valuation;
- The geographical spread of the assets per type and quantity;
- The environmental changes impacting on the biological assets, like drought, diseases etc.;
- The actual input cost per type of biological asset;
- The expected output per type of biological asset and the actual output of prior years;
- The risks associated with the biological assets and a sensitivity analysis thereof, like theft, disasters, arson etc.;
- The licenses and royalties applicable to biological assets, like water rights, land rights etc.;
- An explanation of the valuation model;
- Information on the planting dates, the fertilizer programme, the suitability of the climate to the chosen plants, whether farming operations are continued on arable land or virgin land and the soil type.

The financial statement compilers, individuals charged with governance, auditors and academics suggested that a standard valuation method be developed and applied for common agricultural valuations to address some of the challenges experienced by the industry. An enhancement of the generic accounting policies currently applied in the industry will further address the industry challenges. Auditors, the regulatory body, individuals charged with governance and other users cannot contextualise the biological asset operations when synthetic accounting policies are applied which are not modified to address the unique operations of the organisation and its biological assets.

A detailed disclosure of the input costs, output, changes and other factors on biological assets over the lifecycle of the asset will allow users to understand the life expectancy of the asset and its overall performance. Such information was identified to be valuable for individuals charged with governance, regulatory bodies and other users in accounting for forests where the programmes covers multiple financial

years, as well as those animals and plants where the lifecycle/maturity date does not align to the reporting date. Such detailed life performance reconciliations will allow users to assess the various valuations performed throughout the biological transformation process.

Reconciliations to explain movements which correlates the quantities to the value of biological assets should be included in the notes to the financial statements, where detailed information is available on the purchased assets, the progeny, the deaths, the environmental losses, theft, growth, disasters, and other changes are disclosed to enhance decisions of the individuals charged with governance and the regulatory body. Environmental changes and the impact thereof should be detailed and correlated to the quantities and value of the biological assets to guide the individuals charged with governance, the other users and the owners.

4.6 Summary and conclusion

An assessment of the top ten agricultural produce exporting countries, countries where financial reporting is done in terms of IFRS and the BRICS associates, informed the purposively selected ten countries that was researched in this chapter. The accounting standard setters and regulatory bodies of the ten purposively selected countries were contacted for a listing or database on organisations reporting in terms of IAS 41. As the industry does not maintain a database on registered organisations, their operating activities and their accounting frameworks compliance with the prescribed accounting framework by organisations cannot be monitored or enforced by the accounting standard setters or the regulating bodies.

The purposively selected countries were researched to select a sample of 100 organisations operating in the agricultural industry to allow an assessment of their biological asset reporting, which was selected from the stock exchange market listings of the respective countries in phase two. The organisations were contacted to obtain financial reports for the periods 2012 to 2014 and where available, 2015. A limitation of scope was experienced as not all organisations availed their financial information and the alternative approach to download such reports from their organisational websites did not ensure that all organisations could be researched.

The limitation per country, per agricultural sector type and per selection tier was assessed to investigate the availability of information in the industry. Meaningful research on the available financial reports was conducted on a total of seven countries' biological asset reporting, by 53 organisations for a total of 154 annual reports for the periods 2012 to 2015.

Phase three focussed on inputs by financial statement compilers, accountants, auditors, and other financially orientated individuals on their valuation methods, frequency, challenges experienced and the valuation factors considered. Closed questionnaires were directed to a purposive sample of 40 organisations covering seven countries whereon 24 responses were received from three countries. Open-ended questionnaires were directed to the thirteen organisations that opted to assist further in the study, from the closed questionnaire, whereon only three responses were received from two countries.

Phase four focussed on the information needed by users in their assessment of the financial reports. The literature studies informed the ten user groups that were assessed to invite individuals for interviews. A total of 25 interviews were conducted in this phase.

The consolidated, contextualised findings from the research phases are summarised as follows:

4.6.1 Main operations of the researched organisations and the applicability of IAS 41

The mere holding of fauna or flora does not require of organisations to adhere to the requirements of IAS 41. An assessment should be done on whether the biological transformation of these biological assets are managed to instruct IAS 41 compliance. To assist the financial statement compilers in their assessment, the applicability of the standard was outlined in section 5.2 of the application guideline. The guidance included in chapter five on the accounting policies implemented by other organisations and the disclosure guidance provided in annexures H and I may assist the industry to publish comparable financial results.

4.6.1.1 Main operations categorisation on the stock exchange markets

The categorisation of the main activities of organisations as listed on the stock exchange markets are considered misleading as only 64% of the researched organisations actually held and reported on biological assets. A recommendation from this study is to reconsider such listing categories.

4.6.1.2 Assessment of available reports per agricultural sector

The limitation of scope per agricultural sector confirmed that the grain industry (78% limitation), the vegetable growers (77%) and the horticulture sector (71%) do not avail their financial results to interested users thereto. A recommendation from this study is that organisations should publish their financial results on their official websites.

4.6.2 Significance of biological assets held

The biological assets held in relation to the total assets of an organisation may not be significant, yet such assets may be substantial to the operations when it has the highest revenue contribution, or when the operations of the organisation evolve around it. The users' disclosure expectations and requested financial ratios thereon were outlined in section 5.6.7 of the developed application guideline to guide decision-making.

4.6.3 Prioritising internal reporting

As there is not a defined reporting purpose in the classification of the biological assets, the reporting burden to group biological assets in a meaningful manner superseded the purpose of financial reporting i.e. providing useful information to the users. These challenges may be addressed when the reporting period is aligned to the lifecycle of the biological assets or alternatively when detailing the comprehensive information on the lifecycle of the various types of assets in the notes to the financial statements to enhance decision-making. The latter was detailed in section 5.5.3, table 5.4 and section 5.5.6 in the application guideline.

4.6.4 Notes to the financial statements

The compilers of financial statements should consider the objective of financial reporting, i.e. to assist users in decision-making, and as such should consider that the biological asset value disclosed in the financial statements is meaningless without detailed information to allow users to contextualise and re-perform such valuation. The detailed information required should allow the users to grasp the operational requirements of the biological assets, the capacity of the assets and the related revenue derived therefrom to guide decisions. The detailed note disclosures were addressed in section 5.5.6 of the developed application guideline.

4.6.5 IAS 41 disclosure requirements

The insignificance of the biological assets and the related life expectancy thereof impacts on the insertion of detailed descriptions thereon in the financial statements. The detailed disclosures needed by the decision makers were discussed in section 5.4 and section 5.5.6 of the developed application guideline.

Compliance with the disclosure requirements of IAS 41 can be strengthened in the various agricultural sectors to produce decision-enhancing reports and as such the industry available accounting policies were outlined in section 5.3 with an assessment thereof by the decision makers in section 5.4. A consideration of the comprehensive information required by users as outlined in sections 5.5 and 5.5.6 will further strengthen the financial reporting and the related IAS 41 disclosure requirements.

4.6.6 Valuation of biological assets

Organisations report on the quantities of biological assets held, which informs the valuations. The valuations were affected by the non-consideration of the location of the biological asset (53%), the condition thereof (24%) and the cost to sell the asset (29%) by the valuers. Such omissions may be circumvented when all the valuation factors outlined in section 5.5 listed in table 5.2 of this study is considered.

Although additional disclosure of the valuation method applied is not required in terms of IAS 41, the poultry, forests, grapevines; fruit growers and sugarcane

organisations detailed additional valuation considerations to enhance understanding of their valuation methods. The inclusion of the additional narrative information demonstrates the commitment of the industry to enhance an understanding of the methods applied to derive at the reported values and aligns with the user's information needs outlined in section 5.5.6 of the application guideline.

4.6.7 Usefulness of accounting policies

The accounting policies were assessed to be a recite of the IAS 41 paragraphs. It was not tailored to address the nature of their biological assets, their operations or their unique accounting considerations thereof. The applied accounting policies, grouped per agricultural sector, as well as the users' assessment of the usefulness thereof were outlined in sections 5.3 and 5.4 to guide the industry to develop and tailor their accounting policies aligned to their operations.

4.6.8 Valuation challenges

The valuation challenges identified from the literature study were experienced by the researched organisations, with no additional or unique challenges identified. The valuation cost was highlighted as the most significant challenge by 41% of the organisations, while a lack of understanding the valuation model (35%) and the measurement of the age and condition of plants and animals (24%) were emphasised. It was further noted that 67% of the organisation that experienced valuation challenges merely performed annual valuations. Frequent valuations may enhance the required skills and experience whereas a consideration of all the listed valuation factors and inputs from informed individuals will enhance the reporting thereon. Section 5.5.1 and table 5.2 provide guidance to the industry to address the valuation challenges.

4.6.9 Reconcile qualitative and quantitative data

Reconciliations to explain movements which correlates the quantities to the value of biological assets should be included in the notes to the financial statements, where detailed information is available on the purchased assets, the progeny, the deaths, the environmental losses, theft, growth, disasters, and other changes are disclosed

to enhance decisions of the individuals charged with governance and the regulatory body. Environmental changes and the impact thereof should be detailed and correlated to the quantities and value of the biological assets to guide the individuals charged with governance, the other users and the owners. Section 5.6.4 provides guidance on the users' expectations on the reconciliation between the qualitative and quantitative data required in decision-making and section 5.8.3 details guidance on the environmental reporting required by users.

4.6.10 Accounting for bearer plants

The accounting treatment for bearer plants was outlined in section 5.8.1 to assist the industry to apply the amendments of IAS 41, effective 1 January 2016. The guidance address an identification of bearer plants, clarity on the determination of the useful lives of such assets and applicable journal entries to drive the accounting thereof.

CHAPTER 5

DEVELOPMENT AND VERIFICATION OF THE APPLICATION GUIDELINE

5.1. Introduction

The results from chapter four were contextualised in this chapter as a developed application guideline. This guide was based on the shortcomings, challenges, recommendations and findings from the assessment of the annual reports of organisations, closed questionnaires, open-ended questionnaires and interviews with various user groups of financial reports, and was developed to assist the industry to compile fair and comparable results to be considered by decision-makers.

Chapter five details the application guideline in terms of the accounting policies that informs the treatment of biological assets, the industry's valuation guidance, proposed solutions to industry challenges, guidance on information to be included in the notes to the financial statements and developments in terms of the amended IAS 41 standard, the disclosures relating to IFRS 13, environmental considerations impacting on accounting disclosures and the related land claims considerations.

The guideline will assist compilers of financial statements to establish whether the requirements of IAS 41, or equivalent, need to be applied to account for the fauna or flora held. Where IAS 41 reporting is required, the guideline outlines the researched accounting policies (referenced to the prescribed accounting standards) per agricultural sector, as well as the expectations from the users on the information required therein, to assist the reporters to develop the organisation's unique accounting policies. Guidance is provided on how to elaborate and assess the valuation assumptions, the life expectancy of the biological assets, the frequency of the valuations and the underlying documentation required to substantiate such valuation. The detail required in the notes to the financial statement, detailing the valuation background, the performance of the biological assets, a disclosure of a price index model, detailed reconciliations on the qualitative and quantitative measures, the extent of comparative information required and the suggested ratios needed by the users of the financial statements to enhance their decision-making

process. The researched industry examples are outlined in the guideline to assist the reports in their assessments and valuations.

The guideline also outlines the current industry developments, to ensure that it is updated to guide the compilers to produce comparative financial reports. The reporting of bearer plants were investigated and it outlined, while emphasis was placed on the reporting required on the environmental impact of the organisations as well as the land reform risks associated with the operations.

To confirm that the application guideline is beneficial, it was distributed to a sample of user groups for validation and comments. In the last part of chapter five the guideline was distributed to purposively selected individuals to evaluate whether it assists the users to determine when biological assets should be accounted for; whether the accounting policies applied in the industry, as linked to the accounting standards, are useful; whether the decision-enhancing information required by the users of the financial statements assist in providing useful reports; whether the valuation guidance provided will assist the industry; whether the guideline is considered useful and user-friendly.

A user friendly version of the guideline contained in this chapter is detailed in annexure R.

5.2. Applicability of IAS 41

Biological assets are living animals and plants. Such assets are recorded in the accounting records of an organisation when the biological transformation thereof is managed, thus where the change in the quantity and quality of the assets are monitored. Such monitoring usually aims to improve or maintain the conditions required for growth, degeneration, production and procreation (IASB, 2015:A1347).

Where the biological transformation of the living animals or plants is not managed, the requirements of IAS 41 are not applicable and reporting should be done in terms of a different accounting standard. Such activities include animals and plants held in a zoo or a game park where the natural breeding is not actively managed. In events

where a managed breeding programme exists to avoid distinction, the requirements of IAS 41 are applicable. Likewise, where commercial organisations operate game farms, especially with commercial hunting, the requirements of IAS 41 should be applied (PwC, 2009:3; IASB, 2015:A1348).

IAS 41 should be considered when an organisation grows biological assets under a contract for a third party, where the risks and rewards of ownership are only transferred to the purchaser at delivery. The growing organisation therefore remains the owner of the biological assets until delivery and should adhere to IAS 41. Likewise, is the growth of fish for slaughter or sale the management of biological transformation and therefore subject to the requirements of IAS 41, whereas ocean fishing is regarded as the harvesting of unmanaged sources and therefore outside the scope of IAS 41 (PwC, 2009:3).

Where organisms are grown for research purposes such process do not meet the requirements of IAS 41 reporting as the organisms are not grown for sale or a transformation into another produce. Where the organisms are grown for sale or the use in another produce (like cultures developed for yogurt, cheese etc.) such organisms are reported as biological assets. Where plants are grown for the production of drugs such plants are reported as biological assets (PwC, 2009:4).

It should be noted that produce harvested from biological assets does not constitute another biological asset, but inventory. Therefore, livestock is regarded as biological assets while alive, but at the point of slaughter to sell the carcasses to butcheries, it becomes inventory. Likewise, will the grapevines be accounted for as biological assets, but the harvested grapes will be recorded as inventory as the biological transformation ceased at the point of harvest. The grapevines will still constitute the biological assets as the biological transformation thereon continues. The land on which the biological assets are farmed does not form part of the biological assets, but is reported as property, plant and equipment, under IAS 16 (IASB, 2015:A1347).

Once the recognition criteria have been met, the biological assets can be measured and recorded. Such measurement should be at the fair value of the biological asset, being the amount at which knowledgeable and willing parties will exchange the

goods in an arm's length transaction, which represents a market price based on current expectations. Therefore, biological assets are measured in its present condition and location and at the present value of the expected cash flow market data. As example, this market data considers that there is a market for fully developed apples, whereas the fruit-flower does not have a market price. Such apples are measured by projecting the cash inflows from the grown apple less any costs associated to fully develop the apple (PwC, 2009:7; IASB, 2015:A1349).

The recognition and measurement of biological assets are detailed in the organisation's tailored accounting policies which informs the financial statements.

5.3. Researched accounting policies and valuation guidance per sector

Accounting policies studied in phase two, detailed in annexure H and summarised in table 4.22, informs both the compilers and the users of financial reports on when and how biological assets are accounted for. The accounting policy should be aligned with the requirements of IAS 41, but should provide sufficient information to the users to grasp the underlying reasoning for all estimates and judgements. From the studied organisations, the accounting policies were linked to the relevant valuation guidance detailed per sector which was further referenced to the requirements of IAS 41, GRAP 27 and IFRS 13 to demonstrate why the information is disclosed and considered useful. The detailed accounting policies represent the actual policies adopted by the studied organisations, with references to the organisations removed. The actual paragraphs of these standards were quoted, in colour, to allow the guideline users to research the quoted standards.

The accounting policies of the studied organisations were categorised per sector to address the various farming activities undertaken and reported on. Compilers of financial reports should note that the accounting policies detailed in this section of the application guideline represent the applied industry guidance that has not been updated with the required changes on how to account for bearer plants. Refer to annexure R for the detailed categorisation of the applied accounting policies in the industry.

5.4. Users' expectations on accounting policies

An assessment of accounting policies applied in the industry by a purposively selected ten user groups, concluded that the policies do not consider the objective of financial reporting, i.e. to assist users in decision-making. The accounting policies are often found to be reported as stand-alone accounting informing paragraphs, without a direct link to the notes to the financial statements to demonstrate how the accounting policies are applied. It should be noted that the accounting standard setter, the regulatory body, the academics and the other users of financial statements specifically requested the compilers of financial reports to disclose information that add value and assist in their decision-making, and as such the following recommendations were made:

- The biological assets should be valued considering the realistic, actual conditions in which the organisation trades and not merely consider market values. Such information should be detailed in the accounting policy to allow the users to comprehend the available markets to sell the produce, the impact of restrictions and markets on the inputs costs and all other operations. Such detail should be linked to the financial impact thereof disclosed in the notes. Sections 5.6.2 and 5.6.3 demonstrates the recommended disclosures to address the users' needs.
- The performance of the biological assets should be explained to allow users to grasp the operational requirements of these assets, the capacity thereof and the related revenue derived therefrom. It is vital for the individuals charged with governance, the other users and the investors to understand the maximum operating potential of these assets and to compare such capacity to the actual achieved performance. Any underperformance or idle time should be explained to allow a conceptualisation of the loss in investment. Section 5.6.2 contains suggested solutions to the users' recommendations.
- A price index should be disclosed in the notes to the financial statements, to detail the valuation amounts, reconciled to the market prices, the actual input costs, the spot prices, the long-term averages, the standards SARS rates,

comparative information of the organisation as well as current and comparative information on the industry trends. Details on how these rates are determined and researched should be included in the accounting policy. It was recommended that the industry information be detailed in a table, illustrated in table 5.1, to ease understanding (researcher's illustrative example).

