Main Project Completion Report

1. Background

The project entitled "Water utilization in Shallow Tube Well area of Rupandehi" was awarded by NARDF in August , 2007. The agreement was signed on 16 August 2007 as 3 years project to execute from the September 1, 2007 to August 31, 2010.Shallow tube well (STW) is one of the important schemes within small irrigation in Rupandehi district. The major issues regarding STWs lie at the increased cost of operation which cannot be economical with traditional cropping practices. In order to verify the efficient crop and water management technology in the command area of selected STWs, a project entitled Participatory Research and Development in Optimal Utilization of Shallow Tube-Well Area for Enhanced Food Security of Small Farmers in Rupandehi' was in implementation since 2066/67 for the total project duration of three years. The command area of the project covers Baithaulia of Semlar VDC, Hirapur of Khadwa Bangai VDC and Katani of Makrahar VDC consisting, respectively 6, 6 and 8 DADO supported STWs plus some self established and DDC supported small irrigation system. Local stake holders of the project are Adarsha Agri Co-operative, Semlar, Baithaulia; Siiddhiganesh Agri Cooperatives, Khadwa Bangai, hirapur; and Kumarwarti Goat Farm Co-operative, Makrahar, Katani. Total command area under these three cooperatives in the three sites is approximately 70 ha. and the potential area for STW during project inception accounted for 60 ha. (3 ha./STW) and now there is increased coverage due to supplementation with canaling and pipe lining .The major castes of the target groups include Tharu, Yadav, Ray, Chai, Chhetry, etc. Most of the target group farmers fall within the category of small farmers (owning less than 15 Katha of land). There are ample opportunities in the utilization of STWs for commercialization and diversification of agriculture. Project is targeted at increasing cropping intensity, HVCs intervention, farmers' capability enhancement and optimum utilization of STWs.

2. Research implementation performance

The project has been very successful in achieving its goal, purpose and intended outputs as envisaged by the project. The project has completed three years duration accomplishing all the planed activities successfully. Project has completed 4 activities and several sub activities in order to achieve 4 intended outputs.

Site Selection, Description and Group Formation:

Three research sites: Katani, Makrahar; Baitholiya, Semlar and Hirapur, Khadgabangai village development committees (VDC) were selected in the Rupandehi district with the purpose of implementing project activities in a strong farmer participatory approach. Road accessibility, small and resource poor farmers, predominance of Rice-Wheat pattern, low crop intensification due fallow lands in winter, low utilization of STWs, low productivity of winter crops, less access to new variety of HVCs, and farmers interest and enthusiasm toward new techniques were basis for the selection of research sites for the project. A farmer survey was conducted using questionnaires and group discussion to collect bench mark data at three of the sites.

A farmer group on utilization of STWs has been formed and mobilized at each site to execute the project activities. Each farmer group constitutes an executive committee and general farmer members. The groups have also involved some other experienced & leader farmers as advisors for the group. Executive committees have been responsible to manage all the provided resources and to carry out the planned activities with the facilitation of project team and institutions.

Planning and Orientation Workshops:

Two tier planning and orientation workshops were held to kick off the project activities. One was at district level and second one was held at three site level at Makrahar, Semlar and Hirapur. Both the District and site level workshops were held at the beginning of the annual project programme of every three years. Workshops made orientation on the annual activities to be executed, develop work schedule, identify farmer participants for the field experiments, demonstrations and district level training. Representative of different line agencies, seed companies, agro-vets, farmers, site level and district level extension workers, wheat research station (NARC, Bhairahwa) and other private level service providers were participated in the workshop .

Methodologies of Activities performed during project period :

A multidisciplinary project team member was involved in the execution and evaluation of the pre-planned activities of the project. The farmer participatory approach was adopted to implement the project. The project was very much participatory right from beginning to the end. Different information materials such as; farmers field survey, diagnostic survey, farmer feed backs from different project sites were reviewed and direct interaction with the farmers were made before planning. The outputs of different on-farm/ outreach research sites through various village level workshops were also utilized during the development of project. The project was implemented at the three villages; Semlar, Hirapur and Makrahar in Rupandehi district. In the process of evaluation of different activities in farmer participatory approach 180 farmers participated in the experimentation every year.

Publication and Communication:

All together 1600 copies of three booklets on cereal seed production, Package of practices for maize, Quality seed potato production published and distributed to the farmers of STAs in Rupandehi. About 750 leaflets on successful works and stories due to the project has been produced and distributed. A video documentary of the project activities of the three project site is prepared and disseminated.

Nine Farmer field days were organized in the three years at Semlar, Hirapur and Makrahar sites to share the experiences of the project to the farmers and stakeholders. A total of 300 farmers participated and observed the field activities during Farmer field days. Farmers visited all the three sites and observed the successes in adoption of different outputs. It is believed that field days have made greatest impact as surrounding villages farmers also participated on their own interest. The major events/ findings of the projects were broadcasted from local FM radios. Similarly, they were also published in the local news papers. This activity helped in making of video of important events which was used to show the farmers for training and extension purposes. A project experience sharing workshop was also organized at the end of project where participants discussed lively and shared their views and experiences. Hoarding boards providing information on project activities were also developed and placed at different locations at each of the sites.

