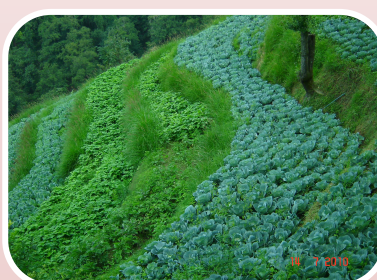


Uttarakhand Decentralized Watershed Development II Project (GRAMYA II)



AGRICULTURE AND HORTICULTURE COMPONENT



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AGRICULTURE AND HORTICULTURE COMPONENT

BACKGROUND

The area of Uttarakhand is about 54,483 sq km. In terms of geographical area, the state is dominated by the hills, 46,035 sq km compared to 7,448 sq km for the plains. However, the total cultivated area is much more evenly distributed between the hills and plains, much of the hill region is difficult to farm or covered with forests. It is estimated that the total cultivated area in the state is 768,000ha, of which 54% (415,000) is located in the hill regions.

Land use in the nine hill districts is shown in Table below. This shows that forests occupy almost two-thirds of land (63%) with only 9% being used for annual crops.

LAND USE IN HILL DISTRICTS

District	Area km ²	Forest	Culturable waste	Barren and uncultivable land	Fallow	Pasture & grazing	Misc tree crops & groves	Net area sown	Land in non-agric use	Fallow and uncultivable waste
Almora	3,090	50.7	9.1	5.5	1.9	6.5	5.8	17.7	2.7	11.0
Bageshwar	2,310	51.6	7.9	3.2	2.4	12.9	9.7	10.2	2.2	10.3
Chamoli	7,951	59.7	5.7	18.7	0.2	5.9	4.8	4.1	0.9	5.9
Champawat	1,781	55.5	6.4	2.3	4.1	8.0	11.1	10.7	2.0	10.4
Pauri	5,438	57.2	5.7	5.3	3.9	5.2	8.3	12.0	2.3	9.6
Pithoragarh	7,169	50.0	9.9	5.1	1.4	13	6.5	11.7	2.5	11.3
Rudrapur	2,328	76.4	3.4	3.1	0.6	1.8	4.9	8.5	1.3	4.0
Tehri	4,421	66.3	16.1	1.1	2.6	0.1	0.0	12.6	1.1	18.7
Uttarkashi	7,951	88.8	0.3	4.6	0.7	1.0	0.5	3.4	0.6	1.0
Total Hill Dist.	42,439	63.5	6.8	6.9	1.6	5.8	4.8	9.0	1.6	8.4

Source: Data for 2004-5 from Strategy for Hill Districts of Uttarakhand, ICRIER, 2008

The hill farms are characterized by being very small and fragmented. The average farm size being 0.6 to 0.8 ha, this is often subdivided into a number of plots in different locations. It is estimated that only 10 to 11% of the hill cultivated land is irrigated (or about 42,000ha) and is mostly located at the bottom of the valleys, the rest relies on rainfall. Generally farmers in the hill regions tend not to use inorganic fertiliser. They instead rely on composting and farmyard manure (FYM) to maintain fertility. Access to many of the hill areas is compromised by narrow, poor roads which are sometimes closed due to landslides etc. It is claimed that as much as 30% of land in the hills that was

once used to grow crops is no longer in production. About 8.4% of land in the nine hills districts is classed as fallow or cultivatable waste land, almost as much as the 9% of land that is cropped.

The relatively cooler temperatures compared to the plains results in the Uttarakhand hill regions being one of the few areas in India that can produce certain temperate vegetables such as tomatoes, potatoes, brassicas (e.g. cabbage, cauliflower) and legumes (e.g. peas, beans). It is also one of the few areas of India that can produce deciduous fruit (e.g. apples, pears, apricots). This comparative advantage is further enhanced for products that are more perishable, e.g. tomatoes, peas, beans.

PROJECT DEVELOPMENT OBJECTIVE

The Project Development Objective is; *to increase the efficiency of natural resource use and productivity of rain-fed agriculture by participating communities in selected micro-watersheds of the State of Uttarakhand.* This would be achieved by supporting the GoUK in consolidating the participatory watershed model development under previous IDA supported interventions with an emphasis on strengthening the agri-business supply chain for high value agriculture production systems.

