

# On the Recognition, Measurement and Disclosure of Forest Biological Assets

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**Abstract:** By analyzing the recognition, measurement and disclosure of forest biological assets, this paper aims to further enhance the recognition, measurement and disclosure levels of forest biological assets and also regulate the recognition, measurement and disclosure processes of forest biological assets. This paper both refers to the relevant provisions of the "Accounting Standards for Enterprises No. 5—Biological Assets" and uses cost measurement methods such as replacement cost method. The recognition, measurement and disclosure analysis of forest biological assets can help grasp the specific value of forest biological assets from another perspective. This will not only be able to improve the credibility of forestry enterprises, but also guarantee the reliability of forest biological assets.

**Keywords:** Forest biological assets, Recognition, Measurement, Disclosure.

## 1. INTRODUCTION

With the increasingly rapid development of China's economy and society, all professions and trades have growing demand for forest biological assets [1-3]. At the same time, non-standard, unreasonable and undemanding recognition, measurement and disclosure of forest biological assets have gradually affected the statistical normalization and utilization of forest biological asset. Therefore, how to well recognize, measure and disclose forest biological assets has been a problem demanding prompt solution for local competent departments [4-7]. In this case, this paper makes a comprehensive analysis of recognition, measurement and disclosure of forest biological assets while conducting targeted studies of the concrete recognition, measurement and disclosure of different forest biological assets.

## 2. RECOGNITION OF FOREST BIOLOGICAL ASSETS

In order to well recognize the forest biological assets, the first thing to do is understand the specific concept of forest biological assets. In accordance with relevant accounting theory, forest biological assets can be recognized as forest resources if an enterprise possesses or controls the biological asset as a result of past transaction or event [8-10], and the economic benefits or service potential concerning this biological asset are likely to flow into the enterprise.

As can be seen from the above definition, whether a certain class of forest resources can be recognized as forest

biological assets is mainly depending on the following standards:

First of all, forest resources that have been recognized should be biological assets. The so-called biological assets can be simply understood as living forest resources grown in woodlands. To be identified as forest biological assets, all types of forest resources should meet the above basic requirements.

In the second place, the forest resources that have been recognized must exist currently, rather than those that existed in the past or will possibly exist in the future. In addition, the forest resources should still be possessed or controlled by an enterprise as a result of past transaction.

In the third place, the forest resources that have been recognized should be able to bring real benefits to the enterprise. Only by meeting this condition can the forest resources be able to be called forest biological assets. For bringing real benefits to enterprises, it incorporates two situations: First, the enterprise that owns the forest biological assets can directly earn some benefits wherefrom; second, although the forest biological assets are not possessed by the enterprise, it can effectively control it in order to gain certain benefits.

Finally, after meeting the above three requirements, forest resources should also meet one more requirement if to be recognized as forest biological assets: the forest resources as a kind of forest biological assets must be able to be indeed profitable for the enterprise. Under normal circumstances, this possibility should be greater than 50%.

After confirming a certain type of forest resources as forest biological assets, before carrying out measurement and disclosure work, people also need to simply classify forest biological assets. More often than not, the classification criteria of forest biological assets should conform to business

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**Table 1. Measurement Methods and Attributes of Purchased Forest Biological Assets.**

	Types of forest biological assets	Method of measurement	Measurement attributes
Forest biological assets purchased	Consumption of forest biological assets	Monetary measurement + physical measurement	According to the measurement of historical cost as obtained
	Production of forest biological assets		
	The public welfare forest biological assets		

purposes. In accordance with this criterion, forest biological assets can be classified into three categories, namely, consumptive forest biological assets, productive forest biological assets and public welfare forest biological assets. Just as the names suggest, this classification standard is generally deemed as "object classification".

### 3. MEASUREMENT OF FOREST BIOLOGICAL ASSETS

#### 3.1. Initial Measurement

As per the relevant provisions of the "Accounting Standards for Enterprises No.5—Biological Assets", forest biological assets should be well initially measured. The so-called "initial measurement" is to take the cost of forest biological assets as the measurement standard. Generally speaking, the acquisition methods of forest biological assets are divided into three categories: sourced from the nature, self-cultivating and purchased.

##### 3.1.1. Purchased Forest Biological Assets

To take purchased forest biological assets as an example, its specific measurement method is:

Purchased forest biological assets = monetary measurement + physical measurement (1)

In Equation (1), purchased forest biological assets can be divided into three types as aforementioned, which are consumptive purchased forest biological assets, productive purchased forest biological assets, and purchased public welfare forest biological assets. When measuring the specific assets, all the measurement attributes are the historical costs acquired by the forest biological assets (See Table 1).

