(Phase II) Towards Climate Smart Villages: promotion of affordable and replicable adaptation and mitigation practices to enhance livelihoods of vulnerable communities in the Kavrepalanchowk District, Nepal

Introduction

The project titled "Towards Climate Smart Villages: Promotion of Affordable and Replicable Adaptation and Mitigation Practices to Enhance Livelihoods of Vulnerable Communities in Kavrepalanchowk, Nepal" aims to address the challenges posed by climate change and enhance the resilience of vulnerable communities in the district of Kavrepalanchowk, Nepal. By implementing a range of adaptation and mitigation measures, the project seeks to improve livelihoods, increase income, reduce carbon emissions, conserve water sources, and promote sustainable agricultural practices. Furthermore, the project aims to establish "Climate Smart Villages" as models of sustainable development and serve as platforms for knowledge sharing and replication.

Objectives

1. Enhance awareness raising and capacity building among community people, farmers, and local government to take up climate change adaptation and mitigation measures.
2. Increase and diversify households' income by adopting climate-smart agricultural practices and enhance households' resilience against negative climate change impacts.
3. Reduce carbon emissions through tree plantation on barren/degraded land and promote the use of alternative energy sources.
4. Conserve water sources and enhance water availability during the dry season.
5. Promote fruit (cash crop) farming through the cultivation of climate-smart species with high market value.
6. Establish "Climate Smart Villages" following the "Climate Smart Village procedure – 2073 B.S. (2016 A.D)" of the Government of Nepal.
7. Implement smart communication strategies, document project activities, and publish relevant information to disseminate knowledge and best practices.
8. Strengthen project implementation, monitoring, and evaluation processes to ensure effective and efficient execution of the project.

By pursuing these specific objectives, the project aims to create sustainable and climate-resilient communities in Kavrepalanchowk, Nepal. Through active engagement with community members, farmers, local government, and stakeholders, the project seeks to foster a holistic and integrated approach to address climate change challenges, enhance livelihoods, and promote sustainable development in the region.

Project Activities implemented so far:

1. ***Conducted one-day community orientation workshop on the climate change project in the selected settlement.***

   A series of seven orientation workshops were conducted in coordination with the ward chairperson, reaching a total of 262 local beneficiaries (162 female and 100 male). These workshops employed various interactive tools such as semi-lecture methods, newsprint paper presentations, group discussions, and Meta cards. Participants gained comprehensive knowledge about the climate change program, including its objectives, target values, activities, and project duration. They also acquired a strong understanding of climate change issues, their consequences, and the crucial linkages between adaptation and mitigation measures implemented within the project. The settlement-based approach for orientation proved to be highly effective in ensuring participants' engagement and comprehension

2. ***Organized a two-day training course on climate change sensitization, adaptation, and mitigation.***

   A two-day training course was organized, resulting in increased knowledge on climate change, adaptation, and mitigation measures for 32 participants (22 male and 10 female). The participants included 19 local elected members, 5 government staff, and 8 high school headmasters and subject teachers. The training covered a range of topics, including climate change terminologies, climate change scenarios, impacts, hazards, vulnerability, risk assessment, adaptation strategies, and mitigation measures. Participants also gained insights into government climate change policies, national programs, and activities. The significance of NAPA policy and LAPA framework in addressing local climate change impacts and the importance of the planning process were also discussed. The training was facilitated by Dr. Him Lal Shrestha and Mr. Suman Ghimire.

3. ***Facilitated two-day training course on organic kitchen gardening and multi-cropping.***

   Through a series of three training sessions conducted at the settlement level, the skills and technical knowledge of 60 local individuals (41 females, 19 males) were enhanced in the areas of organic kitchen gardening and multi-cropping. The trainings, held in three different settlements, focused on equipping participants with the necessary expertise to successfully manage organic kitchen gardens and implement multi-cropping techniques. Participants learned about various technical aspects, including vegetable nursery techniques for seedling germination, the use of compost and farmyard manure, and the application of bio-pesticides to control diseases and pests. Emphasis was placed on increasing the availability of fresh organic vegetables throughout the year for household consumption. Additionally, participants gained insights into the importance and application techniques of farmyard manure, compost manure, and the significance of nutrition for human health. The trainings also covered irrigation systems in vegetable farming and methods for disease and pest prevention.

