Proceedings of National Seminar on

Small Scale Irrigation: Experiences, Challenges, Opportunities and Pathways

Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR)

Swiss Agency for Development and Cooperation (SDC) and

HELVETAS Swiss Intercooperation Nepal

IN PARTNERSHIP WITH

Institute for Social and Environmental Transition-Nepal (ISET-Nepal),

Nepal Engineering College (nec),

National Federation of Irrigation Water Users Association Nepal (NFIWUAN) and

International Water Management Institute (IWMI)

EDITORS

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DoLIDAR

Schweizerische Eidgenossenschaft
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Federal Department of Foreign Affairs FDFA
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HELVETAS Swiss Intercooperation NEPAL

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This proceeding summarises the discussions held during the National Seminar on Small Scale Irrigation: Experiences, Challenges, Opportunities and Pathways. Many organisations and individuals have contributed in a substantive way to the successful completion of the seminar and in the preparation of this proceeding. The proceeding includes the concept note, key issues identified by the participants. It also includes annexes that present abstract of papers and summary of issues highlighted in each presentation. The proceeding also includes boxes that highlight the changing nature of farm system in Nepal, climate change agriculture and food security, the contribution of small-scale irrigation in supporting local economy and livelihood and the role of interfacing of small-scale irrigation technology, market and government support in helping families increase their income and well being.

On behalf of Department of Local Infrastructure and Agricultural Roads, HELVETAS Swiss Intercooperation, Nepal; Institute for Social and Environmental Transition-Nepal; International Water Management Institute, Nepal; Nepal Engineering College and National Irrigation Water Users Association Nepal, the seminar organising committee would like to thank Mr. Deependra Bahadur Kshetry, Vice Chairman of National Planning Commission for inaugurating the seminar and for reinforcing the importance of small-scale irrigation in building a resilient food system to the participants. The organizing committee would also like to thank Mr. Shanta Bahadur Shrestha, Secretary of Ministry of Federal Affairs and Local Development for his support, including presence in the opening and closing sessions. The committee also extends its gratitude to Mr. Thomas Gass, Ambassador of Switzerland and Mr. Jean-François Cuénod, Head of Cooperation Swiss Agency for Development and Cooperation for their support. The committee is also grateful to all paper presenters for their contribution in making the seminar a success. DG scan in Kathmandu designed the layout of this proceeding.

List of Acronyms

CIP	Community Irrigation Project
DDC	District Development Committee
DIMP	District Irrigation Master Plan
DoA	Department of Agriculture
DoI	Department of Irrigation
DoLIDAR	Department of Local Infrastructure Development and Agricultural Roads
DTO	District Technical Office
IFAD	International Fund for Agriculture Development
IGGs	Income Generating Groups
INGOs	International Non Governmental Organisations
IPC	Integrated Planning Committee
ISET-Nepal	Institute for Social and Environmental Transition- Nepal
IWMI	International Water Management Institute
LGCDP	Local Governance and Community Development Program
LILI	Local Infrastructure for Livelihood Improvement
MoAD	Ministry of Agriculture Development
MoCPA	Ministry of Cooperatives and Poverty Alleviation
MoFALD	Ministry of Federal Affairs and Local Development
MoI	Ministry of Irrigation
MUS	Multiple Water Use Systems
NAPA	National Adaptation Plan of Action for Climate Change
NITP	Non-Conventional Irrigation Technology Project
nec	Nepal Engineering College
NEWAH	Nepal Water for Health
NFIUWAN	National Federation of Irrigation Water Users Association Nepal
NGOs	Non Governmental Organisations
RSDC	Rural Self Reliance Development Center
SDC	Swiss Agency for Development and Cooperation
SSIPs	Small Scale Irrigation Projects
SSISs	Small Scale Irrigation Systems
VDC	Village Development Committee
WASH	Water, Sanitation and Hygiene
WCF	Ward Citizen Forum
WUAs	Water Users Associations
WUPAP	Western Upland Poverty Alleviation Program

Preface: The Seminar

Nepali farmers and a variety of governmental and non-governmental development agencies have substantial experience in developing small-scale irrigation systems (SSISs). Their insights, however, have not been communicated to key policymakers and other actors in a manner that can support formulations of strategies to enhance the role such SSISs play in ensuring local food security and in boosting resilience.

To discuss how SSISs can be used to build resilient livelihoods, the Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR), the Swiss Agency for Development and Cooperation (SDC), and HELVETAS Swiss Intercooperation, Nepal in partnership with the Institute for Social and Environmental Transition-Nepal (ISET-Nepal), Nepal Engineering College (nec), International Water Management Institute (IWMI) and the National Federation of Irrigation Water Users Association Nepal (NFIWUAN) hosted a national-level seminar–Small-scale Irrigation: Experiences, Challenges, Opportunities and Pathways–at Mirabel Resort, Dhulikhel, Kavrepalanchwok, Nepal, on December 5-6, 2012.

The seminar saw national and international experts, academics, government officials, small-farm irrigators, researchers, donor representatives, members of the private sector, media persons, non-government organizations, and civil society come together to analyse and discuss existing and emerging issues concerning SSISs and their role in building resilient livelihoods. The seminar had four objectives:

i. To emphasise the role SSISs can play in agrarian societies like Nepal amid changing social, institutional, political and technological contexts.
ii. To review the policy and institutional environment related to the development of small-scale irrigation development and to identify missing links.
iii. To document experiences, impacts of, and lessons learned from small-scale irrigation development programmes undertaken by various government agencies and development organisations.
iv. To recommend policies, strategies and programmes to develop and strengthen the small-scale irrigation sub-sector which build on the best practices of the past to focus on livelihood transformation and resilience building.

Participants explored challenges and issues facing SSISs under four sub-themes:
- The existing state, practices and livelihood linkages
- Emerging challenges and responses
- Innovative development interventions and best practices
- Policy and institutional challenges

A Unique Socio-Technological System: The Small-Scale Irrigation System

Reliable access to irrigation is instrumental in helping small farmers improve the productivity of their land, thereby enabling them to meet their food requirements as well as to generate enough income to cover the cost of maintaining and upgrading their irrigation systems. While such systems minimise the risks associated with small-scale farming, these risks are on the rise as climate variability results in rising temperatures, erratic rainfall and poor crop yields. In addition, isolation, small landholdings, insecure land tenure, lack of access to technology, and fluctuations in the prices of global commodities and production inputs make the livelihoods of small farmers even more precarious. Because many factors are involved, assessing the vulnerability of small farmers is immensely complicated.

Historically, local food production depended on local-level production-consumption relationships determined by mutually dependent local water, land and other resources and involving tightly integrated livestock, crop and forest product systems. While these local factors are still crucial, today a farmer's stock and flow of food also depends on the infrastructure and the institutional arrangements, which link him or her to regional and even global food distribution and markets.

A farmer watering vegetable garden

Concrete-lined canal in the hills

Two interrelated processes have had particularly important effects on rural social and economic systems. First, the penetration of roads and low-cost communication systems has catalysed the expansion of regional markets for food and other commodities. Second, Nepali youths from across the nation, not just those in the impoverished mid- and far-western development regions, are opting out of agriculture and emigrating for work to destinations much further afield than the traditional destination of India.

In addition, the practice of governmental and non-governmental agencies of supplying subsidised food grains to food-deficit districts has changed local food habits and created a disincentive for cultivating traditional crops. These and other processes are changing traditional relationships among land, water, local environments, people and food systems, leaving them less integrated than they used to be. To reduce social vulnerability, the implications of these changes on food production and food security must be better understood.