PROJECT COMPONENTS

1. Social Mobilization and Participatory Watershed Planning

- Social Mobilization
- Preparation of GPWDP/MWS Plans

2. Watershed Treatment and Rain-fed Area Development

a. Watershed Treatment and Source Sustainability

- Watershed Treatment
- NRM Demonstrations

b. Rain-fed Agriculture Development

- Agriculture and Horticulture
- Animal Husbandry

- Fodder Production

3. Enhancing Livelihood Opportunities

- a. Agribusiness Support
- b. Support for Vulnerable Groups
- c. Consolidation of Gramya I Activities

4. Knowledge Management and Project Coordination

a. Knowledge Management

- Capacity Building of Stakeholders
- Centre of Excellence for Watershed Management
- Information Education and Communication
- Monitoring, Evaluation and Learning

b. Project Coordination

PROJECT AREA

The project will be operational within the state of Uttarakhand. Total project area will cover about 2.638 lakh hectare of land spread in 8 districts and 18 development blocks. About 509 GP with a number of 55605 HH and approx 3 lakh population will be benefited by the Project outcome.

PRESENT SCENARIO

Cropping patterns are determined by agro-ecological zones which themselves are broadly defined by altitude. The farming system for the majority of the non-irrigated hill areas consists of a 2-year rotation of barnyard millet (or upland rice), wheat or lentils (both mix cropped with mustard), finger millet mix cropped with soya, sesame, Amaranthus. Nearly all these crops are grown for own-consumption, the exceptions being soya and Amaranthus. Some of the millet is used as stock-feed. Almost without exception, the crops are grown without artificial fertilisers and, although considerable

use is made of FYM and compost, it was reported that the overall soil fertility is declining.

INCOME-GENERATING CROPS

The small fields and fragmented ownership and as most farmers are not self-sufficient, it is highly unlikely that growing staple foods will be “income-generating”. Therefore, a range of income-generating crops have been developed for the hill regions; the most important being horticultural crops, but also efforts have been made to develop seed crops, aromatic plants and spices. Some tree nut crops have also been promoted. It is estimated that more than 57% of the vegetables are produced in the hill areas. Other important income-generating crops include aromatic plants (essential oils) and spices.

Vegetables

The major vegetable crop grown in the state is potatoes, with over 22,000ha with yields of 20t/ha. The state's average potato yields exceed the national average. The yields for all the other vegetable crops are less than the national average, which again demonstrates the opportunities for increasing yields. Despite the low yields, Uttarakhand produces almost one million tons of vegetables. If the yields in the hills were the same as the plains, this would indicate that production in the hills was 520,000t; it is believed that a significant portion of this output is marketed out of the hills and out of the state.

One of the main constraints with the production of vegetables is the need for irrigation. If farmers are to get a sensible return for their vegetable crops it is imperative to use irrigation, as only about 11% of the hill regions is irrigated and much less on the slopes.

The hill regions have a two-fold comparative advantage for horticulture. The first is that the high transport cost of bringing fruit and vegetables into hills gives a degree of protection to the local farmers. The second is that the cooler weather-associated altitude of the hills in May, June, July and August is much better for temperate annual vegetables than the plains or areas further south in India. Uttarakhand has an additional advantage as these vegetable crops are grown in the summer months, when days are longer, enhanced by the more northerly latitudes. The hill areas, have comparative advantage in

supplying the major markets of Delhi and beyond with some of the more fresh off season vegetables.

Aromatic Plants

The Government of Uttarakhand (GOU) has recognised that aromatic plants have comparative advantage over many other crops in the hill regions; specifically, they are often more resilient to variability in rainfall and are not as susceptible to damage by wild animals.

Spices

A range of spices are grown in the hill regions, eg. turmeric, chillies, garlic, ginger etc. It is understood that there is a good local market and the UDWDP-I has made efforts with some farmer groups to dry and pre-pack these spices into small packs for sale in the local markets. Although spice crops are less attractive to wild animals, the yield of garlic is limited by lack of irrigation. After meeting the needs of the local market other, higher value, spice crops could be grown, and/or producers could look for markets outside of the State.

ASSUMPTIONS AND PRINCIPLES

The following assumption and principles, implementation strategy and demonstration process would be applied in the project for agriculture and horticulture activities.