4. ***Delivered a two-day training course on seasonal and off-seasonal vegetable farming.***
   A comprehensive training session on seasonal and off-seasonal vegetable farming was conducted, resulting in enhanced skills and technical knowledge for 28 farmers (7 females, 21 males). The training covered various aspects, including healthy nursery management practices for vegetable seedling production, intercultural operations, and compost manure management. Participants learned about best practices for vegetable cultivation, such as maximizing production per unit area, effective disease and pest management, increasing off-seasonal vegetable production, and temperature control. They gained a clear understanding of the differences between on-seasonal and off-seasonal vegetable cultivation and were guided on cultivating suitable varieties adapted to the area's specific pedo-climatic conditions. The training emphasized the use of non-chemical practices, focusing on the application of bio-fertilizers, manures, bio-pesticides, traps, and lures. To support their practical implementation, participants were provided with tomato seeds (Srijana variety) and seeds of a four-season bean variety known as local Chaumase Bodi.
5. ***Conducted a two-day training course on commercial fruit farming (kiwi, lemon, and walnut).***
   Two training sessions were conducted to enhance the skills and technical knowledge of 87 farmers in kiwi and lemon tree cultivation, as well as the commercialization of these fruits. The first training focused on lemon tree farming and was held at Bethanckhowk Rural Municipality, with a total of 31 participants (18 females, 13 males). The second training, covering kiwi fruit and walnut farming, took place in Dhunkharka. Prior to the distribution of saplings in the winter season of 2023, 56 participants (25 females, 31 males) participated in this two-day training.

   The separation of lemon, kiwi, and walnut farming trainings was necessary due to the different planting seasons associated with each fruit (summer and winter). Participants gained insights into land preparation techniques for sapling plantation and the importance of lemon, kiwi, and walnut farming techniques. They were informed about sapling production, spacing, pit size, and manure techniques specific to each fruit.

   In addition, participants acquired knowledge on the preparation of jhol mal (bio-pesticide), Bordeaux mixture, and paste for effective pest management. The training sessions also covered irrigation techniques and disease and pest prevention methods. Participants understood the link between lemon, kiwi, and walnut cultivation and their potential for mitigating climate change.

   The training was conducted by the Agriculture Officer of the Agriculture and Rural Development Office (ARD), along with their team, who acted as resource persons for the sessions.

6. ***Provided a two-day training course on livestock rearing.***

   A two-day training session was conducted in the project area, improving the skills and technical knowledge of 40 households and farmers in livestock rearing techniques. Led by Mr. Umesh Dahal, the head of the livestock section of Bethanchowk Rural Municipality, the training covered various topics. Participants learned about different livestock breeds, the importance of improved animal sheds and proper spacing for herd health and production, and feed management. They also gained knowledge about common parasites and diseases, including zoonotic diseases, along with preventive measures. The training emphasized the significance of improved livestock rearing practices and shed management, focusing on factors like land orientation and drainage facilities.

7. ***Organized a two-day training on pest control and disease management of fruit species.***

   A training session on Integrated Pest Management (IPM) was conducted in Dhunkharka, focusing on pest and disease control techniques. The training targeted 20 farmers from the project area, with 3 female and 13 male participants.

   During the training, participants gained knowledge about various methods of pest control and disease management under the IPM approach. This included using disease and pest-resistant varieties, repellants and trap crops, physical and mechanical methods, biological methods (such as predatory insects or birds), and as a last resort, chemical methods. The importance of quality compost manure, urine utilization in crop farming, and crop rotation techniques to prevent pests and diseases were also emphasized.

   The training highlighted the significance of proper sanitation, use of resistant varieties, and cultural control measures to modify conditions for better pest and disease management. Participants learned about identifying useful and harmful insects and their impact on crop yield. Moreover, they gained awareness about the negative effects of chemical pesticides and the benefits of using bio-fertilizers and bio-pesticides in pest control and disease management.

8. ***Arranged a one-day awareness campaign on waste management during World Environment Day in schools and the community.***

   Through two events conducted in the project area, a total of 119 local people were informed about proper waste management in their villages. The collaboration involved one local government, two local clubs, two secondary schools, and two cooperatives at the Rural Municipality level.

