Technology Fact Sheet for Adaptation

IV. Agro-forestry [i]

Introduction

Agro-forestry is a land-use system that aims towards optimal utilization of available land resources by multiple as well as beneficial practices of agriculture and forestry. The main purpose of agro-forestry activities is to sustain the fertility of the soil by substituting the nutrition required by intensive agriculture.

Technology characteristics

Agro-forestry incorporates the benefits of both intensive scientific agricultural practices and forestry activities that yield the desired timber, fuel wood and non-wood forest produce. The agro-forestry models concentrate both on the short-term returns from agriculture as well as long-term returns from forestry activities. This ensures long-term economic security aspect of farmers and communities adopting such activities. Agro-forestry activities also ensures diversity in crops raised as well as enhances species diversity by encouraging plantation of multiple –tree species for various uses or plantation of multi-purpose tree species.

Country specific applicability and potential

Non-adoption of adequate soil conservation measures and improper crop rotation are some of the important factors contributing to land degradation in Bhutan[1].Improper farming practices also add to land degradation. Productive land is being lost without realizing the full potential of the limited soil resources of the country; soil erosion and landslides wash away rich topsoil degrading the soil resources, and such degradation also affects the climate both at macro- and micro- levels. About 40,000 ha of land, more than 10 percent of total agriculture area in Bhutan is threatened with soil erosion[2]. These areas can be primarily targeted for agro forestry activities.

Status of technology in country

Agro-forestry activities are being carried out in Bhutan for a long-time now and have been recognized as a viable tool for ecological restoration as well as ensuring economic security to the people. Agro-forestry activities can be encouraged in areas under agriculture, especially areas prone to degradation and soil erosion.

Benefits to economic/social and environmental development

Agro-forestry activities are aimed towards diversification of income means, improvement in the quality of life of marginal farmers, and ensuring energy security and food security of the farmers and the populace as a whole. Agro-forestry also helps in staggering income generation across the year through crop diversification and overcoming the threat of financial losses due to crop failure in an increasingly erratic seasonal cycle. The woodlots and trees planted as part of the model can cater to medium and long term economic security of the farmers as well enhance soil productivity through litter fall and soil conservation.

The supply of fuel wood derived from forestry activities can also be used as a means to encourage improved cook-stoves and more environmentally friendly activities among the populace. Domestic woodlots will help to reduce pressure on natural forests which are presently under increasing pressure from rising demand from a fast growing population.

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[1] Bhutan: State of the Environment, 2001, available at http://www.rrcap.unep.org/pub/soe/bhutan_land.pdf, accessed on 4 May 2012.

[2] FAO Corporate Document Repository, 1994, Land degradation in south Asia: Its severity causes and effects upon the people, available at http://www.fao.org/docrep/V4360E/V4360E07.htm, accessed on 4 May 2012.

Climate change adaptation benefits

The diversification of income source acts as an insurance against climate variability and resultant risk in loss of crops and livelihood and pushes the marginal landholders into poverty. The agro-forestry activities also helps in rehabilitation of degraded farmlands, which are especially threatened by accelerated degradation due to deforestation and increasing variability in rainfall patterns.

Financial Requirements and Costs

The total cost for implementing an agro-forestry activity is about USD 1000[3] per hectare including cost of planting, agriculture, soil conservation measures, training of farmers etc.

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

[3] Assuming USD 1 = INR 50.