

Sustainable forestry in financial times

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Abstract. Sustainability has been a guiding principle of forestry in Europe for the last two hundred years, but at present the principle of sustainability is challenged by global economic pressures, ‘limits to growth’ are unavoidable in the global civilization, but this does not mean that nothing should grow!

Money permits us to use markets to differentiate production and to exchange goods and services. Forestry firms, like all others, are bound to earn more money than their costs of production. In the 19th century *investment calculation* was first developed by foresters to account for the fact that forestry production necessarily depends on the natural environment which, in financial terms, requires a long-term investment. However, discussions on the ‘soil rent theory’ and efforts to maximize profits from forestry production turned out to be a complete failure. We ask what can we learn from the history of forestry; that in the real world development, society and economics can only be shaped within the limits of nature, technology and human behaviour. Financial thinking may influence the status of the economy, and cannot be changed by intelligent technology, but financial interests shouldn't govern economic thinking to the exclusion of all else.

The latest financial crash and its consequences have demonstrated the dangers of the monetarian ideology, and consequently, we believe that a new concept of new *sustainable economic order* is needed, in which nature, labour, and technology must be considered as production factors of equal weight. Currently, there is an over-emphasis on ‘capital’ which has traditionally been considered as a production factor in economics, and is weighted to favour *monetary interest*. However, the politically declared aim of economics in democracy is *human interest*, and the conservation of nature or *ecological interest* is required for sustainable production.

What is meant by ‘financial times’? That business leaders as well as politicians generally overvalue the monetary component of the economy, which in consequence skews their view on reality, society and ecology. Banking must support highly specialized production and markets for the exchange of goods. So called *financial industries* offer ephemeral ‘product’, which are not goods nor services but just ‘money-making’. Their profits and exorbitant wages are depriving working people of revenue and technological resources.

Solutions to the problems of forest economics are to be found outside forestry and contemporary forest policies. The concepts are available that could improve the system, and two of them will be outlined here, although currently there is little evidence that they are likely to be adopted in the present European political system. Nevertheless, sustainable development has been an official policy of the United Nations Conference on Environment and Development (UNCD) since 1992, and we should continue to discuss and promote it.

Key words: forest value, forest economics, financial crisis, sustainable economic order

1. Introduction

A corresponding paper to the British newspaper ‘The Financial Times’ was introduced in Germany in the year 2000: *Financial Times Deutschland*. It indicated the increasing dominance of financial thinking in our societies. Political decisions more and more became ruled by financial considerations. For decades, a tremen-

dous amount of financial liabilities has been a growing problem to many governments (Möller, Schwebler 1981). Lack of state budgets has restricted many public and also forestry activities. Forestry in fact is producing more than marketable timber. Forest production includes a broad range of contributions to the public wealth. Thus, well managed forests are of higher economic value than indicated by a short-term assessment of the market

economy. High volume growing stocks must be built up during very long periods of time. In financial terms they are high capital investments at low rates of return. However, these investments provide for the public demand for beautiful and sound landscapes, add recreational values as well as support biodiversity protection, at the same time are advantageous for watershed conditions, reduction of soil erosion, climate mitigation, carbon sequestration, and last not but least they enhance business and employment opportunities in wood industries and support tourism, public health etc. As profit maximization is related to revenues in cash, it doesn't work as goal setting in forestry. This has been discussed and understood in European forestry for a long time. Sustainable forest management is endangered since financial thinking has been generalized, and now the latter is dominating political decisions. Under the aspect of sustainability the concept of the highest monetary rent on capital investment must be questioned generally – it hardly provides a valid indicator of economic efficiency.

2. Sustainability

Sustainability has been established as the principle of forestry in Europe for the last two hundred years. Under different circumstances sustainable forestry was also practiced before (Köpf 1997). Yet, in history civilizations collapsed quite frequently because of destroying their forests (Metternich 1949; Hornsmann, 1951; Diamond, 2005). The respective peoples began to suffer from deficiency of wood for construction, tools and fuel. What was more threatening, their natural basis was diminished by soil erosion, floods, desertification, and climatic changes. Consequently, their economic and social systems broke down. But in the eighteenth century there was a surprising effort to establish sustainable forestry in a modern sense. Hanns Carl von Carlowitz (1645–1714), the head of the Saxon mining agency, wrote the first German book in which sustainable forestry was broadly discussed, *Sylvicultura oeconomica* (1713) (von Carlowitz 2009). At that time his interest was the continuous supply of timber and charcoal to the mining industry in Saxony. It is important to realize the dynamic element in the sustainability concept developed within the following period. It is *firstly* long-run planning; *secondly* conservation related to nature as the primary production factor in man's economy; *thirdly* the periodic revision of forest inventory and planning.

