Agroforestry in Saskatchewan – Rural Diversification

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The province of Saskatchewan is comprised of 29.7 million ha of agriculture lands and 35.5 million ha of forested land of which 12.9 million hectares is productive. Agriculture is the leading component of the province's economy, while forestry is rapidly approaching.

In recent years, annual profits from agriculture have decreased. Primary factors associated with this decline are environmental, affecting yield and quality reducing crop receipts, and shrinking market access as the result of trade barriers and subsidies. In 2003, the province of Saskatchewan negotiated with a new forest products company, to obtain 80% of their wood from crown lands. This resource development policy has resulted in a move towards deriving the balance of required wood supplies (20%) from private lands.

These factors have led some farmers to consider managing trees as another crop. This crop diversification can result in another source of income, periodic, lump sum, or both depending on how the tree crop is managed.

The Saskatchewan Forest Centre (SFC) is helping farmers make decisions on the incorporation of trees on their land base using afforestation and agroforestry practices.

Incorporation of trees in a landowner's farming operation are referred to as Agroforestry. The following definitions were compiled and edited by Peter Huxley and Helen van Houten, International Centre for Research in Agroforestry – 1997 (http://www.bugwood.org/glossary/)

Agroforestry is the integration of trees in farmland and rangeland that diversifies and sustains production for increased social, economic and environmental benefits for land users at all levels. Agroforestry practices include the following:

> Windbreak: a group of trees or shrubs in any arrangement that will afford protection from high winds to animals or crops or both. When the arrangement is in a long line the group is called a shelterbelt.
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> Silvopastoral: integration of trees with pasture and animals.
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> Riparian: vegetation, with trees and shrubs, growing alongside or close to a watercourse, lake or swamp, and often dependent on its roots reaching the water table.
> Alley cropping: trees are planted at close spacing within row and wide between rows, to leave room for herbaceous cropping between.
> Forest farming: growing a crop under the canopy of mature trees, for example mushrooms.

Afforestation is the conversion of bare land into forest land by planting of forest trees, or the planting of a forest crop on land that has not previously, or not recently, carried a forest crop.

The area of interest in Saskatchewan for practicing agroforestry/afforestation is located in the "forest fringe", which is an area of transition between the Boreal and Grasslands Eco-regions.

Using GIS data obtained from the Southern Digital Land Classification, soil maps and the hybrid poplar suitability project, over 1.2 million ha of private land has been identified in the forest fringe area with potential for forestry development and farming diversification using afforestation or agroforestry practices.

A SFC forest development fund project completed by PFRA in association with the SFC, has produced forest fringe site suitability maps for several tree species including hybrid poplar.

The species of trees to plant depends on the landowner's objectives and on site conditions. Why does the landowner want to plant trees; riparian, silvopastoral or wood production? What soil types, moisture conditions and drainage characterize the landowner's property?

The favoured tree species of most landowners has been various hybrid poplar cultivars. The reason hybrid poplars are so well liked for use in afforestation or agroforestry is the fact that it is a fast growing tree. Usually, hybrid poplar reach a harvestable size in 20 yrs depending on site quality, while species such as white spruce or jack pine need between 60 and 80 years to reach merchantable size. Although a 20 year crop to a farmer remains an option relatively hard to justify due to the long investment time and distant returns, some options exist to create periodic returns until final harvest (i.e. thinning).

Like any conventional farming system, the crop (tree species) you choose to plant is a very critical decision. The same environmental factors that affect traditional agriculture crops such as wind, moisture, nutrient availability and frost affect trees as well.
There are many ways in which trees can be incorporated into existing farming practices. Some I have already noted. The SFC has received several requests from cities and towns interested in the economical incorporation of trees into the community. Following is a list of some benefits and products that can obtained from incorporation of trees in an agriculture operation:

Forest products (veneer logs, saw logs, OSB logs, pulp wood)
Kyoto/carbon credits
Waste management, including livestock and human (Phytoremediation)
Production of wildlife habitat
Increase in biodiversity
Utilisation for biofuels
Biomass production
Reduction of soil erosion & salinity
Shelter for livestock and crops
Ecotourism

Alley cropping – trees and corn growing together, Guelph, Ontario.

Water filtration

Riparian buffers along a creek.

Crop outputs are obviously affected by site productivity and inputs (i.e moisture, nutrients, light). Tree crops are no different than agriculture crops in this regard. Therefore, as mentioned before, a comprehensive crop plan is very important to achieving success. A plan will guide you through the various management stages of your tree crop. For example, you will not be thinning any trees out if you are planting a riparian area. If you are planting trees for economic gain, you will be planting at different spacing and practicing different management techniques than those practiced if you were doing alley cropping.

The SFC encourages an approach that allows the segregation of a harvested tree stem into components that can provide the landowner with the greatest return on investment. This approach can be intensive requiring additional time and money, but it creates additional product value that can reap greater rewards if the raw material is utilised for high-value end products. The approach involves managing the tree growth to obtain several products at harvest. For example, pruning (removal of lower branches) results in clear (knot free or small knots) wood in the first few logs that can be sold at a premium as veneer logs or high grade sawlogs. The middle of the tree could then be used for lower value sawlogs and oriented strand board, while the top and limbs can be chipped for use in pulp or oriented strand board.
Currently, demand for engineered wood products is high and increasing. Many new opportunities in international markets exist for the use of wood from hybrid poplars in these wood products.

The Agroforestry Unit of the SFC is busy helping landowners understand how to diversify their cropping options to include trees. The SFC has been working with Crop Insurance to develop a

plan on how to insure trees as a crop. With partial funding from the SFC's Forest Development Fund (FDF), the Centre for Studies for Agriculture, Law and the Environment (CSALE) is investigating taxation issues for trees on agricultural lands. Several other agroforestry and afforestation projects funded by the FDF are ongoing. The Agroforestry Unit has a good relationship with Farm Credit Corporation (FCC) and keeps them informed of agroforestry activities occurring in the province. Considerable information is available on the SFC website www.saskforestcentre.com relating to agroforestry. Included are technical bulletins, tree establishment and maintenance costs, and completed agroforestry-related FDF reports.

To meet its technology transfer mandate, the Agroforestry Unit of the SFC delivers current agroforestry information in association with Extension Agrologists through technical bulletins, workshops and field days.

There are many reasons why trees can be and should be incorporated into farming operations. These fast growing plantations not only serve as a potential alternative wood supply, they can also accomplish forest and land conservation objectives. By increasing the biodiversity of the landbase on agriculture lands, habitat for desired wildlife can be restored and plant species diversity can be improved.

Many communities are looking towards incorporation of trees into economic development plans to provide employment opportunities, restore of degraded lands, produce biofuels, and process waste products through phytoremediation.

In locations where natural forests are not available for utilisation or where land availability is a constraint, fast growing plantations are necessities. Additionally, they are an attractive option where land values are low due to low productivity for agriculture.