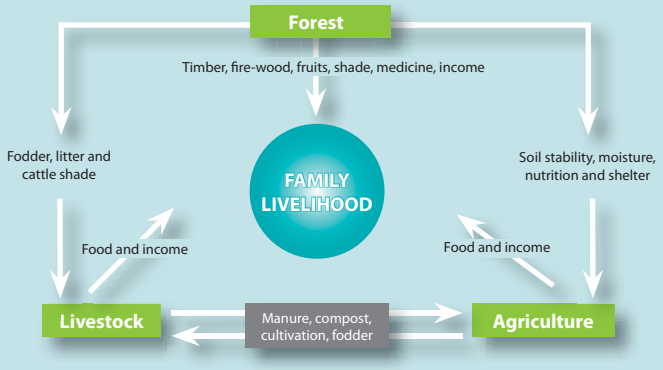
Since local food security now depends on regional as well as local systems, the challenges are also both local and regional. Local issues, such as crop failure, emergence of new diseases and pests, lack of access to appropriate, high-yielding seeds, loss of assets and livestock, and poor access to markets are relatively easy to detect. However, it is much harder to predict the likely impacts of global grain and other markets on prices and supplies, and the nature of disruptions in local storage and distribution systems attributable to global-level disruptions. Such disruption can come from policies of governments, fluctuation of price in food and related commodities while climate induced hazards like floods and landslide can disrupt food distribution producing shocks on food systems at both local and regional levels.

One alternative against potential future shocks to food production and livelihoods is small-scale irrigation, which serves not only as a means to help households achieve and maintain food security and earn income but also to contribute to the national goals of alleviating poverty and promoting sustainable development.

Box 1: Changing dynamics of food, forest and livelihood

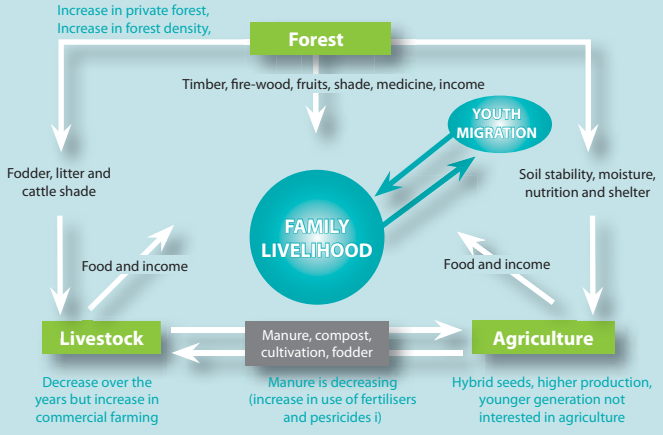
Agriculture continues to be an important source of livelihood and can contribute to food security. Irrigated agricultural land occupies 8.5 per cent of Nepal's total land area and produces 60 per cent percent of the country's agricultural commodities. Of the total production of 12.6 million tonnes, rice accounts for 3.5 million tonnes, wheat 1.3, fresh vegetable 4 and sugarcane 1.8 tonnes. Until recently livelihoods across the country depended on an interdependent forest-farming-livestock system (See Figure 1) in which local forest and grassland resources and livestock-rearing and farming practices were blended into an integrated whole. Recent studies in selected VDCs in Nepal suggest that this interdependence is changing, and the use of this understanding as a conceptual guide is not sufficient to understand farming systems and their vulnerabilities. Depleting source discharge, increasing competition for water, pollution, cut back in public expenditure in irrigation, increased emigration, declining interest of young generation in farming have emerged as new challenges. At the same time, global climate change imposes additional constraints. Studies on climate change in Nepal suggest that in future precipitation is likely to be more variable and affect water available for irrigation. Understanding the sources of vulnerabilities that climate change would bring to SSISs is critical because such systems support majority of small landholders who are in Nepal's social and economic margins. New measures need to be taken to make SSISs more resilient to emerging sources of vulnerabilities, including due to climatic change.

Nepal's Forest Livestock Agriculture and Livelihood System



Adapted from Working paper by P.R. Tamrakar, MOFSC and FAO (2003)

Changing Interdependence



Adapted from Working paper by P.R. Tamrakar, MOFSC and FAO (2003)

Tamrakar, P. R. (2003). *State of Forest Genetic Resources Conservation and Management in Nepal*, Ministry of Forest and Soil Conservation, Food and Agriculture organisation of the United Nations, Forest Genetic Resources Working Papers. Development Service.

The Small-Scale Irrigation Systems Programme

ASSIS is defined as a scheme that serves a command area less than 25 ha in the hills and less than 200 ha in the Tarai.[1] Such systems dot the agricultural landscape of Nepal. Some divert water into canals and then channel it to the crop fields, while others involve pumps (electric, diesel, treadle, solar and traditional), ponds (lined and unlined), sprinklers and drip systems. They can be individually or collectively owned. Together these systems, by enabling small holders to cultivate multiple harvests each for household consumption and/or to be sold in the market, increase agricultural productivity and income, thereby reducing rates of poverty and food insecurity. Unfortunately, many of these systems do not function at their optimal level because they are not integrated with production resources and because they lack effective management and maintenance plans.

SSISs have not only sustained local-level food and livelihood security for generations but have continually adjusted to the evolving social, economic, political and ecological contexts by introducing changes in physical infrastructures and institutional arrangements to suit each new production, operation and management environment as it evolves. Despite their utility, SSISs were recognised in formal development programmes only in 1986, when sectoral programmes for the development of irrigation were initiated. These programmes considered improving the physical infrastructures and services of SSISs crucial to enhancing their efficiency and productivity.

This recognition of the value of SSISs was reinforced in 1992 with the formulation of an irrigation policy, which was later amended in 1996 and 2003. A new irrigation policy has been drafted and is awaiting approval. Since the 2004 Policy on Local Infrastructure Development identifies small-scale irrigation as local infrastructure, the responsibility for small-scale irrigation has moved from the Department of Irrigation to the Department of Local Infrastructure Development and Agricultural Roads under the Ministry of Federal Affairs and Local Development.

Until recently, efforts to develop and modernise SSISs focused on just two types of SSISs—surface and groundwater. These systems were developed with investments from the beneficiary community or the government, and managed by the beneficiary community. Innovations in small-scale irrigation such as lined ponds, treadle pumps, and low-head drip, sprinkler and multiple water-use systems, in contrast, have been largely overlooked despite their potential in transforming the nature and productivity of smallholders' livelihoods. The few exceptions, like the International Development Enterprise and Small Irrigation and Market Initiative, a non-governmental organisation, however, had notable successes with the innovative technologies such as drip irrigation and sprinkler they introduced. In 2004, the context changed: the Department of Irrigation, the nodal agency for irrigation development in Nepal, created a non-conventional irrigation development unit with the aim of promoting non-conventional systems in socially and economically disadvantaged areas where the possibility of implementing conventional systems is limited.

[1] Irrigation policy 2060

Box 2: Investment in SSISs can support local economy and livelihood

- SSISs become more profitable due to significant increases in production intensity and output.
- Purchasing power will increase in SSISs areas that in turn can stimulate the local economy.
- Reduction of financial risks as farmers use capital gained from an increase in production to diversify their activities, and labourers can take advantage of opportunities in the non-farm sector.
- Wider access to credit, affordable equipment and water improves benefits to small farmers using SSIS.
- Increase in production intensity can foster higher wages for labourers and trigger a corresponding increase in local demand for labour.
- Combined expansion of farm and non-farm sectors can reduce seasonal emigration in search of work.
- Special provision is needed to ensure that landless and marginal farmers get benefits resulting from investments in SSIS.
- Local entrepreneurs can grow in response to demands for inputs, the sale of agricultural products, technology and services.