In Germany, books on forestry guidance were published in the eighteenth century, for example by Wilhelm Gottfried von Moser (1729–1793): 'Grundsätze der Forst-Oekonomie' (*Principles of forestry economics*), 1757 and by Carl Christoph Oettelt (1727–1802):

'Beweis, dass die Mathesis bei dem Forstwesen unentbehrliche Dienste tue' (*Evidence that mathematics renders indispensable services to forestry*) 1765. Oettelt and other foresters began to survey forest areas, collect data on forest stands, draw forest maps, draft management plans. Methods were developed for cultivation and utilization of forest land, and a system was organised for the periodic regulation of forest management in order to ensure sustainability under changing conditions (Richter 1950). Increasing scholarship of foresters was the achievement of high importance in forestry. In 1763, Hans Dietrich von Zanthier (1717–1778) founded the first private forestry school in Ilsenburg/Harz. In the following decades other foresters founded units which were called 'master schools'. Forestry became a topic at universities as a part of 'Kammeralwissenschaften' (*chamber sciences*) concerning public business and financial affairs. In 1786 Heinrich Cotta (1763–1844) began to teach his forest surveying assistants techniques of planning, mathematics, and forestry. This practical activity happened to become his private school, the first one located in Zillbach/Thuringia and officially acknowledged in 1794. In 1811, when Cotta came to Saxony to survey public forests, his school was transferred to Tharandt and was made the Royal Academy in 1816. The 200th anniversary of Cotta's arrival in Tharandt was celebrated in 2011.

The two hundred years of forest science, academic forest education as well as established administrative and management structures for implementing sustainable forestry were great achievements. These became effective in the period of industrialisation, increasing density of population, and global commercialisation. Three hundred years of forestry development must be considered in order to understand what forest sustainability means. Remarkably enough, this period hardly cover more than two generations of trees – experience in sustainable forest management therefore is limited. In 1992, at the United Nations' Rio Conference on Environment and Development, the forestry term 'sustainability' was delineated and adjoined to the political concept of 'sustainable development'. It is worthwhile in the process of generalization to remember the origin of the term sustainability in forestry and to realize the long period of implementing it. While there is much bustling about *sustainable development*, the achievements on sustainable forestry often become injured at present, even are lost at a global scale. Taking a critical position one can assume that a coming break-down of the present civilization cannot be excluded. What are the causes?

First to be mentioned is the growth of world population, and *second* – the productivity at high energy input providing a fantastic living standard for a small part of mankind only. Of course, claiming this for all is

justified at least to a certain degree. Technologies if adapted intelligently are the key to achieve it. They are the hope of many nations in the world, a challenge for improvements. But *third*, the present system of world's finances enforcing technological progress, does not primarily support sustainable development. Communication techniques, for example, primarily have been pressed because of high interest in advertising, manipulation of public opinion as well as public relations (Packard 1957). Most important, nature as the basis of life must be maintained not simply preserved. It has been the basic production factor for improving the conditions of life to the majority of people. Growing differences of incomes are reported in most countries, also between the countries. Numerous social problems arise from this fact causing distress and disaster to people and high costs to the states (Wilkinson, Pickett 2009). The worldwide competition forces business firms to profit making, therefore populations become exploited, landscapes and natural forests devastated. It is the financial system which forces firms to survive under extreme competition. In fact, the unlimited greed in the world of finances appears as the main cause of mislead development. We knew it before, but the world finance crisis of 2008 made it evident to everybody.

As long as civilizations were locally limited, their eventual collapse did not harm the world. Since civilization became a global event, *limits to growth* have become a global concern. 'Limits to growth' (Meadows et al. 1972.) never meant that nothing should grow. It is the challenge to include *nature* as the basic factor of production in the economic calculation besides *labour* and *technology*. This includes respecting men both as consumers and labour force in order to avoid social disturbances. Since the utility of forests depends on deliberated and systematic long-term forest management, sustainable forestry which is bound to nature respects a balanced relation to the different production factors. In most industries, however, *capital* as the production factor has become dominant. As this production factor mainly stands for technology, it is calling for liquid money to be invested in technical systems and knowledge. Both, nature and labour have become neglected.

3. Forestry and money

For a very long time of human history, economic activities have been accompanied and supported by money. Money permits the partition of work – thus, differentiating production and making it possible to exchange goods and services at markets. Wood-producing sustainable forestry has also been developed under

financial conditions. Forestry firms, as any business firm, must at least earn the money of production costs in order to survive.