- Users expect detailed disclosure on the organisations' impact on the environment and the impact of uncontrolled events, like land claims and disasters on the trading results.

Table 5.1: Biological asset price index

Reporting period	Valuation applied and reported on	Market price at reporting date	Input cost	Spot price	Long-term average	SARS standard rate
Biological asset type: Sugarcane roots Classification: Non-current biological asset						
2015	10	11	12	10.2	8	5
2014	8	8.5	7	7.9	7	6
2013	7	6.9	8	7.1	6	5
Biological asset type: Sugarcane Classification: Current biological asset						
2015	10	11	12	10.2	8	5
2014	8	8.5	7	7.9	7	6
2013	7	6.9	8	7.1	6	5

Source: Illustration of research result

Organisations should circumvent a reproduction of the requirements of IAS 41 as their accounting policies. Such policies should rather be tailored to address the unique operations, the performance of their biological assets and to explain all the assumptions applied in the valuation to enhance the usefulness of the financial reports for decision-making. Organisations should further substantiate why the biological assets are held and how such transformation address the mandate and operational requirements of the organisation.

5.5. Valuing biological assets

The valuation challenges reported by organisations, as identified from the content analysis of the annual reports, were detailed in annexure G. The prescribed accounting standards were researched for guidance to address the challenges experienced to provide guidance to the industry.

The valuation challenges identified through the literature study was tested on the researched organisations through the closed questionnaire, to confirm whether these challenges are still relevant to the industry. Such results were detailed in figure 4.7 where the valuation cost was highlighted as the most significant challenge by 41% of the organisations, while a lack of understanding the valuation model (35%) and the measurement of the age and condition of plants and animals (24%) were emphasised. It was noted that the organisations that experienced the greatest challenges only performed annual valuations, used inputs only from one source to value the biological assets and did not consider all the tested valuation factors.

5.5.1 Valuation factors that informs fair value accounting

The research confirmed that organisations that consider all the valuation factors listed in table 5.2, that perform monthly valuations and those that forms a valuation group to collect data from various stakeholders, like the finance division, the production unit, the management, the agronomists and other informed individuals, do not experience valuation challenges to report in terms of IAS 41.

Table 5.2: Factors that informs biological asset valuations

Valuation factors
Age of animal/plant
The location of the animal/plant
The condition of the animal/plant
The expected economic benefits to be derived from the animal/plant
The expected cash flow to be generated from the animal/plant
The expected yield to be harvested
The costs to sell the animal/plant

Valuation factors
The quality of the animal/plant
The market price of the animal/plant
The sector prices of the specific animal/plant
The inputs from management on how to value the animal/plant
The expected harvesting date

Source: Research result

It is advisable that the valuation factors per table 5.2 be considered to value biological assets. Furthermore, valuation groups can be formed to combine skills and experience to guarantee that the best suitable and informed valuations are derived at, which can assist the 41% of organisations that experience a cost challenge. Frequent valuations also ensure that experience is gained and assumptions are tested throughout the valuation process to derive at informed reportable figures. It is important to detail how and when the organisation expects the economic benefits to be derived from the biological assets as such considerations informs the valuations.

5.5.2 Valuation assumptions

The valuation assumptions applied should be revisited on an annual basis to ensure that it is still valid for the operations and the business environment of the organisation. This will include a “re-testing” of the valuation reported on in the prior financial period to assess the accuracy of the applied assumptions, when information is available to perform such calculations in retrospect. A re-assessment of assumptions will further ensure that biological assets are valued on a “zero-based” principle and that the type and nature of the assets will be assessed to ensure that the assets meet the recognition requirements of IAS 41.

After detailing all the applied assumptions in the valuation of the biological assets, a sensitivity analysis can be outlined to detail the effect of changes in the key quantitative estimates. Such analysis will outline the overall risk relating to these assumptions as well as the impact of attempted changes to the predictions. This sensitivity analysis can (researcher’s illustrative example) be presented as per table

5.3, and can further outline the impact of the changes on profits and other related balances:

Table 5.3: Biological asset valuation sensitivity analysis

Variable assumption	Per valuation	0 to 10% change in assumptions	11 to 20% change in assumptions	21 to 30% change in assumptions
Crop production				
Rainfall	1 000	900	750	400
Fertilizer	1 000	910	700	380
Hail	1 000	700	500	300
Wind	1 000	850	600	420
Moisture content	1 000	830	710	590

Source: Illustration of research result

The disclosure of a sensitivity analysis will allow users to comprehend the effect of the change in variables applied in the valuation while it further ensures that all valuation variables were considered. The detailed outline will outline the objectivity applied in the valuations, provided that the sensitivity analysis and the assumptions applied are explained to the users. Compilers of the financial reports should safeguard the supporting evidence applied in the sensitivity analysis to allow an independent assessment thereof what will derive at the same conclusion.

5.5.3 The life expectancy of biological assets

IAS 41 paragraphs 5–6 detail that biological assets are recorded when the biological transformation is managed. Thus, when the capability to change is managed and measured. Such biological transformation ceases when there is no longer a change in the quality (thus the genetic merit, the density, the ripeness, the protein content, the fat cover, and the fibre strength) or the quantity (with reference to the progeny, the weight, the cubic metres, the fibre length, the diameter and the number of buds) and the standard implies that such lack of transformation will result in the derecognition of the asset as there will be no further future economic benefits derived thereon (IASB, 2015:A1348–A1349).

To accurately account for the biological assets, an informed decision should be made on the life expectancy thereof. Detailed information on the life cycle, linked to the expected production and revenue can be reported to enhance decision-making. This will assist users to comprehend the capacity of the biological assets and the related performance thereof. As recommended by the users, the following detail is required (researcher's illustrative example):

Table 5.4: Reconciliation between the capacity and performance of biological assets

Biological asset	Life expectancy	Input cost	Asset value	Generated revenue
White maize	< 1 year	R7 402 per ha	R4 200 per ton x expected 3 tons per ha = R12 600 Total area planted: 100 ha Total asset value: R1 260 000	R4 302 per ton x 3.1 tons = R13 336.20 Total asset harvested: 100 ha Total revenue generated: R1 333 620.00
Yellow maize	< 1 year	R8 201 per ha	R3 100 per ton x expected 4 tons per ha = R12 400 Total area planted: 50 ha Total asset value: R620 000	Currently at 80% growth stage. To be harvested
Forest block A	10 years Currently in year 4	Y1: R3 600 per ha Y2: R2 800 per ha Y3: R1 200 per ha Y4: R500 per ha	Area planted: 10 ha Y1: R36 000 Y2: R64 000 Y3: R76 000 Y4: R81 000 current asset value	Expected return on investment: Y: 10 = R15 000 PV of expected revenue = R9 000
Livestock	5 years: currently in year 1	R5 000 per cow R7 000 per bull R2 000 per heifer	Quantities: 10 cows; 1 bull; 3 heifers Asset value: R50 000 cows R7 000 bull	Expected return on investment from year 2. Y2: 1 calf per cow @ R1 000 = R10 000 Heifers grow to cows =

Biological asset	Life expectancy	Input cost	Asset value	Generated revenue
			R6 000 heifers Total: R63 000	R9 000 Y3: 1 calf per cow @ R1 200 x 13 cows = R15 600

Source: Illustration of research result

A reconciliation between the capacity and the performance of the biological assets allows users to assess the performance of the asset as well as the organisation. Under/over utilisation can be identified and managed while the biological transformation of long-term assets can be elaborated on. Such disclosure is especially valuable when the harvesting date/maturity date of the asset does not align to the reporting date, as the users can comprehend the asset's value in relation to the expected return thereon.

5.5.4 Valuation frequency

Valuations should be regarded as a management tool and not an annual task required for financial reporting purposes. Valuations can be performed cost effectively, when informed individuals from the various departments in the organisation are consulted. Such consultation will assist to collect and consider inputs from agronomists, accountants, budget controllers, production units, management, etc. The skill amalgamation will ensure that the organisation consider all the valuation factors to derive at an informed biological asset valuation.

Monthly valuations allows a transfer of skills between the various departments, while the organisation allows itself an opportunity to re-test and reconsider the applied assumptions on a continuous basis when the valuations are revisited retrospectively as subsequent information becomes available.

5.5.5 Valuation documentation

To substantiate the performed valuations, organisations should prepare the following documentation:

- Detail the assumptions used and indicate how it applies and compares to market data;
- Explain the financial model used to value the biological assets and document the actual calculations therein;
- Detail the industry norms and standards against the performance of the organisation to allow a performance assessment;
- The underlying transactions supporting the sales and purchases should be available to inform the physical assets;
- Should experts be used to value the assets, the qualifications and experience of such individual should be evidenced;
- Calculations on the present value of the future cash flows should be documented;
- Physical stock counts should exist or alternative valid documentation to support the volumes and quantities per type of biological asset;
- Photos, monthly reports and where applicable, moisture content reports and quantities per asset type should be available;
- Evidence of market prices or other prices used, with reasons supporting such application;
- Document and substantiate the projected volumes, the price history, the activity cost per operation and the discount rate applied;
- Substantiate the growth, the expected yields and soil condition.

An independent assessment of the valuation documentation should allow such individual to comprehend the assumptions applied to derive at the same biological asset valuation.

5.6. Disclosure notes to the financial statements

The researched organisations' biological asset notes to the financial statements are relayed in annexure I to serve as a guide on how to disclose the assets. From the documented notes it is evident that there is no industry norm on the quantity and quality of the disclosed information, regardless of the disclosure requirements detailed in IAS 41. This annexure was shared with the various user groups to get

their inputs and recommendations on information required to enhance decision-making, which highlighted the following:

5.6.1 Valuation background

Users (individuals charged with governance, the regulatory body, the owners and the investors) found biological asset values meaningless when organisations do not detail the factors and methods applied to derive at such values. It was advised that detailed explanations and even calculations are to be included in the accounting policies and notes to the financial statements to allow a re-performance thereof and an assessment on each assumption, rate and factor considered therein.

The biological assets should be valued considering the realistic, actual conditions in which the organisation trades. Such information should be detailed in the accounting policy to allow the users to comprehend the available markets to sell the produce, the impact of restrictions and markets on the inputs costs and all other operations. This detail should be linked to the financial impact thereof disclosed in the notes.

5.6.2 Asset performance

The performance of the biological assets should be explained to allow users to grasp the operational requirements of these assets, the capacity thereof and the related revenue derived therefrom. It is vital for the individuals charged with governance, the other users and the investors to understand the maximum operating potential of these assets and to compare such capacity to the actual achieved performance. Any underperformance or idle time should be explained to allow a conceptualisation of the loss in investment. A suggested illustration was detailed under the life expectancy considerations above.

5.6.3 Price index

A price index should be disclosed in the notes to the financial statements, to detail the valuation amounts, reconciled to the market prices, the actual costs, the spot prices, the long-term averages, the standards SARS rates, comparative information of the organisation as well as current and comparative information on the industry

trends. Details to how these rates are determined and researched should be explained in the accounting policy. An illustrative example was included under the valuation assumption consideration above.

5.6.4 Qualitative and quantitative reconciliations

Detailed reconciliations disclosing both the quantities and the values per type of biological asset, and the direct link between such quantities and values, should be included in the notes to the financial statement to outline all changes to the assets. This should include, but not be limited to, the purchases, the progeny, deaths, losses, environmental losses, theft, growth, disasters, and all other changes.

5.6.5 Environmental changes

Environmental changes and the impact thereof should be detailed and correlated to the quantities and the value of the biological assets to guide the users to understand the financial and operational impact thereof. Such considerations will address changes to the climate, rainfall, drought conditions, pests, pollution, rehabilitation of soil and resources and any other identified factors.

5.6.6 Elaborated comparative information

Comparative information should be disclosed to allow the users to comprehend the performance of the organisation as well as the biological assets. Such comparative information is required for a minimum of three years by the individuals charged with governance and the other users to enhance their decision-making process.

5.6.7 Financial ratios

Users of the financial data requested the inclusion of the “expected ratios” in the financial report, with corresponding comparative figures. These financial ratios can be included on the overall organisation report to the financial statements. These ratios include, but are not limited to:

5.6.7.1 Capital adequacy ratio

The ratio is applied to assess the risk of insolvency from excessive debt and unstable assets, like biological assets, and it is calculated as:

Capital adequacy ratio =	$\frac{\text{Capital}}{\text{Risk weighted assets}}$
--------------------------	--

Capital includes the ordinary capital which can be used to absorb the losses without the suspension of trading plus the subordinated debt that can absorb losses in the event of liquidation. The risk weighted assets refer to the risks associated per asset, thus considering possible losses or a risk of deterioration.

5.6.7.2 Solvency

Expressing the solvency ratio illustrates to users whether the organisation can meet its debt and other obligations and whether there is sufficient cash to meet the short- and long-term liabilities. The ideal is to have a high solvency ratio as it will provide assurance that there is no probability of debt defaults.

Solvency ratio =	$\frac{\text{Net income (after taxes) + depreciation}}{\text{Liabilities (short-term + long-term)}}$
------------------	--

The solvency ratio measures the available cash, rather than net income, as it disregards the non-cash depreciation expense, to assess whether the organisation can afford its liabilities.

5.6.7.3 Biological asset turnover ratio

The biological asset turnover ratio will highlight the performance of the assets as the revenue derived from the assets is considered in relation to its value. This ratio will assist decision-makers to assess the efficiency of the use of the assets.

Biological asset turnover ratio =	$\frac{\text{Revenue derived from biological assets}}{\text{Biological assets}}$
-----------------------------------	--

5.6.7.4 Liquidity

The ability to settle the short-term liabilities is assessed in the current ratio. The current ratio (also referred to as the working capital ratio) will guide the users to determine if the organisation has sufficient current assets to settle the current liabilities.

Current ratio =	$\frac{\text{Current assets}}{\text{Current liabilities}}$
-----------------	--

A current ratio of 1 indicates that the organisation’s current assets equals its current liabilities, whereas a ratio greater than one will demonstrate financial health as the current assets will exceed the current liabilities. A higher ratio means that the organisation is more financially secure.

5.6.7.5 Return on assets

The return on assets ratio demonstrates the profitability of an organisation in relation to its total assets. It highlights the efficient management of assets to generate revenue, thus allowing an assessment of the capacity of an asset in relation to its performance.

Return on assets =	$\frac{\text{Net income}}{\text{Total assets}}$
--------------------	---

This ratio can be modified to disclose the net income derived from biological assets in relation to the biological asset value to substantiate the performance of these assets.

5.6.7.6 Biological asset data

Specific information requested by the users of the financial reports to be detailed in the notes to the financial statements:

- Age of the biological asset;
- The life expectancy per type of biological asset;

- An indication of where in the life cycle the assets are;
- The nature, type, species, varieties of biological assets held;
- The quantity per type and sex of asset;
- The hectares planted, farmed, expanded, cultivated, rehabilitated;
- The rates and estimates applied in the valuation;
- The geographical spread of the assets per type and quantity;
- The actual input cost per type of biological asset;
- The risks associated with the biological assets and a sensitivity analysis thereof, like theft, disasters, arson etc.;
- The licenses and royalties applicable to biological assets, like water rights, land rights etc.;
- Information on the planting dates, the fertilizer programme, the suitability of the climate to the chosen plants, whether farming operations are continued on arable land or virgin land and the soil type.

Comprehensive notes to the financial statements will guide users to make informed decisions on the biological assets, while information becomes comparable in the industry.

5.7. Industry examples researched and available IFRS 13 guidance

The outlined examples in annexure R will assist the industry to account for the biological assets, assess the various input costs, determine which factors impacts on the overall production per asset type and serves as illustration of the valuation performed on crop by an expert.

5.8. Accounting developments

From the research conducted, the following guidance was identified on the accounting developments:

5.8.1 Accounting for bearer plants

In terms of GRAP 27 all living animals and plants are accounted for as biological assets when the biological transformation thereof is managed. IAS 41 had the same

recognition criteria, but effective 1 January 2016, the standard distinguishes between bearer plants and consumable plants. Consumable plants are accounted for as biological assets in terms of IAS 41, with the bearer plants accounted as property, plant and equipment in terms of IAS 16 (IASB, 2015:A1346). This is due to a consideration that bearer plants are used solely to grow produce over their life expectancy and is therefore similar to an item in a manufacturing process.

Bearer plants will be recognised when it is used in the production or supply of agricultural produce; when the plant will bear produce for longer than one reporting period and when there is a remote likelihood that the bearer plant will be sold as agricultural produce (IASB, 2015:A1347). These plants will be measured, like other items of property, plant and equipment, at the accumulated costs until maturity, like a self-constructed asset. The produce growing on these plants, like apples growing on apple trees, remains within the scope of IAS 41 and will be reported as biological assets, while the tree itself is reported under property, plant and equipment (IASB, 2015:A1348).