- ❖ Pockets with cluster approach will be adopted rather than spreading the resources to larger areas.
- ❖ Use of a facilitative rather than directive approach to support existing processes. Traditional production system permits biodiversity providing nutritional security as well as economic insurance/assurance against Biotic and Abiotic stress.
- ❖ Pulses and oilseeds fetch good price with maximum input support. Minor millets like finger millets, Barnyard millet (Jhingora/ Madua), have nutritional advantage. Prevalent climatic conditions are congenial for harnessing the economic potential of pulses and minor millets.

- ❖ Formation and strengthen farmers groups for delivering the project services at the village level.
- ❖ Promote community owned and managed irrigation system parallel to medium to small scale system
- ❖ Strengthen institutional capacity of community-based organizations so as to make them more responsive and participatory.
- ❖ Promote and transfer new and environmentally friendly technologies.
- ❖ Support to plan market led cash crops production.
- ❖ On Farm Demonstrations (Method demonstration and Impact demonstration) can be a strong means to convince farmers, leading to wider and sustainable adaptability.
- ❖ Maximizing the know-how and skills of human resources through capacity building.
- ❖ Collaboration with other institutions (NGOs, private sector, government) to maximize utilization of project resources and promote long-term sustainability of interventions
- ❖ Consideration of profitability, efficiency and sustainability in the planning of all activities.

IMPLEMENTATION STRATEGY

“On Farm Demonstrations” (Method demonstration and Impact demonstration) can be a strong means to convince farmers, leading to wider and sustainable adaptability. Keeping this in view Demonstrations for Agriculture crops and Vegetable crops will be planned. Agriculture demonstrations will mainly focus on rainfed areas, and suitable high yielding rainfed variety of the crop predominant in that area will be taken, while vegetable crops will be area specific, maximizing the productivity with proper input support. Complete recommended package of practice for that particular crop will be executed on farmers field.

In order to achieve the desired outcomes, the focus of on-farm demonstrations (and farmer trainings linked with these demonstrations) under the project will be on wider dissemination of improved crop husbandry and natural resource management practices

to large number of famers in the project watersheds covering both the irrigated and rainfed agricultural lands. The scope of demonstrations will not be confined only to supplying subsidized inputs such as seed, fertilizers, bio-fertilizers, bio-pesticides, etc. to the beneficiary farmers. These demonstrations will be strategically used to increase productivity of field, and vegetable crops by promoting adoption of improved crop husbandry practices by the larger watershed communities by educating them about the benefits of adopting improved technologies embedded in the critical off-farm inputs provided by the project. For achieving this objective, careful attention will be paid to the following aspects while planning, organizing and evaluating the on-farm demonstrations on field and vegetable crops in irrigated and rainfed areas.

FOCUS ON HIGH PAYOFF INTERVENTIONS

The demonstrations will follow the integrated crop management approach from strengthening field boundaries for controlling run off, in situ moisture conservation and other land preparation activities to improved crop cultivation practices to harvesting of the crop, giving special attention to high payoff interventions like the following:

- ❖ Land preparation activities like field bunding / terracing and ploughing for capture and retention of rain water for having enough moisture for seed germination.
- ❖ Use of good quality seed of improved variety/hybrid which is recommended for cultivation in the area, especially rain fed areas.
- ❖ Use of soil test based nutrient application and proper method and stage of fertilizer application, including integrated nutrient management using organic manures, bio-fertilizers and chemical fertilizers.
- ❖ Methods of in situ moisture conservation and reduced run off during crop growth, and minimizing evaporation by use of mulches and other appropriate practices.
- ❖ Recommended seed rate and optimum time of sowing to ensure proper plant population, particularly in rain fed areas.
- ❖ Line sowing of crops and proper placement of fertilizers for higher plant population, greater plant vigor and easy weed control.

- ❖ Pest, disease and weed management, including integrated pest management practices.
- ❖ Improved methods of on-farm water use in the irrigated areas, including irrigation at critical stages of crop growth.
- ❖ Low cost techniques of raising disease-free vegetable seedlings.
- ❖ Vermi-compost program to popularize vermi-compost pits.
- ❖ Production technology demonstrations for rejuvenation of existing orchards.
- ❖ Carrying out all crop husbandry practices from land preparation to harvesting of the crop at optimum stage for obtaining highest productivity gains.