Early in the 19th century, foresters were the first to develop methods to calculate a long-term investment. They were aware of the unusual high capital value held in growing stocks for a very long time. It was a period in history of liberal thinking, calling for investigations on options of either maintaining the growing stock for further wood production or harvesting the timber for alternative and more profitable business investments. Johann Christian Hundeshagen (1783–1834), a forestry professor at University of Giessen, discussed mathematically the balance of revenues and costs in forestry under the term 'forstliche Statik' (*forestry statics*). *Statics* in general is defined as 'equilibrium mechanics of stationary bodies' (Webster's II New College Dictionary, 2005). In 1849, Martin Faustmann (1822–1876) published his famous formula (for example : Chang 1999). There are many mathematical expressions, and this is just one of them:

$$B_u = \frac{A_u + D_a \cdot (1+i)^{u-a} + D_q \cdot (1+i)^{u-q} - c \cdot (1+i)^u}{(1+i)^u - 1} - \frac{v}{i}$$

where:

i – rate of interest; rate of capital cost; investor's expectation of profit on his capital,

B_u – expected capital value of unstocked ground as a permanent rent paid once in u years,

A_u – net market value of timber harvested at the end of a rotation period of u years

$D_a \dots D_q$ – net market values of all thinnings within one rotation of u years earned in the years $a \dots q$,

c – regeneration and plantation costs to be paid at the beginning of each rotation period,

v – annual costs of administration and management.

The above formula presents the value of a forest management unit over the infinite number of rotations, based on a present monetary estimate of costs and revenues at a fixed interest rate. Therefore, it may be seen as a model of sustainable forestry. It is the rate of interest which governs the present value, and it doesn't say anything else than the estimation of this value under the special aspect at the moment of calculation and under its conditions. Max Robert Pressler (1815–1886), a professor at the Forest Academy in Tharandt, claimed that foresters should consequently adapt their management to profit maximization according to such interest rate calculations. Nonetheless, the specific 'forestry interest rate' of 3 percent had to be chosen remarkably lower than the so called national economic interest rate. Financially, as said before, wood growing appears as not competitive in the national economy. Many foresters even claimed that this rate should be zero, not considering that when

compared to other investment alternatives, this could be misunderstood as ‘of no financial value’ – not good in public opinion. In 1865, at a forest owners' meeting in Dresden, King John of Saxony understood Friedrich Judeich (1828–1894) as to support the concern of improving the booming country by the highest monetary rate of return on the forest capital. Judeich, therefore, was the director of the Tharandt forestry academy (Rubner 1967). Consequently, the forests in Saxony have been until now dominated by spruce (44 percent) and pine (31 percent). While forests cover 28 percent of the land area, 79 percent of 516.572 hectares of the forest land are covered by conifers.

For one hundred years foresters and scientists discussed and objected the ‘Bodenreinertragslehre’ (*soil rent theory*) as against what was called ‘Waldreinertragslehre’ (*forest rent theory*). In fact, Pressler's normative approach is misleading in a similar way as widely accepted greed in monetary speculation in our days. Greed may be as normal as theft, but theft is illegal, and greed could be made illegal as well. Greed is no reasonable economic activity, while the whole economy should be practiced reasonably. Financial calculations may help to understand and compare business activities. The Faustmann formula is just a model in order to explain cultivating and maintaining activities in forestry as a long-term investment. It depends on the purpose of such work whether it should be done or not. The optimum time of timber harvesting depends on market prices, technological progress, aspects of silviculture as stability of stands, change of future expectations, consideration of recreational needs and of biodiversity etc. Many activities are necessary in the national interest which forestry is. Such state activities as security, education, science, health services, preservation of nature are often non-marketable and must be done not regarding a calculated rate of revenue on the investment. When, in Southeast USA, a plantation of the loblolly pine (*Pinus taeda*) is serving for wood production only if can turn out the interest rate of 5 percent at the rotation of about 25 years (Duerr 2004). This occurs in a region of low population density and a surplus of landscape. But in a highly populated and industrialized country most forests serve more purposes than supplying wood to industries. It should not be a problem within the state budget to pay – or accept losses – for non-marketable production in forestry as marketed timber also provides high tax contributions to the treasury. It is just a question of political decision. The value of non-marketable forest products may be estimated as the difference of the average national rate of interest and a rate of interest derived from forestry firms market incomes (Köpf 1964).