(Also see Final Technical Report)

3. Situation regarding delivery of outputs/results

Outputs delivery of the project has been geared up as it is spreading every where in the district. Farmers and other stakeholders have become aware of the methodologies of increasing production and productivity by increasing CI, increase income through HVCs intervention and optimum utilization of STWs with minimum utilization of the fuel and approaching toward its adoption. With the introduction of additional crops in the existing double cropping system the cropping intensity has been increased to 250%. Two alternate crops (Dhaincha, mung) based on adaptive research is established in 60 ha of the command area of STWs. Agriculture production and productivity of 50% farm families in STAs increased by 15% with the increased CI.

High Value Crops (HVCs) were intervened in the project site. Three HVCs (potato seed production from TPS or PBS, winter maize and cereal seed production) were intervened in each pocket. HVC farming is established in 50 ha of land of STAs by the time. The interest of the farmers towards the HVC is increasing due to high demand of the products. Scarcity of seed potato at planting time has reduced significantly through the production of quality seed potato from TPS/PBS. Farmers were convinced to plant maize in winter. Further, it was realized that line sowing and denser planting is important to get higher yield of maize. Cereal seed production is one of the best businesses in the Rupandehi district. Sixty ton of paddy and 42 ton of wheat seed is produced annually in the three project site. The adoption of HVCs by the farmers was more than expectation however, continuous support seems necessary because of unavailability of TPS/PBS seed locally.

Methodologies for optimum utilization of Shallow Tube Wells (STWs) was liked more by the farmers as it covers larger area in less time with less consumption of energy to cover same unit of area. STWs activities were implemented with the help of shallow tube wells owners willing to do experimentation in their STAs. With the support on delivery pipe loss of STW water resource was minimized by over 50 %. The irrigation coverage of STWs has been increased from 3 h to near 5 h /STW. Farmers are practicing seasonal and off season vegetable farming

in areas over 5 hectares at each of the sites. Farmers have also arranged personal delivery pipes of smaller size to make use of water at more number of fields at a time. Surrounding communities are putting demand on DADO office for further support on establishment of new STWs. STWs and delivery pipes provided support to the farmers that these areas were least affected by the dry spells. Demonstration each with two katha of field coverage has been established on 6 farm replications for verification of irrigation methods every year. Two kattha field was partitioned for three different methods of irrigation namely flood irrigation (Terrace to Terrace), Controlled irrigation (Canal to terrace) or Check basin Irrigation and furrow irrigation. The objective of this demonstration was to demonstrate the most suitable and efficient methods for the winter crop wheat and maize. Since the terraces in the areas are of smaller size, canal to terrace irrigation almost resembled with check basin method. The most suitable and efficient method of irrigation as demonstrated by the experiment is controlled irrigation (canal to terrace) in wheat.

For verification of irrigation schedule, demonstrations each with two katha of field coverage have been established on 6 farm replications. Wheat and maize were established for verification in consecutive years. The objective of this demonstration is to demonstrate the most effective irrigation number for wheat and winter maize. For maize, treatments of demonstration were i) two irrigations, at knee high stage and tasseling stage, ii) three irrigations at early knee high stage, tasselinng and 50 % silking stage; and iii) four irrigations at 6 leaf stage, late knee high , silking and dough stage. On an average of all sites, the four irrigation treatment yielded highest (7.5 t/h) followed by the three irrigations (5.1 t/h) and the two (2.6 t/h). Similarly, in wheat treatments of demonstration were i) one irrigation at crown root(CRI) initiation stage ii) two irrigations at CRI and Booting stage and iii) three irrigations at CRI, Booting and Dough stage. On an average of all sites, the two irrigation treatment yielded highest (3.6t/ha) followed by the three irrigation (2.76t/ha) and one irrigation (2.33t/ha).

A number of trainings were provided to the farmers, service providers and other stakeholders to promote the adoption of different results of demonstrations.

4. Prospects for the adoption of the new technology and achievement of purpose

The outputs of the project such as increasing cropping intensity, HVCs intervention, and optimum utilization of STWs have been widely adopted in the project sites as well as in the surrounding villages. People are made aware of the benefits of such methodologies and taken well by farmers and other stakeholders. News paper and other communication media have also given due emphasis to these methodologies. The project benefit is spreading everywhere in the district and people are very much excited to capture the associated benefits. The availability of the seed potato (TPS/PBS) and seeds of other crops, STWs and delivery pipe will have direct impact on adoption of project outputs, therefore there must be strong support program to make them available in the local markets.

