

## Roundtable Proceedings

# Farmer-managed Irrigation Systems at a Crossroads—Mapping Climate and Socio-ecological Challenges

11 March 2016, Kathmandu, Nepal



Consortium members



ICIMOD



## About HI-AWARE

The Himalayan Adaptation, Water and Resilience (HI-AWARE) Research Consortium conducts research and pilot interventions, capacity building and policy engagement to enhance the climate resilience and adaptive capacity of poor and vulnerable people living in the mountains, hills and flood plains of the Indus, Upper Ganga, Gandaki and Teesta river basins in Pakistan, India, Nepal and Bangladesh.

HI-AWARE aims to influence policy and practice to aid the climate resilience and adaptation of poor and vulnerable populations in the region by generating evidence-based knowledge on geophysical, socioeconomic, gender and governance drivers and conditions leading to climate vulnerability, as well as monitoring and assessing adaptation measures. It focuses on identifying 'critical moments' when communities are most vulnerable to climate risks, 'adaptation turning points' when existing adaptation strategies no longer work, and "adaptation pathways", sequences of policy actions that address both short-term responses to climate change and longer-term planning. It looks at strengthening the expertise of researchers, students and science-practice-policy networks to conduct as well as use research on climate/social vulnerabilities, resilience, and adaptation.

HI-AWARE comprises of five consortium members: The International Centre for Integrated Mountain Development (ICIMOD), the Bangladesh Centre for Advanced Studies (BCAS), Pakistan Agricultural Research Council (PARC), The Energy and Resources Institute (TERI)-India, and Alterra-Wageningen University and Research Centre (Alterra-WUR).

HI-AWARE is one of the four research consortia under the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA) supported by the UK's Department for International Development (DFID) and Canada's International Development Research Centre (IDRC).

## Workshop Proceedings

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11 March 2016, Kathmandu, Nepal

Organised by

Himalayan Adaptation, Water and Resilience (HI-AWARE) Research  
Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA)

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# Executive Summary

A roundtable on farmer-managed irrigation systems (FMIS) was organized by ICIMOD's "Himalayan Adaptation, Water, and Resilience Research on Glacier and Snowpack Dependent River Basins for Improving Livelihoods" (HI-AWARE) consortium. The objectives of this roundtable were to facilitate the discussion on the key challenges faced by FMIS and explore the possibility of its revival as an adaptive response against climatic variability and change. The roundtable focused on three thematic questions - factors leading to decline of FMIS, issues of access to and control of irrigated water in changing context, and policies and governance issues constraining its performance. Some of the key issues facing FMIS are competing water demands, feminization of irrigated agriculture, changing technology, climatic variability, and weak governance. Since FMIS have survived decades of changes, they are likely to possess characteristics of a resilient system. However, more research is needed to understand how FMIS are evolving and innovating to address the multiple drivers of change. A system level assessment of FMIS is necessary in order to understand the diverse causal factors leading to its decline. Focusing on the farmers and local institutions, research is needed to understand the pathways of evolution and innovation done by them. This roundtable serves the first stage of discussion in studying the role FMIS can play in strengthening the adaptive capacity and resilience of irrigated agriculture.



# Introduction

Nepal has a long history of irrigation water management by farmers where they take the sole responsibility of operating and maintaining irrigation systems. In the absence of strong government intervention in the past, farmer managed irrigation systems (FMIS) have slowly evolved through collective effort of farmers to irrigate their agricultural land. According to the Department of Irrigation (DOI), FMIS irrigate about 645,716 hectare of command area which is about 67 percent of total surface water irrigation.<sup>1</sup> In Nepal, FMIS are characterized by the use of low-cost technology appropriate for heterogeneous local conditions, autonomous decision making suited to local contexts, and collective action by farmers for the operation and maintenance of the irrigation systems.



While many FMIS have survived decades of change in hydro-climatic, social, institutional, and policy dimensions; their performance are increasingly under stress. The water availability at the intake point is affected by the variability in intensity and timing of precipitation. An increase in incidence of flood and erosion damages at the intake and canals. Less water is available at the irrigation intake points during dry season due to prolonged drought and frequent conditions. In addition, these challenges are further compounded by socioeconomic and institutional changes, mainly the increase in migration and feminization of agriculture and irrigation activities. Other challenges are changes in landuse pattern, and eroding interest in collective action and agriculture. Since FMIS have survived decades of political, social, institutional and hydroclimatic changes, the revival of the FMIS can offer some hope for adapting to changing climate.

