Biological Assets: Financial Recognition and Reporting Using US and International Accounting Guidance

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The agriculture sector is an important element of the global economy but accounting for its activities has had little attention from the accounting standard setters as most business applications focus on production, marketing or tax reporting. This study reviews and discusses current US and international accounting guidance for agricultural and biological assets. With the ongoing discussion between the FASB and the IASB regarding the adoption of international accounting standards, the study also explores the advantages and disadvantages should the US elect to adopt the international accounting guidance for agricultural activities.

INTRODUCTION

Agriculture is an important sector of the global economy and has played a key role in the development of human civilization. Yet historically agricultural activities receive little, or no, attention from the accounting standard setters. This may be the result of the economy being less dependent upon agriculture than the corporate industrial and regulated industries. Prior to the farm crisis in the 1980s (Barney 2010, 8) there was no uniform system of financial reporting for agriculture producers in the United States (US). Most business applications in agriculture were focused on production, marketing, or tax reporting rather than decision-making. In fact, many aspects of generally accepted accounting principles (GAAP) accounting guidance do not apply to, or exempt, agricultural entities.

Currently there is a mix of accounting guidance for agriculture producers in the US that is both GAAP including Financial Accounting Standards Board (FASB) Codification 905 (FASB 2009a) and non-GAAP Financial Guidelines for Agricultural Producers (FGAP 1997). Should the US adopt International Financial Reporting Standards (IFRS), this guidance would be replaced with International Accounting Standard (IAS) 41 – Agriculture (IASB 2000). This exploratory study reviews and illustrates current US and international accounting recognition and reporting for agriculture producers and biological assets. The study also discusses the advantages and disadvantages of adopting the international guidance.

US AGRICULTURE ACCOUNTING RECOGNITION AND REPORTING GUIDANCE

In the 1970s, the federal government tried to offset a growing US trade deficit caused by the OPEC oil embargo by expanding agricultural sales overseas. Subsidies to overseas purchasers via loans by the

Commodity Credit Corporation and the extension of credit to foreign governments by commercial banks contributed to a surge in US farm exports that went from $8 billion in 1971 to $43.8 billion in 1981. Farm incomes and commodity prices soared. The removal of restrictions on Federal Land Bank lending and increased lending by others led to rising farm land values. The convenient low interest rates resulted in farmers going into debt on the assumption that commodity prices and land values would continue to increase. But by the 1980s, the worldwide financial community realized that debtor nations could not repay their loans unless they drastically reduced imports, and the gushing tap of credit was shut off (Ball and Beatty 1984). This action resulted in an agriculture crisis and the debt situation got the attention of accounting and reporting guidance setters (Harl 1990; Barney 2010). At that time existing accounting literature did not specifically cover accounting recognition and reporting by agricultural producers and any available guidance material was predominantly tax oriented.

In response to the farm crisis and to provide a consistent accounting and reporting format for agricultural activities, the American Institute of Certified Public Accountants (AICPA) used Accounting Research Bulletin (ARB) No. 43 (AICPA 1953) to develop the Statement of Position (SOP) 85-3 (AICPA 1985) guidance for accounting by agricultural producers and cooperatives for inventory, development costs and product delivery. The SOP defined agricultural producers as farmers and ranchers, who raise crops or seedlings, breed livestock, or feed livestock for preparation of production or slaughter. The SOP defined cooperatives as a group of producers who joined together to process, prepare for market and/or market the agricultural commodities. The Statement did not apply to growers of timber or commodities produced in tropical regions. The Statement also did not apply to animal production for competitive sports such as horse racing or polo.

The guidance was well received by agriculture producers in all forms of business, from sole proprietorship family farms to publicly held corporations like Tyson Food and Pilgrim's Pride. Agricultural reporting consistency became expected rather than the exception.

US Agricultural GAAP Guidance

Today's agriculture recognition and reporting guidance GAAP is governed by FASB Codification Topic 905 (FASB 2009a). Although FASB did not issue a specific accounting standard for agriculture activities prior to the Codification, two standards were considered GAAP guidance in addition to SOP 85-3. Those two standards were SFAS No. 144 *Accounting for the Impairment or Disposal of Long-lived Assets* (FASB 2001) and SFAS No. 157 *Fair Value Measurements* (FASB 2006). When the Codification was developed to supersede the FASB Standards and other GAAP Guidance, FASB included Codification Topic 905 Agriculture based upon SOP 85-3 guidance that became the highest level GAAP (FASB 2009a).

FASB Codification Topic 905 Agriculture presents an overview, scope, glossary, and other background material for each subtopic guidance, but does not provide any historical background, due process discussion, illustrations for other than cooperatives, or a summary of the accounting and reporting requirements. The subtopics within Topic 905 include information on financial statements, receivables, investments, inventory, fixed assets, liabilities, equity, revenue recognition, and cost of sales.

The more informative sections within the Topic coverage are the inventory and fixed assets Subtopic sections. These two sections identify guidance on whether agriculture assets are treated as goods for sale or as long-lived assets. The guidance provides recognition criteria that can result in reporting dilemmas. The following are specific US agricultural GAAP guidance for reporting inventory that create concerns.

Developing Animals

All direct and indirect costs of developing animals shall be accumulated until the animals reach maturity and are transferred to a productive function. All direct and indirect development costs of animals raised for sale shall be accumulated, and the animals shall be accounted for at the lower of cost or market (LCM) until they are available for sale. This guidance creates problems due to the inconsistent determination of when an animal reaches maturity. Is it based on age, weight, ability to reproduce? All of these criteria are used inconsistently as the determination.

