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NARDF Technical Paper Series Report

This is the precise form of the Project Completion Report based on scientific writing for wide circulation through different media.

Abstract

Dhading district has an area of about 1925 sq. km with 50 VDCs. More than 70% of the upper land is sloppy (above 30° slope) and moderately degraded. Maize and Finger Millet are the major cereal crops grown and the harvest is sufficient for about 5 months of the year to feed the households. They depend on wage labour to supplement their income and meet their food demand. A majority of the farmers neither practiced nor did they have the knowledge of soil conservation and land management techniques, despite the existence of unsuitable degraded land. Realizing the low productivity and traditionally unsuitable cultivation practices, there was a strong demand for improved agricultural practices and technology and a suitable Sloping Agricultural Land Technology (SALT) model from the farmers, local youth club and NGO. Therefore in collaboration with NARDF, PWEDO aimed to regenerate the degraded slope agricultural land by improving terraces and increase commercial vegetable crop and forage production and promote marketing network of vegetables and livestock to improve livelihoods of marginalized tribal farmers. SALT was introduced and high value vegetable crops, cucurbits and pulses were grown in rotation after maize in 500 ropani of 250 households of Mahadevsthan and Gajuri VDCs of Dhading. Major activities included group and cooperative formation, capacity development training, exposure visits, training on rainwater harvesting, establishment of collection and information centre, forage and high value vegetable crop production and marketing network. Annual income of each beneficiary household increased by at least NRs. 30,000.

Keyword

Dhading, SALT, livelihood, commercialized vegetable production

1. Introduction

A large part of Nepal's economy is dependent upon agriculture, which contributes 35% to the GDP (1), and 78% of the national work force is engaged in agriculture. Nevertheless millions of mainly rural Nepalese still suffer from food insecurity and malnutrition. There are various factors contributing to this occurrence including chronic poverty, a growing population, a weak agricultural growth, geographical isolation of the poorest communities, and inadequate access to health services, water and sanitation. In the rural landscapes, existing farming systems have led to deforestation, soil erosion, and low productivity resulting in environmental degradation and poverty. Current practices need to be transformed and innovative technologies need to be incorporated in order to create a more productive, economic and sustainable agricultural production system to improve the livelihood of the people.

Dhading district has an area of about 1925 sq. km with 50 VDCs (2). It has been lagging behind in the development process. The average socio-economic indicators show that the district is below the national average and needs efforts to change this. In the absence of adequate development infrastructures and difficult terrain, the available economic opportunities for the people are very limited. Agriculture is the main stay of the people. Of the total area, agricultural land covers about 25%, and of that 76% is cultivated. About 77% of the economically active population derive their employment from farming. However, most of the households are not able to sustain their livelihoods based upon their current farming systems. Due to small landholding sizes and lack of alternative income opportunities, a majority of the farmers are poor. Only 974 hectares of agricultural land is farmed for commercial vegetable production, which is less than 2% of the total agricultural land of the district (3). The farmers lack adequate knowledge on improved production and marketing practices of vegetables. Equally they have managed knowledge and information concerning protecting degraded agricultural as well as uncultivated land.

Additionally, land degradation is one of the most severe problems in the steep, rain fed and unprotected agricultural land. More than 70% of the upper land is sloppy (above 30° slope) and moderately degraded. In the area, the settlements of Chepang (45%) are inter-mixed with Tamang (28%) and other hill tribes Magar, Gurung, Brahmin and Dalits. Total household of project area is



about 661 and area under agriculture is 255 hectares.

Usually cereal crops are grown and the harvest is sufficient for about 5 months to feed their families (4) and they depend on wage labour to meet their added food demand (5). Realizing the low productivity and traditional unsuitable cultivation practices, there is a strong demand for suitable SALT model from the farmers, local youth club and NGO. In the district DADO, DLSO and DSCO are interested and have made written commitment for collaborative work in this project. Income generating crops such as bitter melon, cucumber, beans and cow pea are grown in very limited areas. This project will include forage crops in the terrace edge bonds and these crops in the main plots aiming to regenerate the degraded sloppy land and commercializing the organic agriculture to improve livelihood.