Adapted from: Brabben, C., Angood, J., Skutsch, and Smith, L. (2004) Irrigation can Sustain Rural Livelihood evidence from Bangladesh and Nepal, H.R. Walligford, DFID and Imperial College London.

Woman framer with her drip irrigation tank and plastic tunnel

In that same year, the Local Infrastructure for Livelihood Improvement Project (LILI) implemented by HELVETAS, with the support of SDC Nepal, pioneered small-scale irrigation development in economically disadvantaged areas and communities. LILI promoted plastic pond irrigation using Silpauline plastic for lining is well accepted and recognised as a milestone in small irrigation in mid hills of the country specially for vegetable farming. The aim was to increase agricultural productivity, create employment opportunities, and diversify income sources. It wasn't until 2011, however, that the government got involved: the Department of Local Infrastructure Development and Agricultural Roads launched the Asian Development Bank financed Community Irrigation Project. This project aims to integrate irrigation with other infrastructures and services to create synergy for transforming rural economy. The Department of Agriculture also supports small- scale irrigation initiatives but in a limited fashion, largely just carrying out minor improvements to existing infrastructures.

Now that small-scale irrigation has the attention of government and development organisations and the cessation of the insurgency in 2006 has provided ample opportunity to restore and expand rural infrastructure, the importance of SSISs needs to be underscored and reinforced. At the same time, since the conditions in which these systems were first introduced have changed and new constraints have emerged; gaps, links and synergies need to be examined. In addition, each implementer of an SSIS, whether government, private sector, non government organisation, or a community has a different approach to development with its own relative strengths, gaps and constraints. It is important to examine the outcomes of all the varieties of SSISs that have been implemented in order to develop a systematic and coordinated effort to maximise the benefits of these approaches. For example, while water users' associations (WUAs) possess enormous social capital (they could even serve as farmers' cooperatives), their role at present is limited to the maintenance of physical systems and services. If WUAs assumed more responsibility, there could be significant multiplier effects in local economies, livelihoods, and inclusive rural development.

Dhulikhel Statement

The participants in the seminar identified 17 issues critical to the development of SSISs in Nepal, presented here as Dhulikhel statement:

Policy Related Statements/Issues

1. SSISs serve a large percentage of Nepal's total irrigated land and play an important role in achieving and supporting food security among small and marginal farmers who otherwise are either ignored or accorded low priority when large infrastructure-development programmes are designed and implemented. SSISs need continued policy and programme support (financial, material and technical) from central and local governments, donors and development agencies. They also need to expand the scope of their support and adopt new approaches, in order to reach those many SSIPs located in remote areas beyond the traditional compass of government and non-governmental agencies.
2. Because of gaps in and oversights during implementation, policies on SSIPs are not translated into effective practices. Institutional overlap and fragmentation caused in part by the lack of clear definitions of roles and responsibilities has resulted in the duplication of efforts and negatively impacted the performance of SSIS interventions. Tackling these shortcomings requires creative efforts in harmonizing and appreciating the impacts of polices and in addressing existing anomalies in their implementation.
3. Using the evidence of on-going SSIS and other irrigation programmes as a measuring stick, the relevance and utility of policies need to be revisited. In order to create an environment conducive for the productive engagement of governmental and non-governmental organisations

Canal of a SSIS with brushwood dam

Farmers harvesting fish from pond

and the private sector the policies need to address a harmonised implementation approach requiring a single planning, budgeting, implementation and monitoring system for all SSIS at district level irrespective of funding agencies.

4. Because of the immediate connection of SSIS with agricultural production systems (cereals as well as vegetables and other cash crops), SSISs can significantly improve economic returns to rural farmers and create an effective foundation for social and economic transformation by providing an opportunities to escape poverty and achieve food and livelihood security.
5. Agricultural subsidies by India and the open border is creating additional stress on Nepali farmers, who find it hard to compete with cheap imported food products. Small farmers in Nepal need support, whether in the form of subsidies for or the regulation of the market prices of inputs.

Institutional Related Statements/ Issues

6. Both central- and local-level human resources such as district technical offices are overwhelmed by their responsibilities. There are too few technical personnel and those that do exist lack the capacity to meet the emerging constraints and challenges that SSISs face. Both the number and technological and managerial capacities of human resources must keep pace with demand and their skills must be regularly updated if top- quality service delivery is to be provided. Since developing SSISs also require a relatively new approach; participatory planning, design and development; there is a need for training a cadre of professionals with specific responsibility for small-scale irrigation development.
7. SSIS programmes need to be designed so that they build synergy with existing institutional mechanisms such as the Local Self-Governance Act. With timely reforms to such mechanisms, they could become entry points for small-scale irrigation.

Box 3: Climate change, agriculture and food security

In terms of agriculture and food security local communities have identified changes in climate largely responsible for declining crop and livestock production. Nepal's vulnerable subsistence farming economy is facing risk due to changes in the reliability of stream flow a more intense and potentially erratic monsoon rainfall and the impact of flooding. Decline in rainfall from November to April adversely affects winter and spring crops. Rice yield are particularly sensitive to climate conditions and may fall in the western region where larger population of the poor live which could threaten overall food security.

Source: NAPA (2010)

Integrated piggery and irrigation pond

Tank holding additional water for MUS

Technology Related Statements/Issues

8. To provide for the sustainable operation and management of SSISs, there is a need for an entirely different approach to their design, one which considers appropriate combinations of physical infrastructures and institutional arrangements. Coming up with resilient infrastructures which best fit the management capacity of users is crucial. Those physical infrastructures, which are expensive to develop and/or maintain or which require high-tech skill to do so are unlikely to be sustainable in the long run.
9. Since the sustainability of any given SSIS is related to the issue of scale, its strengths and limitations at the levels of landscape, community and political boundary must be analysed.
10. Nepal has many technological options when it comes to SSISs. They include small surface diversion and earthen canals, plastic ponds, micro irrigation (drip and sprinkler), low-lift treadle and rover pumps, and multiple-use systems. It also has user-friendly and -appropriate technology for water conservation (terracing, ponds and ahal), water allocation (use of proportional weirs known locally as "sancho" or "keys") and control of water loss (clay and plastic canal lining). Their role in enhancing small-scale production systems can be bolstered by creating appropriate institutional mechanisms for upgrading and dissemination. Using residual soil moisture management methods in coordination with scheduled irrigation water application can increase the efficiency of water use and therefore the output of SSISs.

Treadle pump in the Tarai

Drip irrigation systems in hill

Sprinkler system connected to drinking water tap as a part of multiple water use system

Plastic pond irrigation in hill

Physical Systems Related Statements/Issues

11. The impact of climate change, particularly the rise in temperatures and the increasing variability of rainfall, threatens to reduce water availability and impede the performance of SSISs. Consistency among agricultural, food security, climate change and other policies build the resilience of SSISs and communities in general.
12. Urbanisation and other change processes, such as catchment degradation, are emerging as threats to local food and livelihood security. A reconsideration of Nepal's approach to the conservation and management of both watersheds and irrigated areas could help address and even reverse the degradation processes.

Knowledge and Education Related Statements/Issues

13. The current criterion for an SSIS; an irrigation system less than 25 ha in the hills and 200 ha in the Terai has changed over time and was reconsidered in the draft irrigation policy currently under discussion, but it still fails to cover the diversity of SSISs. The definition of small-scale irrigation needs to be based on a meaningful set of criteria, which encompass the distribution and geographic diversity, as well as the socio-economic and technological contexts of SSISs. Such criteria must be based on insights from local contexts and production imperatives. Water-use inventories and other instruments such as water resources management plan and local adaptation plans of action developed on the sub-basin scale could be used as a starting point for developing these criteria.
14. Past efforts in SSISs have yielded a range of good practices that need to be used as a resource for up scaling and replication. It is important to highlight the unintended consequences of innovations and to include lessons learned in the planning and programming of future development works.