Animals Available and Held for Sale

Agricultural producers shall report animals available and held for sale either:

a. At the lower of cost or market (LCM)
b. In accordance with established industry practice at sales price, less estimated costs of disposal, if all of the following conditions exist:
    1. There are reliable, readily determinable, and realizable market prices for the animals;
    2. The costs of disposal are relatively insignificant and predictable; and
    3. The animals are available for immediate delivery (FASB 2009a).

FASB requires producers to record assets at LCM until they are available to sale. The question becomes what value would a producer assign to a newborn animal. According to the Codification, the value would be LCM since the animal was born on the property. What costs are associated with the infant animal at this point of the cycle? At the time of birth, the cost of feed and boarding would be allocated to the mother animal that produced the newborn. Thus, the assigned value using LCM value to a newborn would be zero. For the first 3 to 10 months of an infant's life cycle, the newborn only requires the mother's milk and the only cost allocated to the newborn would only be the boarding. This presents a valuation issue as GAAP Codification 905 guidance recognizes 3 month old calves at zero on the balance sheet when in the Western US cattle producing area 3 to 6 month old calves have a fair market value of $200 to $300 or higher (www.decaturlivestockmarket.com).

Under US Codification 905 GAAP requirements, most agriculture assets are valued at LCM value. However, exceptional cases exist in which it is not practicable to determine an appropriate cost basis for the product. A market basis is acceptable if the product meets all of the following criteria:

a. They have immediate marketability at quoted market prices that cannot be influenced by the producer;
b. They have characteristics of unit interchangeability; and
c. They have relatively insignificant costs of disposal.

The accounting basis of those inventories is their realizable value, calculated on the basis of quoted market prices less estimated direct costs of disposal. An example is freshly dressed carcass produced in a meat packing operation (FASB 2009a).

If the agricultural product or animals is classified as available for sale, the Codification allows producers to use a fair market value approach rather than the inventory classification using a LCM approach of recognition. Producers wanting higher depreciation expense and lower taxable income may feel the need to reclassify the financial statements and recognize cattle as held available for sale. This causes problems for the financial statement user determining whether the producer is reporting products as available for sale to increase the reporting value, or whether the assets are actually for sale.

At the point that breeding and production animals reach maturity, any accumulated development costs less any estimated salvage value, must be depreciated over the animals' estimated productive life (FASB 2009a). Immature animals are not considered to be in service until they reach maturity, at which time their accumulated costs become subject to depreciation (FASB 2009a). This guidance presents a problem for animal producers as to when to classify the animal as mature. For example, a female calf is raised until it reaches appropriate breeding weight at about 15 months. They are then referred to as heifers that are maintained and continue to grow through their pregnancy (gestation). The heifer usually give birth at about 24 months of age. However according to environmental standards and definitions, they do not reach maturity until at least 4 years of age (EPA 2012). The question becomes, what is the LCM value for the animal that can be sold at a livestock market for a range from $600 to $1300 (Hanawalt 2007; Decatur Livestock Market 2012). This dilemma is intensified by Codification 905 guidance that allows growers to capitalize and depreciate accumulated costs only on production animals.

Multiple Products

Some production animals produce more than one product. For example, sheep produce lambs, wool, and meat; dairy cattle produce milk, calves, and meat. The primary products are lambs and milk, whereas the secondary products are typically wool and calves. Costs may be allocated as either joint products or by-products depending on the estimated relative values of each. In most instances the meat, or slaughter value, of the production animal is considered salvage. The accounting recognition is determined by the amounts anticipated to be received for each product. These amounts are significantly affected by the breeding, production, and marketing practices of the producer which impacts comparability of financial data among producers.

Disclosure

Given the valuation issues, US agriculture accounting recognition and reporting can be complex but unfortunately the financial statement user is not provided any extensive information for decision making. For example, the Tyson Food 2011 Financial Report includes the following note disclosure to explain the company's accounting and recognition for agricultural products and processes included in the inventory amount shown among the assets on the company's balance sheet for fiscal year 2011.

EXHIBIT 1
TYSON FOOD
2011 FINANCIAL REPORT DISCLOSURE

Inventories: Processed products, livestock and supplies and other are valued at the lower of cost or market. Cost includes purchased raw materials, live purchase costs, grow out costs (primarily feed, contract grower pay and catch and haul costs), labor and manufacturing and production overhead, which are related to the purchase and production of inventories.

		in millions
	2011	2010
Processed products:		
Weighted-average method – chicken and prepared	$715	$721
First-in, first-out method – beef and pork	581	462
Livestock – first-in, first-out method	928	759
Supplies and other – weighted-average method	363	332
Total inventory	$2,587	$2,274

None of Tyson's production livestock or products was reported in the property, plant and equipment note disclosure (Tyson Foods 2011, 43).

Another more illustrative example is found in the Willamette Valley Vineyard Inc. 2010 significant accounting policy notes to the annual financial report (www.wvv.com, 30) that describes in detail the subsequent Note 3 disclosure with details of the inventory amount shown on the company's balance sheet.