   In these events, 87 students and 8 teachers from two schools actively participated in the awareness campaign. The campaign focused on waste management and was held on June 5th, coinciding with World Environment Day. The campaign aimed to raise awareness about the importance of waste control and the need for proper waste management.

During the campaign, waste was collected from the nearby market area and roadside, where waste had been haphazardly thrown for a long time. The collected waste mainly consisted of non-degradable materials such as noodle packaging, gutkha covers, chewing gum, polythene bags, and bottles. The principals of both schools expressed their satisfaction with the waste collection program, stating that it effectively conveyed information to the community about waste control and the necessity of proper management. In total, approximately 250 kg of non-degradable waste was collected and safely disposed of, contributing to a more environmentally conscious and cleaner community.

9. ***Facilitated a one-day policy-level discussion/interaction with the local government to enhance the capacity of community forest user groups on silviculture techniques in forest areas.***

   A 1-day policy-level discussion on forest management was held in Bethanchowk Rural Municipality. The event had 36 participants, including local government officials, Community Forest User Group (CFUG) members, and project staff. The discussion focused on legal provisions related to forest management, including the Forest Act, Climate Change Policy, Environment Act, Non-Timber Forest Products (NTFPs), and Environmental Impact Assessment (EIA) procedures.

   Ms. Ranita Baral from the Sub-divisional Forest Office presented information on the current legal procedures and responsibilities of the forest office and local government under the Forest Act. The participants gained knowledge about different types of forests based on ownership and management, such as government forests, community user forests, religious forests, lease-hold forests, and partnership forests.

   Challenges in the forest sector, including forest fires, unregulated road construction, unauthorized crushers, and theft of NTFPs, were discussed. Institutional challenges like inadequate infrastructure, lack of capacity-building training, and limited youth engagement in forestry were also highlighted.

   During the discussion, the participants were instructed on forest policy and management, emphasizing the need for improved forest quality, better coordination between CFUGs and local government, and the formulation of local-level policies. The importance of forest management practices, such as bushes cleaning, thinning, and pruning, was emphasized for enhancing forest quality.

10. ***Provided institutional development and support to project stakeholders.***

    A total of 32 events related to climate change were organized in four target schools. The project provided support to these schools to conduct awareness and knowledge

enhancement activities on climate change, environment, ecosystem, garbage management, and sanitation. In this program, 500 students and 40 school teachers directly participated.

As part of the program, a one-day interaction program on climate change issues was conducted at Parbati School in Geldung, involving 14 participants including the school headmaster, science teacher, and students. Four secondary high schools, namely Parbati School, Saraswati School, Krishna Gopal School, and Chakreshwar School, were selected for the program.

The objective of the interaction workshop was to establish a common understanding of the activity and equip the participating teachers to deliver classes on the same topics. The workshop was facilitated by Dr. Him Lal Shrestha, the technical advisor of ARD CC project, and Bheem Rai. Topics such as climate change terminologies, weather and climate, adaptation and mitigation, greenhouse gases, and other relevant subjects were presented using PowerPoint presentations. The schools and teachers were provided with the materials to deliver the same message to students and parents.

Throughout the program, 32 sessions were conducted in the four schools, with a total of 347 students (202 girls and 145 boys) actively participating and gaining knowledge on climate change. Additionally, some stationery and materials were provided to the schools for extra activities and as prizes for students involved in climate change-related competitions.

Overall, the program successfully engaged schools and students in raising awareness and enhancing knowledge about climate change, contributing to their understanding of the environment and promoting sustainable practices.

11. ***Distributed mini tillers for ploughing.***

7 mini tillers were distributed to 7 different settlements. Each settlement received one mini tiller. The distribution was done among 7 active and interested farmers who were selected for this program.

To contribute to the cost of purchasing the mini tillers, the farmers themselves contributed 28% of the total cost. The remaining 72% of the cost was covered by the project.

The mini tillers provided significant benefits to the farmers. They improved working efficiency compared to traditional ploughs and reduced the workload of the farmers. The mini tillers were of good quality, ensuring their effectiveness in the field.

It's worth noting that the owners of the mini tillers contributed NPR 10,000 towards the project, likely to cover a portion of the operational or maintenance costs associated with the equipment.

