

Chapter 1 Project Idea for Agriculture Sector

1.1 Brief Summary

Transfer and diffusion of drought and pest resistant crop varieties has been seen as an important way of combating some of the critical impacts of climate change such as crop yield instability, increased incidence of pests attacks and diseases, etc. Bhutan has initiated work on development of these kinds of varieties of crops particularly for rice and maize. The country has also initiated a Food Availability Program which has evaluation and adoption of genetic resources resistant to biotic and a-biotic stresses including drought, pests and diseases as one of the key strategies.

While efforts have been initiated in the country towards development and diffusion of such varieties, some efforts at market and institutional aspects are required to complement the on-going efforts. The current proposed project idea consists of set of activities aimed at improving market, institutional, information and awareness aspects associated with diffusion of these varieties. The project idea also consists of setting up a seed development fund which will be aimed at improving the financial support required for providing financial incentives, strengthening institutional structure etc. It also includes training and capacity building workshops for sales representatives to enable proper diffusion of drought and pest resistant varieties of crops, by improving extensions services of RDCs.

1.2 Specific Project Ideas

1.2.1 Introduction

Project title: Diffusion of drought and pest resistant varieties of crops in Bhutan by strengthening the domestic institutional structure, undertaking pilots and establishing a national seed development fund.

Background and rationale

Agriculture is the mainstay of the Bhutanese economy, with the sector contributing 16.8 percent to Bhutan's GDP in 2010 (National Statistics Bureau, 2011). More than 60 percent of the Bhutanese population still depends on the agriculture sector which is mostly subsistence in nature (Labour Force Survey, 2011). The agriculture sector in Bhutan is particularly sensitive to the impacts of changing climate, with vulnerabilities such as crop yield instability, decreased water availability, loss of soil fertility, delayed sowing etc. A country road map paper prepared by the Ministry of Agriculture and Forests ahead of the Bhutan Climate Summit 2011 identifies climate change as one of the major threats of food security in the country.

In addition, several reports have suggested increased occurrence of pests and diseases in various parts of the country, and climate change is suspected to be a major factor in this regard. Further, studies have shown that 65% of the total rice growing areas and 51% of the maize growing areas in the country is still planted with traditional varieties of crops and that there are low adoption rates of improved varieties.

With this background, development of drought and pest resistant varieties of crops was the technology finalized by the TNA Taskforce. The current report, building on the work undertaken in the other parts of the TNA exercise, proposes a project idea with a view of initiating a process towards implementing the needed measures for overcoming the barriers associated with diffusion of drought and pest resistant varieties of crops. The project idea aims to create an enabling environment for diffusion of drought and pest resistant varieties by facilitating technology development and addressing the financing and capacity building requirements for this technology in Bhutan.

1.2.2 Objectives

The project aims to achieve the following:

- Strengthening the current institutions with human resources and required facilities for accelerating research and development and extension services
- Building the needed financial support for development and deployment of new varieties of seeds
- Testing the new varieties through pilots across the country for diffusion

1.2.3 Project Outputs

Following measurable outputs would be attained after the end of the program

- A detailed plan of implementation on increasing the human resources and required facilities for accelerating research and development of BAFRA, National Seed Centre, Technology Release Committee and RDCs for improved varieties of crops
- Establishment of a seed development fund for building the financial support required for providing financial incentives, strengthening institutional structure etc.
- Undertake pilots and field testing of new drought and pest resistant varieties of horticultural crops

1.2.4 Relationship to the country's sustainable development priorities

The importance of agriculture as well as the growing realization of climate change impacts on the agriculture sector is driving several actions within the country aimed at coping with the likely impacts. The current project focussed on development and diffusion of drought and pest resistant varieties of crops is in line with country's Second National Communication to UNFCCC, which identifies the likely areas of action for adaptation in the agriculture sector. In addition, a country road map paper prepared by the Ministry of Agriculture and Forests ahead of the Bhutan Climate Summit 2011 includes a National Food Security Program with an overall goal of ensuring availability of safe and quality food at affordable prices. Under this program, a Food Availability Program has been prepared with the goal of increasing crop production through development of improved varieties, breeds, and management technologies. One of the key strategies to achieve this goal is through evaluation and adoption of genetic resources resistant to biotic and a-biotic stresses including drought, pests and diseases. Some work on climate resilient technologies (drought tolerant varieties, disease resistant varieties) particularly on rice and maize have already been carried out in the country.

Development of new varieties of crops is also the focus in the draft 11th Five Year Plan (FYP) of the Government. The project will be a support to the on-going Food Availability Program and help in achieving the targets as identified in the 11th FYP.

1.2.5 Project Benefits

The project by developing an implementable plan for enhancing the institutional capacity will help in building the institutional strength in terms of human resources, R&D facilities, and extension services of the institutions such as the BAFRA, National Seed Centre, Technology Release Committee and RDCs. By undertaking training of the current and new extension agents, will help in diffusion of these varieties to farmers, especially those located in remote areas. Enhancing the extension services of the RDCs has been the focus of the government in the recent years and this project will greatly benefit that endeavour. By introducing a seed development fund, the project can go a long way in tiding over the financial crunch associated with building research facilities or undertaking extension activities. It'll help build the confidence of farmers in adopting and cultivating new varieties of seeds and overall help the country in tiding over the adverse impacts of climate change particularly on its agriculture sector and issue of food security.