EXHIBIT 2
WILLAMETTE VALLEY VINEYARD INC
2012 FINANCIAL REPORT DISCLOSURE

3. Inventories: Inventories consist of:

	2009	2008
Winemaking and packaging materials	$ 336,813	$ 309,467
Work-in-process (costs relating to unprocessed and/or unbottled wine products)	3,068,934	3,350,830
Finished goods (bottled wine and related products)	8,763,660	6,943,907
Current inventories	$ 12,169,407	$ 10,604,204

Inventories

For Company produced wines, after a portion of the vineyard becomes commercially productive, the annual crop and production costs relating to such portion are recognized as work-in-process inventories. Such costs are accumulated with related direct and indirect harvest, wine processing and production costs, and are transferred to finished goods inventories when the wine is produced, bottled, and ready for sale. For purchased wines distributed through the Company's in-state distribution division, Bacchus Fine Wines, the supplier invoiced costs of the wine, including freight, are recognized into finished goods inventories at the point of receipt.

The cost of finished goods is recognized as cost of sales when the wine product is sold. Inventories are stated at the lower of first-in, first-out ("FIFO") cost or market by variety. Bacchus inventory is accounted for on a separate accounting system which calculates average invoice cost on the purchased brands. The average cost for the Bacchus inventory approximates FIFO in all material respects.

In accordance with general practices in the wine industry, wine inventories are generally included in current assets in the accompanying balance sheet, although a portion of such inventories may be aged for more than one year (Note 3 page 54).

Vineyard Development Costs

Vineyard development costs consist primarily of the costs of the vines and expenditures related to labor and materials to prepare the land and construct vine trellises. The costs are capitalized until the vineyard becomes commercially productive, at which time annual amortization is recognized using the straight-line method over the estimated economic useful life of the vineyard, which is estimated to be 30 years. Accumulated amortization of vineyard development costs aggregated $657,934 and $587,199 at December 31, 2009 and 2008, respectively.

Amortization of vineyard development costs are included in capitalized crop costs that in turn are included in inventory costs and ultimately become a component of cost of goods sold. For the year ending December 31, 2009 and 2008, approximately $70,735 and $68,136, respectively, was amortized into inventory costs.

Both Exhibit 1 and Exhibit 2 illustrate agricultural activities that meet the GAAP reporting requirements of Codification 905 as both companies' annual financial reports received clean audit opinions from their auditors. The financial report is management's responsibility and management elected to be as brief as possible which gives rise to the observation that US financial reporting transparency is not well defined (Barth and Schipper 2008; Schipper 2007).

US AGRICULTURE NONGAAP GUIDANCE

The 1980 farm crisis also led to the 1989 creation of an industry non-profit organization, Farm Financial Standards Council (FFSC), consisting of professionals representing agricultural producer groups, banking, the Farm Credit System, accounting, insurance companies, financial advisors, agribusiness companies, academics and universities, private finance companies, cooperative extension, and other experts involved with agricultural production and finance. The Council's goals are to provide a national forum for developing standards and implementation guidelines for preparers and users of agricultural financial information that promotes uniformity and integrity. In 1997, the council released a non-GAAP Financial Guidelines for Agricultural Producers (FGAP).

Although the FASB did not participate in creating the guidelines, they did allow the use of detailed citations within the FGAP to explicitly illustrate where the FGAP deviated from GAAP. The FGAP is set of guidelines on how to present farm information fairly when preparing information for the use of agricultural lenders and investors. There are seven significant differences between GAAP and FGAP. Those seven differences are the following.

1. Market valuation of assets.

   GAAP requires that cost less accumulated depreciation (book value) be reported on the balance sheet for most assets. FGAP recommends that market values for most assets be shown on the face of the balance sheet. Book values alone are acceptable, but for analytical purposes, the FFSC recommends that both book values and market values be presented.

2. Valuation of Raised Breeding Livestock.

   GAAP requires full cost absorption for assets such as raised breeding livestock. FGAP recognizes full cost absorption as an acceptable method for valuation of raised breeding livestock but also allows the base value approach.

3. Valuation of inventory (other than raised breeding livestock).

   These inventory items include livestock raised or purchased for sale, crops purchased for use or sale, and crops raised for use or sale. The LCM rule required for inventory according to GAAP is recommended in FGAP for crops purchased for use. LCM is the preferred method for crops purchased for sale, crops raised for use, and livestock purchased for sale but an alternative method is also allowed for these categories. Crops raised for sale and livestock raised for sale should be valued according to net realizable value according to FGAP.

4. Combined Financial Statements.

   In certain circumstances, FGAP recognizes the need to combine farm business assets, liabilities, and equity with personal assets, liabilities, and equity. In those situations, accounts are maintained and financial statements are prepared with personal items included.

5. Accrual-adjusted Income Statements.

   GAAP requires accrual accounting for all accounts. FGAP recommends a modified cash-basis system which utilizes cash-basis accounting and certain accrual adjustments at year-end so that accrual-adjusted net income is reported in the income statement.

6. Deferred Taxes.

   FGAP recommends an alternate calculation for deferred taxes from the GAAP requirement – by requiring market value and the accrual adjustments. In sole proprietorships and partnerships, income tax expense is a personal expense and may, or may not, be shown on the farm financial statements, depending on whether personal items are included in the financial statements.

7. Income statement format.

   FGAP recognizes two formats for the income statement. The Gross Revenue format resembles formats used in practice by non-agricultural business. The Value of Farm Product (VFP) format contains a section similar to, but not exactly the same, as the Cost of Goods Sold section found on some income statements.

The Farm Financial Standards Council also produces the *Management Accounting Guidelines for Agricultural Producers* (2012) that is subject to ongoing updating and reviews for the continual monitoring of financial issues that are relevant to agriculture. These guidelines include 21 financial ratios and measures that specifically address farm management and are available at www.ffsc.org.

