

Social silviculture: a new paradigm in the search for sustainable land conservation in the tropics?

Ariel E. Lugo

International Institute of Tropical Forestry
USDA Forest Service
1201 Calle Ceiba
Jardín Botánico Sur
Río Piedras PR 00926-1115
Puerto Rico

A novel and sustainable agroforestry system was designed and implemented with great initial success in the Democratic Republic of Congo (PROCES *et al.*, 2011). Each farmer and family was allocated 25 hectares in which to live, plant cassava (a root crop) and trees for lumber and other forest products: *Acacia auriculiformis*. The scheme, which included farmer training, involved traditional cultivation methods and management of fallow lands. The economic success of the first rotation of the system was evident as measured by a net profit of \$5,000 per family, which was similar to what a teacher made in the capital city of Kinshasa. The main issue raised by the silvicultural use of the land was a small reduction in soil potassium, which could be addressed in the second rotation. Unfortunately, the second rotation was not as successful as the first in terms of yields, because the initial group of farmers used the money from the first rotation to move their families to the capital city, leaving untrained relatives to deal with their farms.

In north-eastern Brazil, women collect and process for oil production the almonds of the babaçu palm, *Attalea speciosa* (CARVALHAES *et al.*, 2011). The activity is the second most important of all non-timber forest product extractions in Brazil, representing 20 percent of the total non-timber forest production. The Brazilian families involved in the babaçu palm almond harvesting ran in conflict with numerous regulations, laws, and beliefs about the conservation of tropical forests. Moreover, there is a significant lack of information about the effects of almond extraction on the ecology of the palm. However, by their sheer numbers and determination, the 350,000 rural families prevail in their actions and activities and drive a significant industry based on the productivity of the palm. Their aspiration is the sustainable harvesting of the palm almonds.



Photograph 1.

A babaçu palm, *Attalea speciosa* (formerly *Orbignya phalerata*), alluded in the essay, Brasil.

Photograph M. Carvalhaes.

What do these two case studies, each from a different part of the tropical world, have in common? The common denominator is how the behaviour of humans trumps technical silvicultural schemes, laws, and regulations. Irrespective of the technical merit of policies, laws, regulations or management schemes, the success or failure of programs or actions depends on human behaviour. Is tropical silviculture at the mercy of these surprises of human behaviour or are there tools to anticipate, alter, or influence these social behaviours?

Consideration of human and social factors in tropical silviculture is not new to the field. In fact, the book on *Plantation Forestry in the Tropics* by EVANS (1992) says (p 76): "...any development, especially in the rural tropics, which is not related to the needs and receptive to the attitudes of the local inhabitants, is failing in one of its most important roles." The intention implicit in this statement has traditionally been addressed by silviculturists through a number of approaches that include the use of socio-economic indicators in the planning and execution of silvicultural systems. Whole silvicultural approaches such as those of agroforestry, also known as community forestry, represent examples of how silviculture aligns its projects with the needs of people and their attitudes. The FAO-generated literature on the interactions of humans with silviculture is large and leaves no doubt about the importance that the interaction of people with silvicultural systems entails.



Photograph 2.

A novel forest of *Spathodea campanulata* in Puerto Rico owes its presence to both social and ecological factors.

Photograph O. Abelleira Martinez

Still, the gap between social sciences and silviculture looms large over the field as demonstrated by the two examples at the outset of this essay. LEACH (2008) argued (p 1784): "...planning blueprints often 'fail', as nature or people bite back in unexpected ways." The consequences of ignoring either natural or anthropogenic surprises determine the success or failures of scientifically-derived silvicultural systems that are designed and tested in the field. Usually, we test for natural surprises in the form of natural disturbances, long-term planning, or species adaptabilities as discussed in EVANS (1992). What are we then missing?

I believe that what is missing is the "social" in "social forestry" or "social silviculture", which in many cases is an add-on to the technical framework of forestry and silviculture. We have been unable to merge the social sciences and silviculture into a coherent and unified field of social silviculture *sensu stricto*. For example, the chapter on social and economic factors in Evans' 1992 textbook summarizes the prevailing approach to social forestry, which is centred on how sound forestry benefits people, the value of the forestry activity to people, and how the social fabric, including regulations and institutions, influence the development of forestry activities. This approach is usually top down from the silviculturists and misses the bottom-up point of view and aspirations of those individuals affected by the top-down schemes.

Shifting to a Social Silviculture paradigm is a daunting task. In addition to current efforts on silviculture and on social involvement in silviculture, we must be ready to modify our view of the role of natural sciences in problem solving as well as how we formulate solutions to technical problems. Fundamentally, we need to recognize that problem solving requires equal measures of social and natural science con-

siderations and that each individual field of science (the social and the natural) must modify its approach to problem solving to take the other into consideration.

Assuming we are successful in modifying our approach to problem solving, we must also meaningfully engage individuals and communities from the outset and throughout the implementation of any silvicultural program. Meaningful engagement with the public in matters dealing with planning and use of public resources, in science, or in addressing complex problems such as climate change (O'BRIEN, 2009) is now the objective of new and emerging sciences such as integral ecology (ESBJÖRN-HARGENS & ZIMMERMAN, 2009), social ecology (REDMAN *et al.*, 2004), sustainable sciences (SALAS-ZAPATA *et al.*, 2011), and many other transdisciplines (ESBJÖRN-HARGENS & ZIMMERMAN, 2009). Over and over, the failure to meaningfully engage people leads to failure of technically sound forestry schemes (LEACH, 2008). A more reflective and inclusive approach is needed to transform the way technical approaches to environmental solutions are presented to society (MACNAGHTEN, 2003).