4. Economy and financing problems

Foresters have probably not much interest in monetary problems except for concerning timber prices. They enjoy the forestry business because of their preference for nature and working with people as well as developing forest stands in accordance with such purposes as growing excellent timber for sale, building up healthy and beautiful stands, maintaining the forestry system for future generations, not to mention hunting and the like. Disturbances of the finance system may affect timber markets to some extent. But the growth of wood is going on and inflation does not harm forests as real assets. Anyway, a few remarks are necessary concerning the economy and the role of finances in it.

During the past few years, we subsequently experienced the crises of *first* the real estates' market in the United States, *second* the ‘subprime’ crediting crisis there, *third* a bank crash (Lehman Brothers in 2008). These events were followed by *fourth* the worldwide crisis of the banking system with heavy efforts to save the world's finance system by the governments and international institutions, *fifth* the serious recession, *sixth* the deep crisis of state budgets, and *seventh* the present troubles about the Euro as currency of different nations. To most politicians, and even economists, this series of events was unexpected. Not so to those who critically observed developments for the last forty years since the Breton Woods system had finished (Groll 2004.). The whole generation of this period just took it for normal ‘making money’, not only by one's own productive work but also by speculation at financial markets. In this period, on the one hand - incomes of unprecedented volume were earned and huge properties collected, and on the other hand the number of people with low and insufficient incomes increased. These are the well known features of unregulated market conditions. In economic turbulences many countries were pushed by the World Bank's and the World Monetary Fund's policies to privatize public assets and firms, and to reduce social services including education. Friedrich August von Hayek (1899–1992) and Milton Friedman (1912–2006) of The Chicago school of economics supported this economic policy with their theories. The outcomes of this system have been described much in detail by Naomi Klein (2007) as *the shock doctrine*.

A very old and early definition of what is meant by ‘economy’ may help to understand the deviation of modern monetary thinking. It is laid down in the mentioned *Principles of Forestry Economics* by Wilhelm Gottfried von Moser, 1757: *Economy is the internal management system of an institution aiming at production, utilization and maintenance of certain commodities which for this purpose need adequate equipment and*

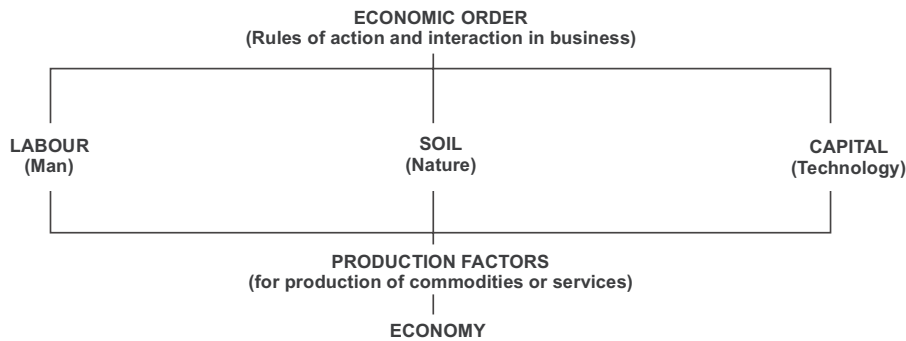


Figure 1. The Economy defined by the best choice for production by means of production factors within an economic order (Köpf 2009)

rules [according to H. Rubner: *Forstgeschichte im Zeitalter der industriellen Revolution (Forest history at times of the industrial revolution)*, 1967].

In the above definition reality is decisive, not a derived monetary value. In general, the subject in American economics has been to study best choices in respect to production. Paul A. Samuelson (1915–2009) underlines: ‘With or without the use of money’ (Samuelson 1967)¹. The consequence is drawn in the following scheme showing the different terms in a system:

Probably it would help to separate strictly *economics* dealing with the production and consumption of commodities and services, and *financial science* dealing with the supply and regulation of finances. Following the idea by François Quesnay (1694–1774), a French physician and economist, the economy can be imagined as a circular flow comparable to the flow of blood in the vessels of the body of commodities and production factors, and a corresponding monetary flow going reverse.