##### 3.1.2. Self-Cultivating Forest Biological Assets

The cost of self-cultivating forest biological assets is ascertained in a way quite different from that of purchased forest biological assets. Among them, the biggest difference is it introduces the concept of "canopy closure". The so-called "canopy closure" can be understood as the degree of forest stand density, which in short can be summarized as:

Canopy closure (forest stand density) = the ratio between the vertical projection area of the forest canopy and the area of the forest land (2)

In Equation (2), if the canopy closure (forest stand density) is 1, then the forest area calculated is completely covered by forest resources; if the canopy closure (forest stand density) is  $\geq 20\%$ , the forest biological asset is usually seen as a closed forest. Conversely, if the canopy closure (forest stand density) is  $\leq 20\%$ , then the forest biological asset is not closed.

For self-created forest biological assets, the key to assets measurement lies in the cost of its assets. Firstly, it is necessary to capitalize forest biological assets. Secondly, expense forest biological assets in the management phase. Finally, when chopping down trees, capitalize forest biological assets and then include the calculation results into the total cost of the asset.

Cost of self-created forest biological assets = cost of forest culture and management production stage + management cost + cost of chopping down (3)

In Equation (3), the specific cost accounting objects are usually tree species or production unit. Moreover, according to the different operation purposes of forest biological assets, cost accounting needs to take into account different factors, typically including these types of factors: government financial subsidies, planting, tending, facilities, soil preparation and after-replacement (See Table 2, Table 3).

##### 3.1.3. Forest Biological Assets Sourced from the Nature

For forest biological assets sourced from the nature, its measurement method is different from those of purchased forest biological assets and self-cultivating forest biological assets. The cost of a forest biological asset sourced from the nature is ascertained in accordance with its nominal amount. The so-called "nominal amount" can be determined by RMB 1 yuan, and only when there is conclusive evidence that the asset is possessed by the enterprise.

To take state administration transfer as an example, if the state transfers a forest biological asset sourced from the nature to a certain enterprise, then the enterprise should take the forest biological asset transferred as government subsidies in accordance with 1 yuan, and should also include it into the current profits or losses.

This cost accounting method is controversial among enterprises. First, although a forest biological asset is sourced from the nature, the government transfers it to an enterprise and the enterprise should be responsible for its management, such as pest control, and these activities require cost input.

**Table 2. Self-Cultivating Forest Biological Assets.**

Forest Biological Assets of Each Stage	The Occurrence Time	Charge	The Cost of the Occurrence of Events
Forest production stage	Before canopy closure	Capitalization	Preparation - on various types of land consolidation
			Planting - refers to the consumption when the planting of seeds and saplings
			Afforestation - refers to the forest canopy in front of the clay
			Tending - refers to the forest canopy before weed fertilization, mowing and pest control operation etc.
Stage management	After canopy closure	The cost	Maintenance - including forest protection personnel wages, related repair costs, pest control fee etc.
			Facilities - including fire anti-theft devices, lookout and other simple facilities etc.
			Other relevant protection cost - in addition to the above except
Harvesting stage	After canopy closure	Capitalization	Replanting - including the replant and necessary preparation fee

**Table 3. Cost of Productive Forest Biological Assets.**

	The stage	Charge	Cost accounting object
To create or plant production of forest biological assets	Immature production of forest biological assets	Capitalization	Tree or production unit
	Mature productive forest biological assets	The cost	

Secondly, a forest biological asset sourced from the nature can be converted to a consumptive forest biological asset under certain conditions. Then, the enterprise will face relatively less assets evaluation. Therefore, the author believes that a more reasonable accounting method can be taken to measure forest biological assets sourced from the nature.

Cost of forest biological assets sourced from the nature = consumable biological assets + productive biological assets + public welfare biological assets (4)

In Equation (4), the commonly used accounting measurement method is the replacement cost method, or the amount that fair value subtracts expected disposal costs. The above measurement methods can not only properly reflect the current profits and losses, but also more rationally, completely and accurately embody the value of forest biological assets sourced from the nature.

**3.2. Subsequent Measurement**

Subsequent measurement of forest biological assets mainly aims to adjust forest biological assets after initial measurement. Specifically, subsequent measurement of forest biological assets includes: subsequent expenditures of accounting treatment, depreciated accounting treatment,

accounting treatment that provides for diminution in value, and harvested and disposed accounting treatment. For length and simplicity reasons, the paper focuses on analyzing the common subsequent expenditure accounting treatment in subsequent measurement of forest biological assets. A forest biological asset is characterized by long life cycle and high input costs; particularly the subsequent input cost is more likely to exceed the initial investment. Therefore, subsequent measurement will directly affect current profits and losses for a business. Subsequent expenditure accounting treatment, in a nutshell, is to capitalize and expense the subsequent investment, which can not only accurately calculate the current profits of an enterprise, but also be greatly beneficial to the calculation of its current profits or losses.

To sum up, the subsequent expenses of forest biological assets shall be capitalized by the enterprise before canopy closure and included in the total cost of the asset; and its subsequent expenses shall be expensed by the enterprise after canopy closure. This is mainly because there are little or no changes in the appearance of forest biological assets after canopy closure. Therefore, the enterprise shall expense the subsequent expenses and additionally set a secondary subject under management expenses, thus enabling it to better clarify its current profits and losses.