This list is only indicative and should be modified to suit local agro-climatic conditions, production and marketing opportunities for a particular crop. The emphasis will be on 4-5 critical interventions in a demonstration which have high payoffs rather than thinly spreading resources by including too many interventions in a particular demonstration. In view of the fact that 85% of the agricultural land in the watershed will remain rainfed, the major thrust will be on promoting low water requiring crops like mandua and other local cereals, maize, wheat, pulses. In view of the high water requirements and lack of any comparative advantage of its cultivation in the project areas, only minimal efforts will be made for promoting rice cultivation.

SELECTION OF FARMER FOR FIELD DEMONSTRATION

- ❖ A progressive farmer from the watershed community will be selected. It will be ensured that he has the commitment, capability and resources to follow the instructions provided by the experts in a timely and complete manner.
- ❖ He should also be capable of and must agree to disseminate the demonstrated technologies to fellow farmers in the watershed.
- ❖ He must provide labor for carrying out all operations for preparation of land, completion of complete package practices (sowing, fertilizer application, water management, pest and weed management, etc) up to harvesting of the crop in a timely manner.
- ❖ He must agree to undertake measures for protecting the crop from wild animals.
- ❖ He must agree to use all the inputs provided by the project (like seed, planting materials, fertilizer, IPM, etc.) for the demonstration plot only, and should neither sell these nor divert their use on his other land.
- ❖ In case of self pollinated crop demonstrations, he should agree to sell/exchange the seed produced from the demonstration plot to other farmers in the village/adjoining villages on the terms decided by the project staff and Gram Panchayat. This may include the prevalent rate in the village plus small additional amount in view of the good quality of the variety.
- ❖ He should agree to grow a small control plot adjoining the demonstration plot by following the farmer's practice in the area. This is required for comparison of results with the improved package of practices followed in the demonstration plot.
- ❖ He should preferably be a small or marginal farmer.
- ❖ Different farmers should be selected for different demonstrations, ensuring that the project benefits do not go to a few farmers only.
- ❖ He must own the land for organizing the demonstration which meets the following site.

SELECTION CRITERIA

- ❖ The plot selected for the demonstration should preferably be on the road side or village path and should be easily accessible. This is necessary for organizing trainings and field days at the demonstration site as well as for showing the benefits to the farmers who pass by the demonstration site.
- ❖ The soil type of the plot should be representative of the area.
- ❖ For demonstrations on irrigated crops the plot should be leveled and should have access to irrigation facilities. This condition is not applicable in case of demonstrations on rain fed crops.

The project staff working in the GP should ensure that the above criteria are followed while selecting the farmer for organizing the demonstration. The wider village community should be informed about the name of the farmer selected for organizing the demonstration, and it should be done at least two months before the sowing time so that there is adequate time to complete the preparatory work, including the completion of soil test report.

ORGANIZING A GROUP OF FARMERS AROUND A DEMONSTRATION PLOT

For the on-farm demonstrations organized in the first year in each revenue village in a GP (about 100 in PY1, 300 in PY2 and 150 in PY3), a group of about 15 farmers will be identified who are cultivating the crop on which the demonstration is being organized. These farmers should preferably belong to the revenue village and give an undertaking to attend all the training sessions linked with the demonstration. They do not need to have land in a cluster. As such they will be required to attend all the trainings which are linked with that demonstration. Generally there will be three training sessions - one before the sowing of the crop, one during the crop growth stage and one field day near the harvesting stage of the crop. These farmers will be provided limited adoption support in terms of critical inputs like seed for promoting large scale adoption of improved productivity enhancing practices by the farmers in the crop season following the year in which the demonstrations are organized.

ENSURING TIMELY SUPPLY OF INPUTS FOR THE DEMONSTRATION

- ❖ All off-farm inputs (like seed, fertilizer, etc.) will be procured well in advance and delivered at the demonstration site about two weeks before the sowing time.
- ❖ If the demonstration (on irrigated crops) requires development of water harvesting structures and irrigation channels, and use of pipes, micro-irrigation structures, etc. these will be procured and installed well in advance so that sowing of the crop is not delayed due to delay in completion of these works.

