



# ***Agroforestry Roles and Issues in Sustainable Land use Systems***

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# **Outline**

- History of the Agroforestry Centre
- Defining Agroforestry?
- Factors Supporting Agroforestry
- Limitations for Agroforestry
- Issues Surrounding Agroforestry

# Agroforestry Centre for Prairie Farmers



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## A Program for Farmers

1901 - a new co-operative on-farm tree planting program was started by the Forestry Branch of the Department of the Interior.



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# The Agroforestry Centre in 2006



260 hectare nursery

Grow 5 to 6 million seedlings per year

Provide trees to 8,000 farmers per year

Over 700,000 hectares are protected

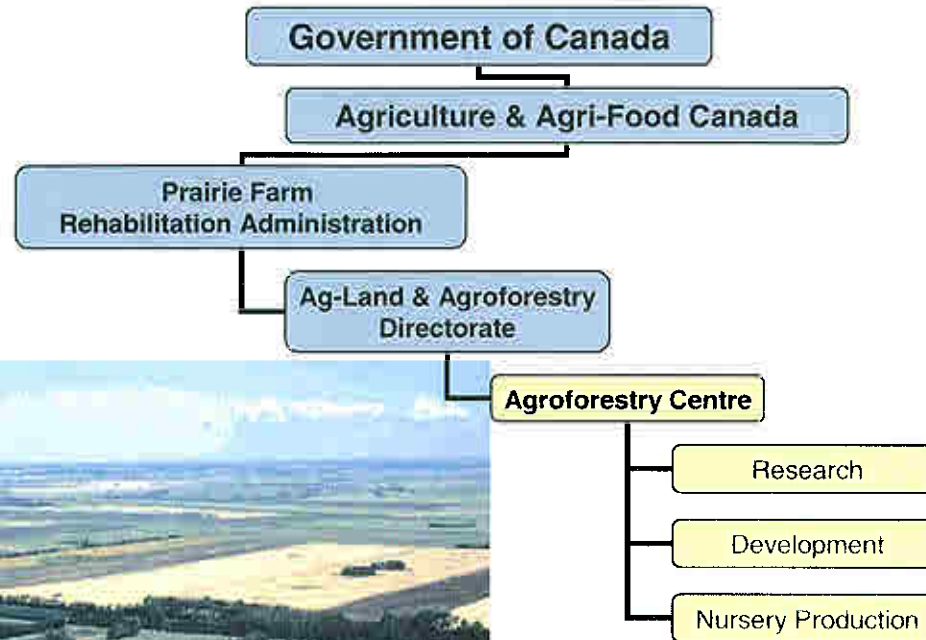


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# Agroforestry Centre in 2006



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# Agroforestry Centre in 2006

## The Centre

- Conducts research;
- Develops and delivers technology tools, products and services;
- Grows and provides tree and shrub seedlings to farmers



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# Why farmers plant trees

- ..... to slow down the wind
- ..... to protect yards and buildings
- ..... to protect livestock
- ..... to protect soil and crops
- ..... to protect roads
- ..... to provide wood and fuel
- ..... to improve their quality of life

2006



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# What is Agroforestry?



.....The intentional mixing of trees and/or shrubs into agricultural production systems to create environmental, economic and social benefits



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# Agroforestry can be.....



Alley Cropping



Silvopasture



Riparian Buffers



Shelterbelts/Windbreaks

**... putting the right  
plant in the right  
location, for the right  
reason**



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# Alley Cropping

Growing an annual or perennial crop simultaneously with a long term tree crop. The agricultural crop generates income while the longer term tree crop matures



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# Silvopasture

- Combines timber and forage/livestock production.
- The trees provide a long-term investment for nut crops or a timber harvest, but also provide the animals shade in the summer and a windbreak in the winter.
- The forage provides feed for beef cattle.



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# Riparian Forest Buffers

- protect the water quality
- control erosion
- stabilize streambanks



Degraded riparian area in 1990



Same area in 1996 with buffer



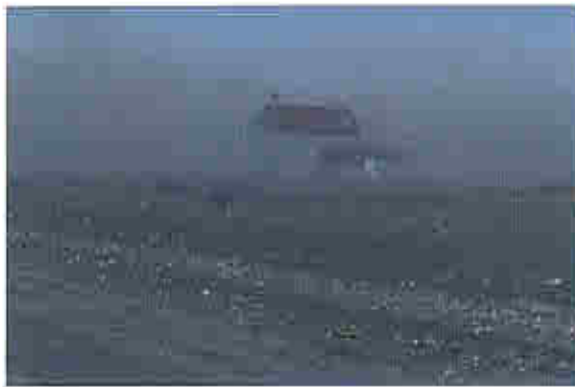
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# Shelterbelts / Windbreaks

Windbreaks are planned and managed as part of a crop and/or livestock operation to enhance production, protect livestock, and control soil erosion.



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# Shelterbelts Control Soil Erosion



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## **Why agroforestry?**

- The need to mitigate excessive environmental impacts of agriculture.
  - Balance productivity and profitability with environmental stewardship
- The need to stabilize and diversify rural economies, especially for small resource-limited family farms
- Agroforestry must offer viable options that are compatible with production agriculture

## **Why agroforestry?**

- ***Agroforestry appeals to a broad audience, and therefore has many clients***
  - The landowner is the primary client and for him/her agroforestry will always need to make good economic and practical sense
  - There are other important and influential clients. These include policy makers and the general public.
  