Some anticipated challenges with the reporting of bearer assets include uncertainty on how to identify the bearer plants, how to determine the useful lives of these plants, how to account for the bearer assets retrospectively, the required journal entries and the financial constraint imposed by such reporting as additional valuations might be required.

5.8.1.1 Identifying bearer plants

To identify the bearer plants, the definition of an asset should first be considered. An asset is defined as a resource controlled by an organisation as a result of a past event, on which future economic benefits is expected to accrue to the organisation (ASB, 2014:25). In this definition, a resource is regarded as a tool to produce the future economic benefits for the organisation (ASB, 2014:25). Such resource should have become available (past event) to the organisation in terms of legislation, procurement, production, donation or a natural occurrence, like the birth of progeny (ASB, 2014:26). These resources should generate future economic benefits for the organisation, which entails a cash-inflow, enabling the organisation to render

services, a reduction of cash-outflow due to the use of the resource (personal emphasis).

To test whether the organisation actively manages the asset, an assessment is done on the degree of human involvement on the physical condition of the resource. Such assessment should consider the measures put in place to protect plants from natural elements, restriction of physical access to the plants and interference in the physical condition of the plants. Where plants are managed, like fruit trees and sugarcane where fertilisation programmes exist, where rainfall is measured and moisture shortages are complemented with irrigation, where weed control and pest control are exercised, such plants are actively managed and therefore meet the definition of an asset.

Once the plant was correctly identified as an asset, an assessment can be made to determine whether such plant will be recognised as a biological asset (living plant where the biological transformation thereof is managed) or an item of property, plant and equipment. When the plant is used repeatedly or continuously for more than one financial period to grow produce and the plant is not harvested and there is no intention of future harvest (ASB, 2014:14), the plant will be recognised as a bearer plant (IASB, 2015:A1347). Examples include vines, sugarcane roots, fruit trees, scrubs cultivated for sap, resin, bamboo, palm trees, rubber trees etc. Once the organisation's intention of holding the plants have been assessed, the useful life thereof can be considered.

5.8.1.2 Determining the useful lives of the bearer plants

The useful life of an asset is regarded as the period in which the asset is expected to contribute to the organisations' operations. This can be a cash-inflow or a process of enabling the organisation to render goods or services due to the use of such asset. To assess the period of economic viability of plants and animals, an assessment should be made on the entire life-cycle of each type of assets as well as the various development stages. In apportioning the life-cycle to the development stages, management can assess the economic viability in terms of the expected performance of such stage.

The assessment of the useful lives should be based on available industry data and can be presented in a tabular format to allow users to comprehend it (researcher’s illustrative example). Detailed information on expected harvests can be included.

Table 5.5: Useful life stages of bearer plants

Bearer plant	Planting to germination	Germination to date of first flowering	Producing capacity	Total lifespan
Apple tree: 8 to 10 foot tree M.9: Golden delicious	4 to 5 weeks	First fruit bearing between 2 and 3 years Full production in year 6	9 to 10 years	15 to 16 years
Apple tree: 11 to 14 foot tree M.26: Gold rush	4 to 5 weeks	First fruit bearing between 2 and 3 years Full production in year 6	12 to 13 years	18 to 19 years

Source: Illustration of research result

The economic viability of bearer plants will be considered, with reference to the producing capacity per type to determine the useful lives.

5.8.1.3 Retrospective accounting and journal entries

On initial recognition of bearer plants, such plants may have been reported as biological assets in prior financial results. As such, if an active market existed for the biological assets, it was measured at the fair value less costs to sell after considering the present location and condition thereof. The bearer plants would have been grouped and presented as (researcher’s illustrative examples):

Statement of financial position	Year 2	Year 1
Non-current assets		
Biological assets	R100	R80

To derecognise the bearer plants, an assessment should be done on the composition of the non-current assets to correctly classify the bearer plants and the bearer animals. The latter will be reported under IAS 41 as biological assets, whereas the bearer plants will be derecognised. Assuming that the total non-current assets in the example consist of bearer plants and that that increases in value relates to biological transformation, the derecognition will be journalised as follows:

Table 5.6: Journal entries to account for bearer plants

Description	Debit	Credit
Bearer plants (non-current asset)	80	
Biological assets (non-current)		80
Derecognise the biological assets held in year 1 and reclassify them to bearer plants.		
Bearer plants (non-current asset)	20	
Fair value gain on property, plant and equipment		20
Account for the biological transformation of the bearer plants.		

Source: Illustration of research result

In the example provided, the bearer plants will be taken on at the fair value less costs to sell as it represents the value of the biological assets. As property, plant and equipment can be valued at either the cost model, where costs less accumulated depreciation and impairments are considered, or at fair value the organisation need to further account for these bearer plants accordingly.

If the bearer plants are not yet mature, it should be measured at accumulated cost, like a self-constructed item of property, plant and equipment that is not yet available for use. At maturity, the bearer plants will be recorded on either the cost model or the revaluation model to account for the changes in the asset. As items of property, plant and equipment are subject to annual impairment reviews, a review of the adequacy of the lifespan of the assets will be done as it is subject to depreciation. A constant review of the performance of the bearer plants can be done to enlighten the financial reporting users.

5.8.1.4 Bearer plants reporting in the public sector

The GRAP requirements, applicable to the financial reporting by the public sector, have not been amended to distinguish between bearer and consumable plants. Such inconsistency results in incomparable financial results between the public and private sectors as the Accounting Standards Board (ASB) is currently assessing the feedback on Discussion Paper 10, *Accounting for living and non-living resources*, that was due on 16 January 2015, but was postponed. From the interview and correspondence with the ASB, it was confirmed that a review of GRAP 27 will still be undertaken once Discussion Paper 10 has been assessed and considered. In terms of Discussion Paper 10, living and non-living resources are defined as (ASB, 2014:14):

- Living resources: Resources that comprise elements that undergo biological transformation.
- Non-living resources: Naturally occurring resources that are not created or modified by mankind.

As the public sector is responsible for the conservation of fauna and flora in zoos and conservations, there is no active management of the biological transformation on these assets and it does not fall in the scope of GRAP 27 (ASB, 2014:12). From the definitions of living and non-living resources it is not clear how the fauna and flora will be accounted for in future, as it undergoes biological transformation, but may be naturally occurring. Other public sector organisations, like the South African Police Service and the South African National Defence Force, hold dogs and horses that are used to meet their service delivery objectives. Even though these assets' biological transformation are not managed, they are restraint, are sheltered and cared for to ensure their good health for effective service delivery (ASB, 2014:28), therefore managed. The ability to manage biological assets in the public sector may therefore be restricted by an organisation's enabling legislation, the government policies or similar instructions. The degree of management required on the physical condition these living and non-living resources assets should therefore be determined to allow organisations to account thereon in terms of the appropriate accounting standards (ASB, 2014:28). As the ASB's review of the living and non-living resources is ongoing, the appropriate changes to GRAP 27 to exclude bearer

plants from agricultural activities will be a simultaneous amendment of the accounting standard.

5.8.2 Available IFRS 13 guidance

Fair value accounting requires the reporters to detail comprehensive information on the valuation assumptions and the related fair value hierarchy applied. As detailed in this chapter, the accounting policies should be comprehensive to outline what, how, when, who and why factors influence the valuation of the biological assets, as such information influence the decisions taken by the users. The notes to the financial statements should be comprehensive to allow a re-performance of the valuation and should further provide a link between the quantities and the values.

5.8.3 Environmental reporting

With an emphasis of an effective use of available resources, investors and users expect organisations to rehabilitate, sustain, protect and to limit the damage to the environment. The electricity crisis in South Africa, where load-shedding was implemented, the drought experienced in the 2016 cropping season, the initiative taken by Eskom to subsidize solar geysers and the increased investment in renewable energy generated in the Eastern Cape on the wind farms are only a few contributing factors which created an obligation on organisations to take responsibility for their operational footprint. Other challenges include but are not limited to greenhouse gas emissions, climate changes and water restrictions (DEFRA, 2013:1). Environmental reporting is vital in a farming environment, where diesel is used in the mechanisation processes, methane gasses are produced by livestock, carbon dioxide is evident in forests and crops etc. The biological asset reporters should therefore consider the impact of their environmental footprint.

Prescribed legislation, like the Companies Act, and related regulations require that organisations take responsibility for the emissions for which they are responsible, which should be evidenced in their reporting (DEFRA, 2013:2). The advantage of reporting on the environmental footprint of an organisation will demonstrate its commitment to effectively use scarce resources, attract investors, demonstrates leadership and to detail the organisation's exposure to legal and operational risks in

events of non-compliance (DEFRA, 2013:1). Environmental reporting should be adequate to ensure that users are provided with decision-enhancing information. This can be achieved by consideration of the following characteristics:

Table 5.7: Environmental reporting characteristics

Characteristic	Environmental consideration
Relevance	Ensure the data collected and reported appropriately reflects the environmental impacts of your organisation and serves the decision-making needs of users, both internal and external to your organisation.
Quantitative	Key performance indicators need to be measurable. Targets can be set to reduce a particular impact. In this way the effectiveness of environmental policies and management systems can be evaluated and validated. Quantitative information should be accompanied by a narrative, explaining its purpose, impacts and giving comparators where appropriate.
Accuracy	Seek to reduce uncertainties in your reported figures where practical. Achieve sufficient accuracy to enable users to make decisions with reasonable confidence as to the integrity of the reported information.
Completeness	Quantify and report on all sources of environmental impact within the reporting boundary that you have defined. Disclose and justify any specific exclusion.
Consistency	Use consistent methodologies to allow for meaningful comparisons of environmental impact data over time. Document any changes to the data, changes in your organisational boundary, methods, or any other relevant factors.
Comparable	Organisations should report data using accepted key performance indicators rather than organisations inventing their own versions of potentially standard indicators. The narrative part of a report provides the opportunity for an organisation to discuss any tensions which exist between providing comparable data and reporting organisation-specific targets. The use of accepted

Characteristic	Environmental consideration
	indicators will aid the organisation to benchmark to the industry and will aid the users to judge the organisation's performance against that of the peers.
Transparent	This is essential to producing a credible report. Address all relevant issues in a factual and coherent manner, keeping a record of all assumptions, calculations and methodologies used. Internal processes, systems and procedures are important and the quantitative data will be greatly enhanced if accompanied by a description of how and why the data are collected. Report on any relevant assumptions and make appropriate references to methodologies and data sources used.

Source: DEFRA, 2013:4

To further enhance the environmental footprint report, the following reporting steps were identified by the United Kingdom's Department of Environment, Food and Rural Affairs:

Table 5.8: Environmental reporting steps

Step	Description
Step 1	Determine the boundaries of your organisation
Step 2	Determine the period for which you should collect data
Step 3	Determine the key environmental impacts of your organisation
Step 4	Measure
Step 5	Report on the environmental impact of the organisation
Develop an environmental strategy	Action 1: Intensify ratios Action 2: Set a base year Action 3: Set a target Action 4: Verification and assurance Action 5: Upstream supply chain Action 6: Downstream impacts Action 7: Business continuity and environmental risks

Source: DEFRA, 2013:5

The identified steps on how to report on the environmental footprint of the organisation, supported by the characteristics of the expected report should guide organisations to take social responsibility for their operations. Such report should provide explanations to allow users to comprehend the impact of the environmental damage. The recommended explanations in the United Kingdom entail:

Table 5.9: Emission gas explanations required in environmental reports

Item	Required explanation
1	General organisational information.
2	The reporting period covered.
3	The reason for any significant changes in emissions since the previous year.
4	The quantification and reporting methodology followed. If you have used data collected for any energy or other schemes, state it as part of the methodology.
5	The approach chosen to identify the operations you have collected data from.
6	The scopes included. Provide a list specifying the activity types included in each scope.
7	Provide detail of any specific exclusions of emissions from scopes (including an estimation of the % it represent).
8	Explain the reason for any exclusion.
9	If the calculation approach is used, state for each activity the % of the activity data estimated.
10	The conversion/emission factors used.
11	Provide a breakdown by country of the total greenhouse emissions.
12	Provide detail of any exclusion of countries.
13	The base year chosen and approach used to set the base year.
14	The base year recalculation policy.
15	State appropriate context for any significant emissions changes that trigger base year emissions.
16	State your target, including scopes covered and target completion date. Provide a brief overview of progress towards targets.

Item	Required explanation
17	The name of the person(s) responsible for achievement of this target and their position in the organisation.
18	The reason for your intensity measurement choice.
19	The reason for any significant changes in your intensity measurement from the previous year.
20	Provide an outline of any external assurance received and a copy of any assurance statement, if applicable.
21	For purchased carbon credits, state the reduction in tonnes of carbon dioxide per year.
22	State the amount of electricity purchased for use or consumption in owned or controlled sources.
23	For purchased green tariffs state the reduction in tonnes of carbon dioxide per year.
24	State the supplier and the name of the tariff.
25	State the additional carbon saving associated with the tariff as a percentage.
26	State the amount of electricity generated from owned or controlled sources. State if the owned or controlled source is onsite or offsite.
27	State, if applicable, the amount of own generated renewable electricity exported to the grid.
28	State the amount of heat generated from owned or controlled sources. State if the owned or controlled source if onsite or offsite.

Source: DEFRA, 2013:42

In addition to the consideration of the organisation's emission gas footprint on the environment, accountability should be demonstrated on the good management of water resources. Water is a scarce natural resource and therefore organisations should reduce their water usage and wastage. Water management reporting to be considered include responsibility for the available infrastructure, like the fixtures and fittings, staff education, measures implemented to reduce water use and controls implemented to store rainwater for later use (DEFRA, 2013:44). Detailed information can also be included on the (DEFRA, 2013:45):

- 'The organisation's supplied water used in cubic metres per annum;
- Direct abstraction of water as the volume taken per annum (not licensed);
- Water returned to the source in cub metres per annum against the volume of water supplied;
- Report on reused/recycled water quality and temperature;
- Collection or harvest and use of rain water;
- Details of investments in technologies that aim to improve water efficiency;
- Strategies developed to minimise or manage the impact the organisation's water use has on the environment.'

An environmental friendly initiative taken by organisations to recycle waste can be financially beneficial as it decreases input costs. Measures taken by organisations to reduce waste can include measures to deposit waste at recycling factories, the reuse of packaging material, printing double-sided and avoiding unnecessary printing (DEFRA, 2013:48). All measures taken to limit waste contribute positively to the functioning of a healthy economy and a society that prioritises biodiversity. As organisations can directly or indirectly impact on biodiversity, such impacts should be outlined in the environmental reports (DEFRA, 2013:62). These impacts can be either positive or negative.

Direct impacts include instances where the operations of an organisation affect the land, air or water and its inhabitants. This includes toxic emissions, irrigation that impacts on water availability and inhabiting species and a displacement of species when land is developed (DEFRA, 2013:62). Indirect impacts are often more significant than direct ones, and includes sourcing materials from water stressed countries and moving rain forests to enable a production of agricultural commodities (DEFRA, 2013:62).

It remains vital for the organisation and the users of its financial reports to report on the impact of the operations on the environment, as social responsibility should be taken to ensure that nature is conserved for future generations.

5.8.4 Operational impact of land claims

The impact of political interference, like land claims, should be elaborated and quantified in financial reports, according to the users. Such uncertainties should highlight the operational risks imposed to the operations and the sustainability of the organisation and its biological assets, especially as the land claims will only be finalised by 30 June 2019 (Sosibo, 2014:1). Furthermore, there is political unrest as the Department of Rural Development and Land Reform announced plans to redistribute commercial farms to the farmworkers, which includes a substantial percentage of the Eastern Cape. Such plans have not been legislated and cannot be enforced yet (Sosibo, 2014:1).

When organisations operate on land that was earmarked for redistribution, such information is vital to the users of financial reports as the sustainability of the organisation can be affected by such claims. Furthermore, the ownership of the biological assets owned by the organisations may be transferred when the land claims are finalised, especially where these assets are immovable. Further concerns about the land redistribution process include the viability of the organisation, food security, and the protection of organisation's investors.

5.9. Verification of the application guideline

An application guideline was developed to assist financial statement compilers to comply with the reporting requirements of IAS 41. It serves as a tool or checklist to instruct the reliable and comparable fair valuing of biological assets and to provide decision-enhancing information to the users thereof as it incorporated the expectations and recommendations from the researched financial statement user groups.

To confirm that the application guideline is beneficial, it was distributed to a sample of user groups to evaluate whether it assists the users to determine when biological assets should be accounted for; whether the accounting policies applied in the industry, as linked to the accounting standards, are useful; whether the decision-enhancing information required by the users of the financial statements assist in

providing useful reports; whether the valuation guidance provided will assist the industry; whether the guideline is considered useful and user-friendly.

The inputs received from the guideline evaluators were considered and applied to enhance the usefulness and the reliability of the document to assist the compilers of financial reports to produce comparable and decision-enhancing financial statements.