ORGANIZING THE DEMONSTRATION

Although the specific details will be determined by the nature of the demonstration and will vary from one demonstration to another, the following aspects will be given adequate attention for organizing good field crop demonstrations:

- ❖ Although the demonstration is organized on the land of one farmer, the larger watershed community should be informed that it is being organized to disseminate improved technologies and practices to a large number of farmers in the watershed and surrounding areas so that they are able to adopt them in the following years and increase their productivity and income.
- ❖ The treatments in the demonstration should be kept simple – one small control plot showing farmers' prevalent practice for growing that particular crop, fodder, vegetable, fruit, etc in the area, and the rest of the plot should have the complete integrated crop management technology including improved seed/samplings, recommended fertilizer dose, irrigation/rainwater management, weed control, pest management, etc. Special attention should be given to include critical inputs and management practices which have high payoff but are generally not used by the farmers in the area.
- ❖ Usually 3 training sessions will be organized at the demonstration site probably around the sowing time and other stages of the crop to educate the farmers about all the critical inputs and practices which are to be followed for obtaining the highest

yield. These trainings will be given wide publicity in advance to ensure that large numbers of farmers participate. Simple brochures or handouts (in local language) listing key practices and operations should be distributed to all the participating farmers.

- ❖ Special attention will be given to ensure proper plant population since one of the main reasons for low productivity in the project areas is poor plant population.
- ❖ Soil of the demonstration plot will be tested well in advance so that soil test based application of nutrients from organic manures and fertilizers is done.
- ❖ All operations in the demonstration plot will be done at the optimum stage of the crop to obtain optimum yield.
- ❖ All other precautions and steps will be taken so as to demonstrate that the crop in the demonstration plot is visibly much better than the farmer's practice control.
- ❖ At maturity, the crop should be harvested and the yield of the control plot compared with the demonstration plot for quantifying increase in productivity and additional income obtained as a result of adoption of the improved technology demonstrated.

TRAINING AND FIELD DAYS (ORGANIZE A FIELD DAY AT THE DEMONSTRATION SITE)

Three field days for demonstrations in each G.P for every season for a particular crop will be an integral component of Demonstration activity. These field days will be organized at sowing, at an intermediate stage of critical crop growth and at crop maturity before harvesting. Funds for the same will be dove tailed from village level training. On field days the farmers of that GP's will be collected at demonstration site and will be explained about the interventions and their comparative results for further adaptability and its wide dissemination. Following points will be focused while organizing field days at demonstration site:

- ❖ It will always be kept in mind that an on-farm demonstration is a powerful tool to demonstrate the benefits of improved technologies to the farmers and not an end in itself. The objective will be to use the on-farm demonstrations for disseminating

improved technologies to large number of farmers in the watershed villages and not only as a physical target for completing certain number of demonstrations or for distributing inputs like seed kits.

- ❖ Capacity building of farmers by “*Learning by doing*” principle will be followed, a field day will be organized at the site of each demonstration for showing the benefits of adopting the improved technologies to the farmers. This will be done at a stage when marked differences in crop condition and expected yield between the demonstration plot and the control plot are clearly visible. Normally the appropriate time for organizing the field day is shortly before the harvesting of the crop.
- ❖ The date of the field day will be decided well in advance and this should be given wide publicity in the watershed and adjoining villages.
- ❖ Steps will also be taken to ensure participation of staff from the concerned line departments like agriculture, horticulture and animal husbandry.
- ❖ Steps will also be taken to ensure that large number of farmers attend the field day.
- ❖ On the field day the famers will be shown the control and demonstration plots and encouraged to discuss the likely benefits from the demonstrated technologies. A training session will be organized by the project staff to educate the farmers about what has been done in the demonstration plot which is different from the practice normally followed by them; when was it done, how and why; what are the likely benefits; etc. Relevant brochures and handouts will also be distributed to the farmers on the field day. Special attention will be given to educate the farmers about the critical inputs, operations and practices which they should follow to obtain highest productivity levels. In addition to short lectures covering specific aspects, famers will be given free time to ask questions so that it is more of an interactive and question answer session rather than a lecture by an expert.
- ❖ Special attention will be given to ask the farmers if they would like to adopt the demonstrated technologies on their farmers in the next crop season; where from they can obtain various inputs like seed, fertilizer, plant protection and weed control materials; how they should carry out all the operations at the optimum stage of the crop; wherefrom they should obtain technical guidance; what are the difficulties they

are likely to face in procuring the required inputs and adopting the improved practices; and how these can be addressed.