Based on the project output achievements and peoples perception this project seemed lovely and highly demanded. There are some indicators which could support the statement on the project as promising. A clear change in the cropping system, cropping intensity, family income, empowerment of farm community, more specifically Women, Dalit and Janajati community have been perceived with the three year short span of the project. Therefore, the output of this project

could be extended for large scale adoption in the similar environment/ ecological zones of the country. (See the final technical report)

5.Key indicators of potential impact identified by project stakeholders

- More than 350 households have been directly benefited by adopting projects' output in the project sites and in the surrounding villages.
- More than 87% of farmers have adopted technologies generated by project at the sites.
- Sixty ton of paddy and 42 ton of wheat seed have been produced and stored in every sites per year.
- Farmers of project area became familiar with green manure Dhaincha and are now introducing it in between two crops rice and wheat and understand its importance to maintain soil physical, chemical and biological properties favourable for the crops.
- The cropping intensity of the area has been increased from 173% to 250%. This was achieved by the intervention of new crops Dhaincha, cowpea and/or vegetable in the existing Rice – Wheat – Fallow, and Rice – Lentil – Fallow cropping system.
- With the introduction and establishment of three HVCs, potato (TPS/ PBS)Winter and spring maize, Cereal seeds in the project command area the income of the farmer increased by 15%.
- The following areas are getting popularity as for Semlar as source centre for green gram and grain seeds, Hirapur as source centre for Dhaincha seeds, Makrahar as source centre for green gram, dhaincha and TPS seed .
- Improvement in irrigation skill and knowledge of farmers from field research on irrigation scheduling in Rice and wheat. Now they look for the critical stages of crops to apply water, thus have got increased water use efficiency.
- Almost 30% water use efficiency has developed after pipeline and canal net-working. This work has forced to increase summer crop.
- Planting time of wheat has been advanced by 2-3 weeks by introduction of early variety of rice like Radha 4.
- Saving in fossil fuel (diesel); 20 litre/ha/year of diesel saving was observed in STAs where efficiency of the STW increased from 3ha./STW to 5ha/STW.

6.Proposed follow-up

The successful outcomes of the project is being disseminated through media, publications, success story, field days, workshops and other extension approaches. DADO has already initiated a scaling up program of these technologies in collaboration with and Directorate of Agriculture Extension, Hariharbhawan; National Wheat Research Program. The following scaling up pathways needed to be followed.

1) There is high market demand for green corn as snacks and maize grains for poultry and livestock feeding, TPS and PBS seed potatoes, improved seeds of cereals (rice and wheat), Dhaincha and green gram
2) Farmers groups and cooperatives formed and mobilized
3) Linkages between development and research intuitions, agro vets, NGOs and farmers established
4) Active woman farmers' groups established and functioning
5) Semlar as source centre for green gram and cereal grain seeds, Hirapur as source centre for Dhaincha seeds, Makrahar as source centre for green gram, dhaincha and TPS and PBS seed potatoes developed and continued their self developed programs
6) Support of concerned authority for infrastructural development like seed processing centers, vegetable processing centers, improved modern packaging materials, further increased numbers of shallow tube wells, pipelining, field canal development and skill based training for the targeted communities on production and processing of agricultural produce of export standard anticipated

7.Lessons learned

- Good experience of working in a farmer participatory mode of research where all stakeholders find their role to play and farmers are better researcher and manager in their own circumstances when they are not controlled the project.
- Farmer evaluation systems of demonstration and experimentation are comprehensive rather than just yield and income from a technology.
- Shallow tube well establishment and operation is costly so additional supports is needed at first then their exploration for agricultural use can be optimized at farm level.
- Three years project period is short for this type of project
- There should be some provision in NARDF for an extension of the projects based on review of impacts and logics and also to tackle new emerging issues
- Working in a multidisciplinary team with different level of collaboration always gives new experiences, visions and broad understandings of a community and environment.
- More small farmers willing to own STWs as they found it suitable for small areas and more cost efficient.
- Project lack the formal impact study which is must for any impact oriented project to understand the dynamics of impacts in detail.
- The adoption of legume crops in the existing cropping pattern seems helpful in sustainable soil management.

8.Publications and contacts

Booklets and Leaflets:

1. Booklets on Seed potato production from TPS/PBS (400 copies), in Nepali language, Author; Rakesh Kumar Ojha, Horticulture Development Officer
2. Booklets on winter maize production, (400 copies), in Nepali language, Author; Durga Parsad Panthi, Crop Development Officer.
3. Booklets on cereal seed production, (400 copies), in Nepali language, Author; Durga Parsad Panthi, Crop Development Officer.
4. Booklets on Farmer group formation and mobilization (400 copies), in Nepali language, Author; Dhruv Narayan Chaudhary, Agriculture Extension Officer.
5. Leaflets on success story, (400 copies), in Nepali language, Author; Rajendra Parsad Chaudhary, Crop Development Officer.

Video Documentary on project output:

A complete story regarding the success and challenges of the project is prepared in the video form.

Periodic Reports:

1. Technical and Financial Trimester Reports
2. Technical and Financial Annual Report

Technical Papers:

1.Surya Parsad Poudel.2010
- Booklets on Vegetable Seed Production Techniques (Cole Crops) published in 2051 B.S.
- Booklets on Citrus Management published in year 2053 B.S.
- Booklets on Potato Seed Production published in year 2055 B.S.