Technology Fact Sheet for Adaptation
B Agro forestry [i]

Technology: Agro forestry	
Technology characteristics	
Introduction	Agro-forestry is used in almost the whole world where agriculture is practiced. In Rwanda, it is practiced in the agriculture zones which are found in all the provinces. World Agro forestry Center defines the technology as an integrated approach to the production of trees and of non-tree crops or animals on the same piece of land. The crops can be grown together at the same time, in rotation, or in separate plots when materials from one are used to benefit another. Agro-forestry systems take advantage of trees for many uses: to hold the soil; to increase fertility through nitrogen fixation, or through bringing minerals from deep in the soil and depositing them by leaf-fall; and to provide shade, construction materials, foods and fuel.
Institutional and organizational requirements	Agro forestry development in Rwanda involves government institutions/agencies such as the Ministry of Local Government, the Ministry of Agriculture and Animal Resources, the Ministry of Natural Resources, RAB/NAFA, Rwanda Natural Resources Authority Rwanda Environmental Management Authority, Research institutions like RAB/ISAR, Training institutions – Gako Organic Farming, NGOs such as ICRAF, farmers' associations/cooperatives –Urugaga Imbaraga and the private sector-dealers in seeds.
Size of beneficiaries	1 400 000 households
Operation and maintenance	It requires specialized skills in seedling production. Plantation and maintenance can be made easy by training farmers' representatives. Harvesting can be done using local knowledge.

Advantages	• Agro-forestry is appropriate for all land types and is especially important for hillside farming where
	agriculture may lead to rapid loss of soil. • Agro-forestry systems make maximum use of
Disadvantages	Agro-forestry systems require substantial management.
Capital costs	
Cost to implement adaptation option	The average cost to put in place 1 ha of agro forestry
Additional cost to implement extra unit	Any additional unit (ha) implemented in the same area
Development impacts, indirect benefits	
Economic benefits	
Employment	Creation of jobs in seedling preparation, land preparation, plantation, maintenance and harvesting
Investment	Can create investment in forestry production inputs, equipments and production transformation industry
Public and private expenditures	Can reduce public expenditure on subsidized fertilizers and irrigation systems
Social benefits	
Income	It increases the income earned and inputs saved through improvements in the farm resource base and products for sale. Through increased yields, it provides significant savings for households on fire wood, forage and fertilizer purchase.
Learning	Agro forestry practices would improve local knowledge about the technology and increased income would increase school attendance.

Health	It can improve medicinal plant conservation, domestication, and propagation, provides nutritious agro forestry foods, including fruits and leaves, promotes changes in ecosystem structure and function that affect disease risk and transmission.
Environmental benefits	
Increasing water infiltration and slowing runoff flow, stabilizing and protecting stream banks	
from erosion, filtering pollutants from runoff water, shading streams for controlling	
Local context	
Opportunities	-The technology is well understood by local farmers, -There exist farmers associations/cooperatives which can reduce initial investment costs by sharing the cost of seedling production, -Maintenance can be done by beneficiaries themselves, -Conservation and reforestation are among the country's' priority

Barriers	1. Poor access to agro-forestry inputs/resources including land tenure, tree tenure, water, seeds and germplasm, and credit. 2. Agro-forestry production or management issues relating to knowledge about agro-forestry systems, quality control, storage, processing of products, access to technical outreach services, and upfront costs versus long-term gain. 3. The main benefits of agro-forestry are perceived in the medium term at least five to ten years after establishment; this means that farmers must be prepared to invest in their establishment and management during several years before the main benefits are generated. 4. Marketing of agro-forestry products and services. Lack of access to transport, handling, processing, and marketing infrastructure, bans/restrictions on timber products.
Market potential	The technology has a national wide potential
National status of the technology	Agro forestry plantations only occupy ¼ of the available
Timeframe	The implementation can start immediately
Acceptability to local	Well accepted by the local population

[i] **This fact sheet has been extracted from TNA Report – Technology Needs Assessment and Technology Action Plans For Climate Change Adaptation– Rwanda. You can access the complete report from the TNA project website http://tech-action.org/**