With the increasing adoption of the IFRS worldwide, there is interest in the adoption of IFRS in the US. Advocates of the adoption suggest that a single set of accounting standards would benefit all participants in the capital markets and enable investors to compare and translate financial results more easily. While the FASB and International Accounting Standards Board (IASB) conceptual frameworks are quite similar, evasive differences may cause differences in financial reports produced using IFRS (Plumlee 2010). A not so subtle difference between the IFRS and US accounting recognition and reporting would be the accounting guidance for agriculture products and assets.

INTERNATIONAL ACCOUNTING STANDARD – IAS 41 AGRICULTURE

An international standard dedicated exclusively to agriculture was issued in 2000, IAS 41 Agriculture (IASB 2000). The guidance applies to biological assets, agricultural produce at the point of harvest, and government grants received for agriculture activities.

IAS 41 makes a distinction between biological assets and agricultural produce. The guidance does not apply to agricultural related land or intangible assets as these items are covered by other accounting guidance. IAS 41 also does not apply to the products after harvest. For example, the guidance addresses the planting and caring for coffee trees together with the harvesting of the coffee beans. However, processing the beans into coffee powder is excluded as this processed product is considered inventory.

The following table displays items included and excluded from the IAS 41 guidance.

TABLE 1
ASSETS AND PRODUCTS INCLUDED IN IAS 41 GUIDANCE

Included	Included	Excluded
Biological assets	**Products**	**Products resulting from processing after harvest**
Sheep	Wool	Yarn, threads, carpets
Plantation trees	Felled trees i.e., Logs	Boards, plywood, rubber
Plants and shrubs	Cotton	Threads, cloth
	Sugar cane	Sugar, molasses
	Leaves	Tea, tobacco
Dairy cows	Milk	Ice cream, cheese
Stocker animals	Calves, carcasses	Steak, hamburger
Pigs	Carcasses	Sausages, cured ham, bacon
Chickens and turkeys	Eggs, carcasses	Meat for consumption
Vines	Grapes	Wine
Fruit trees	Picked fruit	Processed fruits

The standard introduces a model of fair value to agricultural accounting in contrast to prior reporting that used the historical cost basis. IAS 41 defines fair value as the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's length transaction (IASB 2000). This differs from the US GAAP Accounting Standard Codification (ASC) 820 fair value definition. ASC 820 defines fair value as the price that would be received to sell the asset or amount paid to transfer a liability in an orderly transaction between market participants at the measurement date (FASB 2009b). IASB resolved the difference by revising IFRS 13 standard on fair value measurement

and disclosure effective January 2013 (IASB 2011). The revised guidance embraces the ASC 820 exit price definition for measuring fair value.

Researchers that study using fair value measurement in agriculture financial reporting argue that the valuation change will create negative issues for the agriculture sector (Argiles et al. 2011). However, according to Barth et al. (2001) and Landsman (2007), research provides a conclusion that fair value-based information is more relevant than historical cost-based information.

The literature contains extensive studies that analyze the impact of implementing IAS 41 in various countries and industries (Arigles and Solf 2001; Booth and Walker 2001; Elad 2004; Elad and Harbohn 2011; Lefter and Roman 2007; Mates and Grosu 2008; PriceWaterhouseCoopers 2009). An issue highlighted in the research is that IAS 41 has generalized fair value measurement for all biological assets even though not all assets appreciate and are ultimately sold which can result in misleading financial statement information. Another issue is the lack of a systematic system of determining fair value which can lead to differences in earning quality in the agriculture sector (Aryanto 2011).

IAS 41 guidance deals with the recognition and recording of the transformation of biological assets that include any living plant or animal. Biological transformation is defined as the process of growth, aging, production, or procreation of the biological asset. Recognition of biological assets occur when the organization controls the assets as the results of a prior activity; future economic benefits are probable; and the asset fair value or cost can be measured.

Inherent within the guidance are several problems including the revenue recognition and income measurement, accretion, income statement format, and international comparability.

IAS 41 Concerns

Revenue Recognition and Income Measurement

The first problem with the guidance is revenue recognition and income measurement. IAS 41 Section 7 emphasizes that biological transformation leads to the following results:

- Modifications of the asset through growth by increasing the quantity or improving the quality.
- Degeneration of the asset by decreasing quantity or deteriorating the quality.
- Reproduction of the asset by creating additional living animals and plants.
- Obtaining new agricultural products such as latex, tea, wool or milk.

In this context, biological transformation comprises the processes of growth, degeneration, production, and procreation that cause qualitative or quantitative changes in a biological asset. When biological assets are sold the physical changes that have happened to the assets are to be valued at fair value. This fair value calculation is to be used in the income statement when the asset is sold. If fair value cannot be determined then a like asset or the most recent market price is used to determine fair value.

According to IAS 41 Section 18, the determination of the fair value should be based on the following points, without any prescribed hierarchy.

- The most recent market prices of some similar assets, providing that since then no relevant modification of the economic circumstances took place;
- The market prices for similar assets, the difference being treated through adjustments;
- Branch standards, where the value is determined through recalculated production measures, such as the value of the cattle expressed as kilograms of meat.

If fair value cannot be determined using any of those criteria then present value of future cash flows may be used.

These criteria lead to inconsistent valuation within and among countries and industries. Without extensive disclosures, financial information transparency is not available (Elad and Harbohn 2011).

Accretion

The most controversial part of IAS 41 is the requirement that increments or decrements in the fair value of biological assets, less estimated point-of-sale costs, be recognized as revenues or expenses in the income statement for the financial year in which the accretion (increments or decrements) occurs. That is, revenues are recognized during the growth or maturation of the agricultural products rather than when the product is sold.