- ❖ Since seed is a critical input and acts as a catalyst in the adoption of other practices, in case of self pollinated crops some arrangements will be made to distribute the seed of the demonstration plot to other farmers in the watershed/ adjoining villages.
- ❖ The date of crop cutting, which will take place sometime after the field day, should be announced in the field day. The farmers should be invited to come on that day so that they can actually see the increase in productivity as a result of adoption of improved technologies demonstrated in the plot.

PROMOTING ADOPTION OF THE DEMONSTRATED TECHNOLOGIES BY LARGE NUMBER OF FARMERS

The objective of the demonstrations is achieved only if large numbers of farmers in the watershed and adjoining villages adopt the critical demonstrated technologies on their fields in the years following the crop season in which the demonstration is organized. In order to accomplish this, the farmers should be encouraged to achieve this by organizing meetings in the village before the sowing season of the crop in the following year(s). Technical guidance and adoption support in terms of critical off farm inputs (like improved seed) will be provided to the group of 15 farmers in a revenue village which is linked to the demonstration plot as described above. Efforts will also be to help other interested farmers in the village in acquiring the required inputs by tapping into the ongoing schemes funded by Govt. of India and the GoUK, like Rashtriya Krishi Vikas Yojna, National Food Security Mission, Horticulture Mission, State Extension Reforms scheme, etc. Linkages will also be established with the state Departments of Agriculture and Horticulture, for achieving large scale adoption of the demonstrated technologies by the farmers. Based on the response, an enhanced target for the subsequent years may be fixed. At the same time the project will continue to organize on-farm demonstrations in a GP for two more years so that the farmers are continuously educated about the better ways of managing land and water resources and improved methods of crop cultivation for increasing productivity levels.

EVALUATING SUCCESS OF DEMONSTRATIONS

The success of a demonstration will be assessed at two levels – one in terms of how well the demonstration was organized to cover all the above steps and the level of gain in productivity in the demonstration plot vis-à-vis farmer practice in the area; and second in terms of adoption rates of the demonstrated technologies by the farmers in the project villages during the years following the year in which the demonstration was organized and the gains in productivity achieved by the farmers on their fields.

For measuring the adoption rates in the following years, the following three parameters will be monitored:

- ❖ Number of farmers adopting new technologies. It is likely that most of the farmers may not adopt all the practices due to various constraints. Efforts should be made to facilitate adoption of critical technologies/practices which will result in substantial gains in productivity.
- ❖ Area over which the new technologies and practices have been adopted.
- ❖ Gains in productivity achieved by the farmers.

The focus of the demonstrations should be on maximizing these three parameters. Obviously the gains in productivity levels achieved by the adopter farmers in most cases will be lower than those achieved in the on-farm demonstration plot per se, but these are an excellent indicator of the real success of on-farm demonstration because these benefits will accrue to large number of farmers (and will not be confined only to the direct beneficiary who received input support from the project) in the project area. These benefits will also be sustainable because the farmers will continue to use these improved practices. This will also substantially increase the number of households benefitting from the project, lower the cost per household, and improve the rate of return to investments under this component.

The O.K. card given on Annexure-I will be completed and duly signed by all concerned and kept for record for each demonstration.

AGRICULTURE CROP DEMONSTRATIONS (RAINFED AGRICULTURE)

The objective of proposed agriculture and horticulture interventions is to increase the productivity of field and horticultural (mainly vegetables) crops grown in the project watersheds. Because of the topographic constraints only about 15% of the cultivated land in the project watersheds can be brought under irrigation and the remaining 85% will remain rainfed. Therefore, the main thrust would be on enhancing the productivity of rainfed crops grown in the area. The main thrust will be on promoting the adoption of improved varieties and hybrids of low water requiring crops like madua, wheat, maize, other nutritious cereals, pulses and oilseed in conjunction with improved crop husbandry and rain water conservation practices, including life saving irrigation with stored rain water at critical stage of crop growth for maximizing productivity. Special attention will be paid to educate and empower the farmers about adopting critical practices like fertilizer application to the crop immediately after a rainfall event in early stages of crop growth. In the areas which already have some irrigation facilities or the additional area which will be brought under irrigation as a result of project interventions efforts will be made to promote the cultivation of high value vegetable crops. On-farm demonstrations and farmer trainings will be the main vehicle for the dissemination of improved rain water capture, in situ moisture conservation and crop husbandry practices. In the years following the year in which the on-farm demonstrations and farmer trainings are organized, the project will also provide adoption support in terms of critical inputs like seed to groups of farmers linked to the demonstrations. The detailed guidelines for organizing and monitoring demonstrations and providing adoption support are being developed. The performance indicators for this component include increase in productivity of field and vegetable crops, diversification to high value vegetable crops and improvement of cropping intensity. These efforts will help in improving household food security. Details of proposed agriculture demonstrations are as below:

**YEARLY PROPOSED AGRICULTURE DEMONSTRATIONS AND PROPOSED ADOPTION
ALONG WITH INPUT SUPPORT**

S. No	Year	No. of G.P. to be covered	No. of RV's to be covered	Description of no. of demonstration	Total no. of demo.	Description of no. of farmers adopting	Total unit of adoption support to be given	Input support for adoption @1000/farmer
1	1	100	210	210X5	1050			
2	2	300	630	630X5+210X4	3990	210X15	3150	3150000
3	3	109	226	226X5+630X4+210X3	4280	630X15+210X20	13650	13650000
4	4			226X4+630X3	2794	226X15+630X20	15990	15990000
5	5			226X3	678	226X20	4520	4520000
					12792		37310	37310000
		509	1066	cost per demo. @	3000			
				total cost	38376000			

- Proposed crops for demonstration in each district will be as per the maximum covered area.
- For each G.P. in Kharif 3 most prominent crops and for Rabi 2 most prominent crops are proposed in 1st year.
- In each G.P. for 2nd year and 3rd year, demonstration of two crops and one crop is proposed respectively.
- The demonstration plot will be of 0.2ha and the upper ceiling limit for the same will be Rs 2500 per demonstration.
- In first year GPWDP of 100 G.P's would be under preparation, i.e. presence of P.I.A. staff only in these G.P will permit demonstrations only in these 100 G.P.
- In subsequent years (2nd and 3rd) GPWDP of rest 450 G.P's (300+150) will be prepared allowing demonstrations in total 550 (100+300+150) G.P's.
- Demonstration in each G.P will be taken for only three years.

8. In each G.P.; one F.I.G. will be formed, which will comprise of clusters of farmer from where these demonstrations will be held.
9. From 2nd year of demonstration Adoption by farmers will be tracked and input support for promotion of the same will be provided.
10. The no. of farmers adopting interventions of demonstrations will be (say) 5 in Ist year and 10 in subsequent year.
11. The one time adoption support to these farmers will be upto Rs 500 which will be in the form of input support like seed, fertilizer, bio fertilizer etc.

DEMONSTRATIONS FOR VEGETABLE CROPS (IRRIGATED AREAS)

In the areas which already have some irrigation facilities or the additional areas which will be brought under irrigation as a result of project interventions the project will promote the cultivation of high value vegetable crops. Because of lower temperatures in the hilly project areas as compared with the adjoin plains, there is a comparative advantage in producing off season vegetables which are sold at a premium price in the plains. The approach will be to organize farmers into village and GP level groups of vegetable growers which will then be integrated into block/district level farmer federations. In addition to providing technical backstopping for vegetable cultivation, improved post-harvest management, marketing, backward and forward linkages of farmer groups and federations, and agribusiness development will be an integral part of project strategy. Thus the vegetable production activities under this component will be integrated with marketing and agribusiness development activities under Component B of the project.

Like rain fed agriculture described above, on-farm demonstrations, farmer training and adoption support will be the main activities which will be used for promoting

diversification and increasing productivity of vegetable crops. Details of proposed vegetable demonstrations are as below:

Yearly proposed vegetable crop demonstrations and proposed adoption

S. No	Year	No. of G.P. to be covered	No. of RV's to be covered	Description of no. of demonstration	Total no. of demo.	Description of no. of farmers adopting	Total no of adopting farmers
1	1	100	210	210X5	1050		
2	2	300	630	630X5+210X5	4200	210X5	1050
3	3	109	226	226X5+630X5+210X5	5330	630X5+210X10	5250
4	4			226X5+630X5	4280	226X5+630X10	7430
5	5			226X5	1130	226X10	2260
					15990		15990
				cost per demo. @	4000		
	Total	509	1066	total cost	63960000		