2. Materials and methods (conceptual framework, data, model, methodology)?

The project is designed to promote commercialized farming to improve livelihoods of marginalized ethnic people especially of Chepang, Tamang, Magar and Dalit communities in Dhading district and the use of SALT model in restoring and preserving the degraded slope land.

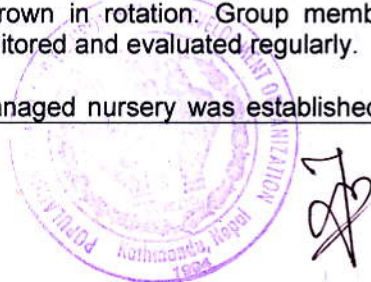
At the initial stage, a baseline survey was conducted. The baseline report identified existing farming practices, land use pattern, cropping system and economic status of farmers. The average landholding size was determined to be 15.14 ropanis. The cropping pattern followed in the lowlands included paddy, soybean, maize, bean, potatoes and in the uplands included maize, cowpea, bean, finger millet, mustard and some vegetables. It was observed that vegetable production was solely for household consumption. A household questionnaire was constructed to collect basic information of the households of the selected VDCs. A VDC level workshop and consultative meeting was organized to share the project purpose and selection of project site and farmers and to develop project work plan at the field level. All the concerned stakeholders i.e. representatives from DADO/DLSO, local NGOs, VDCs, farmer groups attended the meeting.

The project formed 10 farmer groups consisting of 25 members in five wards of two VDCs (3 wards from Mahadevsthan and two wards from Gajuri VDC). The project adopted the strategy of "one household and one member" in course of group organization. The participation of women in each group was at least 50%. The groups were strengthened continuously to convert into a cooperative. The groups were responsible in leading project activities (planning, implementing, monitoring and evaluation of project activity). The groups were responsible for "farmers-to-farmers" diffusion of tested technology.

Following the formation of groups, orientation and commercial vegetable production and marketing training was conducted. The focus of the training was to increase knowledge and skills of the target farmers. The trainings included use of improved seeds/seedlings, nursery establishment and management, field preparation, manure use, plantation, use of fertilizer and pesticide and its adverse effect on the soil and health of consumers, weeding, harvesting, post harvest technology including preserving and marketing of vegetables. Specialists from DADO, PWEDO acted as resource persons. The trainings emphasized on the currently present technical inadequacies of the farmers. Demonstration plots of growing various vegetables were established. Plants and seeds were also distributed along with the dissemination of technical information.

On spot training on SALT practices along with vegetable production was conducted to the group farmers. This model was carried out for enhancing production and productivity of terrace based cropping systems, conserving soil erosion and growing different crops, for example, cereals for food security and high value leguminous and vegetable crops for economic growth of the targeted beneficiaries. In this project, fodder trees such as Badahar, Kutmiro, Tanki, *Ipil-Ipil*, and forage crops such as *Napier*, and *Amriso* were grown as hedge rows of the terraces. In the terraces maize, beans, bitter melon, cucumber and cowpea were grown in rotation. Group members actively participated in all activities. Project activities were monitored and evaluated regularly.

Furthermore, in order to ensure sustainability, one group managed nursery was established to



produce saplings of above mentioned plants. PWEDO provided necessary inputs for this activity. After saplings were ready to be transplanted they were distributed among farmers. These saplings were transplanted to the fields with technical supervision of the project team. The importance of these plants in providing food for farm animals and in controlling erosion was also highlighted.

Minikit of vegetable seeds such as bitter melon, cowpea, cucumber and beans were provided to ten farmer groups for raising seedling in the nursery and grow vegetables commercially in their terraced land. Ten group managed nurseries of vegetables were established. Each group took a leading role in establishing, managing, producing and distributing the seedlings of the vegetables especially of cucumber and bitter melon. Fertilizers and other necessary inputs were also provided to the farmers groups.