5.9.1 Purposively selected evaluators

The developed application guideline was shared with 21 the purposively selected individuals (see annexure R), to obtain their assessment and inputs thereon. It was done to ensure that the guideline assists the financial statement compilers to report on biological assets in terms of IAS 41 and to provide decision-enhancing reports to the users. Refer to annexure F for the communication dates.

As per the Ethics approval, the purposively selected evaluators of the application guideline were involved in the research phases informing the development of the guideline and as such were either respondents to the questionnaires (phase three) or have been interviewed (phase four).

The guideline was structured to address the users' expectations and the studied focus areas from chapter four: being the applicability of IAS 41 and when to account for biological assets; examples of accounting policies and an assessment of the improvements required thereon to provide useful information to the users of the financial reports; guidance on how biological assets should be valued to address the researched valuation challenges; information required to be disclosed in the notes to the financial statements to provide useful information to the users; industry examples on how to account for, report and disclose biological assets and examples of input costs associated with biological assets; and a discussion of the recent developments on biological asset reporting. The assessment criteria were drafted to determine whether the application guideline address the users' expectations of what should be included in the application guideline.

5.9.2 Analysis of the assessor's feedback

Annexure O details the individual assessments received from the guideline reviewers, whom are all regarded as experts in their fields. The feedback was analysed and further comprehended in annexure Q.

Upon assessing the inputs received from the 13 guideline assessors, followed by an amendment of the developed guideline, it could be concluded that the developed application guideline is a user friendly document that can be applied to assist the industry to prepare comparable and decision-enhancing financial reports, as it:

- Assist the users to determine when the requirements of IAS 41 should be applied;
- Provides practical examples, that are reference to the prescribed accounting standards, of available accounting policies to account for the various classes of biological assets;
- Details the users' expectations on the decision-enhancing information required to be included in an organisation's accounting policies;
- List the researched valuation factors applied in the industry to value the biological assets;
- Provides clarity on how the valuation assumptions should be explained to enhance understanding thereof by the users;
- Elaborates on the life expectancy of biological assets which should be considered in the valuation thereof;
- Details the elaborative information required by the users of the financial statements to be disclosed in the notes to the financial statements;
- Provides available industry examples to assist the biological asset valuers;
- Explains the developments on the accounting for bearer assets, the environmental reporting required by the users and the significant impact of political factors, like land claims, on the operations of farming organisations.

5.10. Summary and conclusion

The application guideline was developed to assist the industry to prepare comparable financial reports to enhance decision-making. This guideline outlined when the

requirements of IAS 41 should be applied by organisations. The detailed accounting policies applied in the various agricultural sectors was linked to the prescribed accounting standards and the users' expectations on these policies were documented to assist compilers to customise their accounting policies.

To assist with the valuation of the biological assets, the tested valuation factors were outlined as well as the documentation identified as required to substantiate such valuations. Assistance on how to prioritise and document the valuation assumptions and the life expectancy of the biological assets were documented while the frequency of valuations were emphasised as a critical procedure to be applied by organisations. The users' expectations on what should be disclosed in the notes to the financial statements were outlined to guide the reporters to document the information required in decision-making. Researched industry examples were included to demonstrate how to account for the biological assets, to detail the various input costs considered in various biological asset transformations and to outline a crop valuation performed by an expert.

The researched accounting developments were outlined in the application guideline. The accounting for bearer plants were outlined to assist the reporters to report such assets as property, plant and equipment, while a consideration of environmental reporting and land claims were detailed to emphasise the importance of such reporting for the users thereof.

The developed application guideline was shared with purposively selected individuals to assess the usefulness and the validity thereof. Recommended changes were affected to the guideline to enhance the provided guidance on fair valuing biological assets to produce comparable and decision-enhancing financial reports.

The developed application guideline was assessed by the evaluators as an assisting tool to determine when the requirements of IAS 41 should be applied. The guideline provided applied accounting policies that were referenced to the prescribed accounting standards, whereon an assessment was done by the various user groups of the financial statements to guide the industry to enhance their accounting policies to provide decision-enhancing data.

The guideline further details information to guide in the valuation of the biological assets as the valuation factors, the valuation assumptions, the life expectancy of the biological assets, the frequency of the valuations and the documentation required to substantiate the valuations were outlined. Industry examples were included to assist the valuers to consider the types of input costs per commodity while the importance of environmental reporting and the accounting for bearer plants were outlined to guide the reporting thereon.

The application guideline to fair value the biological assets that were developed in this study have no intention to act as a rule-based guide or set of accounting rules. The principles of the fair value accounting will merely be analysed and detailed to guide the compilers of the financial statements.

CHAPTER 6

CONCLUSION OF THE STUDY

6.1 Introduction

Reporting in terms of the principles of IAS 41, or equivalent, did not result in comparable financial results in the industry. This is mainly due to valuation challenges experienced and the significant costs of these valuations. This study was undertaken to determine how to improve the consistency, validity and reliability of the fair valuing of biological assets and to incorporate such results into an application guideline to assist the financial statement compilers to present results to users that will enhance their decision-making. This guideline is the result of an investigation on the industry trend and standards on how to value, disclose and report on biological assets in the annual reports; an assessment of the valuation challenges experienced, the valuation factors considered and the frequency thereof; an analysis of the valuation inputs applied and a contextualisation of the various users' expectations when these financial results are assessed. The purpose of the developed guideline is to assist biological asset reporters to address the information needs of the users to derive at informing, comparable, decision-enhancing balances that can be derived at in a cost efficient manner when detailed information is presented.

The application guideline to fair value the biological assets that were developed in this study have no intention to act as a rule-based guide or set of accounting rules. The principles of the fair value accounting are merely analysed and detailed to guide the compilers of the financial statements.

6.2 Summary of the research

The objectives of the study, the underlying research problem and the hypothesis derived at are revisited in this chapter. A concluding summary per chapter is outlined to demonstrate how these addressed the research objectives, followed by an overall research conclusion on this study. Chapter six further outlines possible recommendations arising from the study and areas for further research.

6.2.1 Objectives of the study and the research problem

The purpose of this study was to determine how to improve the consistency, which includes the validity and reliability, of the fair valuing of biological assets. The analysed research results informed the development of an application guideline to assist financial statement compilers to comply with the requirements of IAS 41, GRAP 27 and the fair value principles of IFRS for SMEs. The guideline considered the identification and analysis of the recent development in the accounting of biological assets, an analysis of the valuation challenges experienced in the industry which were further linked to the theoretical guidance available from IAS 41. This application guideline is regarded as a tool or checklist to instruct the consistent, reliable and valid fair valuing and the related disclosure of biological assets. This guideline specifies the challenges experienced by organisations linked to the theoretical guidance on how to attend thereto.

The following thesis statement informed the development of the application guideline: *The consistency, including validity and reliability, of fair valued biological assets can be improved when the quantitative and qualitative indicators required in the users' decision-making process are available in an application guideline.*

6.2.2 Contextualising the challenges of fair value accounting on biological assets

The biological asset valuation methods applied in various countries were analysed through prior studies to explore the inconsistent reporting and the underlying valuation challenges. The studied challenges place the users of the required financial information at the centre of the valuation process. As such, valuations are done to address their decision-making requirements and not necessarily the principles of fair value accounting. This unique dilemma in conjunction with the accounting, market and economic developments that impact on the fair value reporting of biological assets justifies the development of an accounting guideline to assist the compilers and users of financial reports to produce comparable and decision-enhancing financial reports.

6.2.3 Research design and methodology

The methods and procedures established to execute an inductive study on the empirical documentation that was required for the qualitative research of the descriptive data are delineated in chapter three. An outline was provided on the research phases to cover the content analysis of the annual reports, the closed and open-ended questionnaires and the interviews with the various financial statement user groups to examine the narrative procedures, the valuation methods applied, the underlying available calculations, the assessed assumptions and the related valuation challenges in the industry. The grounded theory analysis was followed where coding was done on collected data to undertake the in-depth analysis and a contextualisation of the external documentation and feedback. Once the overdrawn contrasts were made and uncertainties were cleared with immediate follow-ups the available industry guidance was paired with the users' expectations to develop an application guideline to assist the compilers to produce comparable and decision-enhancing financial reports.

6.2.4 The empirical research process and outcomes

Ten purposively selected countries, carefully chosen as a result of an assessment of the top ten agricultural producing exporting countries, IFRS reporting countries and the BRICS market leaders, formed the basis of this research study. After contacting their accounting standard setters and regulatory bodies it was established that a database of organisations that report on biological assets do not exist. As the industry does not maintain a database on registered organisations, detailing their operating activities and their applied accounting framework, their implementation of and adhering to the requirement of IAS 41 or equivalent cannot be tested. As alternative a sample of 100 organisations operating in the agricultural industry was selected in the purposively selected countries to form the research sample in phase two of the study. Their financial reports were downloaded, or where not available it was requested, for the periods 2012 to 2014, and for 2015 where such reports were available. As organisations are not all availing their financial reports, a limitation of scope was experienced. Meaningful research was conducted on the 53 organisations from seven countries where a total of 154 (available) annual reports were analysed for the 2012 to 2015 financial periods.

In phase three closed questionnaires were directed to a purposively selected sample of 40 organisations, representing seven countries, to collect data from financial statement compilers, accountants, auditors and other financially orientated individuals on the applied biological asset valuation methods, the frequency thereof, the challenges experienced and the valuation factors instructing such valuation. Twenty-four participants informed the study, representing three countries. Open-ended questionnaires were directed to the thirteen organisations that elected to participate further in the study whereon only three responses were received, from two countries.

In phase four the information needs of the various user groups of financial reports were assessed. A total of 25 interviews were conducted, representing the ten user groups identified from the literature studies. The consolidated, contextualised findings from the research phases are summarised as follows:

6.2.4.1 Main operations of the researched organisations and the applicability of IAS 41

The mere holding of fauna or flora does not require of organisations to adhere to the requirements of IAS 41. An assessment should be done on whether the biological transformation of these biological assets are managed to instruct IAS 41 compliance. To assist the financial statement compilers in their assessment, the applicability of the standard was outlined in section 5.2 of the application guideline. The guidance included in chapter five on the accounting policies implemented by other organisations and the disclosure guidance provided in annexures H and I may assist the industry to publish comparable financial results.

6.2.4.1.1. Main operations categorisation on the stock exchange markets

The categorisation of the main activities of organisations as listed on the stock exchange markets are considered misleading to the users of financial information when the organisation do not trade in farming operations. Only 64% of the researched organisations actually held and reported on biological assets. Brazil, Canada and New Zealand's activities were correctly listed on the stock exchange

markets, whereas the operations of South Africa (79%), Australia (44%), the United Kingdom (44%) and the United States of America (33%) were partly in line with their listing categorisation.

6.2.4.1.2 Assessment of available reports per agricultural sector

The limitation of scope per agricultural sector confirmed that the grain industry (78% limitation), the vegetable growers (77%) and the horticulture sector (71%) do not avail their financial results to interested users thereto. A recommendation from this study is that organisations should publish their financial results on their official websites.

6.2.4.1.3 Significance of biological assets held

The biological assets held in relation to the total assets of an organisation may not be significant, yet such assets may be substantial to the operations when it has the highest revenue contribution, or when the operations of the organisation evolve around it. The users' disclosure expectations and requested financial ratios thereon were outlined in section 5.6.7 of the developed application guideline to guide decision-making.

6.2.4.1.4 Prioritising internal reporting

As there is not a defined reporting purpose in the classification of the biological assets, the reporting burden to group biological assets in a meaningful manner superseded the purpose of financial reporting i.e. providing useful information to the users. These challenges may be addressed when the reporting period is aligned to the lifecycle of the biological assets or alternatively when detailing the comprehensive information on the lifecycle of the various types of assets in the notes to the financial statements to enhance decision-making. The latter was detailed in section 5.5.3, table 5.4 and section 5.5.6 in the application guideline.

6.2.4.2 Notes to the financial statements

The compilers of financial statements should consider the objective of financial reporting, i.e. to assist users in decision-making, and as such should consider that

the biological asset value disclosed in the financial statements is meaningless without detailed information to allow users to contextualise and re-perform such valuation. The detailed information required should allow the users to grasp the operational requirements of the biological assets, the capacity of the assets and the related revenue derived therefrom to guide decisions. The detailed note disclosures were addressed in section 5.5.6 of the developed application guideline.

Further information required by the user groups include details of the:

- Age of the biological asset;
- The life expectancy;
- An indication of where in the life cycle the assets are;
- The nature, type, species, varieties of biological assets held;
- The quantity per type and sex of asset;
- The hectares planted, farmed, expanded, cultivated, rehabilitated;
- The rates and estimates applied in the valuation;
- The geographical spread of the assets per type and quantity;
- The environmental changes impacting on the biological assets, like drought, diseases etc.;
- The actual input cost per type of biological asset;
- The expected output per type of biological asset and the actual output of prior years;
- The risks associated with the biological assets and a sensitivity analysis thereof, like theft, disasters, arson etc.;
- The licenses and royalties applicable to biological assets, like water rights, land rights etc.;
- An explanation of the valuation model;
- Information on the planting dates, the fertilizer programme, the suitability of the climate to the chosen plants, whether farming operations are continued on arable land or virgin land and the soil type.

6.2.4.3 IAS 41 disclosure requirements

The insignificance of the biological assets and the related life expectancy thereof impacts on the insertion of detailed descriptions thereon in the financial statements. The detailed disclosures needed by the decision makers were discussed in section 5.4 and section 5.5.6 of the developed application guideline.

Compliance with the disclosure requirements of IAS 41 can be strengthened in the various agricultural sectors to produce decision-enhancing reports and as such the industry available accounting policies were outlined in section 5.3 with an assessment thereof by the decision makers in section 5.4. A consideration of the comprehensive information required by users as outlined in sections 5.5 and 5.5.6 will further strengthen the financial reporting and the related IAS 41 disclosure requirements.

6.2.4.4 Valuation of biological assets

Organisations report on the quantities of biological assets held, which informs the valuations. The valuations were affected by the non-consideration of the location of the biological asset (53%), the condition thereof (24%) and the cost to sell the asset (29%) by the valuers. Such omissions may be circumvented when all the valuation factors outlined in section 5.5 listed in table 5.2 of this study are considered.

Although additional disclosure of the valuation method applied is not required in terms of IAS 41, the poultry, forests, grapevines; fruit growers and sugarcane organisations detailed additional valuation considerations to enhance understanding of their valuation methods. The inclusion of the additional narrative information demonstrates the commitment of the industry to enhance an understanding of the methods applied to derive at the reported values and aligns with the user's information needs outlined in section 5.5.6 of the application guideline.

6.2.4.5 Usefulness of accounting policies

The accounting policies were assessed to be a recite of the IAS 41 paragraphs. It was not tailored to address the nature of their biological assets, their operations or their unique accounting considerations thereof. The applied accounting policies,

grouped per agricultural sector, as well as the users' assessment of the usefulness thereof were outlined in sections 5.3 and 5.4 to guide the industry to develop and tailor their accounting policies aligned to their operations.

6.2.4.6 Valuation challenges

The valuation challenges identified from the literature study were experienced by the researched organisations, with no additional or unique challenges identified. The valuation cost was highlighted as the most significant challenge by 41% of the organisations, while a lack of understanding the valuation model (35%) and the measurement of the age and condition of plants and animals (24%) were emphasised. It was further noted that 67% of the organisation that experienced valuation challenges merely performed annual valuations. Frequent valuations may enhance the required skills and experience whereas a consideration of all the listed valuation factors and inputs from informed individuals will enhance the reporting thereon. Section 5.5.1 and table 5.2 provide guidance to the industry to address the valuation challenges.

6.2.4.7 Reconcile qualitative and quantitative data

Reconciliations to explain movements which correlates the quantities to the value of biological assets should be included in the notes to the financial statements, where detailed information is available on the purchased assets, the progeny, the deaths, the environmental losses, theft, growth, disasters, and other changes are disclosed to enhance decisions of the individuals charged with governance and the regulatory body. Environmental changes and the impact thereof should be detailed and correlated to the quantities and value of the biological assets to guide the individuals charged with governance, the other users and the owners. Section 5.6.4 provides guidance on the users' expectations on the reconciliation between the qualitative and quantitative data required in decision-making and section 5.8.3 details guidance on the environmental reporting required by users.

6.2.4.8 Accounting for bearer plants

The accounting treatment for bearer plants was outlined in section 5.8.1 to assist the industry to apply the amendments of IAS 41, effective 1 January 2016. The guidance address an identification of bearer plants, clarity on the determination of the useful lives of such assets and applicable journal entries to drive the accounting thereof.

6.2.5 Development and verification of the application guideline

To assist the financial statement compilers to produce comparable and decision-enhancing reports, an application guideline was developed in chapter five. The guideline provides guidance on when the requirements of IAS 41 should be considered and applied by organisations reporting on fauna and flora. The detailed accounting policies available from the various agricultural sectors were relayed after it was referenced to the prescribed accounting standards. As these applied accounting policies were assessed by the users to be too generic, their constructive feedback on how the policies can be enhanced was included in the guideline.

