

Focali Brief: 2013:01

Forests and trees - essential for food security on a landscape level

In February 2013 The Global Forum on Food Security and Nutrition opened an online forum and posed the question "Forest and trees provide benefits for food security and nutrition – what is your say?" SIANI and Focali made a joint contribution on the forum, about which this brief is based. The contributions made to the forum will be used for policy development at the upcoming FAO conference "Forests for Food Security and Nutrition" in May 2013.

THE AIM of the FAO conference is to: "increase understanding of the important role that forests, trees on farms and agroforestry systems can play in improving food security and nutrition, especially in developing countries. The conference will also propose policy options that need to be undertaken at national and international level to better position the role of forests and trees in food security and nutrition decision-making processes." This is what the conference organizers state as being crucial today since forest and trees are mostly absent from policy decisions on food security despite the important direct and indirect role they play for food security and nutrition. Focali and SIANI agree with this problem identification and hence want to contribute to the deliberations on key challenges and bottlenecks that hinder a greater contribution of forests for food security. This is done by selecting key examples of how forests and trees can provide multiple benefits for food security, livelihoods and socio-ecological systems. In addition Focali and SIANI identify policy needs and recommendations for a cross-sectorial landscape approach, which includes the multiple benefits of forests and trees for food security.

Challenges and Bottlenecks

For practical reasons the environment and its services have been described and managed

About this brief

This is a Brief written by two Swedish networks: Focali (Focest, Climate and Livelihood research Network) and SIANI (the Swedish International Agriculture Network Initiative). It is a contribution to the FAO conference "Forests for Food Security and Nutrition" that will be held in May 2013.



Harvest time in an agroforestry system in Ouahigouya, Burkina Faso by Lisa Westholm.

under different definitions, dependant on the sector that developed the definition. Agriculture has been defined simply as cultivation for food (fibre, fodder and fuel), and forests as being for example; land with trees; a canopy cover of more than 10 percent or where; wood is the main product in focus. As a consequence the corresponding policies developed through the use of these definitions have become limited by their own specificity.

At government level, food production has been connected to a government's agriculture department and not to the department for health or department for trade. Similarly, trees and timber are connected to a government's forest department and seldom to department of trade or rural development. Perhaps it is the multitude of benefits, or their sheer diversity that has meant that on a management level forests themselves have fallen into different categories. Fruit and nut trees like cocoa and cashew, are not in the same category as plantation species like pine and fir. The effect of this compartmentalisation based on the 'product' means that in the context of food security the multiple benefits of trees are not easily realised and on a prac-

tical level multiple uses are hard to achieve. Forests must be seen as providing multiple opportunities for enhancing food security as well as being interconnected with other important resources in the landscape such as agricultural land and water.

Cross-sectorial approach needed

Today the world stands before multiple challenges. By 2050 the world's food systems need to feed 9 billion people which necessitate an increase of food production of about 70 percent. At the same time water scarcity, climate change and environmental degradation are posing serious constraints for food security. Rainfed agriculture is in many regions already becoming unreliable in addition further depletion of water resources and degradation of soils will make farming difficult to sustain in some areas. These challenges together with increasing demand for land and water resources for the production of food, feed, fibre and fuel put enhanced pressure on land resources and related ecosystems.

Through a landscape approach land, water, forests resources, biodiversity and other ecosystem services can be analysed holistically. Continued focus on forests and food security therefore needs to apply cross-sectorial approaches to better identify beneficial interactions as well as trade-offs on a landscape level for the different products and services. Large and small-scale agriculture is currently the main driver of deforestation. It is consequently crucial to analyse food security not only within the agricultural sector but on a broader landscape level. At the same time efforts to reduce deforestation cannot be successful if the analysis of causes and needed measures is separated from the developments in the agricultural sector.

However in food security policies cross-sectorial concepts such as environment, livelihoods, socio-ecological systems, watersheds, ecosystem services or landscapes are often discussed at global or international level but are absent when it comes to a management level, which only further stresses the need to move towards a food security approach beyond sectors and produce examples of good practices.