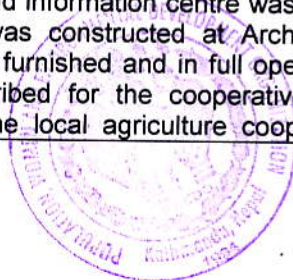
An important aspect of the project was the introduction of rain water harvest technology for collecting rain water during the monsoon to be used to irrigate fields during the dry period. PWEDO provided technical service in site selection, site cleaning, digging of ponds, and material collection. Materials included stones, sand, cement, and durable silpaulin plastic sheets to prevent infiltration of water from the ponds. The ponds were constructed with dimensions 15 meter long and 15 meter width with 5 meter depth. The walls of the pond were made of mud walls and lined with plastic sheets.

In order to observe and experience first-hand similar activities carried out elsewhere, exposure visits for all group farmers were arranged. The farmers observed the SALT model developed and implemented by LIBIRD at Majhimtar, Chitwan District. The farmers were provided abundant information regarding growing such hedge rows. A visit to the dairy farm in Yampa Phant of Tanahu district was organized. There the farmers observed a system of forage and fodder production which conserves and enhances natural resources while producing food on an economically viable and sustainable manner. The farmers observed that it was a very good example showcasing interrelationships among biology, environment and land management systems. Farmers also visited market and vegetable production sites to gain knowledge on vegetable and species production technology and market information. The farmers actively interacted with traders and learned about marketing and planning aspects. They were also briefed on Kalimati, Balaju and Samakhushi markets in Kathmandu. This provided them exposure to a wider market network. This visit gave them knowledge on production, packaging, storage and overall management through a cooperative model.

In order to know the efficacy of these activities, regular supervision and monitoring were carried out by a team comprising of PWEDO, DADO Dhading and representatives of local youth club. The team held regular interactions/discussions with the beneficiary farmers, leader farmers and other non beneficiary farmers in the community. The team suggested farmers to stop open grazing of livestock in order to protect vegetable and fodder plants.

The team identified some of the technical problems such as dryness of the slope land, provision of the polythene pipe required for water harvesting pond, irrigating plants, wind erosion loss, open grazing goats, browsing plants planted in the last season and suggested possible solutions. Also some of the established off season vegetable seeds planted in the poly bag in the nursery did not germinate well. The team discussed with the local VDC authorities for the provision of polythene pipes required for connecting water source to the harvesting pond. The farmer groups developed a policy and convinced all farmers about cut and carry and stall feeding system of fodder collection and take care of their animals. As a result, free grazing in the newly planted and vegetable growing areas has been stopped. Also the team advised farmers to set rules for punishment for those who graze animals in the planted areas.

For ensuring the marketing of vegetables produced by the targeted farmers and promoting marketing planning network, a vegetable collection and information centre was established. The building for vegetable collection and information was constructed at Archale Bazar of the Mahadevsthan VDC. The centre is currently partially furnished and in full operation. Agriculture related booklets and other publications are subscribed for the cooperative. The vegetable collection and information centre is managed by the local agriculture cooperative and local



progressive youth club. Currently vegetables and fruits from nearby villages are brought to the cooperative by farmers and is transported to the markets by using trucks.

3. Results

The target beneficiaries benefitted from commercial vegetable production. The beneficiaries have become aware of Integrated Cropping System with high value vegetables and have adopted advanced practices and use of improved varieties of vegetable crops and fodder production on the terraces. Participating households were trained on the SALT model. As a result, terraced farmlands have been preserved and a source of livestock fodder has been established.

By the end of the project, 10 groups comprising of 25 members each, were formed. In the groups, 50% women participated, not only the members, mostly represented in the executive bodies. The groups have become very active and hold monthly meetings to share and discuss important issues and collect funds to be deposited into the group accounts. They recognized the benefits of functioning as a group. They noted that they have realized that working together has helped them share knowledge, solve problems together, and achieve better results. All farmer groups were registered with the District Agricultural Development Office in Dhadingbesi. From the groups, an Agricultural Networking Committee has been formed. The committee consists of 1-2 members from each farmer group. The committee holds monthly meetings and discusses about monthly activities and proposed activities. Thus women empowerment and involvement is clearly visible in the area.