Box 4: Interfacing of small-scale irrigation technology, market and government support

Kalpana Khanal of Fulbari, Masyam in Nepal's Palpa District is encouraged by the income she makes from selling vegetables. Similarly, many other farmers of Masyam are following Kalpana's footsteps. More than 1,000 residents of Palpa District are engaged in vegetable farming. Drip irrigation is providing water to households in water scarce region of the village. The District Agriculture Office supports farmers with plastic ponds, small irrigation, plastic tunnels and also provides subsidy on seeds. In selected places where weekly markets are held, sheds have been built to sell vegetables. In the last three years, vegetable production in the district has increased annually by 500 tonnes. Surplus vegetables are exported to other districts. According to District Agriculture Office, in 2012, two thousand fifty ha land in the district is under vegetable cultivation. Interfacing of small-scale irrigation, technology, market and governmental help can increase production of vegetables and raise income. The shift is also made possible by improved access to mobility and market, education and communication infrastructures.

Based on *Kantipur* March 3, 2013.

15. Nepal's past experience and current practice of small-scale irrigation have yielded insights and knowledge that needs to be used to refine methods and policies. The departments of irrigation, agriculture, and local infrastructure development and agricultural roads need to partner educational institutions to revise curricula and prepare new case studies and other teaching materials for use in training students and practitioners of SSIS development. Existing design manuals and guidelines on SSISs need to be updated with proven principles of design and implementation.

Participation and Synergy Related Statements/Issues

16. To generate local-level multiplier effects, SSISs must be integrated into the production systems and livelihoods of smallholders and linked to other rural infrastructures and institutions. Involving beneficiaries in decision-making right from the conception of a programme generates a sense of ownership that helps to minimise the possibility that improper practices will insinuate themselves. SSISs must observe the principles of good governance, collective action and accountability and, to avoid elite capture, adopt mechanisms providing for democratic decision-making, social inclusion, gender parity and social auditing. SSISs should also promote the capabilities of local organisations like WUAs. While every WUA should adopt a set of norms, it also should take measures to serve the interests of all members despite differences in landholding size, livelihood strategy, and location within the irrigation system.
17. The sustainability of SSISs requires that the issues of water rights and social justice be addressed within the context of natural, social and political systems. SSISs must, for example, identify how the landless can be integrated into the production system as beneficiaries. When rights are considered, disputes can be resolved, competition among and within sectors minimised, and crosscutting issues like social exclusion and gender disparity incorporated at the conceptual and operational levels. With high rates of migration among young men and the resultant feminization of agriculture, gender roles, in particular, need to be examined. In the mean time government should also invest more in this SSIS sector and make it more attractive to migrating youths.

At the End

The participants of the national seminar recognised that agriculture in Nepal must undergo significant transformation in order to meet the related challenges of achieving food security, economic development, poverty alleviation and climate change. The threat of climate change is important to recognise because most estimates indicate that it is likely to lower agricultural productivity, affect production stability, and reduce income of socially and political marginal farming families. Those living in food insecure areas will be even more vulnerable. The issues identified above need to be systematically addressed so that SSISs become physically, socially and institutionally more resilient to absorb different kinds of shocks and contribute to overall well being.

Annex 1


HELVETAS
National Seminar on
Small-scale irrigation: Experiences, Challenges, Opportunities and Pathways
December 5 - 6, 2012,
Dhulikhel, Kavrepalanchowk
साना सिंचाइ: अनुभव, चुनौती, अवसर र भावी रूपरेखा
विषयक
राष्ट्रिय सेमिनार
ISET-N
IWMI

Opening Session

Bhupendra Bahadur Basnet, Director General of DoLIDAR chaired the opening session. Inaugurating the seminar Chief Guest Deependra Bahadur Kshetry, Vice Chairman of National Planning highlighted the importance of agriculture, irrigation, urban planning, and transportation that contribute towards building resilience of SSISs. Kumar Thapa, senior divisional engineer of DoLIDAR delivering the welcome speech highlighted objectives and themes of the seminar. Head of Swiss Agency for Development and Cooperation, Jean-Francois Cuenod addressed the session and suggested that small-scale irrigation systems are necessary to raise economy of the disadvantaged farmers. Shanta Bahadur Shrestha Secretary of MoFALD emphasised the importance of the Ministry accorded to develop SSISs.

SESSION 1: **Chair: Khem Raj Sharma, Ph.D**

Existing State, Practices and Livelihood Linkages

- **Small Irrigation Policies and Experiences**
  Kumar Thapa, Senior Divisional Engineer, DoLIDAR

- **Micro Irrigation Development in Nepal: Policy and Challenges**
  Kishore Bhattarai, Coordinator, NITP/DOI

- **Training Program on "Community Engagement in Small scale Irrigation and Reservoir Systems"**
  Prachanda Pradhan Ph.D, IWMI

- **Examining water and food systems interdependence in Nepal Himalaya: Small-scale irrigation system as foundations to build resilient food system**
  Ajaya Dixit, Executive Director, ISET-Nepal

Small Irrigation Policies and Experiences

Kumar Thapa

Key focus of the presentation and discussion

- Investment in irrigation creates value in sustaining the livelihood and economy of rural population through its role in enhancing, stabilising and diversifying agricultural production.
- SSIS, with size smaller than 25 ha in the hills and less than 200 ha in Tarai, have larger coverage of irrigated area in the country. Such schemes exist to a large extent in the hills, river valleys and foothills and to a limited extent in Tarai, and provide irrigation water to scattered farm plots. Nepalese farmers have rich tradition of building and maintaining irrigation system of this size through their own collective actions and self-governing institutions.
- Irrigation Policy (2003) envisions investment in small-scale irrigation development as the means to maintaining local level food security and alleviating rural poverty. The policy entrusts the responsibility of small-scale irrigation development to the local bodies with DoLIDAR at the central level and DTOs at the district level responsible for planning, designing and implementing small-scale irrigation development programmes.
- Local Infrastructure Development Policy (2004) considers small-scale irrigation and river control as an integral part of local infrastructure. The institutional arrangements envisioned for local infrastructure development include MoFALD/DoLIDAR responsible for central level planning, budgeting and monitoring and evaluation, DDCs for district level planning and implementation and DTOs providing technical backstopping in infrastructure development at the district level.
- GoN has been allocating budget for small-scale irrigation development in each fiscal year beginning 2010-2011. At present, the allocated amount is limited to Rs. 2 to 4 million per district. DoLIDAR has taken a lead in developing implementation guidelines for small-scale irrigation development programme and conducted training to enhance the capacity of the DTO personnel to implement small-scale irrigation development. District Irrigation Master Plan (DIMP) has been prepared for three districts and preparation of a technical guideline for small-scale irrigation development is currently underway.
- Alongside the regular programme, Community Irrigation Project (CIP) under the funding of ADB is being implemented under the rubric of DoLIDAR, covering 12 districts in mid western and farm western regions. The districts are Kanchanpur, Kailali, Dang, Kapilvastu, Doti, Salyan, Rukum, Rolpa, Pyuthan, Bajhang, Jumla and Mugu. Over a period of seven years (2010-2017) the program envisions to support development of 200 surface irrigation schemes and 100 shallow tubewell clusters covering 17,000 ha.
- Local Infrastructure for Livelihood Improvement (LILI) Project, currently implemented under the funding of Helvetas/SDC covers 8 hill districts: Achham, Kalikot, Dailekh, Jajarkot, Khotang, Okhaldunga and Ramechhap. The project envisions providing development support in 390 small irrigation schemes covering 2,925 ha. To date the project has provided development assistance to 269 irrigation schemes covering 2,000 ha benefitting 13,362 households.
- The provision of funds for small-scale irrigation development, however, has been meager. Due to limited funds it has been impossible to meet the demand made by local communities. Small-scale irrigation development is a new initiative within DoLIDAR and needs consolidation and

harmonisation with other sectors. Capacity development of DTO personnel to take up irrigation development is another important issue.

