Agroforestry: agriculture and non-timber forest products

Agroforestry is an integrated approach of using the interactive benefits from combining trees and shrubs with crops and/or livestock. It combines agricultural and forestry technologies to create more diverse, productive, profitable, healthy and sustainable land-use systems. (Agroforestry) Alleycropping - Part 1 (Agroforestry) Alleycropping - Part 2 (Agroforestry) Riparian Buffers - Part 3 (Agroforestry) Riparian Buffers - Part 4 (Agroforestry) Silvopasture - Part 5 (Agroforestry) Silvopasture - Part 6 (Agroforestry) Windbreaks - Part 7 (Agroforestry) Windbreaks - Part 8

Definitions According to the World Agroforestry Centre , Agroforestry is a collective name for land use systems and practices in which woody perennials are deliberately integrated with crops and/or animals on the same land management unit. The integration can be either in a spatial mixture or in a temporal sequence. There are normally both ecological and economic interactions between woody and non-woody components in agroforestry. In agroforestry systems, trees or shrubs are intentionally used within agricultural systems, or non-timber forest products are cultured in forest settings.

Knowledge, careful selection of species and good management of trees and crops are needed to optimize the production and positive effects within the system and to minimize negative competitive effects. In some areas, a narrow definition ofagroforestry might simply be: trees on farms . Hence, agroforestry, farm forestry and family forestry can be broadly understood as the commitment of farmers, alone or in partnerships, towards the establishment and management of forests on their land. Where many

landholders are involved the result isa diversity of activity that reflects thediversity of aspirations and interests within the community.

Impacts Agroforestry systems can be advantageous over conventional agricultural and forest production methods through increased productivity, economic benefits, social outcomes and the ecological goods and services provided. Biodiversity in agroforestry systems is typically higher than in conventional agricultural systems. Agroforestry incorporates at least several plant species into a given land area and creates a more complex habitat that can support a wider variety of birds, insects, and other animals. Agroforestry also has the potential to help reduce climate change since trees take up and store carbon at a faster rate than crops.

Agroforestry tree species of research interest in the tropics, particularly in relation to improving maize yields in sub-Saharan Africa, include the nitrogen fixing species Sesbania sesban, Tephrosia vogelii, Gliricidia sepium and Faidherbia albida . For example, a ten year experiment in Malawi showed that by using fertilizer trees such as Tephrosia vogelii and Gliricidia sepium , maize yields averaged 3. 7 tonnes per hectare, compared to 1 tonne per hectare in plots without fertilizer trees or mineral fertilizer.

Research with Faidherbia albida in Zambia over several years showed that mature trees can sustain maize yields of 4. 1 tonnes per hectare compared to 1. 3 tonnes per hectare beyond the canopy of the tree. Unlike other trees, Faidherbia sheds its nitrogen-rich leaves during the rainy crop growing season so it does not compete with the crop for light, nutrients and water. The leaves then regrow during the dry season and provide land cover and

shade for crops. Potential impacts of agroforestry caninclude: *. Reducing poverty through increased production of agroforestry products for home consumption and sale . Contributing to food security by restoring farm soil fertility for food crops and production of fruits, nuts and edible oils *. Reducing deforestation and pressure on woodlands by providing fuelwood grown on farms *. Increasing diversity of on-farm treecrops and tree cover to buffer farmers against the effects of global climate change *. Improving nutrition to lessen the impacts of hunger and chronic illness associated with HIV/AIDS *. Augmenting accessibility to medicinal trees, the main source of medication for 80% of Africa's population [citation needed]

Alley cropping Alley cropping, sometimes referred to as 'sun systems', is a form of intercropping , and can be applied by farmers as a strategy to combat soil erosion , to increase the diversity of farmland, as a means for crop diversification and to derive other integrated benefits. In this practice, crops are planted in strips in the alleys formed between rows of trees and/or shrubs . The potential benefitsof this design include the provision ofshade in hot, dry environments (reducing water loss from evaporation), retention of soil moisture , increase in the structural diversity of the site and wildlife habitat.

The woody perennials in these systems can produce fruit , fuelwood, fodder, or trimmings to be made into mulch . Forest farming Forest farming , also known as 'shadesystems', is the sustainable, integrated cultivation of both timber and non-timber forest products in a forest setting. Forest farming is separate and distinct from the opportunistic exploitation / wild harvest of non-timber forest products. Successful forest farming operations produce:

mushrooms, maple and birch syrup, native plants used for landscaping and floral greenery (e. g. alal, sword fern, bear grass, cedar boughs and others), medicinal and pharmaceutical products (e. g. ginseng, goldenseal, cascara or yew bark), wild berries and fruit. Silvopasture Early days 34 years later Silvopastures combine livestock grazing on forage crops or pastures within actively managed tree or shrub crops. Cattle, sheep and goats are the most common livestock incorporated into silvopasture systems and they may be deployed entirely within a private farm/woodlot silvopasture or through collaborative arrangements between forest licensees and livestock producers on public lands (e. . in British Columbia, sheep grazing is used as a vegetation management tool in young forest plantations). Pinus radiata planted in 1970 in rowsapproximately 30 metres apart mid-spring. The trees averaged ~33 cms/13 inches in height at time of planting. To maintain productivity in the paddock, hay was harvested and then cropped the following autumn with oats. After this crop was harvested Merino lambs were pastured to graze the stubble. They grazed for about two weeks before they started feeding on the trees. These lambs were then swapped with a new mob of lambs.

Hay was then cropped again. After this harvest the trees were sufficiently high to cope with sheep grazing theirlower branches. Virtually no productivity was lost and as the treesstarted to influence the micro-climate the paddock became more and more productive. Riparian buffers and integrated riparian management Riparian buffers are managed forest and shrubs belts in areas bordering lakes, streams, rivers, and wetlands. Integrated riparian management systems are used to enhance and protect

aquatic and riparian resources as well as generating income from imber and non-timber forest products. Similar to shelter andtimberbelts, integrated riparian management systems can employ a wide variety of tree and shrub species, with specific plantings tailored to suit the specific growing conditions and production opportunities. Other uses Agroforestry practices may also be employed to realize a number of other associated Environmental Services, including: *. Carbon sequestration *. Odour, dust, and noise reduction *. Waste water or manure management (e. g. utilizing urban waste water on intensive, short rotation forests for wood fibre production) . Green space and visual aesthetics. *. Enhancement or maintenance of wildlife habitat. Agroforestry books: Forest Gardening books: See also: Perennial Vegetables: From Artichokes to Zuiki Taro, A Gardener'sGuide to Over 100 Delicious and Easy to Grow Edibles by Eric Toensmeier (ebook preview) - Imagine growing vegetables that require just about the same amount of care as the flowers in your perennial beds and borders—no annual tilling and potting and planting. They thrive andproduce abundant and nutritious crops throughout the season.

It sounds too good to be true, but in Perennial Vegetables author and plant specialist Eric Toensmeier (Edible Forest Gardens) introduces gardeners to a world of little-known and wholly underappreciated plants. Ranging beyond the usual suspects (asparagus, rhubarb, and artichoke) to include such " minor" crops as ground cherry and ramps (both of which have found their way onto exclusive restaurant menus) and the much sought after, anti-oxidant-rich wolfberry (also known as goji berries), Toensmeier explains how

toraise, tend, harvest, and cook with plants that yield great crops and satisfaction.