The researched valuation factors were detailed to guide the valuers to consider the elements that impact on the fair value of the biological assets, while guidance on what documentation should be prepared and safeguarded to support this valuation was provided. Assistance on how to prioritise and document the valuation assumptions and the life expectancy of the biological assets were documented while the frequency of valuations were emphasised as a critical procedure to be applied by organisations. Information required by users in their decision-making process was detailed to guide compilers to disclose comprehensive results in the notes to the financial statements. The guideline includes examples on how to account for the biological assets in the financial records; it details the variation in accounting for input costs per asset type as well as a valuation performed by an expert.

The impact of accounting for bearer plants were detailed to provide guidance to the compilers to report thereon, while an assessment of the importance of environmental reporting and the impact of land claims were stated to emphasise that such external, non-financial data is needed in the decision-making process.

The developed application guideline was shared with purposively selected individuals to assess the usefulness and the validity thereof. Recommended changes were affected to the guideline to enhance the provided guidance on fair valuing biological assets to produce comparable and decision-enhancing financial reports.

6.3 Research conclusion

An application guideline was developed based on the results of the study in determining how to improve the consistency, validity and reliability of the fair valuing of biological assets to assist the industry with decision-enhancing financial results. The guideline will assist compilers of financial statements to establish whether the requirements of IAS 41, or equivalent, need to be applied to account for the fauna or flora held. Where IAS 41 reporting is required, the guideline outlines the researched accounting policies (referenced to the prescribed accounting standards) per agricultural sector, as well as the expectations from the users on the information required therein, to assist the reporters to develop the organisation's unique accounting policies. Guidance is provided on how to elaborate and assess the valuation assumptions, the life expectancy of the biological assets, the frequency of the valuations and the underlying documentation required to substantiate such valuation. The detail required in the notes to the financial statements, detailing the valuation background, the performance of the biological assets, a disclosure of a price index model, detailed reconciliations on the qualitative and quantitative measures, the extent of comparative information required and the suggested ratios needed by the users of the financial statements to enhance their decision-making process. The researched industry examples are outlined in the guideline to assist the reports in their assessments and valuations.

The guideline also outlines the current industry developments, to ensure that it is updated to guide the compilers to produce comparative financial reports. The reporting of bearer plants were investigated and it outlined, while emphasis was placed on the reporting required on the environmental impact of the organisations as well as the land reform risks associated with the operations.

6.4 Contribution of the study

This study explored and analysed the reporting requirements and the information needs of the users of financial statements to determine how to improve the consistency, validity and reliability of the fair valuing of biological assets to produce decision-enhancing information.

Theoretical contribution:

On the level of scholarship, this thesis provided additional academic insights into the unique information requirements by the various users of financial information which was not previously explored, thereby making a modest contribution to the body of knowledge on financial reporting requirements and extending the theory of fair value accounting to improve the consistency, validity and reliability of the biological asset reporting. The theoretical contribution responded to calls made in the literature (citations) for future research on fair value accounting on various accounting balances.

- (a) There are fundamental differences between the country specific accounting standards applied to report on biological assets and the requirements of IAS 41 (Marsh, *et al.* 2013:85);
- (b) Unavailable market information results in incomparable financial results on biological assets (Mates, *et al.* 2015:705);
- (c) Users of financial information may find fair valued reports difficult to understand due to the complexity of accounting standards (Pike and Chui, 2012:89);
- (d) Financial results in the agricultural sector are incomparable due to the application of various evaluation methods (Rožentāle and Ore, 2013:65).

Applied/Contextual contribution:

The developed application guideline presents such industry guidance to financial statement compilers and the various user groups who rely on the financial results in their decision-making process in a user friendly layout and details information to:

- Assist the users to determine when the requirements of IAS 41 should be applied;

- Provides practical examples, that are reference to the prescribed accounting standards, of available accounting policies to account for the various classes of biological assets;
- Details the users' expectations on the decision-enhancing information required to be included in an organisation's accounting policies;
- List the researched valuation factors applied in the industry to value the biological assets;
- Provides clarity on how the valuation assumptions should be explained to enhance understanding thereof by the users;
- Elaborates on the life expectancy of biological assets which should be considered in the valuation thereof;
- Details the elaborative information required by the users of the financial statements to be disclosed in the notes to the financial statements;
- Provides available industry examples to assist the biological asset valuers;
- Explains the developments on the accounting for bearer assets, the environmental reporting required by the users and the significant impact of political factors, like land claims, on the operations of farming organisations.

6.5 Revisiting the established cognitive theory

The cognitive theory that informed this research, as outlined in chapter two, was reassessed at conclusion of the study: *Biological asset accounting was introduced much later than other accounting principles. This may be as agricultural activities have mainly been performed by smaller organisations or individuals who did not publish their financial statements and prioritised taxation regulation compliance. As such, users were not interested in the performance of these organisations. It was not necessarily a priority to compare the financial results to those of other organisations or to make operational decision therefrom. The increased importance of the financial statements to the users thereof now requires accountants and management to amend their thought process to produce comparable and informative financial statements to the users thereof.*

In conclusion, the developed theory is still considered appropriate for this study. Through the detailed testing performed in the various research phases it was reconfirmed that even though smaller organisations do not publish their financial statements listed organisations demonstrated the same deficiency while detailed information is not included in the annual reports to allow users to assess the performance of the organisation or to compare the financial results to that of other organisations. It was also confirmed that financial reports on the 2014 and 2015 financial years were more comprehensive than that of previous years, which is a confirmation that there is an increased focus on the reporting of comparable and informative financial results.

6.6 Revisiting the research objectives

The research objectives were addressed as follows:

An application guideline was developed in chapter 5 of the study, attached as Annexure R, as a summary of the research on determining how to improve the consistency of the fair valuing of biological assets to produce decision-enhancing financial results to the users. The application guideline details the analysed information needs of the various user groups of financial statements which will assist the compilers to produce decision-enhancing financial reports. The application guideline was informed by the following sub-objectives:

- The accounting and related developments that impact on financial reporting and the related valuation of the biological assets were researched as part of the literature study in chapter two. These developments were further researched in chapter four during the interviews to comprehend the industry's readiness for the reporting of bearer plants. The researched guidance was included in the application guideline in chapter five to provide assistance to the industry on the required conversion reporting.
- The challenges experienced in the industry to report biological assets at a fair value were researched in chapter two as part of the literature study. These challenges were further explored and analysed in the closed questionnaire, the open-ended questionnaire and the interviews with the users of financial statements in chapter four. The challenges were assessed and linked to

available industry guidance in annexure G to assist the industry with possible solutions. The guideline developed in chapter five, as detailed in annexure R, was carefully structured to address the challenges emphasised by the users during the interviews.

- The applied accounting policies researched in this study was outlined in annexure H of the study. These policies were assessed, grouped and made anonymous and was included in the application guideline in chapter five. The applied accounting policies were analysed and linked to the available accounting standards to demonstrate why the industry leaders elected their applied accounting principles. This guidance allows the compilers of the financial statements to analyse the industry trends on how to account for the researched biological asset groups while it further details the assessment thereof by the ten user groups on how these policies can be enhanced.

The developed application guideline was improved by including examples availed by the industry on how to account for the biological assets, guidance on the various input costs per biological asset type and an expert valuation performed. The guideline was shared with purposively selected individuals in chapter five to assess the validity and usefulness thereof, whereafter inputs were considered and the guideline was improved. This developed application guideline will assist the compilers of financial statements to meet the objective of financial reporting, i.e. to produce decision-enhancing information to the users thereof that can be reliably compared to that of other organisations.

In meeting the research objectives, the thesis statement developed in chapter one was successfully tested: *The consistency, including validity and reliability, of fair valued biological assets can be improved when the quantitative and qualitative indicators required in the users' decision-making process are available in an application guideline.*

6.7 Recommendation from results

The following recommendations are made from the results of this study:

- A database can be developed to monitor and report on all the registered organisations per country. This database should outline the operating activities of the organisation as well as the applied accounting framework. The accounting regulators and other regulatory bodies should have access to such database.
- An information bureau can be established where the financial statements of all listed organisations are safeguarded. Such bureau can act as a library where financial reports of other organisations can be retrieved for analysis and possible industry guidance for templates used, accounting policies applied and the extent of information disclosed in the notes to the financial statements.
- The financial results of listed organisations should be accessible on their official websites. Such requirement can be legislated and enforced by the stock exchange markets or alternatively by the accounting regulators, especially in Italy and Spain where no financial reports could be availed for this study. Financial reporting and the related availing thereof should also be enhanced in the grain, vegetable, horticulture and dairy industries.
- The project implementers that report on their activities undertaken to manage biological assets should disclose the owner of such assets to substantiate that the assets are correctly accounted for.
- The operational activities undertaken by organisations should be carefully assessed to correctly categorise such activities on the stock exchange listings.
- Standardised valuation methods can be developed and prescribed for common agricultural activities. Such method and guideline should list the assumptions, input costs and valuation factors to be applied to ensure a consistent application thereof.
- The Agricultural Research Council can develop a guide on the various input costs affecting the different biological assets which can be availed to the accountants and agronomists to assist with the valuation.
- Guidance on the Faustmann valuation model that is applied in the forestry sector can be provided to accountants to serve as a prescriptive model to value forests.
- Valuation costs associated with biological assets can be decreased when the curriculum prescribed at Universities are enhanced to incorporate valuation techniques and related models that are applied in the industry. Such study

models can be included in the accounting, agronomy and economics courses, amongst others.

6.8 Areas identified for further research

The theoretical knowledge from the results of this study, as summarised in the application guideline, can be studied further to explore the decision-enhancing user needs in reporting on other accounting balances to determine whether it will contribute to the consistency, validity and reliability of such fair valuing.

The impact of the implementation of IFRS 13 on the overall results of the financial statements was not assessed in this study. Such study can be undertaken to determine whether the development and implementation of IFRS 13 had a positive contribution on fair value reporting.

As the accounting for bearer plants is prescribed from 1 January 2016, the impact thereof on the industry can be researched. The reclassification of the biological assets to the property, plant and equipment, the actual identification of the bearer plants, the valuation thereof and the effect of such classification on the usefulness of financial reports can be further explored. As the Accounting Standards Board is in the process of finalising their proposed standard on “accounting for living and non-living resources” such standard can be researched, together with the anticipated changes to GRAP 27, to determine how the public sector envisage reporting on state owned biological assets. The study may further explore whether the financial reports compiled in the public and the private sectors will be comparable after implementation of the new standard.

List of tables and figures

Chapter 1

Figure 1.1: Illustrating the research study	10
---	----

Chapter 2

Table 2.1: IPSAS application in Asian countries	39
Table 2.2: Categories and measurement methods adopted in Australia to value biological assets	46
Table 2.3: Agricultural market information databank	48
Table 2.4: Advantages and disadvantages of IAS 41 in the Latvian accounting system	50
Table 2.5: Summary of the valuation challenges experienced in various countries	54
Table 2.6: Qualitative characteristics that harmonise financial statements	58
Table 2.7: Deep/intermediate/shallow ecology taxonomy	63
Figure 2.1: Theory of planned behaviour adapted to financial statement reliance	32

Chapter 3

Table 3.1: Characteristics of qualitative research	82
Table 3.2: Audiences and their expectations of qualitative research	83
Table 3.3: Focus areas of the questionnaire	95
Table 3.4: Data required for the execution of this study	98
Table 3.5: Grounded theory versus narrative analysis research methods	123
Table 3.6: Practicalities of coding information	124

Chapter 4

Table 4.1: The world's top 10 agriculture exporting countries of 2014	137
Table 4.2: IFRS compliant agricultural produce exporting countries	138
Table 4.3: IFRS compliant countries included in the purposive sample (neither top agricultural exporters nor BRICS category)	139
Table 4.4: Summary of the ten purposively selected countries	141
Table 4.5: Sampled organisations –availability of annual reports per country	142
Table 4.6: Classification of biological assets per agricultural sector	147
Table 4.7: Summary of organisations with biological assets exceeding 20% of total assets held: 2012 to 2015	150
Table 4.8: Organisations reporting on the aggregate fair value gains or losses in the notes to the financial statements	151
Table 4.9: Aggregate fair value losses/profits not disclosed on annual reports in relation to the significance of biological assets	153
Table 4.10: Organisations reporting on the description of biological assets in the notes to their annual reports	155
Table 4.11: Organisations reporting on the quantities of biological assets	157
Table 4.12: Applied valuation method per researched organisation	159

Table 4.13: Summarised disclosure compliance per country	165
Table 4.14: Disclosure requirements compliance score for significant biological asset holding organisations	168
Table 4.15: Responses received on the closed questionnaire per country	171
Table 4.16: Responses received on the closed questionnaire per financial statement user group	171
Table 4.17: Average revenue per main operation generated per sector	173
Table 4.18: Activities undertaken by organisations on biological assets	174
Table 4.19: Accounting treatment applied by organisations on animals and/or plants agricultural sector	176
Table 4.20: Significance of biological assets to tested organisations	178
Table 4.21: Valuation frequency and valuers linked to the significance of biological assets	179
Table 4.22: Significance of valuation factors considered	180
Table 4.23: Interview focus area per purposively selected user group	182
Figure 4.1: Organisations identified as agricultural producers actually reporting on biological assets	196
Figure 4.2: Classification of biological assets per agricultural sector	144
Figure 4.3: Required reporting compliance per country	148
Figure 4.4: Overall IAS 41 compliance per country	166
Figure 4.5: Main operations of researched organisations in the closed questionnaire	167
Figure 4.6: Valuation methods applied to account for biological assets in the agricultural sector	172
Figure 4.7: Challenges experienced to value biological assets	178
Figure 4.8: Interviews conducted per financial statement user group	185

Chapter 5

Table 5.1: Biological asset price index	237
Table 5.2: Factors that informs biological asset valuations	238
Table 5.3: Biological asset valuation sensitivity analysis	240
Table 5.4: Reconciliation between the capacity and performance of biological assets	241
Table 5.5: Useful life stages of bearer plants	241
Table 5.6: Journal entries to account for bearer plants	251
Table 5.7: Environmental reporting characteristics	252
Table 5.8: Environmental reporting steps	255
Table 5.9: Emission gas explanations required in environmental reports	256

Bibliography

Accelerated and Shared Growth Initiative of South Africa – Eastern Cape (AsgiSA-EC). 2011. Crop valuation report. Valuation by an expert. Unpublished.

Accelerated and Shared Growth Initiative of South Africa – Eastern Cape (AsgiSA-EC). 2013. Production plans. Input cost considerations in the production cycle. Unpublished.

Accounting Standards Board (ASB). 2012. *Generally Recognised Accounting Practice (GRAP) 27 Agriculture* [online]. South Africa. Available from: <http://www.asb.co.za/documents/standards> [Accessed 4 May 2013].

Accounting Standards Board (ASB). 2014. *Discussion paper 10: Accounting for living and non-living resources* [online]. South Africa. Available from: <http://www.asb.co.za/LinkClick.aspx?fileticket=3EtWc-XlszQ%3D&portalid=0> [Accessed 4 November 2014].

Accounting Standards Board (ASB). 2015. *Exposure Draft 131: Invitation to comment on the exposure draft of the International Public Sector Accounting Standards Board on the applicability of IPSASs* [online]. South Africa. Available from: http://www.asb.co.za/LinkClick.aspx?fileticket=NQy0gZ_VZ0w%3d&portalid=0 [Accessed on 13 August 2015].

Adams, M., Cousins, B. & Manona, S. 1999. *Land tenure and economic development in rural South Africa: Constraints and opportunities, working paper 125, London December*. Overseas Development Institute.

Adecoagro. 2012. *Annual report for the year ended 31 December 2012* [online]. Brazil. Available from: www.adecoagro.com [Accessed on: 4 August 2015].

Adecoagro. 2013. *Annual report for the year ended 31 December 2013* [online]. Brazil. Available from: www.adecoagro.com [Accessed on: 4 August 2015].

Adecoagro. 2014. *Annual report for the year ended 31 December 2014* [online]. Brazil. Available from: www.adecoagro.com [Accessed on: 4 August 2015].

Agria Corporation. 2012. *Annual report for the year ended 30 June 2012* [online]. New Zealand. Available from: www.agriacorp.com [Accessed on: 4 August 2015].

Agria Corporation. 2013. *Annual report for the year ended 30 June 2013* [online]. New Zealand. Available from: www.agriacorp.com [Accessed on: 4 August 2015].

Agria Corporation. 2014. *Annual report for the year ended 30 June 2014* [online]. New Zealand. Available from: www.agriacorp.com [Accessed on: 4 August 2015].

Agriterra Limited. 2013. *Annual report for the year ended 31 May 2013* [online]. United Kingdom. Available from: www.agriterra-ltd.com [Accessed on 3 August 2015].

Agriterra Limited. 2014. *Annual report for the year ended 31 May 2014* [online]. United Kingdom. Available from: www.agriterra-ltd.com [Accessed on 3 August 2015].

Akhavan, P. and Dehghani, M. 2015. 'Knowledge acquisition techniques selection: A comparative study', *The IUP journal of knowledge management*, XIII(3):17-30.