ESBJÖRN-HARGENS & ZIMMERMAN (2009) suggest four irreducible perspectives that require consideration when engaging people with the purpose of understanding and remedying environmental problems. These four levels of consideration are the intentional "I", the cultural "we", the behavioural "it", and the social "its"; where the "I" and "we" are subjective or interior views of how individuals and groups of individuals feel, and the "it" and "its" represent objective behavioural and social exterior views of individuals and groups. This level of analysis and resolution, of how individual and groups of individuals feel and act is not commonly considered in social forestry, but represents the new level of analysis and consideration that we need to improve the effectiveness of our technical solutions when applied in the real world.

Most foresters are not trained as social scientists and even less trained for dealing with the internal views of individuals and groups of people. Nevertheless, it appears that without meaningful engagement with people, forestry solutions will have little chance of success. People are more likely to be mobilized if the environmental issues are presented in a way that relates to their personal experiences (MACNAGHTEN, 2003). LEACH (2008) argues that to have success in policy implementation more attention is needed on the human-ecological dynamics, history, path dependency, and the ways in which different people frame or construct problems. She advocates approaches that are more adaptive, deliberative, and reflexive. Thus, a new coalition of sciences is needed to address the gaps that individual sciences fail to include in their respective individual focus. This justifies the need for new integrative sciences discussed by ESBJÖRN-HARGENS & ZIMMERMAN (2009). Here I am proposing that a new paradigm for silviculture is aligning silviculture with the social sciences.



Photograph 3.

This novel forest of *Spathodea campanulata* regenerated naturally after the abandonment of sugar cane production in Puerto Rico. Photograph O. Abelleira Martinez

To those that believe that the level of integration of social sciences implied in the discussion above appears excessive, not needed, or already addressed by traditional approaches to silviculture, I respond with the following observations. Attaining sustainability of land use in forestry is a complex problem. Its technical attainment, if possible, will require considerable effort and high levels of investment of time and resources because the schemes have to be adapted to both the ecological and social conditions where they are applied. However, the implementation of silvicultural practices must be accomplished through individuals and communities with different levels of formal education, different cultures, and a variety of needs and wants. The social environment for silviculture is as complex as the ecological environment is for trees, but the bulk of our traditional focus has been on the ecological environment. Nevertheless, the level of complexity and difficulty in the task of integrating the social and silvicultural sciences is consistent with the high level of expectations and payoff in the very notion of sustainability of silvicultural schemes. The high expectation and high stakes implicit in the idea of sustainability requires equal attention to ecological and social efforts, as well as attention in the way ecological scientists do their job if the resulting schemes are to be successful.

We already know that being technically correct from a silvicultural or ecological point of view is not sufficient to assure success of silvicultural solutions. And we also know that articulating the value, importance, and need of silvicultural practices also fall short of expectations, as does the in-depth analysis of laws, regulations, and social structures that affect the field practices of forestry. We are left with the challenge of probing deeper into the fabric and perceptions of individuals and communities in search of intervention procedures that are more likely to approach the elusive goals of sustainability. In short, we need a paradigm shift into social silviculture.

Acknowledgments

This essay is based on the talks presented at the IUFRO International Conference in Montpellier France during November 15-18, 2011. Any misrepresentation of these talks is my fault, but the cited talks inspired me to propose the social silviculture paradigm shift. This work was done in cooperation with the University of Puerto Rico, and the material is based upon work supported by the National Science Foundation under Grant No. 0948507 with the San Juan Urban Long-Term Research Area and the Puerto Rico Conservation Foundation. I thank Tischa Muñoz Erickson for reviewing the manuscript and Mildred Alayón for editing.

Bibliographical references

- CARVALHAES M. A., SILVA K. J. D., OLIVEIRA R. E., ZAKIA M. J. B., SANTOS M. F., SILVA M., 2011. Participatory construction of best management practices for babaçu palm extractivism in Northeastern Brazil. *In*: Research priorities in tropical silviculture: towards new paradigms, p. 28, *in* : Sist, P., editor, IUFRO International Conference, Montpellier, France.
- ESBJÖRN-HARGENS S., ZIMMERMAN M., 2009. An overview of integral ecology. Resource Paper n°. 2. Integral Institute, Louisville, CO, p. 1-14.
- EVANS J., 1992. Plantation forestry in the tropics, second edition. Oxford University Press, Oxford.
- LEACH M., 2008. Pathways to sustainability in the forest? Misunderstood dynamics and the negotiation of knowledge, power, and policy. *Environment and Planning A*, 40: 1783-1795.
- MACNAGHTEN P., 2003. Embodying the environment in everyday life practices. *The Sociological Review*, 63-84.
- O'BRIEN K., 2009. Responding to climate change: the need for an integral approach. Resource Paper n°4, Integral Institute, Louisville, CO, p. 1-12.
- PROCES P., BISIAUX F., MARIEN J.-N., 2011. Mampu agroforestry system in DRC: Is it sustainable and can it be a model for large-scale plantations? Research priorities in tropical silviculture: towards new paradigms, p; 102 *in* : Sist P., editor, IUFRO International Conference, Montpellier, France.
- REDMAN C. L., GROVE J. M., KUBY L. H., 2004. Integrating social science into the long-term ecological research (LTER) network: social dimensions of ecological change and ecological dimensions of social change. *Ecosystems*, 7: 161-171.
- SALAS-ZAPATA W., RÍOS-OSORIO L., ÁLVAREZ-DEL CASTILLO J., 2011. La ciencia emergente de la sustentabilidad: de la práctica científica hacia la constitución de una ciencia. *Interciencia*, 36: 699-706.