**Table 4. Basic information disclosure of forest biological assets.**

	Category	Numbers (MU)	Planting	Canopy Density	The Government Subsidies
Consumption of forest biological assets	Timber forest				-
Production of forest biological assets	Bamboo forest				-
	Fruit tree				-
The public welfare forest biological assets	The ecological public welfare forest				

## 4. DISCLOSURE OF FOREST BIOLOGICAL ASSETS

### 4.1. Important Events Before the Financial Report of Forestry Enterprises

After a long term of development, disclosure of forest biological asset has gradually shifted from the traditional accounting information disclosure to a combination of non-financial information and accounting information disclosure. Disclosure of forest biological assets should be more accurate and vivid on the basis of traditional assets disclosure. At the same time, the disclosure of forest biological assets should also have some pictures and videos, thereby displaying related situation of forest biological assets in an all-round, three-dimensional way. Therefore, a forestry enterprise shall disclose the information concerning the forest biological assets as follows:

(1) The categories of forest biological assets. The so-called categories of forest biological assets not only refer to the division of its operation purpose, but also include various forest biological assets, namely quantities of physical output and book value of immature and mature forest biological assets.

(2) The natural condition reports, including plant diseases and insect pests in various forest biological assets and whether there are natural disasters.

(3) The appearance of massive updates of forest biological assets, especially improvements of biotechnology results in a substantial change in biological assets.

(4) The categories, obtainment methods and quantities of physical goods of the forest biological assets sourced from the nature (productive natural forests, consumptive natural forests or public welfare natural forests).

### 4.2. The Proposed Content and Format for Financial Statements of Forestry Enterprises

For forestry enterprises, forest biological assets are disclosed by income statements, cash flow statements and balance sheets. Since forest biological assets have the particularity of canopy closure, the measurement of historical cost is put a priority in the disclosure of assets. Meanwhile, the fair value shall be disclosed in the notes. The specific measure of

including forest biological assets and the earnings in the financial statements is to increase the appropriate items in the statements, and separately disclose the financial condition and economic performance indicators regarding forest biological assets. This paper analyzes the financial statements required to disclose forest biological assets, in the hope of promoting the standardization of forest biological assets disclosure, as well as enhancing its scientificity and reasonability (See Table 4, Table 5).

#### 4.2.1. Income Statement

Concerning the income statement of forest biological assets, in actual disclosure of assets, "the income of biological assets" can be added according to the actual situation. In addition, for public welfare forest biological assets, government subsidies and other factors should be taken into account, and then correspondingly, in the income statement, "government subsidies", "productive subsidies" and "welfare benefits", among many others, should be added.

#### 4.2.2. Cash Flow Statement

For the cash flow statement of forest biological assets, in actual disclosure of assets, "cash inflow" and "net flow" and more can be added according to the actual situation. To take as an example disclosure of public welfare forest biological assets, if the cash flow generated by the government's ecological compensation to forestry enterprises, then the cash flow statement is appropriately more perfect. Similar cases encompass the addition of cash resulted from selling forest biological assets in operation activity cash flow.

#### 4.2.3. Balance Sheet

When forestry enterprises disclose forest biological assets, the balance sheet shall be involved inevitably. In the forestry enterprise's balance sheets, it is necessary to list respectively productive biological assets and public welfare biological assets. Meanwhile, the consumptive biological assets subject shall be added in the secondary subject of stock. However, this operation method has obvious shortcomings in the actual disclosure of assets. In particular, incorporating all biological assets under the subject of biological assets leads to a lack of rationality. In actual operations,

Table 5. Detailed Statement of Forest Biological Assets.

	At the Beginning of the Book Balance	The Increase Amount	Decrease for the Period	The Final Book Balance	Market Value
Consumption of forest biological assets					
Production of forest biological assets					
The public welfare forest biological assets					

accounting personnel prefer another method, which is to appropriately increase subjects in the balance sheet based on the above methods. For example, add the "consumptive forest biological assets" under the subject of "consumptive biological assets". This can more accurately and objectively reflect the disclosure requirements of forest biological assets.

## CONCLUSION

In summary, with the increase in forest biological assets in our country, the recognition, measurement and disclosure of assets have been increasingly difficult. In real asset recognition, measurement and disclosure work, relevant personnel should carry out work flexibly as per the actual situation. Depending on the different operation purposes of forest biological assets, well measure the assets while taking the canopy closure as an important standard to rationally and scientifically capitalize and expense forest biological assets. In addition, relevant personnel should disclose forest biological assets. Especially for public welfare forest biological assets, scientific and reasonable government subsidy disclosure plays a very important role for both the reliability of forest biological assets and the credibility of all forestry enterprises.

## CONFLICT OF INTEREST

The authors confirm that this article content has no conflicts of interest.

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