- It is important to prepare district wise inventory of small irrigation in order to ascertain the number, distribution and area coverage. Preparing a District Irrigation Master Plan can help establish database system and prioritise the irrigation development within the districts.

Micro Irrigation Development in Nepal: Policy and Challenges

Kishore Kumar Bhattarai, Ph.D

Key focus of the presentation and discussion

- Non-Conventional Irrigation Technology (NITP) involves drip, sprinkler, treadle pump and rainwater harvesting methods. These methods create opportunity to provide irrigation in those areas where limitations of available water source and topography do not create opportunity for developing conventional surface and groundwater irrigation systems. These areas are inhabited by poor and marginal farmers and disadvantaged groups where dependence on monsoon rainfall is the only option for them to cultivate crops on the limited land with very low to low productivity. Because of unsuitability of land, soil or limitation of the available water sources, around 800 thousand hectares of cultivable land in the country has little opportunity for developing conventional irrigation system.
- By integrating conventional canal and groundwater systems, NITP schemes create opportunity to enhance their efficiency and productivity to address deficiency by achieving more controlled application of water in section of the command area.
- Investment in the development and promotion of NITP creates opportunity to address hunger and poverty in short period of time due to small gestation period of these methods and low level of investment required. This investment creates opportunity for positive discrimination, focusing especially the poor, disadvantaged, marginal groups and women.
- The 2003 Irrigation Policy, APP (1995), Water Resources Strategy (2002) and National Water Plan (2005) emphasis promotion of NITP. Increasing irrigation coverage under NCIT has been emphasised in Tenth Plan (2002-2007) and successive Three Years Interim Plans (2007-2010 and 2010-2013). National Adaptation Plan of Action for Climate Change (NAPA) has stressed scaling up of the NCIT options to minimise the likely impact of climate change in food production.
- Promotion policy and implementation guidelines for micro irrigation was developed with the support of ADB (ADB TA 4774) has emphasised on market based initiative in supplying technology and spare parts by promoting network of dealers and retailers. This guideline has also emphasised institutional support for credit, knowledge dissemination and capacity building.
- Department of Irrigation (DoI) promotes NITP through a new unit called New Irrigation Technology Program (NITP) created within DoI in 2005. DoI has also developed its own project implementation guidelines for NITP. The programme has emphasised integration of development of such technology and practices of crop and water management. Such integrated development has however been limited because DoI lacks human resources and capacity to undertake these activities.

- NCITs are often misunderstood for having potential to cover small areas for irrigation. Though a single NITP unit irrigates small area, a much larger area could be covered when numbers of NCITs are used in clusters. It is important to appreciate that impact of NCITs is at 'micro scale' by effectively integrating them with agricultural production systems much larger impact can be produced and sustained.
- Despite its potential, the focus of the government, especially the DoI, has been on large and conventional irrigation development instead of promoting NITPs in a meaningful way. Minimal efforts have been made in addressing the agricultural water needs in the marginal and water scarce areas. The promotion of NITP within DoI is limited to inclusion of some components in large irrigation development programmes.

Training Programme on Community Engagement in Small scale Irrigation and Reservoir Systems

Prachanda Pradhan, Ph.D

Key focus of the presentation and discussion

- Management of water for agricultural development is key to achieving both food and water
- security on a sustainable basis.
- Western Upland Poverty Alleviation Program (WUPAP), funded by International Fund for Agriculture Development (IFAD), includes investment in improving irrigation infrastructure as means to achieving water and food security in the project area. IWMI has undertaken a study on "improving Sustainability of Impact of Agricultural Water Intervention" in IFAD supported project area. Based on the study findings that agricultural water management interventions can be improved through "better" community engagements at all stages, IFAD requested IWMI to develop training programmes to promote community engagements in the project area.
- The community engagement exercise was conducted by IWMI in Risbang Vilage of Rolpa District. The training involved community as well as engineers, social facilitators and agricultural technicians engaged in implementation of the project.
- The training methodology involved experience sharing, transect walk, community interaction and planning exercise with the community members. The programme emphasised the principle of "from community to the community".
- The program helped in emphasising the role empowered community can play for effective engagement in process development of irrigation infrastructure and thereby improve return on the investment. It underscored that such engagement creates a sense of ownership from the very beginning of the programme.

Examining Water and Food System Interdependence in Nepal Himalaya: Small Scale Irrigation System as Foundation to Build Resilient Food System

Ajaya Dixit

Key focus of the presentation and discussion

- The presentation analysed climate change and food system interaction in six Village Development
- Committees (VDCs) that formed transect in central Nepal Gandaki Basins. The VDCs extend from Tarai to High Mountains (100-5,000m): Dubia (Kapilvastu), Hansapur (Arghakhanchi), Madanpokhara (Palpa), Rupakot (Kaski), Ramche (Myagdi) and Kagbeni (Mustang). In all these VDCs people have invested in developing local infrastructure and systems to harness available sources of water for agricultural uses. The systems ranged from small run-of-the-river canals to plastic lined and earthen ponds. Use of drip and sprinkler are common in areas like Madanpokhara and Rupakot, where development agencies have long been involved in the promotion of appropriate agricultural and irrigation technologies. In most VDCs, availability of irrigation was limited to river valleys and old river terraces. Irrigation was not available in upland terraces of hills and mountains.
- In all VDCs such investments were part of what can be termed autonomous action of the farmers who seek measures for reliable supply of water. With increasing climatic variability, manifested by rise in temperature and erratic precipitation across the region, the smaller systems for irrigation developed by the farmers can serve as the entry point to pursue planned adaptation measures. Such an approach can link national planned efforts with autonomous strategies
- In six VDCs climate change is one among many change drivers that affect the livelihood of the rural population who understand that the challenges they face are not unique to them.
- Investment in small-scale irrigation can contribute to local level food security in the realm of climate uncertainty because such system increase opportunities of enhancing and diversifying smallholder's production system. The need for inter-sectoral coordination is critical to create synergy for the development and promotion of smallholder's irrigation and agricultural technology. Consistency among agriculture, food security and climate change policies is essential to enhance such cooperation.

SESSION 2: **Chair: Arun Dhoj Adhikari**

Emerging Challenges and Responses

- **CClimate Impacts on Micro-Irrigation Hits the Smallholders Hardest: Climate Smart Agriculture Enhances Community Resilience.**
  Deepak Rijal, Ph.D, Adaptation Specialist
- **Vertical Integration of Small- Scale Irrigation, Agricultural Technology and Marketing for Food Security and Livelihood**
  Tulasi Gautam, Agricultural Economist
- **Small Scale Water Storage Systems: Appropriate Means to Improving Agricultural Livelihood in the Hills of Nepal**
  Deepak Lochan Adhikari and Chiranjibi Rijal
- **Plastic Pond Technology Management and Income Generation**
  Nagendra Raj Pandey, Entrepreneur

Climate Impacts on Micro-Irrigation Hits the Smallholders the Hardest: Climate Smart Agriculture Enhances Community Resilience

Deepak Rijal, Ph.D

Key focus of the presentation and discussion

- Temperature and rainfall changes across the country do not follow a defined trend though available data indicate shift in the pattern and distribution. This shift is responsible for affecting local livelihood and increasing vulnerability of the people. Farmers identify shift in the dates of planting, flowering and maturity of the crops, incidences of pests and diseases and animal calving intervals as indicators of climate change. These indicators are in resonance of anomalies in the climate system.
- Climate change impacts cut across three key sectors: infrastructures and settlement, water and biodiversity and agriculture. Agricultural production system faces high threat from climate change. Annual cereal production of the country fluctuates from year to year owing to favorable or unfavorable weather in the growing season. Drought and flood undermine food security. Drought from monsoon failure in 2006 and winter drought in 2008 have jeopardised Nepal's food security.
- Even in region with canal systems, irrigation is seasonal and many pockets in country's ecological zones have no irrigation infrastructures. The small and marginal farmers in the hills,

river valleys and foothills depend on small-scale irrigation schemes, including wells and ponds. Current coverage and possibilities of large-scale irrigation is limited to Tarai. Emphasis needs to be accorded to developing small-scale irrigation as means to sustaining livelihood and food security at local level while improving performance of larger systems.