Biological assets may be sold at any time during their growth. For example, sheep or goats can be sold any time at any age at a given market prices. However, older sheep or goats typically have higher market prices. Another example is older teak trees that command a higher price than saplings. Under the accretion concept, the asset's economic benefit increases during the accounting period and revenue is recognized without having to be realized based on the premise that realization is certain and only a matter of time before activation.

Professional accounting bodies have openly defied accretion because most believe that being able to recognize profits before the assets are sold is not prudent (Elad 2004) and that the recognition leads to earnings volatility. There is also a concern about the tax implications of being able to recognize accretion as it seems that the recognition will provide incorrect and inconsistent information for financial reports (Elad and Herbohn 2011).

Income Statement Format

IAS 41 does not specify whether it prefers the *by nature* or a *by function* approach. Components within the income statement may be presented by the function performed i.e., production, administration or distribution costs, or by the nature of the expense i.e., wages, raw materials or depreciation. The *by nature* approach reports only total cost for each item of expense as opposed to the components of the costs that relate to a specific product or cost center. Thus unlike the *by function* approach, the *by nature* approach does not allow the disclosure of cost of goods sold. Many believe this avoids conflict with IAS 1 (IASB 2009) which permits two income statement formats of a combined comprehensive income presentation or two separate statements, i.e., basic operating income statement and separate comprehensive statement that combines operating and nonoperating activities.

The inclusion of unrealized gains and losses of biological transformation in the income statement using the *by nature* approach can result in earnings volatility. IAS 41 has other issues with the *by nature* approach because it has some linguistic issues. For example, in France the term gross profit has a different meaning as it only relates to the margin on goods purchased from external resources for resale (Mates and Grosu 2008). It does not relate to the internal production of the company as it does in many other countries. Intermediate consumption is another word that has several meaning in different countries. The United Nations Statistics Division System of National Accounts (SNA 2012) defines intermediate consumption as the value of the goods and services consumed as inputs by a process of production, excluding fixed assets whose consumption is recorded as consumption of fixed capital. In France, intermediate consumption refers to the recognition of value added (Elad and Herbohn 2011).

Interviews of international agricultural company representatives find that IAS 41 reporting demands a lot of extra work. This highlights the auditor's role in policing the application of the accretion recognition which in some cases result in disagreements between the auditor and management (Aryanto 2011, Elad and Herbohn 2011). One of the more positive things about IAS 41 is it should resolve the problem of heterogeneity in valuation. This problem should be resolved because both measures of sold and unsold production are based on fair value. *Comparability due to International Diversities*

Another IAS 41 concern is the international diversities in regards to income measurement and financial reporting. Several countries and sectors have their own special versions of the agricultural guidance which make uniformity difficult if not impossible. One important argument in support of IAS 41 where there is a good market for biological assets, fair market accounting can be more efficient than historic-cost accounting. However, there are major impediments that may be adverse in promoting the goal of international accounting. A major issue that could begin the demise of other models used by developing nations is the reliability of attaining the fair market value of biological assets. For example, in

some tropical countries the fair value determined by the market authorities does not reflect the fair value of commodities such as coffee, tea, banana and cocoa. Not everyone accepts that the world market price (fair value) of these plantation crops is a price that fully reflects their value (Aryanto 2011).

The revaluation of biological assets on an annual basis is also an area of concern as this could prove costly and time consuming as well as creating inconsistencies in terms of associated holding gains or losses. And then there are the issues that relate to the implementation of IAS 41. In terms of the forestry industry in tropical countries, IAS 41 would be difficult to carry out where vast expanses of primary forest exist instead of commercial tree plantations (Jansson and Fagerstrom 2011).

US AND INTERNATIONAL AGRICULTURAL REPORTING DIFFERENCES

The main difference between current US agricultural reporting and IAS 41 is reporting the fair value for agricultural assets and products as inventory. US GAAP allows the option for an entity to disclose their property, plant and equipment assets, biological assets included, at fair value. However, once elected, the entity may not revert to reporting historical cost values. Historical cost values are widely used because of the difficulty in determining a fair value of biological assets, as many may not have a liquid market, or may be valued lower than the historical cost. FGAP (nonGAAP guidance) encourages the use of fair value reporting for purchased biological assets. Neither US GAAP or nonGAAP guidance allows accretion valuation for locally produced agricultural products. This contrasts to IAS 41 that requires the use of fair value reporting for purchased as well as produced biological assets. The use of fair value reporting has invoked a mixed response from the users of financial statements of agricultural producers.

Agricultural Fair Value Recognition Advantages

Miller and Bahnson (2009) propose a valid argument for the use of fair value reporting of agriculture as directed in IAS 41. They contend that US agricultural producers issue meaningless financial statements based on GAAP or other comprehensive basis of accounting such as the tax basis. The entity then provides financial information on an estimate current value of the assets, liabilities and equity as supplemental information. Both presentations include disclaimers that precipitate questions from lenders and auditors about the information. Using fair value as a basis for the financial information valuation resolves the reporting inconsistency as the current financial statement information has little connection with reality (Miller and Bahnson 2009, 17).

Miller and Bahnson (2009) also argue that agriculture could be considered a specialized industry with its own misnomers and quirks but fair value recognition would be beneficial. For example, a rancher buys a cattle herd for $100,000 that is expected to have a ten years life with little or no value at the end of that period. The rancher depreciates the herd using an accelerated method, such as the double-declining method. At the end of the second year, the rancher needs to borrow money and wants to pledge the cattle herd as collateral. The market value of the cattle is about $95,000. However, since the rancher uses an accelerated method of depreciation, the depreciated book value is only $64,000.[1] Without tracking the fair value of the cattle, the rancher would not be able to acquire the capital needed using the cattle as collateral for the loan.