Direct, indirect and multiple benefits

When analysing what role forests, trees and agroforestry systems can play to improve food security it is important to look beyond the direct benefits of trees and to characterise their multiple direct and indirect benefits. In the context of food security the direct benefits of a single tree are the provision of food, or com-

mercial products (rubber, shea butter, fruits etc.). The indirect benefits of trees can create diverse micro-climates, increase carbon uptake in vegetation and biomass, blocking direct sunlight, increasing humidity, improve soil moisture and providing a source of organic matter leading to better productivity.

Agroforestry systems provide multiple benefits for food security. Direct benefits such as fruits and fodder for human and livestock consumption are important especially to reduce vulnerability during food-insecure periods. The indirect benefits of agroforestry systems are less visible but are important for soil fertility, water infiltration and other ecosystem services. When trees are mixed with cropland the trees circulate nutrients from deeper layers in the soil through their root system through the tree. When the leaves then fall on the cropland it enables the crops to receive more nutrients than from the topsoil layer which can sustain or even improve soil quality.

In the Maradi/Zinder Sahel region of Niger, a method called Farmer Managed Natural Regeneration (FMNR) uses the *Faidherbia albida* tree (formerly named *Acacia Albida*) for multiple benefits, see photo No.5 below. It defoliates during the wet season leaving crops underneath with access to groundwater without competition from the tree and in the dry season the fallen leaves are a source of both fertilizer and fodder for the farmers. Compared to other trees used in agroforestry systems this tree has a unique ability to fixate nitrogen, which enhance the yields on nearby farms. Over a wider scale these matrices of trees are contributing to a re-greening of the Sahel, restoring the soil

quality and creating landscapes where agriculture can again be practiced on a large scale, thus contributing to food security. This is yet one example of why policy makers and practitioners must look beyond the direct benefits of trees and see how trees can interact with the agricultural system and wider landscape. Enhanced understanding of the positive linkages between trees, soil and water is therefore a key to strengthen food security.

Diverse vegetation reduce vulnerability

Another benefit provided by trees for food security is that a diverse land use and mix of species reduce vulnerabilities associated with monocultures where pests, diseases and weather conditions can cause severe harm. If both seasonal and perennial crops and trees are mixed then households are more resilient to shocks such as harvest failure or diseases. One concrete example of this from Brazil was provided during the workshop “Landscapes in a carbon focused world” co-organized by SIANI and Focali 2012. André Gonçalves professor of agroecology at Instituto Federal Catarinense explained that 2004 a strong hurricane hit Brazil and devastated vast areas of monoculture banana plantations while banana plants belonging to farmers practicing agroforestry systems could resist the strong winds. Another example is how mangroves can reduce damages of heavy storms and tsunamis in coastal landscapes. See photo No.6. A diversity of species is therefore an imperative to more resilient livelihoods. At the same time a diverse landscape benefits biodiversity,

Examples of direct and indirect benefits of trees for food security:



1)



2)



3)



4)

1) Leaves and fruits from trees are important as animal fodder, especially during dry seasons when other fodder sources are scarce. Pastoralists food security depends on the health of their livestock and hence on the access to animal fodder. Photo from the Afar region in Ethiopia by Maria Ölund.

2, 3) The tree *Vitellaria Paradoxa*, commonly called Shea tree or Karité, produces nuts which can be transformed to Shea butter. The Shea nuts reduce vulnerability since they can be stored at home and sold when there is a food deficit in the household. Photo of small scale Shea butter production in Burkina Faso by Maria Ölund.

4) Agroforestry systems with a diversity of perennial and seasonal crops reduce vulnerability to shocks and provide multiple benefits for food-security, biodiversity and the environment. Photo of “Shaded coffee” and corn in agroforestry system in Dilla, Ethiopia by Maria Ölund.



Soil erosion is a major threat for food security, restoration of degraded areas is therefore essential. Photo: Maria Ölund.

watershed and carbon storage functions of importance for socio-ecological systems and climate mitigation and adaptation.