- The investment in irrigation development must be supported by protection of water sources and promotion of conservation technologies to enhance sustainability and productivity of irrigated agriculture. Smart agricultural techniques, including conservation farming, IPM and diversification of production system by integrating crop, livestock and floriculture can help minimise the climate vulnerability. Efforts should also be made to promote eco-friendly farming approaches to sustain smallholders' income. This approach would be consistent with the framework of climate smart agriculture of FAO (2011) that aims to increasing productivity while building resilience (enabling adaptation) and mitigation (reduction of emission of greenhouse gases) while achieving national food security goals.

Vertical Integration of Small Scale Irrigation, Agricultural Technology and Marketing for Food Security and Livelihood

Tulasi Gautam

Key focus of the presentation and discussion

- The investment of the government in the development of irrigation infrastructure and in the development of agriculture over the past 25 years (1984/19985-2010/2011) has been almost same (Rs. 71,448.3 million in agriculture and 78,982.3 million in irrigation). Yet the productivity gain in the irrigated agriculture is not encouraging. Lack of coordination between irrigation and agricultural development is a key bottleneck to enhance agricultural productivity in the irrigated areas.
- The shift from traditional agricultural practice in non-irrigated area to improved agricultural practices with the development of irrigation has brought about productivity gains in cereals, pulses and vegetables. When integrated with suitable agricultural technology the productivity gains in agriculture is high as 68% in rice and 117% in wheat. An array of proven agricultural technology components exists and needs to be promoted in the irrigated areas.
- There is a large discrepancy in the available data on irrigation coverage by type and size of schemes. This is especially true with small scale and farmer managed irrigation schemes. The distribution of irrigation coverage of 1.25 million ha in the country is skewed across the three ecological zones; Tarai (81%), Hills (15%) and Tarai (4%). The coverage is large in the eastern and central development regions (33% and 32% of the cultivable area) compared to the mid- western and far western development regions (11% and 9% of the cultivable area).
- Despite the role played by small-scale irrigation development in enhancing agricultural productivity, small-scale irrigation development has not received the attention it needs. Three agencies, DoI, DoA and DoLIDAR are involved in small-scale irrigation development and their mandate is unclear which limits achieving production and productivity gains.
- Efforts are needed to integrate appropriate agricultural technology with irrigation development to create synergy for agricultural productivity enhancement. Improvement in the irrigation database

through regular updating of information on coverage, cropping intensity and productivity changes of major food crops would be another important area of improvement in the days to come.

Small Scale Storage System: Appropriate Means to Improving Agricultural Livelihood in the Hills of Nepal

Deepak Lochan Adhikari and Chiranjibi Rijal

Key focus of the presentation and discussion

- Rural households need water to meet their water needs for domestic, irrigation, and livestock watering and for other small-scale enterprises and for social rituals and festivities. Access to dependable water supply in the hills to meet all these needs are severely constrained owing to a host of climatic and geologic and social, economic and political factors. The households belonging to poor and disadvantaged groups are on the losing end. Water poverty resulting from lack of access to dependable water supply is responsible for producing spectrum of social and economic consequences and hardships faced by rural households.
- Development of small-scale water storage system could serve as alternative to increase access of isolated rural households and communities to dependable source of water to meet water for drinking and irrigation needs. Available and proven technologies are accessible to develop household and community-based water storage systems ranging from 500 to 15,000 liters in capacity, such as jar, ferrocement tanks and concrete tanks. Concrete and plastic lined ponds are proven alternatives for community-based water systems for irrigation uses.
- Household based water storage systems create opportunity to begin income generating enterprises such as vegetable production and livestock rearing in addition to providing water for domestic needs and reducing the drudgery involved in water fetching. Households with small storage systems earn a monthly income of Rs. 15,000 and higher by integrating production activities with the available water sources. Even with water tank of 1,000 liters capacity, the frequency of fetching water from other sources have reduced from 5 to 2 times per day in a period of five months in a year.
- Rehabilitation of existing ponds and development of new ponds with plastic and concrete lining creates water source for community uses. Such a pond in one ropani (515 m2) could store enough water to provide irrigation in 50 ropani (2.6 ha) of land, creating possibility for one additional crop in dry season.
- The potential for promoting small-scale water storage systems is high in rural Nepal. The process of promotion needs to involve appropriate investment that are pro-poor, environment-friendly and gender sensitive that will generate high return.
- Promotion of small-scale water storage system demands efforts of the government, development organisations and the private sector to disseminate information and technology related to small-scale water systems. The roles of local government (VDC and DDC) are important in promoting technology.

Plastic Pond Management and Income Generation

Nagendra Raj Pandey

Key focus of the presentation and discussion

- Climatic variability and variation in the timing, amount and distribution of rainfall is responsible for decline in agricultural production. Small-scale water storage system, that collect rainwater or springs create opportunity for producing high value crops. These systems when integrated with market create opportunity for enhanced income and employment in agriculture.
- Ponds lined with Silpaulin Plastic Film help store water and support irrigation of tomato that are grown in plastic tunnel.
- Such ponds can last for a long time if rat infestation can be controlled. A plastic lined pond developed on sandy formation of riverbed 30 years ago is still in use in Ridi. Women groups use the pond for fish production.
- Plastic lined ponds are beneficial for small holders and contribute significantly in achieving local food security. Water stored in such ponds allow possibility of cultivating off-season and year round production of vegetables that create opportunities to small holders and enhance income. By using such ponds few smallholders in Nepal earn money. The income amount ranges from Rs. 30 thousands to 200 thousands in one season.