The material circle represents the real business actions. The monetary circle must be understood as a subsidiary one, like a lubricant in a machine. From this point of view it does not make sense to talk about the ‘finance industry’, because its function is subsidiary to real industries and nothing else. In 2008, a little book was published in Germany based on an English one from 2001 ‘Creating New Money – A monetary reform for the information age’ (Huber, Robertson, 2008). In order to avoid the misuse of crediting it suggests returning the right to create new money to the public sector while, at present, it is practised largely by private banks. It would be a sound reform giving the right to create new money back to the public as it was at times when coinage was a royal privilege. Aside from advantages to the economic

order, the public could earn the profits which at present are collected by private banks. Extensive credits to the public sector are weakening the states and, at present, even cause a break down in Greece. The suggested reform would stop such threatening processes. And here we come back to forest policies:

According to Heinrich Cotta (1849) forestry may

- aim at perfect forest condition for supplying the maximum volume of the most usable wood sustainably; or
- aim at the maximum monetary gain from the forest area without respect of the public wealth or the future condition of the forest; or
- aim at the highest general public wealth without respect of the cash which directly supplies the forest treasury.

Cotta argues that the typical forester will tend to follow the first goal; the private forest owner - the second one; and only forests in state property can meet the third goal. It is the only way to regard efficiently forest conservation, preservation of nature, improvement of biodiversity, areas for wilderness and recreation, hunting practices, mountain biking, horseback riding and so on. To Heinrich Cotta it is not feasible to subdue private forestry to public rules without remuneration; and evaluating the restrictions in a just way appears impossible to him. This may be seen different in modern democracy, but the full scope of wishes by the public remains a state’s duty. Therefore, when state budgets are running short - sustainable forestry as described above must suffer. The personnel will be reduced, the assets of the state are for sale, taxes are increasing, the social transfer is diminished, and education neglected. At present Poland is fortunate not to have this problem as other

¹ Paul A. Samuelson: *Economics – An Introductory Analysis*. McGraw-Hill Book Company, New York et al., 1948, 7th edition 1967, p. 5: *Economics is the study of how men and society choose, with or without the use of money, to employ scarce productive resources, which could have alternative uses, to produce various commodities over time and distribute them for consumption, now and in the future, among various people and groups in society.*

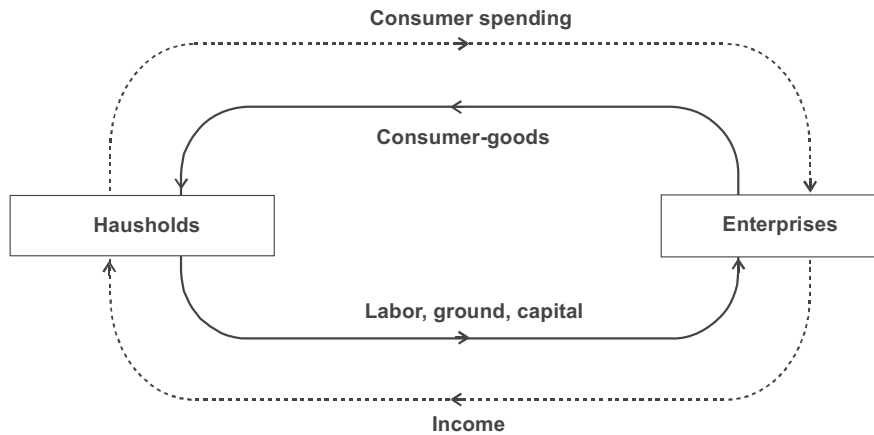


Figure 2. Simplified model of an economy of households and firms connected through markets (Bartling, Luzius 2000)

European countries. But the trends are to equalize the conditions in Europe, and this may increasingly be seen as a problem of forest policy.

5. Conclusion

Money is necessary both for investment and for trading commodities and services which are produced in specialized activities. This purpose of the finance system may be understood as lubricating the real economy. The global finance system has largely lost its connection to economic activities in their original sense. It missed its way by *making money* without relation to assets, by trading obscure derivatives and automatized currency speculation. They call it ‘finance industry’, but no industrial production takes place.

Money is accumulated somewhere above the national economies and government control. Because budgets are getting reduced, basic state duties become neglected, especially the compensation between the contributions of the different sectors and production factors to the public wealth. Social problems and their costs increase, in the long run resulting in instability and break-down. Forests are destroyed where the states are too weak to protect them efficiently.

Forestry sustainability has been developed successfully in a long process. It may be endangered by the deterioration of the worldwide economic and financial system. Since *sustainable development* has become the issue of international politics, the experience of forestry sustainability should be better regarded. It is not to be copied but must be understood as a long-term obligation which must be protected by the lasting and sufficiently strong state authority.

Forest policies cannot become efficient in favour of the sensible system of sustainable forestry if the context is not understood by foresters and forest owners. Therefore, it is necessary for foresters and the public to study forest history and to deal with the financial, social and economic problems of this time.

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