ICIMOD's "Himalayan Adaptation, Water, and Resilience Research on Glacier and Snowpack Dependent River Basins for Improving Livelihoods" (HI-AWARE) organised the roundtable on FMIS with the objectives to facilitate the discussion on key challenges faced by FMIS. It also explored the possibility of its revival as an adaptive response against climatic variability and change. Further, FMIS have been recognized as one of the research areas in a research component 2 of the project that focuses on socio-economic, governance and gender drivers leading to vulnerability. The Situational Analysis report produced by HI-AWARE also point towards the issue for further research. Thus the roundtable initiates discussion on FMIS to serve multiple purposes.

A total of eight participants from outside of ICIMOD participated in the programme along with 19 staff members from ICIMOD (see Annex 1). The participants include prominent interested personnel in the field of FMIS and related areas.

<sup>1</sup> DOI. (2007). *Development of Database for Irrigation Development in Nepal* (p. 180). Department of Irrigation, Kathmandu, Nepal.

## Welcome address

The programme began with a brief welcome address by David Molden. Based on his experiences in the 1990's, he highlighted the evolving contexts within which current FMIS are functioning. Compared to 25 years ago, there is an increase in feminisation of irrigated agriculture, use of technologies like groundwater pumps in the Terai, and creeping urbanisation. Further, climatic variability worsens the impacts FMIS face as water availability changes in these systems. He motivated the audiences to think about the role FMIS can play in addressing the changing climatic conditions.

Following the opening remarks, the participants introduced themselves and shared their experiences with FMIS.

## Overview presentation

Pranita Udas gave her presentation on the key issues and challenges faced by FMIS. Using vivid examples, she delivered her presentation with a focus on three broad categories of issues – socioeconomic, environmental, and institutional and governance.

Udas pointed out that FMIS are facing diverse socioeconomic challenges, ranging from losing interest in collective action, increasing migration and feminization, and changing landuse pattern. As roads and markets penetrate villages, farmers are diversifying their income source to off-farm based livelihoods. Increase in migration has resulted in female-headed households who face challenges in FMIS governance predominantly dominated by male population. Agricultural lands in peri-urban areas are converted into residential and commercial properties like brick kiln that affects the overall FMIS watershed.



Environment challenges faced by FMIS include variability in intensity and timing of rainfall affecting water flow in the source, increase in incidences of water-induced damages on intakes and canals, and reduced water availability due to drying-up of springs mainly in the hills. For example, in Khageri irrigation scheme of Chitwan district, the river flow has gone down considerably due to sand mining and decrease in river discharge. As a result, farmers have to move the canals up thus affecting the command area. Similarly, the spring-fed irrigation in Manakamana village of Nuwakot district face increasing water scarcity during dry season when springs significantly dry-up.

The governance of FMIS is challenged by traditional approach to water management, pressure from globalisation, and the politicisation of irrigation management. With greater support from Department of Irrigation (DOI), many traditional farmers with little knowledge about formal institutions find it cumbersome and bureaucratic to receive external resources from government agencies. On the other hand, some FMIS with knowledge and capacity to access government resources are extensively dependent on government funding that causes decrease in collective



action. With mobility of youths to off-farm activities and foreign countries, FMIS management is in the hand of old people and women that creates challenges in its long term sustainability. Similarly, in many cases, the political divisions are prominent in Water User Association (WUA) that often results in poor management and resource inefficiency.

Udas ended her presentation with three questions to the group that formed the basis for discussion after her presentation. These questions are as follows:

- *What are leading the FMIS to decline?*
- *What are the issues of access to and control of irrigation water in the changing socio-ecological context i.e. feminisation of agriculture, alternative technology, and rainfall variability?*
- *What are the policies and governance issues constraining FMIS in the changing socio-ecological context?*

## Discussion session

David facilitated the overall group discussion. The summary of the group discussion around the three questions are as follows:

### Factors leading to the decline of FMIS

Many participants proposed the first question to be re-framed. Ashutosh Sukla pointed that farmers are not declining but evolving to rapidly changing contexts, including technological, cultural, environmental and economic. For example, irrigation technology has expanded to groundwater pumping and pond irrigation especially in Terai and mid-hills. Farmers are adopting these new technologies according to their needs and convenience. Prachanda





Pradhan argued that not all FMIS are deteriorating. In many cases, FMIS are performing well despite the major natural disasters like Gorkha earthquake of 2011. With little technical and financial support, FMIS have promptly recovered from the quake in Sindhupalchowk and Dhading districts. Aditi Mukherji pointed out that in order to find out which FMIS are declining, an update is needed in the Nepal Irrigation and Institution System (NIIS) database. This compiles more than 500 variables of 233 irrigation systems in Nepal. The database was developed by Elinor Ostrom and her colleagues in 1990s.