SESSION 3: **Chair: Deepak Rijal, Ph.D**

Innovative Development Intervention and Best Practices

- **LILI's Experiences in Small Scale Farmers Managed Irrigation Systems**
  Bhagat Bist, Team Leader, LILI/Helvetas
- **Role of Multiple Water Use Systems (MUS) in Building Livelihood**
  Umesh Pandey NEWAH
- **Diffused Water Technology for Enhancing Income of Marginalised Households: A Case Study of Nepal's Marchawar Region**
  Binod Sijapati, Executive Director, RSDC
- **Challenges of Small Scale Irrigation in Nepal: Perspective of Civil Society Organisation**
  Ram Lakhan Harijan, NFIWUAN

LILI's Experiences in Small Scale Farmers Managed Irrigation Systems

Bhagat Bista

Key focus of the presentation and discussion

- LILI was initiated since 2004 as a pilot project by HELVETAS Swiss Intercooperation Nepal and followed by 3 years 1st phase covering 2006 to 2009. At the moment LILI is in its last year of its 2nd phase August 2009 to July 2013. The 2nd phase of LILI is being implemented in collaboration with the Government of Nepal and is funded by the Swiss Agency for Development and Cooperation SDC.
- LILI's main purpose is to provide better access to water for irrigation through small scale farmer managed irrigation systems (FMIS) thereby increasing agricultural productivity and improving income and food sufficiency of rural communities in hill areas of Achham, Dailekh, Jajarkot, Kalikot, Ramechhap, Okhaldhunga and Khotang districts.
- The respective DDCs are overall responsible for the implementation of the project at the district level through local service providers (LSP) and users committees (UC). A Memorandum of Understanding (MoU) regulates the collaboration between DDC and LILI. Funds are channelised through the District Development Fund of the DDC. MoFALD/DoLIDAR coordinates and provides strategic guidance at the central level.
- Till December 2012, constructions of 356 small irrigation schemes are completed covering 2'784 ha of land of 17'567 households of whom more than 60% belong to disadvantaged groups. Additional
- 121 schemes are under construction.
- LILI uses surface irrigation system with concrete lining with Nominal reinforcement using GI wire to avoid cracks and seepage. "Soft" intake structures that farmers are able to maintain/repair after floods occur are promoted. The cost per ha for surface type irrigation is Rs 140,000.

- LILI also uses plastic pond that is suitable for fresh vegetable farming in water deficit hill areas Water from springs is collected in plastic sheet lined ponds by means of gravity flow pipe lines. Plastic sheets are water proof, durable, less affected by earth-movement and affordable for small farmers to replace. Adopted pond sizes are 15, 30, 45 and 60 cubic meters depending upon available water and command area. The technology is tested in more than 100 schemes in hill areas. Cost per ha for pond irrigation is Rs 165,000. Soil-cement jute-bag lining above the plastic sheet has been recently piloted in seven districts to increase its durability.
- Together with DoLIDAR, LILI is also putting efforts to develop small irrigation as a important sub-sector to improve livelihood of small farmers. A Small Irrigation Design Manual has been developed for engineers and technicians to carry out design and implementation at filed level.

Role of Multiple Water Use Systems (MUS) in Building Livelihood

Umesh Pandey

Key focus of the presentation and discussion

- Multiple Water Use Services (MUS), integrated with WASH programme, is promoted by NEWAH with the aim of enhancing the livelihood of the beneficiaries through promotion of water and wastewater uses in productive activities.
- MUS integrated to WASH programme, involved range of alternatives, such as development of ponds for irrigation, fish raising, sprinkler, operation of peltric sets, intake for collecting overflow in tanks and use the water for irrigating vegetable and ponds for cattle. One or more of these technologies are used depending upon local conditions and needs.
- The programme includes methods to develop water mill, use bio-briquetting and connect toilets bio gas plants to meet households' energy needs.
- In NEWAH's approach to promote MUS, 20 per cent extra water is added when the system is designed wherever yield from the source permits such addition. The extra water is meant to create multiple uses. NEWAH has developed guidelines for promoting MUS and a booklet published to disseminate MUS as integral to water supply and sanitation programmes.
- MUS integrated to water and sanitation program can produce additional gains to households by increasing income, food and nutrition uptake and provision of energy. This integration also added to the dignity, self-respect and self-reliance of the households.
- When integrated with WASH programme, MUS can enhance community ownership and sustainability.

Diffused Water Technology for Enhancing Income of Marginalised Households: A Case Study of Nepal's Marchawar Region

Binod Sijapati

Key focus of the presentation and discussion

- Rural Self Reliance Development Center (RSDC) is involved in rights based development approach with the mission of liberating rural poor from deprivation by implementing sustainable socio-economic development activities. The approach also emphasises values of self-reliance and self-respect. The programs are designed and implemented to enhance capabilities of the rural households to harness their own potential and make them 'doer' rather than 'recipient' of development.
- This philosophy forms the cornerstone of RSDC's work relating to poverty alleviation, self-reliance, district road construction and water sanitation and health (WASH) programmes.
- RSDC's involvement in command area of Marchwar Lift Irrigation Systems aimed at capacitating the poor in the areas in making effective use of resources (land, water and labour) to enhance productivity. The irrigation system served four VDCs in the command area covering 9,752 households and 72,943 beneficiaries. Of this 3,250 were the targeted direct beneficiaries of RSDC's intervention.
- Social mobilisation was used as the vehicle to raise awareness and build group solidarity supported by integration of technology, skill development and credit and saving to promote self-reliance.
- Income Generating Groups (IGGs) within the command area of the irrigation system was the entry point for building self-reliance. Monthly membership fee in the IGGs, which ranged from Rs. 5 to 50, was instrumental in creating initial fund within the group to support group activities.
- The programme supported the households with small credit, used for the installation of treadle pumps, procurement of quality seed and other production inputs. A total of 3,987 loans were advanced with cumulative disbursement of Rs. 7,367,924.00 at 18 per cent interest rate. The collection rate of loan was 82.86 per cent.
- The irrigation planning and infrastructure development activity involved installation of 612 treadle pumps among 85 households, covering 44 ha of area. In addition, 10 bore pumps were installed which provided year round irrigation to households without access to canal irrigation. Canal lining was carried out to improve irrigation distribution benefitting 85 households in 18 ha of land.
- Technological input, together with credit and saving created opportunity for the households to diversity their cropping by including vegetable production in the cropping system. The marketable vegetables enhanced income of the households. Collective action through IGGs increased access of the households to decision making of the water users' association and made their access to irrigation water more dependable.

Opportunities and Challenges to the Development of Small Irrigation Systems in Nepal

Ram Lakhan Harijan

Key focus of the presentation and discussion

- Farmer managed and small-scale irrigation systems (SSIS) have provided irrigation services to farmers in Nepal. These systems cover almost 70 per cent of the irrigated area in the country.
- SSISs have resilient physical system, low cost, self-governance and capacity to mobilise resources, resolve dispute and while meeting consideration of equity in distribution of water. These attributes have sustained SSIS for long period of time.
- Despite these strengths, government has not paid enough attention to develop and supportSSISs, only large and medium irrigation schemes have received focus.
- The guidelines for development of small irrigation schemes formulated in 2010 emphasise selection of at least two small irrigation schemes for new construction and four small irrigation schemes for rehabilitation and improvement in each district. Rs. 2.5 million has been allocated to each district to meet these objectives. The guideline foresees undertaking all physical construction and improvement works through water users' group. Contrary to this formulation, the agencies involved in implementation of the irrigation systems are inclined in completing all construction works using local contractors.
- The guideline has foreseen selection of systems for new development and also for rehabilitation and improvement based on merit and contribution to improving the livelihood of socially and economically marginalised and disadvantaged groups. A committee composed of the representatives from DDC, Irrigation Division Office, Groundwater Development Unit, District Development Office, District unit of NFIWUAN and District Technical Office (DTT), is responsible for selecting the system as per the guidelines. In many instances, however, political motivated selection of projects is also responsible for mis-appropriation of the budget allocated for small irrigation development.
- Lack of emphasis on institutional development and capacity building of water users' association limits their access to development support.