- Agroforestry is one of the few technologies that can simultaneously provide economic, environmental, conservation and social benefits to multiple stakeholders.

## **What is holding agroforestry back?**

- **It is a non-traditional practice**
  - **There is a perception that it conflicts with modern, efficient agricultural practice.**  
**“trees get in the way”**

***Tree Removal for  
Pasture and  
Annual Cropping***



## **What is holding agroforestry back?**

- Agroforestry is not recognized by stakeholders as a “real” practice.

## **What is holding agroforestry back?**

- **No one owns agroforestry.**
- **Is it agriculture or is it forestry?**

## **What is holding agroforestry back?**

- **Does it make economic sense?**
  - **Ability to develop long term markets.**
  - **Ability to react to markets**
  - **Long term investment and commitment**

## **Agroforestry is not a set of static practices**

It is a set of concepts and technologies that should be tailored to individual situations

Blended and balanced with other appropriate conservation practices

Achieve more sustainable land use systems.



## **What is needed to get understanding, acceptance and support for agroforestry?**

- **Agroforestry must address important issues**
  - issues of land depletion
  - water quality improvement
  - loss of biodiversity
  - need for sustainability and rural economic diversity
  
- **Must be pertinent to stakeholder needs**
  - provide economic, environmental, conservation and social benefits to a variety of stakeholders

## **What is needed to get understanding, acceptance and support for agroforestry?**

### ➤ **Leadership**

- Needed to facilitate partnerships and catalyze cooperation to develop agroforestry and get it applied

### ➤ **Visibility**

- Need to bring agroforestry to the attention of policy makers to gain their support.

**Agroforestry needs champions.**

## **What is needed to get understanding, acceptance and support for agroforestry?**

### **➤ Grassroots Support**

- Needed from landowners, industry, conservation organizations and special interest groups. Policy makers need to hear about agroforestry from the people that use it (and want it).

### **➤ Focused programs and funding**

- This will accelerate agroforestry development and implementation

## **What is needed to get understanding, acceptance and support for agroforestry?**

### **➤ Research and development**

- Develop improved agroforestry technologies, information, decision/application support tools and integrated systems

### **➤ Technology Transfer**

- Needed to provide printed materials, demonstrations, application projects, assessments, synthesis and tools to accelerate putting into practice what we already know.

## **Agroforestry and Sustainable Land Use Systems**

- Agroforestry practices are considered to have attributes that promote sustainability more than other production based approaches to land management.
- Agroforestry is a blending of production with the protection of the natural resources on which production depends.

## **Agroforestry's role in Sustainability**

- Building in flexibility to deal with uncertainty
  - Agroforestry systems and practices by design are diverse. This diversity is the result of more efficient utilization of moisture, space, nutrients and energy from a given area of land.
  - The diversity of crops and products helps farmers and resource managers avoid risks associated with monocropping.

## **Agroforestry's role in Sustainability**

### **➤ Developing Resiliency**

- Land use practices have been developed and have become finely honed to average or ideal environmental conditions in an area.
- However when droughts or frosts occur that years crop can be partly or totally destroyed .ie 1930's
- Agroforestry can moderate the effects of such phenomena or provide a resiliency so that farmers who depend on the land, can rapidly bounce back after such phenomena
- Agroforestry practices are structurally and functionally more complex and because of this they are naturally more resilient than other types of land use.

## **Agroforestry's role in Sustainability**

### **➤ Examples of Resiliency**

- Windbreaks help sustain crops by conserving soil moisture during windy, dry periods that would otherwise destroy crops in monocropping systems
- Tree fodder being available can be a substitute for hay and native forage during extended periods of drought
- Tree products provide a source of income for farmers during periods of drought or other weather calamities
- By combining woody perennials with forage and food crops, production can be carried out on areas that are too fragile for intensive monocropping practices



## **Agroforestry's role in Sustainability**

- Linkages with Other Land Uses and Externalities
  - Agroforestry can be used to develop positive interactions among land uses
    - Soil protection and reduced water erosion by wind and water, soil conservation is a fundamental requirement of all agroforestry systems.
    - Nitrogen fixation by some tree species can add nitrogen to the soil which in turn can improve crop production
    - Improved hydrological benefits such as
      - Improved infiltration by rainfall and reduced surface runoff
      - Biofilters between cropping systems and aquatic systems

## **Conclusion**

- Appropriate agroforestry practices provide many of the characteristics of land use systems that we associate with sustainability.
- The diversity of agroforestry practices inherently makes them resilient and provides farmers with greater flexibility in coping with uncertainties of drought, frost, pests, and other phenomena that can lead to production failure

## **Conclusions**

- Agroforestry has the potential to enhance the financial situation of farmers while providing for amenities and environmental benefits to society that we associate with sound conservation and watershed management

## **Conclusions**

- Agroforestry is not a panacea for sustainable land use; although the potential for enhanced land use exists, there can be detrimental effects.
- Monitoring of agroforestry practices and research must continue so that we can avoid unsustainable practices and promote appropriate technologies.