Álvarez, I.G., Grecco, M.C.P., Formigoni, H. & Geron, C.M.S. 2014. 'An analysis of profit and loss in Brazil before and after the full adoption of the International Financial Reporting Standards', *International journal of accounting, auditing and performance evaluation*, 10(3):1-25.

Antonio, L.M. and Bassetti, A. 2014. 'Rotation of independent auditors and analysis of their reports before and after rotation in Brazil', *Journal of accounting and taxation*, 6(1):19-29.

Argilés, J.M., Blandón, J.G. & Monllau, T. 2013. *Fair value and historic cost accounting of biological assets* [online]. Department of accounting. University of

Barcelona. Spain. Available from: <http://www.scribd.com/doc/124716943/IAS-41-Fair-Value-and-Historic-Cost-on-Biological-Assets> [Accessed on 18 March 2014].

Aryanto, Y.H. 2011. *Theoretical failure of IAS 41: Agriculture* [online]. The Indonesian Institute of Accountants. Available from <http://ssrn.com/abstract=1808413> [Accessed on 4 August 2015].

Asian Citrus Holding Limited. 2012. *Annual report for the year ended 30 June 2012* [online]. United Kingdom. Available from: www.asian-citrus.com [Accessed on 3 August 2015].

Asian Citrus Holding Limited. 2013. *Annual report for the year ended 30 June 2013* [online]. United Kingdom. Available from: www.asian-citrus.com [Accessed on 3 August 2015].

Asian Citrus Holding Limited. 2014. *Annual report for the year ended 30 June 2014* [online]. United Kingdom. Available from: www.asian-citrus.com [Accessed on 3 August 2015].

Asien, E.N. and Nuri, J. 2014. 'Market reactions to news of accounting manipulation', *Research journal of finance and accounting*, 5(7): 33-42.

Associated British Foods PLC. 2012. *Annual report for the 52 weeks ending 13 September 2012* [online]. United Kingdom. Available from: www.abf.co.uk [Accessed on 3 August 2015].

Associated British Foods PLC. 2013. *Annual report for the 52 weeks ending 13 September 2013* [online]. United Kingdom. Available from: www.abf.co.uk [Accessed on 3 August 2015].

Associated British Foods PLC. 2014. *Annual report for the 52 weeks ending 13 September 2014* [online]. United Kingdom. Available from: www.abf.co.uk [Accessed on 3 August 2015].

Astral foods. 2012. *Annual report for the year ended 30 September 2012* [online]. South Africa. Available from: www.astralfoods.co.za [Accessed on 4 August 2015].

Astral foods. 2013. *Annual report for the year ended 30 September 2013* [online]. South Africa. Available from: www.astralfoods.co.za [Accessed on 4 August 2015].

Astral foods. 2014. *Annual report for the year ended 30 September 2014* [online]. South Africa. Available from: www.astralfoods.co.za [Accessed on 4 August 2015].

Athanasios, V., Stergios, A. & Laskaridou, E.C. 2010. 'The importance of information through accounting practice in agricultural sector – European data network', *Journal of social sciences*, 6(2):221-228.

Atkinson, D. and Büscher, B. 2006. 'Municipal commonage and implications for land reform: A profile of commonage users in Philippolis, Free State, South Africa', *Agrekon*, 45(4):437-466.

Australian Accounting Standards Board (AASB). 2013. *Exposure draft 245: Agriculture bearer plants – proposed amendments to AASB 116 and AASB 141* [online]. Australia. Available from: http://www.aasb.gov.au/admin/file/content105/c9/ACCED245_07-13.pdf [Accessed 20 September 2013].

Australian Agricultural Company Limited. 2012. *Annual report for the year ended 31 March 2012* [online]. Australia. Available from: <http://www.aaco.com.au/about-us/our-history/> [Accessed on: 4 August 2015].

Australian Agricultural Company Limited. 2013. *Annual report for the year ended 31 March 2013* [online]. Australia. Available from: <http://www.aaco.com.au/about-us/our-history/> [Accessed on: 4 August 2015].

Australian Agricultural Company Limited. 2014. *Annual report for the year ended 31 March 2014* [online]. Australia. Available from: <http://www.aaco.com.au/about-us/our-history/> [Accessed on: 4 August 2015].

Australian Agricultural Company Limited. 2015. *Annual report for the year ended 31 March 2015* [online]. Australia. Available from: <http://www.aaco.com.au/about-us/our-history/> [Accessed on: 4 August 2015].

Australian Natural Proteins Limited. 2012. *Annual report for the year ended 30 June 2012* [online]. Australia. Available from: www.australiannaturalproteins.com.au [Accessed on 3 August 2015].

Australian Natural Proteins Limited. 2013. *Annual report for the year ended 30 June 2013* [online]. Australia. Available from: www.australiannaturalproteins.com.au [Accessed on 3 August 2015].

Australian Vintage Limited. 2012. *Annual report for the year ended 30 June 2012* [online]. Australia. Available from: www.australianvintage.com.au [Accessed on 3 August 2015].

Australian Vintage Limited. 2013. *Annual report for the year ended 30 June 2013* [online]. Australia. Available from: www.australianvintage.com.au [Accessed on 3 August 2015].

Australian Vintage Limited. 2014. *Annual report for the year ended 30 June 2014* [online]. Australia. Available from: www.australianvintage.com.au [Accessed on 3 August 2015].

Australian Vintage Limited. 2015. *Annual report for the year ended 30 June 2015* [online]. Australia. Available from: www.australianvintage.com.au [Accessed on 3 August 2015].

Azevedo, G.M.C. 2007a. *The impact of International Accounting Standard 41 "Agriculture" in the wine industry* [online]. Instituto Superior de Contabilidade e Administração da Universidade de Aveiro. Available from: <http://ssrn.com/abstract=975508> [Accessed on 4 August 2015].

Azevedo, G.M.C. 2007b. *Dimension of the company versus knowledge of IAS 41* [online]. Instituto Superior de Contabilidade e Administração da Universidade de Aveiro. Available from: <http://ssrn.com/abstract=975510> [Accessed on 3 August 2015].

Baigrie, I. 2014. *An analysis of the financial reporting compliance of South Africa public agricultural companies* [online]. MCom thesis. University of Johannesburg. South Africa. Available from: <https://ujdigispace.uj.ac.za/bitstream/handle/10210/14020/INGRID%20BAIGRIE.pdf?sequence=1&isAllowed=y> [Accessed on 4 August 2015].

Barton, L. 1978. 'Agricultural assistance measures: A survey and assessment', *The Australian Economics Review*, third quarter:71-83.

Bayboltaeva, N.A., Makulova, A.T., Abaeva, K., Alibekova, B.A. & Bolysbayeva, A. 2015. 'Problems of development of accounting of peasant (farm) enterprises in Republic of Kazakhstan', *Asian Social Sciences*, 11(14):211-218.

BayWa Ag. 2012. *Annual report for the year ended 31 December 2012* [online]. New Zealand. Available from: http://us.baywa-re.com/media/filer_public/65/e3/65e3835a-8840-48cf-9d1c-6287044ce904/baywa_ag_financial_statements_2014.pdf [Accessed on 4 August 2015].

BayWa Ag. 2013. *Annual report for the year ended 31 December 2013* [online]. New Zealand. Available from: http://us.baywa-re.com/media/filer_public/65/e3/65e3835a-8840-48cf-9d1c-6287044ce904/baywa_ag_financial_statements_2014.pdf [Accessed on 4 August 2015].

BayWa Ag. 2014. *Annual report for the year ended 31 December 2014* [online]. New Zealand. Available from: http://us.baywa-re.com/media/filer_public/65/e3/65e3835a-8840-48cf-9d1c-6287044ce904/baywa_ag_financial_statements_2014.pdf [Accessed on 4 August 2015].

BDO New Zealand. 2013. *Bearer plants no longer at fair value?* [online]. New Zealand. Available from: https://www.bdo.co.nz/__data/assets/pdf_file/0006/136509/bdo_assurance_alert_september_2013.pdf [Accessed 5 August 2013].

Berkeley Graduate Division (Berkeley). 2015. *Graduate student instructor* [online]. University of California. Available from gsi.berkeley.edu/gsi-guide-contents/learning-theory-research/cognitive-constructivism/ [Accessed on 14 September 2015].

Berstein, A. 2005. *Land reform in South Africa: A 21st century perspective, research report no. 14* [online]. The Centre for Development and Enterprise: South Africa. Available from: http://www.cde.org.za/wp-content/uploads/2013/02/2005_May_Land_reform_-_abridged_report.pdf [Accessed on 4 March 2014].

Bevo Agro Incorporated. 2012. *Annual report for the year ended 30 June 2012* [online]. Canada. Available from: www.bevofarms.com [Accessed 3 August 2015].

Bevo Agro Incorporated. 2013. *Annual report for the year ended 30 June 2013* [online]. Canada. Available from: www.bevofarms.com [Accessed 3 August 2015].

Bevo Agro Incorporated. 2014. *Annual report for the year ended 30 June 2014* [online]. Canada. Available from: www.bevofarms.com [Accessed 3 August 2015].

Boeije, H. 2013. *Analysis in qualitative research*. London: SAGE.

Bohušová, H., Svoboda, P. and Nerudová, D. 2012. 'Biological assets reporting: is the increase in value caused by the biological transformation revenue?', *Agric Econ – Czech*, 58(11):520-532.

Bohušová, H., Valouch, P. & Svoboda, P. 2012. *IFRS for SMEs: what will the implementation of IFRS for SME bring for the timber industry?* [online]. MENDELU working papers in business and economics. University of Brno. Available from: ftp://ftp.mendelu.cz/RePEc/men/wpaper/27_2012.pdf [Accessed on 2 April 2014].

Bono Farm Investments Property Limited. 2012. *Annual financial statements for the year ended 31 October 2012* [online]. South Africa. Available from: www.safe.co.za [Accessed on 4 August 2015].

Bono Farm Investments Property Limited. 2013. *Annual financial statements for the year ended 31 October 2013* [online]. South Africa. Available from: www.safe.co.za [Accessed on 4 August 2015].

Bono Farm Investments Property Limited. 2014. *Annual financial statements for the year ended 31 October 2014* [online]. South Africa. Available from: www.safe.co.za [Accessed on 4 August 2015].

Bowen, F. and Aragon-Correa, J.A. 2014. 'Greenwashing in corporate environmentalism research and practice: The importance of what we say and do', *Organization & Environment*, 27:107-112.

Bowen, G.A. 2005. 'Preparing a qualitative research-based dissertation: lessons learned', *The qualitative report*, 10(2):208-222.

Brasil Agro. 2014. *Annual report for the year ended 31 March 2014* [online]. Brazil. Available from: www.brasil-agro.com [Accessed on 5 August 2015].

Brasil Agro. 2015. *Annual report for the year ended 31 March 2015* [online]. Brazil. Available from: www.brasil-agro.com [Accessed on 5 August 2015].

Bunge Limited. 2012. *Annual report for the year ended 31 December 2012* [online]. Canada. Available from: <http://www.bunge.com/> [Accessed on 3 August 2015].

Bunge Limited. 2013. *Annual report for the year ended 31 December 2013* [online]. Canada. Available from: <http://www.bunge.com/> [Accessed on 3 August 2015].

Bunge Limited. 2014. *Annual report for the year ended 31 December 2014* [online]. Canada. Available from: <http://www.bunge.com/> [Accessed on 3 August 2015].

Burnside, A. 2005. *IAS 41 and the forest industry – a study of the forest products companies' perception of the IAS 41 today* [online]. Dissertation, school of economic and commercial law. Göteborg University. Available from: <https://gupea.ub.gu.se/handle/2077/1524> [Accessed 2 February 2014].

Burykin, Y., Klichova, G. & Bremmers, H. 2011. 'The development of integrated accounting in small and medium-sized companies in the agri-and food sector of the Russian Federation', *Agro inform Publishing House*, 131-135.

Carter, S.M. and Little, M. 2007. 'Justifying knowledge, justifying method, taking action: epistemologies, methodologies and methods in qualitative research', *Qualitative health research*, 17(10):1316-1328.

Chan, C. 2013. *Accounting for agriculture – new models for bearer plants and produce growing on trees* [online]. Malaysia. Available from: http://www.mia.org.my/miapp/ems/upload/EDUCO130920A-Accounting%20for%20Agriculture_New%20Models%20for%20Bearer%20Plants%20&%20Produce%20Growing%20on%20Trees_2013-825.pdf [Accessed 6 September 2013].

Chebac, N. and Onica, C.M. 2009. 'Correlation between International Financial Reporting Standards and assessment in the context of market value relations – fair value', *Euro Economica*, 2(23):32-49.

Clavano, M.J. 2014. *Proceedings of Global Business and Finance research conference: Factors that influence the valuation of biological assets and compliance with IAS 41/PAS 41 mandatory disclosures by selected agricultural companies in Davao region, Melbourne, Australia, May 5-6, 2014*. ISBN: 978-1-922069-50-4.

Cosan Limited. 2012. *Annual report for the year ended 31 March 2012* [online]. Brazil. Available from: <http://ri.cosan.com.br/Default.aspx?linguagem=en> [Accessed 10 August 2015].

Cosan Limited. 2013. *Annual report for the year ended 31 March 2013* [online]. Brazil. Available from: <http://ri.cosan.com.br/Default.aspx?linguagem=en> [Accessed 10 August 2015].

Cosan Limited. 2014. *Annual report for the year ended 31 March 2014* [online]. Brazil. Available from: <http://ri.cosan.com.br/Default.aspx?linguagem=en> [Accessed 10 August 2015].

Creswell, J.W. 2003. *Research design: qualitative, quantitative and mixed methods approaches*. Second edition. London. SAGE publications.

Creswell, J.W. and Miller, D.L. 2000. 'Determining validity in qualitative inquiry', *Theory into practice*, 39(3):124-130.

Cronjé, C.J. 2013. *The communication potential of corporate annual reports of companies: towards a Dooyeweerdian approach* [online]. MPhil thesis. University of the North-West, Potchefstroom. Available from <http://uir.unisa.ac.za/handle/10500/13580> [Accessed 2 July 2014].

Da Silva, R.L.M., Nardi, P.C.C. & Ribeiro, M.D.S. 2015. 'Earnings management and valuation of biological assets', *Brazilian Business Review*, 12(4):1-26.

Deegan, C. and Unerman, J. 2011. *Financial accounting theory*. Second edition. Berkshire: McGraw-Hill.

Demir, E. 2015. 'A look at the accountancy in Turkish agriculture in terms of International Accountancy Standards', *International journal of academic research in business and social sciences*, 5(7):52-70.

Denzin, N.K. 2009. 'The elephant in the living room: or extending the conversation about the politics of evidence', *Qualitative research*, 9(2):139-160.

Department for Environment, Food and Rural Affairs (DEFRA). 2013. *Environmental reporting guidelines: including mandatory greenhouse gas emissions reporting*

guidance [online]. United Kingdom. Available from:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/206392/pb13944-env-reporting-guidance.pdf [Accessed 17 February 2016].

Distell. 2012. *Annual report for the year ended 30 June 2012* [online]. South Africa. Available from: <http://www.distell.co.za/investor-centre/> [Accessed on 5 August 2015].

Distell. 2013. *Annual report for the year ended 30 June 2013* [online]. South Africa. Available from: <http://www.distell.co.za/investor-centre/> [Accessed on 5 August 2015].

Distell. 2014. *Annual report for the year ended 30 June 2014* [online]. South Africa. Available from: <http://www.distell.co.za/investor-centre/> [Accessed on 5 August 2015].

Downsborough, L., Shackleton, C.M. & Knight, A.T. 2012. *The potential for voluntary instruments to achieve conservation planning goals: The case of conservancies in South Africa* [online]. South Africa. Available from:
<http://eprints.ru.ac.za/2420/1/The%20potential%20for%20voluntary.pdf> [Accessed 25 April 2012].

Dube, T. 2011. *Systematic corruption in public enterprises in the Harare metropolitan area: a case study* [online]. Master's dissertation in public administration. University of South Africa. Available from:
http://uir.unisa.ac.za/bitstream/handle/10500/4694/dissertation_dube_t.pdf?sequence=1 [Accessed on 3 June 2014].

Duman, H., Özpeynirci, R. & İçerli, M. 2012. 'Agricultural activities – TAS 41: Turkey example', *International journal of academic research in accounting, finance and management sciences*, 2(3):118-131.

Eastern Cape Rural Development Agency (ECRDA). 2014. Production plans. Input cost budgeting per crop variety. Unpublished.

Eksvärd, K. 2014. 'How intentions guide the application of principle in co-creating sustainable agriculture', *Journal of agricultural extension and rural development*, 6(7):311-321.

Elad, C and Herbohn, K. 2011. *Implementing fair value accounting in the agricultural sector* [online]. Scotland: Institute of Chartered Accountants of Scotland. Available from: https://icas.org.uk/res/elad_report_feb_2011.pdf [Accessed 12 July 2012].

Essendi, H. 2014. 'Perceptions of development by residents of a rural community in Kenya: A capability issue', *Journal of African studies and development*, 6(4):67-77.