1.2.6 Project Scope and Possible Implementation

The project covers the entire country by developing strategies of strengthening of institutions both at central and regional level. The proposed seed development fund to be established under this project would also cover the entire country. The pilot projects would be implemented at each Dzongkhags in Bhutan as each of them have very different features. The implementation possibility of the project idea is very high as it very well aligned with the National Food Availability Program of the Ministry of Agriculture and Forests and the 11th Five Year Plan of the country. The Ministry has also endorsed this project idea and there is a possibility of linking this project with ongoing programs of the Ministry such as the shuttle breeding program to develop new varieties. The Ministry is also keen to develop a Comprehensive Agriculture Policy of Bhutan for which the outputs of the proposed project idea would be very useful.

1.2.7 Project activities and timelines

The key project activities and timelines are shown in Table 1 below

Table 1: Proposed project activities- Agriculture sector

S No.	Activity	Sub-activity	Duration	Budget (000 USD)	Budget heads	Responsibility/Coordination agency	Measurement/Evaluation parameter
1	Prepare a detailed plan of implementation for increasing the human resources and required facilities for accelerating R&D and extension services of the domestic institutions	<p>1.1 Review existing institutional arrangements and assess areas of improvement. As part of the review, conduct stakeholder consultations <i>inter alia</i> through key informant and focused group interviews.</p> <p>1.2 Assess and identify the specific technical expertise required in key institutes including BAFRA, National Seed Centre, Technology Release Committee and RDCs</p> <p>1.3 Identifying equipments/lab requirements, of the institutions for development of technology. Identify domestic and international technology suppliers along with scope of tie ups</p> <p>1.4 Identify and collaborate with regional and international research institutes with the RDCs under DoA by</p> <ul style="list-style-type: none"> - Establishing tie-ups - Defining scope of tie-ups - Promoting exchange of experts on exchange programmes <p>1.5 Design a training program</p>	<p>6 months (activities 1.1 to 1.4)</p> <p>6-8 months (activities 1.5 to 1.8) would be required for designing the program and actually conducting the first training. However this should be an on-going</p>	<p>100</p> <p>100</p>	<ul style="list-style-type: none"> • Staff costs/ consulting fees; • Workshop costs; cost of training materials, venue and other logistics • Travel, accommodation and other related logistical expenses • Website creation and maintenance 	<p>Department of Agriculture under the Ministry of Agriculture and Forests – will provide dedicated staff and procure services from consultants for the study.</p> <p>For activities 1.5 to 1.8 DoA along with RDCs and Royal University of Bhutan (RUB) will be involved.</p>	<p>Integration of the plan of strengthening the institutional capacity in the national strategy. Establishing tie ups with international research institutes.</p> <p>About 20-30 extension agents trained under the first phase of training across all RDCs.</p>

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(certification based) in collaboration with the research arm of RDCs to train extension agents on selling of new varieties to farmers. In collaboration with College of Natural Resources under the Royal University of Bhutan (RUB) exercise, conducted at regular intervals.

1.6 Develop extension and communication materials for the training programmes, handouts for farmers for their ready reference. This could be done by hiring consultants.

1.7 Create a website/webpage within Department of Agriculture for knowledge creation on new varieties of seeds and for easy reference for extension agents.

1.8 Assign responsibility to a particular team/individual at DOA, to act as a contact point for RDCs or extension agencies to coordinate with. Also, responsible for coordinating and planning these training programmes periodically.

2	Establishing a seed development fund for building the financial support required for strengthening institutional structure, conducting trainings etc.	<p>2.1 Conduct a review of similar funds in other countries</p> <p>2.2 Design and develop a possible institutional structure of such a fund. Estimate the fund corpus based on targets set</p> <p>2.3 Set procedures and protocols and institutional structure for operationalizing the fund. Organize a workshop to discuss the structure of such a fund with different stakeholders within the Government.</p> <p>2.4 Identifying potential international</p>	12-18 months	50	<p>-Staff cost/consulting costs</p> <p>- Workshop costs;</p> <p>- Documentation and printing costs</p>	Department of Agriculture	Creation of a fund by end of the tenure of the activity
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The fund could consist of domestic and international funds, provided either in form of grant and debt for identified activities

agencies/funds to be approached

2.5 Develop tie-ups with selected agencies. Formalizing the scope of financing and particular financing mechanism to be introduced through such tie-ups

3	Undertake pilots and field testing of new varieties of horticultural crops	<p>3.1 Identifying sites for pilots and field testing</p> <p>3.2 Identify institutions for conducting the pilots</p> <p>3.3 Prepare techno-economic feasibility reports and detailed project reports highlighting technology, application and financial details, taking into account soil erosion aspects of the selected pilot sites.</p> <p>3.4 Seek source of funding these pilots</p> <p>3.5 Prepare implementation plan including ownership models and project management models, technical skill development plans, etc.</p> <p>3.6 Implement the pilot and monitor the pilots to draw lessons from pilot applications of the drought and pest resistant varieties</p>	3 years	1000	<p>-Staff cost for planning, implementation and management of the pilots</p> <p>- Technical reports including detailed project reports</p> <p>- Documentation and printing costs</p>	RDCs and Dzongkhags	No. of pilots implemented by 2015
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1.7.1 Possible Complications/Challenges

The key challenges in the project are:

- Limited human resources in DOA and RDCs may slow down the process and thereby increase lag time
- Delay in getting access to fund from domestic and international sources
- Delay in implementation of pilot projects due to low level of supportive infrastructure