12. ***Installed plastic tunnels for seasonal and off-seasonal vegetable farming.***

    35 plastic tunnels, each measuring 16m x 8m, were distributed to 35 farmers for off-seasonal vegetable farming, covering a total land area of 0.44 hectares (8.8 ropani). The farmers received agricultural tools, seeds, and technical support from ARD. Regular visits by ARD staff provided guidance, with each farmer being visited at least 10 times per year. The objective was to improve the farmers' financial situation, although specific data on the percentage increase is unavailable. The farmers practiced commercial vegetable farming using the tunnels, benefiting from increased efficiency and reduced workload.

13. ***Implemented drip irrigation systems.***

    35 farmers received drip irrigation systems to irrigate their land for vegetable production, covering a total of 0.44 hectares (8.8 ropani). The systems were used to irrigate dry land for approximately 3 months, from March through May, promoting off-seasonal vegetable farming. The percentage increase in off-seasonal vegetable farming during this period is not available. Each farmer received a complete set of drip irrigation equipment, including a plastic drum with a capacity of 100 liters and 84 meters of drip pipe laid in 8 lines inside the plastic tunnel. The distribution and installation were facilitated by a professional distributor.

14. ***Promoted organic kitchen gardens and multi-cropping practices.***

    60 households from 3 settlements have established organic kitchen gardens after receiving training. The households were provided with vegetable seeds of various local varieties such as radish, beans, cucumber, and pumpkin. Additionally, each household received a 60-liter plastic drum for making bio-pesticides. The implementation of organic kitchen gardens depends on farmers' availability of time and land after crop harvest. The agriculture technician from ARD conducts regular monitoring to ensure proper setup and provides assistance in addressing any issues such as insect or pest attacks.

15. ***Encouraged Integrated Pest Management (IPM) techniques.***

    Twenty farmers have implemented Integrated Pest Management (IPM) practices on their farms for disease and pest control. As support for their IPM activities, each of the twenty households received agricultural inputs including pheromone traps, yellow sticky traps, bio-pesticides (neem-based and metarhizium), sprayers, and plastic drums (60 liters). The pheromone traps are used to control fruit flies, yellow sticky traps for white flies, and metarhizium for white grub. The sprayers are used to apply bio-pesticides, and the plastic drums are provided for making homemade pesticides. Technical support has also been provided to assist the farmers in implementing IPM practices effectively.

16. Supported the construction of improved animal sheds for cows and buffaloes.

Forty-two improved animal sheds have been constructed according to government standard norms. Additionally, 42 pit composts have been installed, and the households are preparing pit compost fertilizer. The animals kept in the sheds are in good hygienic and health condition. Each beneficiary is visited at least six times a year by ARD technical staff. The construction of the improved sheds has provided facilities for 152 animals, including 50 cows, 100 buffaloes, and 2 oxen. ARD provided non-local materials and skilled labor for the construction, while farmers contributed local materials and unskilled manpower. Plastic drums have been set up near the sheds for proper collection of raw dung and urine. Each improved animal shed can accommodate 3 or 4 animals.

17. Conducted nursery activities.

A collaboration has been established with two private nurseries. Two collaboration meetings have been conducted to discuss the modalities of the partnership. The nurseries have provided a total of 5,000 seedlings. A list of varieties and the number of seedlings per variety is provided annually. Only high-quality seedlings are obtained to ensure high survival rates. The provision of seedlings is done in a timely manner, taking into consideration the plantation season and project goals. The project does not have its own nursery but has negotiated with the private nurseries to purchase the seedlings needed.

18. Conducted Tree Plantation Programs

A total of 1,300 seedlings of hard shell walnut species were planted in the community forest. Additionally, 3,839 fodder tree seedlings were planted on private land, covering a total area of 2.39 hectares. The plantation followed government standard norms regarding spacing. The fodder tree species planted include Gogan (Saurauria napaulensis), Hattipaile (Brassaiopsis hainla), Epil Epil (Leucaena leucocephala), and Ficus roxburghii (Nevaro). A total of 5,139 native seedlings were planted in the project area during June-July 2022. The conservation and enhancement of forest quality and biodiversity, as well as enrichment and replacement plantations, are being carried out. The survival rate of the planted forest trees has not yet been examined. The tree plantation campaigns involved community members, including women, youth, CFUG members, and farmers.