Restoration of watersheds and degraded soils

Reduction of wind speed is another ecosystem service that trees can provide which is important, not only to cushion the effects of extreme weather events. In desert and dry areas trees reduce soil erosion caused by strong winds. It is well known that deforestation of trees and under vegetation strips the soil of its protection from heavy rainfall and wind. On the other hand restoration of degraded areas can increase the water holding capacity of the area and reduce soil erosion. Rain that through infiltration remains in the soil, so called “green water” is the basis of rainfed agriculture. In sub-Saharan Africa green water is fundamental for food production. The role of irrigation is in comparison to green water insignificant. Consequently restoration of watersheds and degraded areas is a key for

sustainable food systems. A mixed vegetation cover does not only help to store water in the soil, it is beneficial to precipitation patterns since evaporation to the atmosphere results in new rainfall.

In the two boxes below some examples of additional benefits and ecosystem services provided by trees, agroforestry and forests of importance for agricultural systems and food security are presented. These examples confirm the great need to apply a cross-sectorial approach which can facilitate a better understanding of how livelihoods are integrated on a landscape level. There is thus a need for policies to better handle these interactions which can strengthen household income and food security, environmental protection, climate change mitigation and adaptation and lead to greater resilience within rural areas.

Policy needs

As this contribution has exemplified, discussions on food and forests needs to move be-

yond single understandings of forests when thinking about food security and start to focus on the complex but multiple benefits that forests provide and the opportunities for enhancing food production and resilience through focusing on forests. Single definitions and government ‘departmentalisation’ risk hiding the complex interactions of forests within a landscape and distort the multiple benefits forests have for food security and ultimately for poverty alleviation.

In order to realise the potential of forests and food the questions which need to be raised are;

- i) how can policy makers and practitioners move away from the simple definitions and encourage governments to think outside of their departments,
- ii) how can well-adapted, accepted and often durable land-use systems combining food and forest be extrapolated and
- iii) how can these systems stay dynamic?

Recommendations

1) There is a need to move towards concepts such as environment, livelihoods, socio-ecological systems, and cross-sectorial approaches to enable landscape management for the benefits of food and nutrition security in which trees are an important resource.

2) In this debate we should look beyond the direct benefits of trees and see how trees can interact within the agricultural system for the enhancement of food security and hence food production.

Examples of forest related eco-system services important for food security:



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8)

5) The *Faidherbia albida* tree is used in agroforestry systems. It fixes nitrogen, which enhance the yields on nearby farms. Photo from Burkina Faso by Marco Schmidt.

6) Besides cushioning coastal landscapes from extreme weather, mangroves are indispensable nursery habitats for many fish species and hence of importance for biodiversity, foodsecurity and economic development. Photo of Mangroves in Kenya by Lisa Westholm.

7, 8) Honey production is a direct benefit of trees for food security, the selling of honey can be very profitable. The ecosystem service the bees provide, pollination, is further important to biodiversity, quantity and quality of agricultural yields and thus for food security. Studies have even shown a positive correlation between proximity to forests areas and agricultural yields and their financial returns. Photo of honey production and flowers in Dawe Kachen, Ethiopia by Maria Ölund.

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The Landscape workshop: Videos from the workshop organized by SIANI and Focali in October 2012 is available at www.siani.se/landscapes

The FAO conference: "Forests for Food Security and Nutrition" will be held the 13-15th of May 2013, www.fao.org/forestry/food-security/en/

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Photos from the upper left: Drying of harvested crops and leaves from trees on a compound in Saponé, Burkina Faso. Food and fodder fruits in the Afar region of Ethiopia. Agroforestry systems in Dilla, Ethiopia and agroforestry system, called "homegarden", in Sri Lanka both provide multiple ecosystem services, reduce vulnerability and enhance food security. Photos No.1-3 by Maria Ölund, No.4 from Sri Lanka by Eskil Mattsson.

Focali is a Swedish research network where several Swedish universities and institutions are represented. Focali aims to facilitate cooperation between different disciplines as well as between research, policy and practice. Focali has a secretariat placed at the The Centre for Environment and Sustainability, GMV, in Gothenburg. GMV is a network organization at Chalmers University of Technology and University of Gothenburg. This brief is produced in cooperation with SIANI.

SIANI is a network whose mission is to: "promote dialogue and collaboration among scientists, practitioners, policy-makers, the private sector, Government authorities and civil society, with a focus on sustainable food and nutrition security in the context of poverty reduction, primarily in low-income countries".



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