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FINAL REPORT

Integrating geospatial technologies in climate-smart agriculture planning and management in South Asia

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1. Summary

Agriculture contributes one-third of the national GDP in Nepal (CBS, 2016), 23% in Pakistan (Plecher, 2019), and 17% in Bhutan (NSB, 2018). It employs 65%, 60%, and 44% of the population in Nepal (CBS, 2016), Bhutan, and Pakistan (FAO, 2019), respectively. Agriculture is immensely affected by climate change (CC) in these countries. Climate-smart agriculture (CSA) has been identified as a sustainable solution to CC challenges in agriculture; however current efforts in CSA limit to conventional planning, extension, and dissemination approaches. The effective adoption of CSA requires smart, informed decisions for which the application of geospatial and other information technologies is crucial. The project aimed to integrate geospatial technologies in the CSA planning and management in Nepal and Bhutan with the ultimate goal of mainstreaming this technology in the local and national planning process. Specifically, the project assessed the potential applications of geospatial tools for CSA management in the selected watershed of Nepal, organized the capacity enhancement training sessions for application of geospatial techniques for the best/innovative CSA planning and management and established the field monitoring station. Assess the potential application of geospatial tools for CSA management in the selected watershed in Nepal and Bhutan;

The training program included about 30% theory and 70% hands-on practice. The participants were also taken on a field visit to successful climate-smart farms. As part of practicing the lessons learned, the participants worked in different groups on various themes revolving around CSA and geospatial technologies, including mapping potential agricultural and vulnerable areas based on various bio-physical conditions and other related information. The trainings were resourced by experts from different background, including academia, researchers, practitioners, and software developers from Nepal, Bhutan, and China.

In Nepal, a total of 107 participants, about 40% female and 60% male, representing all 7 provinces of Nepal were trained whereas in Bhutan, a total of 43 participants, about 25% female and 75% male participants, representing from diverse backgrounds and nine of the 20 districts of Bhutan. Furthermore, to manage the spatial data generated from the field and training, a web base platform was developed and established infrastructure for field monitoring that brings together stakeholders for effective communication, knowledge sharing, leading to the adoption of best CSA technologies and practices. The project showcased the dedication of the team towards advancing sustainable practices in agriculture sector and fostering regional collaboration for the benefit of agriculture in the face of climate change challenges.

2. Objectives

The overall goal of the project was to strengthen the capacity of local government and stakeholders on the application of geospatial technologies in CSA planning and management for promoting sustainable agriculture in Bhutan and Nepal.
The specific objectives of this project were as follows:

1. Assess the potential application of geospatial tools for CSA management in the selected watershed in Nepal and Bhutan;

2. Enhance capacity for application of geospatial techniques for the best/innovative CSA planning and management in the collaborating countries;
3. Establish working stations in the selected places to bring together stakeholders for discussions, knowledge sharing, leading to the adoption of best CSA technologies and practices.

3. Outputs, Outcomes and Impacts

This capacity-building project has generated tangible outputs, meaningful outcomes, and sustainable impacts, contributing to the resilience and prosperity of the region's agricultural sector.

Outputs	Outcomes	Impacts
1.1. Field survey conducted; 1.2. Spatial data collected; 1.3. Potential applications of geospatial tools for CSA management at watershed assessed; 1.4. Training materials developed;	• Spatial datasets on the selected watersheds in Nepal and Bhutan developed; • An assessment report produced; • A training manual developed;	• Generated knowledge and documented; • Geospatial tools leverage spatial data and technology to improve decision-making processes in agriculture with a focus on mitigation and adaptation to climate change
2.1 Training sessions on application of geospatial techniques for the best/innovative CSA planning and management conducted in Nepal and Bhutan	• Increased geospatial application literacy; • 4 training session completed in Nepal; • 2 training session completed in Nepal; • More demand on the training and applications in agriculture;	• Increased skill and geospatial tools and techniques application capability of the key-stakeholders in agriculture; • Adoption of climate-smart practices based on geospatial information can lead to increased resilience of agricultural systems to climate change impacts, such as extreme weather events and shifting weather patterns;
3.1 Spatial database management system developed for data achieving; 3.2 Infrastructure setup	• Spatial database management facility available; • Establishment of data archival system;	• Strengthened institutional capacity for ongoing training and support in geospatial

for field monitoring station;	• Stakeholders recognized in the need of the field monitoring station;	technologies within agricultural extension services and research institutions; • Spatial database and field monitoring station brings together stakeholders for discussions, knowledge sharing, leading to the adoption of best CSA technologies and practices;

4. Key facts/figures

Some notable facts and numbers (figures), related to section 3 as outputs of this capacity building initiative are provided herewith below:

- 107 persons trained on the geospatial applications on Climate-Smart Agriculture (CSA) in Nepal;
- 43 persons trained on the geospatial applications on CSA in Bhutan;
- 1 training module developed;
- 1 web platform developed for database management and achieving;
- 1 peer-review article developed;
- 4 training events in Nepal and 2 training events in Bhutan, and 1 workshop held;
- 2 field trips by the APN team in Nepal;
- 2 international exchange visits;
- 1 country-specific case on the application of geospatial tools for CSA management assessed and applied;
- 1 field monitoring station established.

5. Publications

Thakuri, S., Adhikari, M., Tashi, S., Acharya, P.R., Chauhan, R., Maharjan, B., Chaudhari, P., Shrestha, M.L. (2023) Integrating geospatial technologies in climate-smart agriculture planning and management in South Asia. *Under submission*.

6. Media reports, videos and other digital content

Some glimpse of Media coverage about the training sessions.
https://ekantipur.com/news/2021/10/05/16334448952396905.html?fbclid=IwAR1E8dqGO7FhSql5Lj86Lx5_N_SKDaSVTiTITpZMTuvT15kgI2ShBQq8t0o