1. In each G.P. for 1st, 2nd year and 3rd year, demonstrations of ten, five and three prominent vegetable crops are proposed respectively.
2. The demonstration plot will be of 0.08 ha and the upper ceiling limit for the same will be Rs 4000 per demonstration.
3. In first year GPWDP of 100 G.P's would be under preparation, i.e. presence of P.I.A. staff only in these G.P will permit demonstrations only in these 100 G.P.
4. In subsequent years (2nd and 3rd) GPWDP of rest 450 G.P's (300+150) will be prepared allowing demonstrations in total 550 (100+300+150) G.P's.
5. Demonstration in each G.P will be taken for only three years.
6. In each G.P.; one F.I.G. will be formed, which will comprise of clusters of farmer from where these demonstrations will be held.
7. From 2nd year of demonstration Adoption by farmers will be tracked and input support for promotion of the same will be provided.
8. The no. of farmers adopting interventions of demonstrations will be (say) 5 in Ist year and 10 in subsequent year.

In addition of providing adoption support to the innovative farmer / farmers willing to adopt demonstrated interventions, they will be supported by Agribusiness

subcomponent (Pilot fund, agribusiness support) after being organized as FIG with Hand holding from Agribusiness Support Organizational Support meant for exploring marketing channels and providing market intelligence.

Performance indicators

Performance indicators for this component include increase in productivity of field and vegetable crops, diversification to high value vegetable crops and improvement of cropping intensity. These efforts will help in improving household food security.

Seed Production Programme

Seed production programme will be undertaken by progressive farmers for high yielding rain fed agriculture crops with seed support from Research institutes (VPKAS, GBPUA&T etc.) and seed certification from seed certification agency and assured buy back arrangements from Tarai Seed Corporation. For seed production programme crop will be identified keeping in view its suitability of cultivation in that area and existing market demand. Efforts will be laid to execute seed production programme in cluster. This on one hand increase farmer's income and on other hand will add to self sufficiency and availability of quality high yielding seeds for the project area. For this farmers will be earmarked and proper orientation and technical training will be imparted along with suitable exposure visits by concerned agencies.

O.K. CARD FOR ON-FARM DEMONSTRATIONS

1. Nature of demonstrations (crop, variety and theme):
2. Name and designation of the project functionary responsible for organizing the demonstration:
3. Name of farmer in whose farm the demonstrations was organized:
4. Name of para worker/Mitar Kisan, if any:
5. Name of support organization and its agriculture expert:
6. Name of revenue village and GP:
7. Name of block and division:
8. Details of organizing demonstration and related activities:

Sr. No.	Activity	Completion Date
(i)	Selection of farmer	
(ii)	Organization of related training sessions for farmers in the village: <ul style="list-style-type: none"> • Land preparation, critical inputs, and how these are to be procured, sowing, water management, fertilizer application, etc. • Practices like weed control, pest disease and nutrient management, etc. during crop growth 	
(iii)	Supply of inputs for the project (must include seed, soil-test based fertilizer dose)	
(iv)	Sowing of crop	
(v)	Fertilizer application	
(vi)	Field day	
(vii)	Crop cutting	

9. Assessment of key activities:

Sr. No.	Activity	Yes	No
(i)	Was the demonstration on a roadside/commonly used path side plot?		
(ii)	Were the inputs supplied before the recommended sowing time?		
(iii)	Was foundation/certified seed supplied by the project?		
(iv)	Were 2-3 training sessions organized in which about 15 farmers participated?		
(v)	Was a field day organized at the demonstration site in which at least 20 farmers from the adjoining villages/watershed participated?		
(vi)	Did the demonstration have a control plot showing the practices normally followed by the farmers in the area?		
(vii)	Was the cropping cutting for recording yield done by following the prescribed procedure?		

10. What were the yields (Q/ha) in the control and demonstration plots?

Control:

Demonstration:

11. What is the average yield (Q/ha) of the demonstration crop in the village?

12. What are the main requirements of the farmers for adoption of the technologies demonstrated?

13. Was a group of about 15 farmers organized around the demonstration?

14. How many farmers from the above group attended all the three training sessions?

Signature: _____

Name: _____

Date signed: _____

Facilitator/Soc. Mobilizer Project staff responsible GP Pradhan
WWMC Member