Agricultural Fair Value Reporting Disadvantages

Under IAS 41 biological assets are no longer recognized as depreciable property and are revalued at each balance sheet date and presented at the fair market value at the balance sheet date. Regular assets, such as property, plant, and equipment, have the option to be reported at fair value, but it is not mandatory (IASB 2003). A gain or loss resulting from these fair value valuations flow through the profit or loss of the company to the company's income statement unlike US guidance that continues to recognize biological assets as depreciable property assets.

Michael St. Clair George (2007), the managing director of SIPEF SA, a Belgian plantation company that is traded publicly on the Brussels-Euronext exchange, makes an argument against fair value reporting for biological assets under IAS 41 guidance. He argues that the biological assets, specifically trees, are

assets that clearly bear the features of a revenue-earning asset. Prior to IAS 41, industry practice booked the trees at their historical cost, capitalized any costs to put the trees in service (plant), and depreciated the trees over their useful life. At the end of their useful life, the trees would be felled (cut down) and re-planted, starting the cycle over. The industry practice used prior to IAS 41 was concrete. The method was verifiable, auditable, and understandable. The use of fair value to report the value of SIPEF's biological assets, in George's opinion, has deviated away from fundamental accounting principles and created financial statements that rely on too many estimates and opinions. George argues that in place of actual historical costs, we now have the malleable notion of fair value, which is often a matter of opinion rather than hard evidence. This undermines accounting information, makes it difficult to express an audit opinion, causes confusion, fertilizes litigation, and is a clarion call to white-collar crooks (George 2007, 80).

Another disadvantage of fair value recognition comes from the changes in realized value of the biological asset passing through profit and loss and ending up on the income statement. The application of IAS 41 could result in very substantial unrealized gains and losses passing through the new income to produce a completely false idea of results that could encourage a dividend at odds with the cash flow needed to support the disbursement (George 2007, 81).

Other accountants and auditors believe that the requirement to value biological assets at fair value is unduly burdensome (Elad and Herbohn 2011, 88) and will lead to the continued use of historical cost and a variety of proxies for fair value. Thus, fair value recognition is unlikely to enhance comparability of agricultural accounting and disclosure practices.

US Versus International Disclosures

Although the current US biological asset disclosure displayed on earlier on pages is brief and lacks transparency, the biological asset disclosure under international guidance, should the US embrace the international guidance, could be a major improvement. Appendix A includes selected items from the 2012 Crookes Brothers Limited Integrated Annual Report (CBL 2012). The selected items include the accounting policies disclosures (page 52), and Note 12 pertaining to biological assets (p 68). Crookes Brothers is a large publicly traded farming corporation located in Johannesburg South Africa that employs the international IFRS guidance for financial reporting that received a clean audit opinion from Deloitte & Touche.

A comparison of the Crookes Brothers information (CBL 2012) and that of Tyson Food or Willamette Valley Vineyards material discussed in the disclosure section of the current US GAAP guidance, finds a significant difference between the inventory (US) and the biological asset (IFRS) method of explaining biological assets valuation. The Tyson US GAAP disclosure provides little information about the specific component of the processed products or the livestock. Crookes' disclosure Note 12 has detailed information pertaining to their growing crops (bananas, sugar cane, and fruit) and livestock (sheep and crocodiles). Given the information in the Crookes disclosure, the information provided to the financial statement user contains far more transparency and analysis usefulness.

Should the US embrace IFRS recognition and reporting guidance, the following is an example of the disclosure that US entities would use to convey the adjustments of the historical cost to fair value required by IAS 41.

TABLE 2
DISCLOSURE OF INCOME STATEMENT RESTATEMENT
(in thousand $s)

	Current Year			Prior Year		
	Before	Adj	Reported Amount	Before	Adj	Reported amount
Revenue	237,829		237.829	279,402		279,402
Cost of gold sold	-148,134	2,762	-145,372	-187,174	2,122	-185,052
Gross Profit	**89,695**	**2,762**	**92,457**	**92,228**	**2,122**	**94,350**
Biological asset valuation		19,209	19,209		22,812	22,812
Production costs (net)		-13,208	-13,208		-17,646	-17,646
General and administration	-17,814		-17,814	-20,156		-20,156
Other operating revenue	2,027		2,027	1,994		1,994
Operating results	**73,908**	**8,763**	**82,671**	**74,066**	**7,288**	**81,354**

Given the information in Appendix A and Table 2, information available to the financial statement reader would be greatly expanded if IAS 41 were adopted by US agriculture producers.

CONCLUSION

The agriculture sector is an important element of the global economy. This exploratory study finds that there are systematic differences between the US GAAP and International accounting and reporting for agricultural assets and products. The study also finds that international and US agricultural accounting recognition and reporting guidance results in dissimilar reporting due to guidance interpretation. IAS 41 is an effort to improve comparability of agricultural companies' financial statement. However, valuation variances and definition differences including the requirement to change the agricultural asset recognition method from historical cost to fair value continue to be the basis of major reporting differences.

Nobes and Parker (2010) observe that the different versions of IFRS practices have emerged in the last few years and are a new concern of comparative international accounting. Elad and Herbohn (2011) support the observation as they find that the variety of biological asset valuation methods is an impediment to comparability of practices within and cross countries and sectors. In fact, they found companies that operate in the same region use fundamentally different methods under IAS 41 for valuing the same type of biological asset. An example is the fair value method used in valuing tropical plantation such as tea, rubber and oil palm that involve many subjective estimates and assumptions. This concern is shared by George (2007) who professes that his company's, SIPEF, financial reports (2011) and results are nonsense thanks to the fire value valuations.