Esterhuizen, D., Schutte, C. & Du Toit, A. 2012. 'A knowledge management framework to grow innovation capability maturity', *South African journal of information management*, 14(1), Art 495, 10 pages.

European Financial Reporting Advisory Group (EFRAG). 2013. *Emissions trading scheme – draft comment paper* [online]. Europe. Available from: http://www.efrag.org/files/Emissions%20Trading%20Schemes/Draft_Comment_Paper_on_Emissions_Trading_Schemes.pdf [Accessed 21 September 2013].

Explorable. 2009. *Empirical Research* [online]. Available from: <https://explorable.com/empirical-research> [Accessed 28 June 2014].

Farm Pride Foods Limited. 2012. *Annual report for the year ended 30 June 2012* [online] Australia. Available from: www.farmpride.com.au [Accessed on 4 August 2015].

Farm Pride Foods Limited. 2013. *Annual report for the year ended 30 June 2013* [online] Australia. Available from: www.farmpride.com.au [Accessed on 4 August 2015].

Farm Pride Foods Limited. 2014. *Annual report for the year ended 30 June 2014* [online] Australia. Available from: www.farmpride.com.au [Accessed on 4 August 2015].

Feleagá, L., Feleagá, N. & Ráileanu, V. 2012. 'IAS 41 implementation challenges – the case of Romania', *World academy of science, engineering and technology*, 63:415-418.

Financial Accounting Standards Board (FASB). 2006. *Statement of financial accounting standards no. 157 – fair value measurement* [online]. Norwalk. Available from: <http://www.fasb.org/cs/BlobServer?blobkey=id&blobwhere=1175823288587&blobheader=application/pdf&blobcol=urldata&blobtable=MungoBlobs> [Accessed on 3 May 2014].

Financial Accounting Standards Board (FASB). 2011. *Fair value measurement (topic 820) – amendments to achieve common fair value measurement and disclosure requirements in US GAAP and IFRS* [online]. Norwalk. Available from: <https://asc.fasb.org/imageRoot/00/7534500.pdf> [Accessed 1 March 2014].

Freeman, M., deMarrais, K., Preissle, J., Roulston, K. & St.Pierre, E.A. 2007. 'Standards of evidence in qualitative research: an incitement to discourse', *Educational researcher*, 36(1):25-32.

Gabriel, N.C. and Ștefea, P. 2013. 'International accounting standard 41 (IAS 41) – implication for reporting crop assets', *Management Agricol*, 15(3):100-105.

Global Sherpa. 2015. *Globalization, sustainable development and social impact in world rankings, countries and cities* [online]. Available from: <http://www.globalsherpa.org/bric-countries-brics> [Accessed 7 January 2015].

Gonçalves, R. and Lopes, P. 2014. *Accounting in agriculture: disclosure practices of listed firms* [online]. FEP working papers, School of economics and management.

University of Porto. Available from: <http://wps.fep.up.pt/wps/wp530.pdf> [Accessed on 3 July 2014].

Gonçalves, R. and Lopes, P. 2015. *Value-relevance of biological assets under IFRS* [online]. FEP working papers, School of economics and management. University of Porto. Available from: <http://wps.fep.up.pt/wps/wp556.pdf> [Accessed on 3 August 2015].

Grant, C. and Osanloo, A. 2014. 'Understanding, selecting and integrating a theoretical framework in dissertation research: creating the blueprint for your 'house'', *Administrative issues journal: connecting education, practice and research*, 4(2):12-26.

Grege-Staltmane, E. 2010. 'Challenges in accounting the forests – a Latvian case study', *Annals of forest research*, 53(1):51-58.

Hall, R. and Williams, G. 2000. *Land reform in South Africa: Problems and prospects* [online]. South Africa. Available from: http://www.mokoro.co.uk/files/13/file/lria/land_reform_sa_problems_and_prospects.pdf [Accessed 25 April 2013].

Hammar, A. 2010. 'Ambivalent mobilities: Zimbabwean commercial farmers in Mozambique', *Journal of Southern African Studies*, 36(2):396-416.

Harriss-White, B. 2008. 'Introduction: India's rainfed agricultural dystopia', *The European journal of development research*, 20(4):549-561.

Herbohn, K. and Herbohn, J. 2006. 'International Accounting Standard (IAS) 41: what are the implications for reporting forest assets?', *Small scale forest economics, management and policy*, 5(2):175-189.

Hofstee, E. 2010. *Constructing a good dissertation: a practical guide to finishing a master's, MBA or PhD on schedule*. Johannesburg: EPE.

Horsburgh, D. 2003. 'Evaluation of qualitative research', *Journal of clinical nursing*, 12:307-312.

Huffman, A.A. 2013. *Value relevant asset measurement and asset use: evidence from IAS 41* [online]. PhD thesis. University of Utah. Available from: http://eifrs.ifrs.org/eifrs/comment_letters/27/27_3206_AдриennaHuffmanUniversityofUtah_2_HuffmanAdriennaJobMarketPaper.pdf [Accessed on 17 June 2014].

Illovo Sugar Limited. 2012. *Annual report for the year ended 31 March 2012* [online]. South Africa. Available from: <http://www.illovosugar.co.za/Contact-Us/Sales> [Accessed 10 August 2015].

Illovo Sugar Limited. 2013. *Annual report for the year ended 31 March 2013* [online]. South Africa. Available from: <http://www.illovosugar.co.za/Contact-Us/Sales> [Accessed 10 August 2015].

Illovo Sugar Limited. 2014. *Annual report for the year ended 31 March 2014* [online]. South Africa. Available from: <http://www.illovosugar.co.za/Contact-Us/Sales> [Accessed 10 August 2015].

Illovo Sugar Limited. 2015. *Annual report for the year ended 31 March 2015* [online]. South Africa. Available from: <http://www.illovosugar.co.za/Contact-Us/Sales> [Accessed 10 August 2015].

International Accounting Standards Board (IASB). 2009a. *International Financial Reporting Standard (IFRS) for small and medium-sized entities (SMEs)* [online]. United Kingdom. Available from: <http://eifrs.iasb.org/eifrs/sme/en/IFRSforSMEs2009.pdf> [Accessed 7 September 2013].

International Accounting Standards Board (IASB). 2009b. *IFRS foundation: Training material for the IFRS for SMEs – Module 34 Specialised activities* [online]. United Kingdom. Available from: <http://www.ifrs.org/IFRS-for->

SMEs/Documents/IFRS%20for%20SMEs%20Modules/Module_34_Specialised_Activities__version%202013.pdf [Accessed 7 September 2013].

International Accounting Standards Board (IASB). 2012. *Technical summary: IAS 41 Agriculture* [online]. United Kingdom. Available from: <http://www.ifrs.org/IFRSs/Documents/English%20IAS%20and%20IFRS%20PDFs%202012/IAS%2041.pdf> [Accessed 1 September 2013].

International Accounting Standards Board (IASB). 2013a. *International Accounting Standards (IAS) 41 Agriculture* [online]. United Kingdom. Available from: <http://eifrs.ifrs.org/eifrs/bnstandards/en/2013/ias41.pdf> [Accessed 1 May 2013].

International Accounting Standards Board (IASB). 2013b. *International Financial Reporting Standards (IRFS) 13. Fair value measurement* [online]. United Kingdom: International Accounting Standards Committee Foundation. Available from: <http://www.ifrs.org/IFRSs/IFRS.htm> [Accessed 5 May 2013].

International Accounting Standards Board (IASB). 2013c. *IFRS for SMEs fact sheet* [online]. United Kingdom. Available from: <http://www.ifrs.org/IFRS-for-SMEs/Documents/Fact-Sheet/SME-Fact-Sheet-July-2013.pdf> [Accessed 18 September 2013].

International Accounting Standards Board (IASB). 2013d. *Exposure draft (ED/2013/8) Agriculture: Bearer Plants – proposed amendments to IAS 16 and IAS 41* [online]. United Kingdom. Available from: <http://kjs.mof.gov.cn/zhengwuxinxi/gongzuotongzhi/201307/P020130719334708700118.pdf> [Accessed 18 September 2013].

International Accounting Standards Board (IASB). 2013e. *Discussion paper DP/2013/1: A review of the conceptual framework for financial reporting* [online]. United Kingdom. Available from: <http://www.ifrs.org/Current-Projects/IASB-Projects/Conceptual-Framework/Discussion-Paper-July-2013/Documents/Discussion-Paper-Conceptual-Framework-July-2013.pdf> [Accessed 27 June 2014].

International Accounting Standards Board (IASB). 2014a. *Technical summary: IAS 41 Agriculture* [online]. United Kingdom. Available from:

<http://www.ifrs.org/IFRSs/Documents/Technical-summaries-2014/IAS%2041.pdf>

[Accessed 1 July 2015].

International Accounting Standards Board (IASB). 2014b. *Technical summary: IFRS 13 Fair value measurement* [online]. United Kingdom. Available from:

<http://www.ifrs.org/IFRSs/IFRS-technical-summaries/Documents/English%20Web%20Summaries%202013/IFRS%2013.pdf>

[Accessed 1 July 2015].

International Accounting Standards Board (IASB). 2014c. *International Accounting Standards (IAS) Presentation of financial statements* [online]. United Kingdom.

Available from:

<http://eifrs.ifrs.org/eifrs/PdfAlone?id=14477&sidebarOption=Unaccompaniedlas>

[Accessed on 12 January 2015].

International Accounting Standards Board (IASB). 2015. *International Accounting Standards (IAS) 41 Agriculture* [online]. United Kingdom. Available from:

<http://eifrs.ifrs.org/eifrs/bnstandards/en/2015/ias41.pdf> [Accessed 1 May 2015].

International Federation of Accountants (IFAC). 2008. *Agenda item 7 – IFAC IPSASB meeting* [online]. Austria. Available from:

<http://www.ifac.org/sites/default/files/meetings/files/4279.pdf> [Accessed on 1 May 2014].

International Financial Reporting Standard (IFRS) Foundation. 2013a. *Due process handbook* [online]. IASB and IFRS interpretations committee. London Available from:

<http://www.ifrs.org/DPOC/Documents/2013/Due-Process-Handbook-February-2013.pdf> [Accessed 10 September 2013].

International Financial Reporting Standards (IFRS) Foundation. 2013b. *IAS 41 Agriculture and IFRS 13 Fair value measurement – valuation of biological assets using a residual method* [online]. London. Available from: <http://www.ifrs.org/Meetings/MeetingDocs/Interpretations%20Committee/2013/March/AP02%20-%20IAS%2041%20IFRS%2013%20Valuation%20of%20biological%20assets.pdf> [Accessed 19 September 2013].

International Public Sector Accounting Standards Board (IPSASB). 2011. *Transition to the accrual basis of accounting: guidance for public entities* [online]. New York: International Federation of Accountants. Available from: <http://ifac.org/publications-resources/study-14-transition-accrual-basis-accounting-guidance-governments-and-governm> [Accessed 9 July 2012].

International Public Sector Accounting Standards Board (IPSASB). 2015. *Exposure draft 56, the applicability of IPSASs*. New York: International Federation of Accountants. Available from: <http://www.ifac.org/system/files/publications/files/IPSASB-Exposure-Draft-56-The-Applicability-of-IPSASs-2.pdf> [Accessed on 3 August 2015].

Jajairam, P. 2013. 'Fair value accounting vs. historical cost accounting', *Review of business information systems*, 17(1):1-6.

Johnson, R.B. and Onwuegbuzie, A.J. 2004. 'Mixed methods research: A research paradigm whose time has come', *Educational researcher*, 33(7):14-26.

Kamukasa, A. and Bintooro, K. 2014. 'Assessment of the effects of changing land use from pastoralism to crop farming on Lake Nakivale wetland system in Isingiro District, Uganda', *Journal of African studies and development*, 6(4):56-66.

Kangela Citrus Farms (Pty) Ltd. 2012. *Annual financial statements for the year ended 31 March 2012* [online]. South Africa. Available from: www.safe.co.za [Accessed on 12 August 2015].

Kangela Citrus Farms (Pty) Ltd. 2013. *Annual financial statements for the year ended 31 March 2013* [online]. South Africa. Available from: www.safe.co.za [Accessed on 12 August 2015].

Kangela Citrus Farms (Pty) Ltd. 2014. *Annual financial statements for the year ended 31 March 2014* [online]. South Africa. Available from: www.safe.co.za [Accessed on 12 August 2015].

Kangela Citrus Farms (Pty) Ltd. 2015. *Annual financial statements for the year ended 31 March 2015* [online]. South Africa. Available from: www.safe.co.za [Accessed on 12 August 2015].

Kenawy, E.M. and Elgany, M.F.K. 2009. 'Corporate governance and its potential implementation in Egypt in light of international experiences', *Journal of public administration and policy research*, 1(5):84-100.

Koopman, S.G. 2012. *The experiences of senior leaders driving large scale change in a construction company* [online]. Master's dissertation in industrial and organisational psychology. University of South Africa. Available from: <http://uir.unisa.ac.za/handle/10500/8590> [Accessed 2 July 2014].

Krug, W. 2001. 'Private supply of protected land in Southern Africa: A review of markets, approaches, barriers and issues', *Centre for social and economic research on the global environment*: 1-42.

Kurniawan, R., Mulawarman, A.D. & Kamayanti, A. 2014. 'Biological assets valuation reconstruction: a critical study of IAS 41 on agriculture accounting in Indonesian farmers', *Procedia social and behavioural sciences*, 1-8.

Lahiff, E. and Cousins, B. 2005. 'Smallholder agriculture and land reform in South Africa', *IDS Bulletin*, 36(2):127-131.

Landcorp Farming Limited. 2012. *Annual report for the year ended 30 June 2012* [online]. New Zealand. Available from: www.landcorp.co.nz [Accessed on 6 August 2015].

Landcorp Farming Limited. 2013. *Annual report for the year ended 30 June 2013* [online]. New Zealand. Available from: www.landcorp.co.nz [Accessed on 6 August 2015].

Landcorp Farming Limited. 2014. *Annual report for the year ended 30 June 2014* [online]. New Zealand. Available from: www.landcorp.co.nz [Accessed on 6 August 2015].

Landsman, W.R. 2006. *Fair value accounting for financial instruments: Some implications for bank regulation* [online]. Working paper on accounting risk management and prudential regulation. Bank of International Settlement. Basel. Switzerland. Available from: <http://www.bis.org/publ/work209.pdf> [Accessed on 3 February 2014].

Leão, H. and Ambrozini, M.A. 2014. *Measurement of fair value of biological assets: a proposal for a discount rate for cash flow models of sugarcane* [online]. University of São Paulo. Available from: <http://www.custoseagronegocioonline.com.br/numero2v10/Artigo%206%20valor%20justo%20%20english.pdf> [Accessed on 24 August 2015].

Lefter, V. and Roman, A.G. 2007. *IAS 41 Agriculture: Fair value accounting* [online]. Academy of economic studies. Bucharest. Available from: http://www.researchgate.net/publication/4903215_IAS_41_Agriculture_Fair_Value_Accounting [Accessed on 5 April 2014].

Lottering, F. and Dick, A.L. 2012. 'Integrating knowledge seeking into knowledge management models and frameworks', *SA journal of information management*, 14(1):1-9.

Macedo, D. 2012. *The fair value of forestry assets: analysis of precious woods and green resources* [online]. MSc in business administration. University of Católica Portuguesa. Available from:
<http://repositorio.ucp.pt/bitstream/10400.14/10196/1/Master%20Thesis%20Fair%20Value.pdf> [Accessed on 8 May 2014].

Maina, PN. 2010. *Fair value reporting challenges facing small and medium-sized entities in the agricultural sector in Kenya* [online]. MCom (Accounting) thesis. University of South Africa. Pretoria. Available from:
<http://uir.unisa.ac.za/handle/10500/4093> [Accessed 18 August 2011].

Malaysian Accounting Standards Board (MASB). 2013. *IASB exposure draft on agriculture: Bearer plants (proposed amendments to IAS 16 and IAS 41)* [online]. Malaysia. Available from:
http://www.masb.org.my/index.php?option=com_content&view=article&id=1850 [Accessed 16 September 2013].

Malomane, M.A. 2013. *The role of the department of agriculture, forestry and fisheries in strengthening existing second tier agricultural cooperatives in South Africa* [online]. Master's dissertation in public management. University of South Africa. Available from: <http://uir.unisa.ac.za/handle/10500/11882?show=full> [Accessed on 1 July 2014].

Maps of the world. 2015. *Top ten countries by agricultural exports* [online]. Available from: <http://www.mapsofworld.com/world-top-ten/world-top-ten-agricultural-exporters-map.html> [Accessed on 29 March 2015].

Marsh, T., Austin, S.F. & Fischer, M. 2013. 'Accounting for agriculture products: US versus IFRS GAAP', *Journal of business & economic research*, 11(2):79-88.

Mates, D. and Grosu, V. 2008. 'Evaluating and recognising biological assets and agricultural activities according to IAS 41', *Agronomie*, 51:457-462.