Through the project, 5 rainwater harvest ponds were constructed in order to irrigate fields during the dry period.

Farmers now grow cauliflower, tomatoes, cucumbers, bitter gourd, bottle gourd, string beans and so forth. On an average, the annual income of farmers increased by NRs. 15,000 by selling vegetables. Each farmer is found to be using 2-3 ropanis of land for vegetable farming. One woman who was interviewed during the end of project even claimed that she had earned NRs. 50,000.

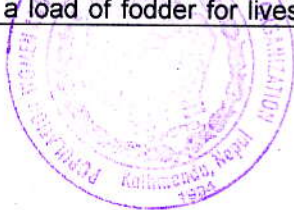
Leaflets, posters and booklets explaining all the processes of vegetable production, SALT model development and management with photographs of SALT model application were published and distributed to the farmers, stakeholders, youth clubs and other concerned organizations for future reference.

Information and collection centre established in Mahadevsthan VDC.

A video documentary was prepared for the dissemination of the impact of the SALT on management of degraded land and the impacts made by the project. The documentary covered the status of degraded land and the coping strategies adopted before the implementation of the project, project activities implemented and finally the impacts project has made in transforming the livelihoods of the farmers and in conserving the farmlands from degradation.

4. Discussion

Land is recognized as an important natural resource for avoiding food deficit problems in the country and in reducing poverty. Low productivity from unmanaged slope land terraces was one of the primary causes of food deficit and poverty in the area. There was a lack of protective live plant hedges, fodder trees and land covering plants which could play a pivotal role in preventing soil erosion. The adoption of the SALT has borne multiple results to the local farmers. Foremost, this model has helped restore and regenerate degraded lands of the project area. It has also helped control soil loss, maintain soil fertility, and help improve the soil moisture holding capacity of the land for sustaining desired productivity. Forage crops on the terrace edge bonds, leguminous and cucurbits based commercial cropping systems in the terrace main plots has added value to the soil by fixing nitrogen from the atmosphere, reduce the soil erosion and increasing the income of the farmers. The once unused, dry, unproductive lands have now been transformed into green, productive lands. As a result, farmers have been able to enhance their agricultural yield and productivity. The adoption of the SALT model has had an additional positive effect on the women of the area. The plants planted along the outer edge of terraces also serve as nutritious fodder for the local livestock. Thus, women, the group that is involved in fodder collection, have immensely benefited from this practice. Currently, the women no longer need to enter the forest for fodder collection, saving them time and effort. Some women stated that in the past they would spend up to 6 hours for collecting a load of fodder for livestock. Now they only



spend 2 hours.

The second component of the project was to improve the currently practiced terrace based farming system and promote commercial vegetable production to increase income of beneficiaries. It is widely accepted that poverty alleviation and livelihood improvement can be achieved when farmers embrace new farming technology and practices and improved marketing strategies. Through increased high value vegetable crop production and a developed marketing network, the once poor households have been able to improve their livelihoods. The farmers have been able to strengthen their organizational network and have been able to develop a strong marketing network. Prior to intervention, cereal crops accounted for most of the land used by farmers. Now they have switched to commercialized vegetable farming and have realized its entrepreneurial prospects. Thus they have gradually shifted from traditional crops to more high value vegetables. The farmers have stated that earlier they had problems selling their vegetables but now since a strong market network has been established, they have been able to receive optimum prices for their produce. The construction of harvest tanks has immensely aided the farmers in growing vegetables during the dry season. Farmers have witnessed increased food production, rise in economic growth and enhanced purchasing power which are all reliable indicators for poverty alleviation. Importantly, they have realized that there is no need to go abroad for employment when viable financial capabilities can be created at home.

The women expressed that with the additional income, they have been able to purchase educational materials for their children, deposit the funds into the group savings account and spend it on other necessary household expenses. Besides selling the vegetables they grow, they have also started to consume the vegetables themselves. This has added nutritional value into their daily lives and no longer need to buy vegetables from the market.