Even with these observations of agricultural reporting disadvantages, IAS 41 required disclosures do provide greater information for the financial statement user than do the disclosures provided by US agricultural producers. As the US continues to ponder the adoption of international reporting guidance, the FASB (2012) has issued an Invitation to Comment regarding its *Disclosure Framework* that asks for input on ways to improve effectiveness of financial statement notes disclosures. The study of disclosure framework together with its recommendations is not expected to conclude until 2015.

Current US GAAP guidance on recognizing and reporting agricultural assets is more conservative than the international guidance. US GAAP requires long-term agricultural assets to be reported at LCM which is hard to determine since agricultural assets go through many development stages and every stage has a different market value. Plus the recognition requirement includes a time provision on maturity

determination that can be as much as 24 months. Once maturity has been achieved, the reporting guidance allows productive agricultural assets to be displayed as inventory and those assets available for sale to be displayed at market value. Overall, the US agricultural recognition and reporting guidance contains less information and is therefore less beneficial to financial statement users.

Should the US decide to embrace the international agricultural guidance included in IAS 41 and given the volatility of fair value pricing of commodities that makes financial statements less comparable, the US should condorse rather than adopt the agricultural guidance. Condorsement would allow FASB to fix the problem for US agricultural producers by requiring a combination of historical-capitalized costs disclosure together with the fair value valuation details presented in the notes for enhanced transparency while the fair value amount is displayed on the face of the statement of financial position.

There are many different methods of accounting for agriculture throughout the industry today which present an opportunity for further research in this area. Exploring a longitudinal assessment of annual report disclosure practices of agricultural producers in countries that have adopted IAS 41 guidance would be worthwhile to track comparability and differences as well as transparency. A study of agricultural companies' perceptions of the utilization of international agricultural guidance together with the evolution of the changes over time would be insightful for future accounting standard setters.

ENDNOTE

1. Calculation for depreciation, using double declining method of calculation:

Year	Book Value	DD Rate	Depreciation Expense	Acc. Depreciation
1	100,000	20%	20,000	20,000
2	80,000	20%	16,000	36,000
3	64,000	20%	12,800	48,800
4	51,200	20%	10,240	59,040

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APPENDIX A

Selected Pages from the Crookes Brothers Limited Integrated 2012 Annual Report

Notes to the financial statements
for the year ended 31 March 2012

CRITICAL ACCOUNTING JUDGEMENTS AND KEY SOURCES OF ESTIMATION UNCERTAINTY

Critical accounting judgements made by management

In the process of applying the group's accounting policies, management has made the following judgements, apart from those involving estimations, that affect the amounts recognised in the financial statements and related disclosures:

- **Impairment of assets**
  In making its judgement, management has assessed at each reporting date whether there is an indication that items of property, plant and equipment and other assets may be impaired. If such an indication exists, the recoverable amount of the asset is assessed in order to determine the extent of the impairment loss, if any. The recoverable amount is the higher of fair value less costs to sell and value in use.

Key sources of estimation uncertainty

In the process of applying the group's accounting policies, management has made the following key assumptions concerning the future and other key sources of estimation uncertainty at the reporting date:

- **Biological asset valuations**
  The accounting policy is detailed above in this report and the assumptions that have been used to determine the fair value of the consumable biological assets are detailed in note 12 to the financial statements.
- **Property, plant and equipment residual values and useful lives**
  Assets are written down to their estimated residual values over their anticipated useful lives using the straight-line basis. Management reviews the residual values annually, considering market conditions and projected disposal values. In assessing useful lives, technological innovations are considered. The carrying value of property, plant and equipment is disclosed in note 11 to the financial statements.
- **Post-employment benefit obligations**
  The key assumptions are provided in note 24 to the financial statements.

There are no other key assumptions concerning the future, or key sources of estimation uncertainty at the reporting date, that management has assessed as having a significant risk of causing material adjustments to the carrying amounts of the assets and liabilities within the next financial year.

BIOLOGICAL ASSETS – OWNED BY THE GROUP

Biological assets are measured at fair value on initial recognition and at each period end date at their fair values. Any change in value is included in the net profit or loss for the period in which it arises, as more fully set out below:

Growing crops and orchards

Growing crops and orchards comprise two elements:

- Bearer biological assets – sugar cane roots, deciduous trees and banana plants
- Consumable biological assets – standing sugar cane, deciduous fruit, bananas, wheat and barley

Bearer biological assets are valued at fair value based on the current replacement cost of planting and establishment, subsequently reduced in value over the period of their productive lives.

Consumable biological assets are measured at their fair value, determined on current estimated market prices less estimated harvesting, transport, packing and point-of-sale costs:

- Standing cane at estimated sucrose content, age and market price.
- Growing fruit at estimated yields, quality standards, age and market prices.

BIOLOGICAL ASSETS – LEASED BY THE GROUP

Biological assets are measured on initial recognition of the lease and credited to a long-term liability. At each period end date, biological assets are measured at their fair values and any change in value is adjusted to the long-term liability for the period in which it arises.

Livestock

Livestock are measured at their fair value less estimated point-of-sale costs, fair value being determined upon the age and size of the animals and relevant market price. Market price is determined on the basis that the animal is either to be sold to be slaughtered or realised through sale to customers at fair market value.