19. Installed biogas plants.

In Gorkhali village and Kunekharka village of Bethanchowk Rural Municipality, 4 biogas plants have been installed in accordance with government norms. These plants are benefiting 4 households for cooking purposes. Short orientations on the benefits, use, and maintenance of the biogas plants have been conducted in each working settlement. The installation of the biogas plants has resulted in a 66% reduction in the quantity of firewood used by each household, equivalent to a reduction of at least 24.60 tons per year. The ARD technical staff provides annual follow-up to ensure the proper use of the

biogas plants. The construction materials and support for the installation were provided by the ARD and a biogas company, while the households contributed by digging pits, providing unskilled labor, and collecting stones. Each household with a biogas plant reduces 10 kg of firewood per day, resulting in a total reduction of 14,600 kg of firewood per year for the 4 installed biogas plants. The biogas plants have a capacity of 6 m3 and require 3,000 kg of animal dung initially for methane production. Once fully functional, the plant requires 15 to 20 kg of animal dung per day for proper operation. The biogas plants are suitable for cooking food for a household with 5 to 6 members.

20. ***Renovated permanent water ponds.***

    A permanent public pond located in Kana Pakha village, Bethanchowk ward no. 3, has been renovated. The dimensions of the pond are 11.5 m (length) × 6 m (breadth) × 1.5 m (height), with a water holding capacity of 106.9 m3 (106,950 liters). The renovation addressed issues such as water seepage and overgrown bushes. The pond now provides water throughout the year, sourced from a spring. Approximately 3 hectares (60 ropani) of land are irrigated using the water collected in the pond. The renovation included excavation using a backhoe loader JCB machine, cement concreting in the pond's basement, and the construction of a stone masonry wall around the pond. Iron poles with gabion net fencing were installed on top of the wall for safety. Twenty households benefit from the renovated public pond, utilizing the available water for irrigation and livestock watering purposes. The pond allows domestic animals to access the water without causing damage or deteriorating water quality.

21. ***Promoted commercial fruit (cash crop) farming of kiwi, lemon, and thin-shelled walnut trees.***

    A total of 1,000 kiwi saplings have been distributed and planted by 41 households, covering at least 2.25 hectares of land. Similarly, 1,600 lemon tree saplings have been distributed to 69 households, covering at least 3.6 hectares of land. Furthermore, 300 walnut tree saplings have been distributed to 31 households, covering at least 2.25 hectares of land. The survival rate of the planted saplings is observed to be 80%. The distribution and plantation activities were supported by technical staff, providing guidance on pit preparation, manure application, and plantation techniques. The farmers have received suitable saplings based on their demand and land availability. Proper protection measures have been taken to safeguard the trees against damage. These plantations have the potential for commercial fruit production, contributing to the agricultural productivity of the area.

22. ***Shared project experience among various stakeholders.***

    A total of 262 farmers and key stakeholders are now aware of the project interventions. This awareness has been facilitated through various activities, including a one-day orientation on climate change interventions. Ongoing communication and discussion have taken place during the implementation of interventions in the settlements, ensuring continuous engagement and information sharing. Additional efforts are planned to further

raise awareness and discuss climate change issues throughout the project period. Two project information sharing meetings have been conducted with the local government of Bethanchowk, one at the beginning and another at the end of the annual program, strengthening collaboration and knowledge dissemination.

Conclusion

This project implemented by ARD is an ongoing initiative that has made significant progress in improving the livelihoods of farmers and addressing various agricultural challenges. Through the distribution of plastic tunnels, drip irrigation systems, kitchen garden support, and biogas plants, the project has enhanced agricultural practices, increased off-season vegetable farming, reduced firewood consumption, and improved access to clean cooking fuel. Additionally, the establishment of improved animal sheds, the plantation of fruit and fodder trees, and the renovation of water ponds have contributed to environmental conservation and increased water availability. Continuous technical support and monitoring by ARD staff have ensured the effective implementation of project interventions and the dissemination of knowledge among beneficiaries and key stakeholders. With its ongoing efforts, the ARD project continues to empower farmers, enhance sustainable agricultural practices, and foster resilience to climate change in the project areas of Kavre.