## Issues with access to and control of irrigation water in the changing socio-ecological context

Participants raised many issues regarding the access and control of irrigation water in the changing contexts of urbanization, migration, and technological changes. With booming population and economic growth, the access to irrigation water is challenged by contrasting water demands for drinking and commercial purposes. This situation is particularly serious in peri-urban and water scarce areas where irrigation is mostly neglected and under-prioritized. For example, in Kathmandu Valley, large amount of vegetables are irrigated by wastewater due to lack of irrigated infrastructure and scarcity of drinking water.

Migration is another significant driver that may have linkages with FMIS. Amina Maharjan argued that there is only anecdotal evidence on linkages between FMIS and migration. Further, the relationship is not linear but is influenced by diverse elements like globalization, access to market, and farmers' aspirations. Mr. Pradhan further adds that not all type of migration is bad for FMIS governance. The short duration or seasonal migration is found to be beneficial for FMIS management whereas long duration migration where absenteeism can last for more than a year can result in negative consequences.





Diverse technological choice for irrigation also affects the access and control of irrigated water. Many farmers in Terai prefer cheap and convenient shallow tube wells rather than labour intensive FMIS. This technology has brought about the shift from collective to individualistic water management in some areas. However, not all technology disintegrates the collective action. Mrs. Mukherji pointed that since solar is not affordable by individual farmers, it can then be harnessed through cooperatives.

## Policies and governance issues constraining FMIS

Some important policy and governance constraints affecting the FMIS governance were raised during the group discussion. In the context of increasing infrastructure risks, long term sustainability of FMIS will depend upon the technical and financial support that FMIS receive. The support should be flexible and accessible to all FMIS. In the late 1990s, when the state shifted the ownership of water resources to communities, the Federation of Water Users Association recognized only those FMIS that received funding from the government. This created discrepancies in funding mechanisms. Flexibility is also needed in rules and regulatory considerations. For example, farmers generally have their own rules and regulations that take into account the local socio-environmental contexts. The state rules should co-exist and synergize, rather than conflicting with traditional rules.

The goal of government policies should be to strengthen capacity and not to create government dependency. Some previous projects by donor agencies have focused less on institutional strengthening, but more on infrastructure development. As a result despite huge infrastructure investment, the performance of FMIS did not increase.

Another major constraint affecting the governance of FMIS is unsynchronized policies. The road construction policy in urban and peri-urban areas sometimes converts the traditional FMIS canals into roads. The irrigation planning should be well integrated with urban planning, migration, disaster risk reduction, and earthquake policies.

## Concluding remarks

Due to time limitations, the lively discussion was wrapped with concluding remarks from David Molden and Eklabya Sharma respectively. The key concluding points based on concluding remarks and the group discussions were as follows:

- FMIS are important local institutions for sustainable governance of irrigated agriculture and ensuring of food security in Nepal.
- These institutions have survived and evolved over multiple decades of change in the sectors of socio-economy, climate, technology and governance.
- Over the recent decade, FMIS in Nepal have been facing increasing stress from globalization and market access, socioeconomic and environmental changes, and institutional and governance.
- Some of the key issues facing FMIS are competing water demands, feminization of irrigated agriculture, interest in off-farm income, changing technology, climatic variability, and weak water governance. Nonetheless, the impacts are not linear and homogenous across temporal and spatial scales.
- Since FMIS have survived decades of changes, FMIS do possess characteristics of resilient systems. Revival of FMIS does offer some hope for adapting to changing climate. However, more research is needed to understand how FMIS are evolving and innovating to address the multiple drivers of change.
- While studying FMIS, a systems approach is necessary that takes into consideration all the diverse challenges and competing water uses into account and explores the upstream and downstream linkages. A watershed and basin approach is useful for such assessment.
- Farmers should be the centre of research in FMIS studies. The perspectives and aspirations of farmers should be understood in order to devise programs and policies for sustainable irrigated agriculture.
- The success of DOI lies in a well-functioning FMIS. This roundtable paves the way for future discussion and initiatives on strengthening the resilience of irrigated agriculture.