ASSETS CLASSIFIED AS HELD FOR SALE

Assets or disposal groups are classified as held for sale if the carrying amount will be recovered principally through sale rather than through continuing use. This condition is regarded as met only when the sale is highly probable and the asset held for sale or disposal groups are available for immediate sale in their present condition.

Immediately prior to being classified as held for sale, the carrying amount of the item is measured in accordance with the applicable accounting standard. After classification as held for sale, it is measured at the lower of the carrying amount or fair value less costs to sell. An impairment loss is recognised in profit or loss for any initial and subsequent write-down of the asset and disposal group to fair value less costs to sell. A gain for any subsequent increase in fair value less costs to sell is recognised in profit or loss to the extent that it is not in excess of the cumulative impairment loss previously recognised.

Once classified as held for sale, non-current assets or disposal groups are no longer depreciated.

Notes to the financial statements
for the year ended 31 March 2012

	GROUP		COMPANY	
	2012 R'000	2011 R'000	**2012 R'000**	2011 R'000
12. BIOLOGICAL ASSETS				
12.1 Growing crops and orchards				
At fair value less estimated point-of-sale costs				
Sugar cane	**193 934**	146 441	**91 331**	70 503
Bananas	**19 522**	18 077	**19 522**	18 077
Deciduous fruit	**59 768**	52 077	**59 768**	52 077
Carrying amount at end of year	**273 224**	216 595	**170 621**	140 657
Non-current assets – bearer biological assets	**116 000**	101 730	**90 490**	81 075
Current assets – crops	**157 224**	114 865	**80 131**	59 582
	273 224	216 595	**170 621**	140 657
Reconciliation of carrying amounts of bearer, growing crops and orchards:				
Net book value at beginning of year	**216 595**	183 890	**140 657**	110 728
Transfers from assets classified as held for sale	**–**	25 005	**–**	25 005
Decreases due to disposal of farms	**(6 058)**	(25 005)	**(6 058)**	(25 005)
Increases due to purchases and leased farms	**2 637**	25 005	**2 637**	25 005
Gains arising from changes attributable to physical and price changes	**180 043**	113 580	**97 052**	57 960
Decreases due to sales/harvest	**(119 958)**	(104 909)	**(63 667)**	(53 036)
Effect of foreign currency exchange differences	**(35)**	(971)	**–**	–
Net book value at end of year	**273 224**	216 595	**170 621**	140 657
12.2 Livestock				
Reconciliation of carrying amounts of livestock – sheep and crocodiles:				
Carrying amount at beginning of year	**8 812**	15 608	**8 812**	11 566
Increases due to purchases	**117**	98	**117**	98
Gain arising from changes attributable to physical changes and price changes	**2 407**	3 176	**2 407**	2 750
Decreases due to sales	**(4 180)**	(10 070)	**(4 180)**	(5 602)
Carrying amount at end of year	**7 156**	8 812	**7 156**	8 812

			GROUP		COMPANY	
			2012	2011	**2012**	2011
12.	**BIOLOGICAL ASSETS** continued					
	The following key assumptions have been used in determining the fair value of biological assets:					
	Sugar cane					
	(i) Standing sugar cane					
	Expected area to harvest					
	– South Africa	(ha)	**4 774**	4 628	**2 798**	2 657
	– Swaziland	(ha)	**1 929**	1 618		
	– Zambia	(ha)	**438**	438		
	Estimated yields					
	– South Africa	(tons cane/ha)	**89,7**	81,6	**99,4**	90,4
	– Swaziland	(tons cane/ha)	**108,3**	108,2		
	– Zambia	(tons cane/ha)	**133,7**	129,1		
	Average maturity of cane at 31 March					
	– South Africa	(%)	**62**	62	**63**	63
	– Swaziland	(%)	**56**	64		
	– Zambia	(%)	**64**	64		
	Estimated RV price – South Africa	(R)	**3 197**	2 802	**3 197**	2 802
	Estimated sucrose price – Swaziland	(R)	**2 635**	2 040		
	Estimated ERC price – Zambia	(R)	**2 561**	2 245		
	(ii) Cane roots					
	Estimated productive ratoons		**6 to 8**	6 to 8	**6 to 8**	6 to 8
	Average indexed current replacement cost of establishment (per ha) – reduced according to age	(R/ha)	**5 719**	5 494	**6 309**	5 224
	Bananas					
	(i) Crop					
	Expected area to harvest	(ha)	**255**	243	**255**	243
	Estimated yields	(tons/ha)	**57,9**	57,0	**57,9**	57,0
	Average maturity of crop at 31 March	(%)	**50**	50	**50**	50
	Estimated price per carton	(R)	**77,30**	69,71	**77,30**	69,71
	(ii) Banana plants					
	Estimated productive life	(years)	**9**	9	**9**	9
	Average indexed current replacement cost of establishment (per ha) – reduced according to age	(R/ha)	**39 170**	37 503	**39 170**	37 503
	Deciduous fruit					
	(i) Crop					
	Expected area to harvest – after 31 March	(ha)	**140**	115	**140**	115
	Estimated yields	(tons/ha)	**58,6**	52,3	**58,6**	52,3
	Average maturity of crop at 31 March	(%)	**87**	84	**87**	84
	Estimated net price per kg – apples	(R)	**2,37**	1,83	**2,37**	1,83
	(ii) Deciduous trees					
	Estimated productive life	(years)	**30**	30	**30**	30
	Average indexed current replacement cost of establishment (per ha) – reduced according to age	(R/ha)	**136 782**	121 632	**136 782**	121 632