SESSION 4: **Chair: Uttam Raj Timilsina, Ph.D.**

Policy and Institutional Challenges

- **Policy, Institutions and Community in Small-Scale Irrigation Development and Management in Nepal**
  Prachanda Pradhan, Patron, FMIST
- **Small Scale Irrigation: Examination from Governance Perspectives**
  Ganga Dutta Awasthi, Decentralised Specialist
- **Small Scale Irrigation Programmes in Nepal: A Review from Gender Perspective**
  Shabanam Shivakoti
- **Building Social Capital for Productivity and Sustainability through Multifunctionality in Small Community Irrigation Institutions: Findings of Case Studies**
  Ashutosh Shukla, Nepal Engineering College

Policy, Institutions and Community in Small Scale Irrigation Development and Management

Prachanda Pradhan, Ph.D

Key Focus of the Presentation and Discussion

- SSISs make important contribution to local food and livelihood security. Thousands of SISSs exist across the country and their number rather than size becomes more important.
- The key strengths of the SISSs are established procedure for involving the local communities in their development and in operation and management. In many cases, strong users' organisation behind most SSIS compensates their weak physical infrastructures.
- Despite the importance of SISSs, these are kept outside the purview of the formal irrigation policy. At present, development of SISS is kept under the responsibility of the local bodies (DDCs and VDCs).
- SISS faces new challenges that emerge from the shortage of local construction materials, changes in water regime, shortage of labour and tendency to use imported materials. These factors not only increase operation and management stresses in the SISS but also their vulnerability to external shocks.
- SSIS are getting renewed attention from policy makers, donors and government and non-government organisations due to their established potential in poverty alleviation, food security and contribution in enhancing income opportunity of smallholders through direct agricultural productivity linkages.
- A number of government ministries focus on the development of SSIS. These include MoI,

MoFALD, MOCPA and MOA. At the same time non-governmental organisations and donors are also involved in providing assistance to SISS. Each agency has its own turf, policy and procedure to development.

- There is a need for comprehensive policy on SISS that defines institutional arrangement, financing alternatives, processes and procedures for implementation. The policy also needs to define role of users and local agencies.
- The key areas of concerns that relates to SSIS are approach taken by government agencies and development organisations. An approach that balances physical and socio-institutional development is key to sustained functioning of SISS. Because SSIS is an important entity of social-environmental system it must be integrated and available multiple forms of knowledge used for development of SSIS.

Decentralisation, Local Governance: Opportunities and Challenge

Ganga Datta Awasthi, Ph.D

Key focus of the presentation and discussion

- Decentralisation means both, the system as well as the process of transferring the authority, responsibility, accountability and resources from the central to sub-national entities. The focus of decentralisation is people centered development to increase their access and participation in decision-making governance.
- Decentralisation is a means to promoting greater involvement of citizens in decision making and ensuring effective delivery of services to the citizens. Involvement and quality of service promote empowerment and inclusion at local level.
- Interim Constitution of Nepal has envisioned a process of state restructuring to address various forms of discrimination, emerging from caste, location, gender, ethnicity and religion. Policies and legal provisions that emphasize devolution of power to the local bodies and increasing their roles to deliver the services to the people in an integrated way are also recognised.
- In the absence of elected local government representatives Local Governance and Community Development Program (LGCDP) has opened window for greater citizen engagement in development. LGCDP has created opportunity to develop partnership of the local bodies with the government line agencies and other development partners (I/NGOs and donors). This partnership is expected to harmonise many community-based initiatives through better integration of supply side service providers at local level and increased involvement of the citizens.
- Ward Citizen Forum (WCF) and Integrated Planning Committee (IPC) operational in the absence of elected representatives have been used as means to make the service providers accountable to the people. Until election of the local bodies is completed, these processes can be used as alternative to people based institutions and to link development programmes to the people through these alternatives.

Small Scale Irrigation Programmes: A Review from Gender Perspectives

Shabanam Shivakoti

Key focus of the presentation and discussion

- Gender concerns are emerging strongly as a result of increasing feminisation of agriculture due to increase emigration of males, which has led to increased work burden on women. There is a need for women friendly technology and practices are established in agricultural production and also in the development and management of irrigation.
- Gender concerns in irrigation development policies appear at two levels: i) mandatory representation and participation of women in WUA and ii) involvement of women and disadvantage groups in the planning and implementation of the irrigation programs. The Irrigation Policy of 2003 has made 33 per cent representation of women in the WUA mandatory. Despite these provisions women are not represented in influential position and role in most WUAs.
- The Local Infrastructure Development Policy of 2004 also mentions gender equality and increased participation of twomen in local infrastructure development programmes, however their participation in benefit sharing is poorly defined.
- Agricultural Policy of 2004 emphasises that agricultural and irrigation development programs focus on women. Though this policy has produced some impacts on increased involvement of women in production, the impacts on benefit sharing and economic empowerment are yet to be seen.
- Gender focus on small irrigation development have essentially targeted in increasing participation of women. Though mandatory participation is an essential tool for gender empowerment, it cannot be considered an end in itself. Focus on economic empowerment, technology adaption, and livelihood diversification continue to be the missing elements in most irrigation development programmes.

Building Social Capital for Productivity and Sustainability through Multifunctionality in Small Community Irrigation Institutions: Findings of Case Studies

Ashutosh Shukla, Professor

Key focus of the presentation and discussion

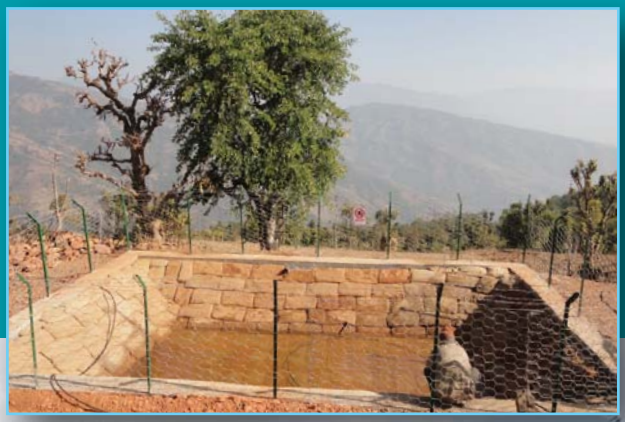
- Investment in irrigation development must target significant improvement in the livelihood
- of the users through direct linkages to productivity gains and increase in the return to land, labor and input. Increased income will create incentives for the investment in maintenance and upkeep of physical infrastructure and services, thus contributing to sustainability of the irrigation system.

- While the pathways of return from irrigation development through direct productivity linkages are straight forward, the productivity and income gains from the direct productivity linkages can be enhanced through appropriate interfacing of technology, infrastructure, institution and market with the agricultural production system in the irrigated areas. Equally important is looking into the multiple use opportunity of water in irrigated agriculture to enhance water productivity.
- WUAs in the irrigation systems can be made instrumental to go beyond their role in operation and management of irrigation infrastructures and services. WUAs have established potential to function has farmers' cooperative in the irrigated areas. These can be effectively involved in input supply and marketing of agricultural produce and dissemination of appropriate agricultural technology and practices.
- Case studies on multifunctional water users associations in several FMIS in the eastern, central and western regions of Nepal have shown that WUAs are capable of accepting and delivering multiple roles in the irrigated areas. These roles can be through multiple use of water in irrigation through integration of micro-hydropower and water supply in the irrigation infrastructure and also in input supply, marketing, in dissemination of technology and in running credit and saving cooperatives.
- Multifunctional roles of WUAs built on multiple uses of water or subsidiary activities contribute to enhancing and diversifying the production system. They also enhance the livelihoods and income opportunities of farmers and create incentive for modernising infrastructures and services.

Closing Session

Bhupendra Bahadur Basnet, Director General of DoLIDAR chaired the closing session where Ajaya Dixit summarised key policy issues that emerged from the two day discussion. Ambassador of Switzerland, Thomas Gass highlighted the challenges of developing SSISs in Nepal. He suggested that SSIS needs to be developed further to overcome food insecurity. The chief guest, Shanta Bahadur Shrestha, Secretary of MoFALD suggested that research should aim to bridge the gap in understanding that will be helpful in planning and implementing SSISs.

Annex 2



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