Mates, D., Grosu, V., Hlaciuc, E., Bostan, I., Bunget, O., Domil, A., Moraru, M. & Artene, A. 2015. 'Biological assets and the agricultural products in the context of the implementation of the IAS 41: a case study of the Romanian agro-food system', *Archives of Biological Science, Belgrade*, 67(2):705-714.

McCaslin, M.L. and Scott, K.W. 2003. 'The five-question method for framing a qualitative research study', *The qualitative report*, 8(3):447-461.

Merriam, S.B. 2002. *Introduction to qualitative research*. San Francisco, Jossey-Bass.

Mgbodille, C.C. and Onah, C.E. 2014. 'Ethical and cultural issues in accounting and finance', *Research journal of finance and accounting*, 5(6):90-95.

Mitonga-Monga, J., Coetzee, M. & Cilliers, F.V.N. 2012: 'Perceived leadership style and employee participation in a manufacturing company in the democratic republic of Congo', *African journal of business management*, 6(15):5389-5398.

Mitropolitiski, S. 2015. 'Interactive interview: A research note', *Forum: Qualitative Social Research*, 16(1):Article 8.

Mojtahed, R., Baptista Nunes, M., Tiago Martins, J. & Peng, A. 2014. 'Equipping the constructivist researcher: The combined use of semi-structured interviews and decision-making maps', *The electronic journal of business research methods*, 12(2):87-95.

Mondi Group. 2012. *Annual report for the year ended 31 December 2012* [online]. South Africa. Available from: <http://www.mondigroup.com/desktopdefault.aspx/tabid-349/> [Accessed on 4 August 2015].

Mondi Group. 2013. *Annual report for the year ended 31 December 2013* [online]. South Africa. Available from: <http://www.mondigroup.com/desktopdefault.aspx/tabid-349/> [Accessed on 4 August 2015].

Mondi Group. 2014. *Annual report for the year ended 31 December 2014* [online]. South Africa. Available from: <http://www.mondigroup.com/desktopdefault.aspx/tabid-349/> [Accessed on 4 August 2015].

Monea, A. and Cotlet, D. 2008. 'Some aspects regarding biological asset accounting', *Lucrări Științifice*, X(3):1-8.

Morse, J.M., Barrett, M., Mayan, M., Olson, K. & Spiers, J. 2002. 'Verification strategies for establishing reliability and validity in qualitative research', *International journal of qualitative methods*, 1(2):13-22.

Muhammad, K. and Ghani, E.K. 2014. 'A fair value model for bearer biological assets in promoting corporate governance: a proposal', *Journal of agricultural studies*, 2(1):16-26.

Munjanja, I. 2008. *Obstacles to determining the fair values of financial instruments in Mosambique* [online]. MCom thesis. University of South Africa, Pretoria. Available from: <http://uir.unisa.ac.za/handle/10500/1273> [Accessed 24 August 2011].

Musarat, R., Sarwar, S. & Azhar, M.S. 2014. 'Performance improvement of support staff at public sector higher education institutions (A case of IUB)', *Journal of public administration and policy research*, 6(1):1-7.

Muxanbcba, B.B. 2015. 'Quality cost accounting of products in the context of growing of the biological assets of gardening', *Technology audit and production reserves*, 6(22):abstract.

Namazi, M. 2013. 'Role of the agency theory in implementing management's control', *Journal of accounting and taxation*, 5(2):38-47.

Olugbenga, A.A. and Atanda, O.A. 2014. 'Value relevance of financial accounting information of quoted companies in Nigeria: A trend analysis', *Research journal of finance and accounting*, 5(8):86-93.

Ortmann, G.F. 2005. 'Promoting the competitiveness of South African agriculture in a dynamic economic and political environment', *Agrekon*, 44(3): 286-320.

Ossip, J.G. 2011. *The value relevance of mandatory IFRS adoption in South Africa* [online]. MCom (Accounting) mini-dissertation. University of Pretoria. South Africa. Available from: <http://upetd.up.ac.za/thesis/available/etd-11072011-100602/> [Accessed 30 September 2013].

Pasha, SA. 2011. *Call for Pakistan Public Sector Accounting Standards Board* [online]. Pakistan: ArticleBase.Com. Available from: <http://www.articlesbase.com/accounting-articles/call-for-pakistan-public-sector-accounting-standards-board-4914125.html> [Accessed 12 July 2012].

Pike, B. and Chui, L. 2012. 'An evaluation of the FASB's conceptual framework from a user's perspective', *Academy of Accounting and Financial Studies Journal*, 16(1):77-94.

Phillips, T.J., Drake, A. & Luehlfiing, M.S. 2010. 'Transparency in financial reporting: A look at rule-based versus principle-based standards', *Academy of Accounting and Financial Studies Journal*, 14(4):11-28.

Precious Woods. 2012. *Annual report for the year ended 31 December 2012* [online]. Brazil. Available from: http://www.preciouswoods.com/site/index.cfm?id_art=81171&actMenuitemID=36534&/vsprache/EN [Accessed on 4 August 2015].

Precious Woods. 2013. *Annual report for the year ended 31 December 2013* [online]. Brazil. Available from: http://www.preciouswoods.com/site/index.cfm?id_art=81171&actMenuitemID=36534&/vsprache/EN [Accessed on 4 August 2015].

Precious Woods. 2014. *Annual report for the year ended 31 December 2014* [online]. Brazil. Available from:

http://www.preciouswoods.com/site/index.cfm?id_art=81171&actMenuitemID=36534&/vsprache/EN [Accessed on 4 August 2015].

PricewaterhouseCoopers (PwC). 2009. *A practical guide to account for agricultural assets* [online]. Available from: https://www.pwc.com/gx/en/ifrs-reporting/pdf/a_practical_guide_to_accounting_for_agricultural_assets.pdf [Accessed 16 January 2016].

PricewaterhouseCoopers (PwC). 2011a. *New guidance on fair value measurement – a significant issue for the agriculture industry* [online]. Industry-specific IFRS packs. Available from: <https://inform.pwc.com/inform2/show?action=informContent&id=1131270107140059> [Accessed 14 September 2013].

PricewaterhouseCoopers (PwC). 2011b. *Emissions trading schemes – a big issue for the agriculture industry* [online]. Industry-specific IFRS packs. Available from: <https://inform.pwc.com/inform2/show?action=informContent&id=1131270107140059> [Accessed 14 September 2013].

PricewaterhouseCoopers (PwC). 2014. *IFRS adoption by country* [online]. Available from: <http://www.pwc.com/us/en/issues/ifrs-reporting/publications/ifrs-status-country.jhtml> [Accessed 2 December 2014].

RCL Foods Group. 2012. *Annual report for the year ended 30 June 2012* [online]. South Africa. Available from: www.rainbowchicken.co.za [Accessed on 4 August 2015].

RCL Foods Group. 2013. *Annual report for the year ended 30 June 2013* [online]. South Africa. Available from: www.rainbowchicken.co.za [Accessed on 4 August 2015].

RCL Foods Group. 2014. *Annual report for the year ended 30 June 2014* [online]. South Africa. Available from: www.rainbowchicken.co.za [Accessed on 4 August 2015].

Reischauer, G. 2015. 'Combining artefact analysis, interview and participant observation to study the organizational sensemaking of knowledge-based innovation', *Historical Social Research*, 40(3):279-298.

Riley, S. 2002. *IAS 41 Agriculture* [online]. Association for Chartered Certified Accountants (ACCA). Hong Kong. Available from: <http://www.accaglobal.com/en/student/dipifr/dipifr-resources/technical-articles/ias-41.html> [Accessed 17 September 2013].

Rouse, M. 2012. *Archival research of the underlying conceptual paradigm of fair value* [online]. Minor Master Commerci dissertation in international accounting, University of Johannesburg. South Africa. Available from: <https://ujdigispace.uj.ac.za/bitstream/handle/10210/7829/Rouse.pdf?sequence=1> [Accessed on 19 May 2014].

Rozenãle, S. and Ore, M. 2013. 'Evaluation of biological assets: problems and solutions', *Journal of modern accounting and auditing*, 9(1):57-67.

Sabauri, L. and Kharabadze, E. 2015. *17th International academic conference: Methods of accounting and assessment of the biological assets and agricultural products in the absence of an active market (by the International Accounting Standards)*, Vienna, June 21, 2015. ISBN 978-80-87927-10-9:349-366.

South African Fruit Exporters (SAFE) commercial Proprietary Limited. 2012. *Annual report for the year ended 31 October 2012* [online]. South Africa. Available from: www.safe.co.za [Accessed on 5 August 2015].

South African Fruit Exporters (SAFE) commercial Proprietary Limited. 2013. *Annual report for the year ended 31 October 2013* [online]. South Africa. Available from: www.safe.co.za [Accessed on 5 August 2015].

South African Fruit Exporters (SAFE) commercial Proprietary Limited. 2014. *Annual report for the year ended 31 October 2014* [online]. South Africa. Available from: www.safe.co.za [Accessed on 5 August 2015].

South African Fruit Exporters (SAFE) farm exports Proprietary Limited. 2014. *Annual report for the year ended 31 October 2014* [online]. South Africa. Available from: www.safe.co.za [Accessed on 5 August 2015].

Said, K. and Al-Tarawneh, K.I. 2013. 'Ethics and postsecondary accounting curriculum in Bahrain: Perspective from faculty members', *Journal of accounting and taxation*, 5(3):65-82.

Said, K. and Khasharmeh, H. 2014. 'Auditor's perceptions on impact of mandatory audit firm rotation on auditor independence – evidence from Bahrain', *Journal of accounting and taxation*, 6(1):1-8.

Samkin, G., Schneider, A. & Tappin, D. 2014. 'Developing a reporting and evaluation framework for biodiversity', *Accounting, auditing and accountability journal*, 27(3):527-562.

Sandelowski, M. 2000. 'Focus on research methods – whatever happened to qualitative description?', *Research in Nursing and Health*, 23:334-340.

São Martinho. 2014. *Annual report for the year ended 31 March 2014* [online] Brazil. Available from: http://ir.saomartinho.ind.br/saomartinho/web/default_en.asp?idioma=1&conta=44 [Accessed on 5 August 2015].

São Martinho. 2015. *Annual report for the year ended 31 March 2015* [online] Brazil. Available from: http://ir.saomartinho.ind.br/saomartinho/web/default_en.asp?idioma=1&conta=44 [Accessed on 5 August 2015].

Saris, W.E. and Gallhofer, I.N. 2014. *Design, evaluation and analysis of questionnaires for survey research*. Second edition. Spain. John Wiley & Sons Inc.

Schutte, D. and Buys, P. 2011. 'A critical analysis of the contents of the IFRS for SMEs – A South African perspective', *South African Journal of Economic and Management Sciences*, 14(2):188-209.

Scott, D., Wingard, C. & Van Biljon, M. 2016. 'Challenges with the financial reporting of biological assets by Public Entities in South Africa', *South African Journal of Economic and Management Sciences*, 19(1):139-149.

Seale, C. 1999. 'Quality in qualitative research', *Qualitative Inquiry*, 5(4):465-478.

Sedláček, J. 2010. 'The methods of valuation in agricultural accounting', *Agric Econ*, 56(2):59-66.

Seloane, M.P. 2010. *The relationship between transformational leadership and organisational culture* [online]. Master's dissertation in administration. University of South Africa. Available from:
http://uir.unisa.ac.za/bitstream/handle/10500/4942/thesis_seloane_m.pdf?sequence=1 [Accessed on 2 February 2014].

Sergeeva, I. 2015. 'Specifics of accounting recognition and reflection of government assistance funds for agro-industrial complex organisations', *Asian Social Science*, 11(6):144-149.

Silver Fern Farms. 2012. *Annual report for the year ended 30 September 2012* [online]. New Zealand. Available from: www.silverfernfarms.com [Accessed on 4 August 2015].

Silver Fern Farms. 2013. *Annual report for the year ended 30 September 2013* [online]. New Zealand. Available from: www.silverfernfarms.com [Accessed on 4 August 2015].

Silver Fern Farms. 2014. *Annual report for the year ended 30 September 2014* [online]. New Zealand. Available from: www.silverfernfarms.com [Accessed on 4 August 2015].

Silverman, D. 2013. *Interpreting qualitative data*. Fourth edition. London. SAGE.

Sosibo, K. 2014. *Seven facts about the Restitution of Land Rights Act* [online]. South Africa. Available from: <http://mg.co.za/article/2014-08-07-seven-facts-about-the-restitution-of-land-rights-act> [Accessed 5 January 2016].

Stonciuviene, N., Zinkeviciene, D. & Martirosianiene, L. 2015. *5th Annual International Conference on Accounting and Finance: Formation of the accounting policy for biological assets - Theoretical and analytical aspects, Singapore, June 8-9, 2015*. ISSN 2251-1997:62-70.

Sudana, P., Sukoharsona, E.G., Ludigdo, U. & Irianto, GI. 2014. 'A philosophical thought on sustainability accounting', *Research journal of finance and accounting*, 5(9):1-10.

Sun, S. and Xu, X. 2010. 'Study on the asset impairment accounting', *International journal of business and management*, 5(6):199-202.

Thani, X.C. and Wessels, J.S. 2011. 'Appropriate research methods for postgraduate research: a public administration case study', *Politeia*, 30(1);75-86.

Tongaat Hulett Limited. 2012. *Annual report for the year ended 31 March 2012* [online]. South Africa. Available from: www.huletts.co.za [Accessed on 7 August 2015].

Tongaat Hulett Limited. 2013. *Annual report for the year ended 31 March 2013* [online]. South Africa. Available from: www.huletts.co.za [Accessed on 7 August 2015].

Tongaat Hulett Limited. 2014. *Annual report for the year ended 31 March 2014* [online]. South Africa. Available from: www.huletts.co.za [Accessed on 7 August 2015].

Tongaat Hulett Limited. 2015. *Annual report for the year ended 31 March 2015* [online]. South Africa. Available from: www.huletts.co.za [Accessed on 7 August 2015].

Trafford, V. and Leshem, S. 2008. *Stepping stones to achieving your doctorate*. Berkshire & New York: Open University Press, McGraw-Hill.

Treasury Wine Estate. 2012. *Annual report for the year ended 30 June 2012* [online]. New Zealand. Available from: <https://www.tweglobal.com/> [Accessed on 5 August 2015].

Treasury Wine Estate. 2013. *Annual report for the year ended 30 June 2013* [online]. New Zealand. Available from: <https://www.tweglobal.com/> [Accessed on 5 August 2015].

Treasury Wine Estate. 2014. *Annual report for the year ended 30 June 2014* [online]. New Zealand. Available from: <https://www.tweglobal.com/> [Accessed on 5 August 2015].

Treasury Wine Estate. 2015. *Annual report for the year ended 30 June 2015* [online]. New Zealand. Available from: <https://www.tweglobal.com/> [Accessed on 5 August 2015].

Turner, D.W. 2010. 'Qualitative interview design: a practical guide for novice investigators', *The qualitative report*, 15(3):754-760.

University of Kentucky. 2015. *New crops budgets* [online]. Centre for crop diversification: College of Agriculture, Food and Environment. Kentucky. Available from: <http://www.uky.edu/Ag/NewCrops/budgets.html> [Accessed on 9 February 2016].

Van Biljon, M. 2013. *Clarifying fair value accounting challenges in the reporting of biological assets in the public sector by referring to AsgiSA-EC* [online]. M.Compt thesis. University of South Africa. Available from: <http://uir.unisa.ac.za/handle/10500/2716/browse?value=Van+Biljon%2C+Marilene&type=author> [Writer].

Van Biljon, M., Scott, D. & Wingard, H.C. 2013. *Challenges with the financial reporting of biological assets in a public entity: proceedings of the 2013 SAAA Biennial Conference, Somerset West, June 2013* [online]. South Africa. Available from: <http://www.saaa.org.za/Downloads/Publications/Challenges%20with%20the%20financial%20reporting%20of%20biological%20assets%20in%20a.pdf> [Writer].

Visagie, E. and Prasad, G. 2006. 'Renewable energy technologies for poverty alleviation in South Africa: Biodiesel and solar water heaters', *Renewable Energy Technology Working Group*, 1-27.

Vukmirovic, N., Arsenovic, D., Lalic, S. & Milovanovic, D. 2012. 'Evaluation of accounting acquisition of biological assets and property', *Third international scientific symposium, Agrosym Jahorina*, 723-727.

Williams, B. and Wilmshurst, T. 2008. *Accounting for self-generating and regeneration assets – meeting the objectives* [online]. Working paper series 3/2008. University of Tasmania school of accounting and corporate governance. Available from: http://eprints.utas.edu.au/7035/1/WilliamsWilmshurstWPS3_2008.pdf [Accessed 2 January 2014].

Whittemore, R., Chase, S.K. & Mandel, C.L. 2001. 'Validity in qualitative research', *Qualitative health research*, 11(4):522-537.

Wingard, H.C. 2001. *Financial performance of environmentally responsible South African listed companies* [online]. D.Com (accounting) thesis. University of Pretoria,

South Africa. Available from: <http://upetd.up.ac.za/thesis/available/etd-08312001-154421/> [Accessed 9 September 2013].