An important impact made by the project has been the empowerment of women. The women have observed this change themselves. In the past, women were confined to their homes and their participation in the community was frowned upon. Now society and women themselves have realized that women have an important role to play in the community. The formation of 10 women farmer groups has created a sense of community empowerment and helped facilitate the technical and entrepreneurship capabilities of the farmers. Today, the women are more organized, have greater knowledge, are confident and are self-reliant. They have realized the need for women to step forward in society and become active stakeholders of society. The women have expressed that, prior to intervention they had difficulties working in groups and some had reservations about joining a group. Now the women have created a savings account and regularly hold meetings to discuss investment opportunities. An Agricultural Networking Committee has been created by the women. The committee is involved in various community development activities including construction of a community building, raising awareness campaigns on sanitation and women's rights, educating women about the importance of child vaccination, birth registration and school enrolment. The committee has held interaction programs involving politicians, social workers, government officials and locals, organized field visits, raised the importance of toilets in each household, raised awareness of preventative measures on the spread of diseases and constructed a house for a homeless woman who was living in a cave and also provided food for her. They are able to request seeds and plants from DADO and also access development funds from the VDC. Women farmers have been able to increase their income and able to generate savings. Women have been able to utilize the funds from these savings for their children and for emergency purposes.

5. Conclusion and implication

The participating locals from the project sites were very enthusiastic towards the implementation of the project in their area. They were eager to transform their standard of living and bring a positive change in theirs and their children's lives. A high level of participation was observed from the locals. Through the project, many women have stated that they have grown in self-confidence, have become more self-reliant and are eager in making further progress in their lives and in the community. Furthermore, they have realized the rewarding experience of working in groups.



Some feedback was received from the beneficiaries towards enhancing the results of the project. Some noted that cement walled harvest tanks were necessary as they are more durable than plastic lined ones. Many stated that there was a need for more harvest tanks. In order to generate further income, the farmers revealed that additional training on vegetable farming and on new varied vegetables and fruits was required. A few women also indicated that they had a desire to gain employment based skills training. Additional pipes are also needed for improved utilization of the harvest tanks. Scaling up and replicating such a model project would enhance sustainable agriculture production and improve livelihood of the marginalised farmers.

6. Acknowledgement

The project team would like to thank NARDF for providing the funds to conduct this innovative and effective project in Dhading. The team would also like to express their sincere gratitude to all the government agencies including DADO, DLSD and VDC for their involvement and supporting the program. The team would also like to thank local Progressive Youth Club and Gaurishankar Agricultural Multipurpose Cooperative and their staff for their assistance.

The team would specially like to thank Mr. Hem Raj Bhujel, the local resource person, for his endless support and dedication towards the success of the program.

Finally the team would like to express their heartfelt gratitude towards the beneficiary farmers, the household members, local political leaders, and community based organizations for their generous support, enthusiastic commitment, and suggestions in successfully completing the project.

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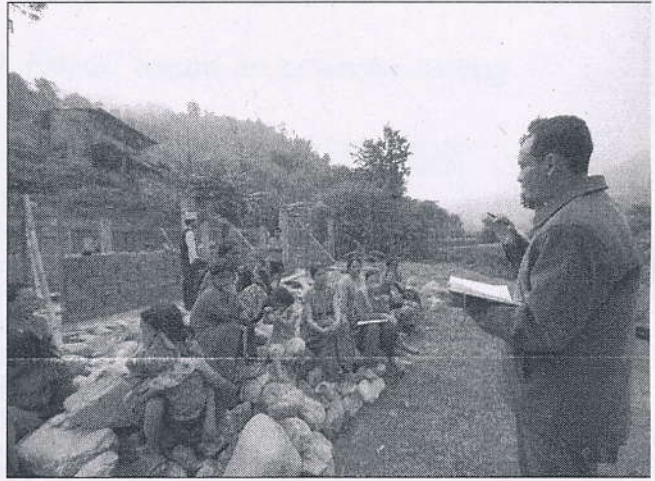
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g. Farmers growing green beans



h. Beneficiary farmers listening to local resource person Mr. Bhujel, with the under construction community building in the background