## Annex 1 : List of participants

1. Bandana Pradhan, Professor, Tribhuvan University
2. Ashutosh Shukla, ISET
3. Floriane Clement, IWMI
4. Khemraj Sharma, Nepal Engineering College
5. Dhruva Pant, Independent Researcher
6. Prachanda Pradhan, FMIS trust
7. UpendraGautam, JVS
8. Hari Thapa - Senior Divisional Engineer / Ministry of Irrigation
9. Kirty Shrestha, Practical Action

### ICIMOD

1. David Molden
2. Eklabya Sharma
3. Arun Shrestha
4. Aditi Mukherji
5. Philippus Wester
6. RuchaGhate
7. Arabinda Mishra
8. Amina Maharjan
9. Giovanna Gioli
10. ChandaGurung Goodrich
11. Pranita BhusanUdas
12. BhuwanThapa
13. Kanchan Shrestha
14. Aneel Piryani
15. Sangita Dandekhya
16. Santosh Nepal
17. Avash Pandey
18. Ujol Sherchan
19. Nani Bajracharya



## Annex 2: Programme schedule

Date: March 11, 2016

Place: Nanda Devi ICIMOD, Kathmandu

Time: 2:00 to 4:30 pm

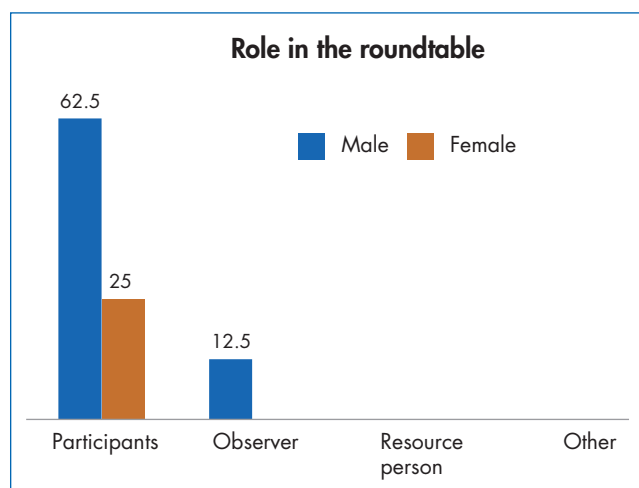
14:00 – 14:10	Opening remarks by Dr. David Molden, DG, ICIMOD
14:10 – 14:30	Highlights of Key Issues around FMIS: Dr. Pranita B Udhas
14:30 – 15:30	Roundtable discussions on three key questions chaired by Dr. David Molden
15:30 – 15:45	Tea and Coffee
15:45 – 16:00	Summing up and way forward –Dr. Eklabya Sharma, DPO, ICIMOD

## Annex 3: Evaluation survey results

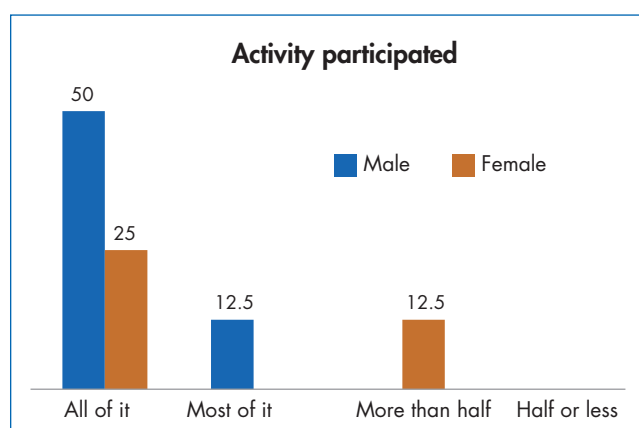
Total participants: 11

Total evaluation forms submitted:  
8 (Male: 5; Female: 3)

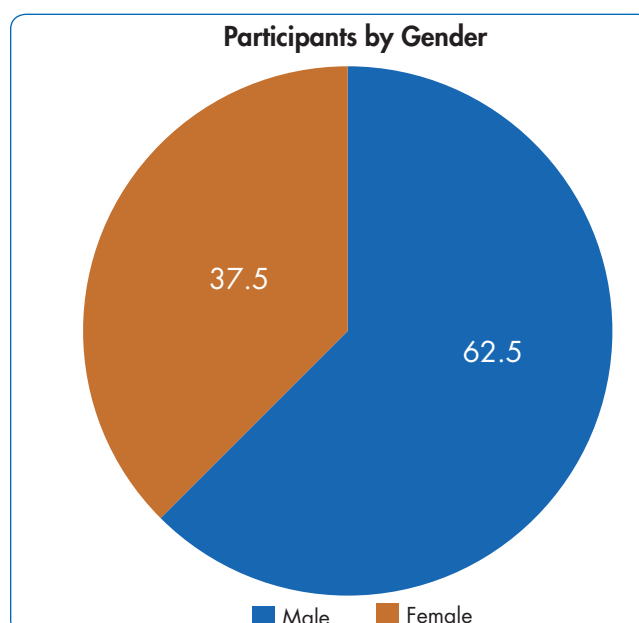
1. Which of the following best describes your main role in this workshop/seminar?



2. How much of the activity were you able to attend?

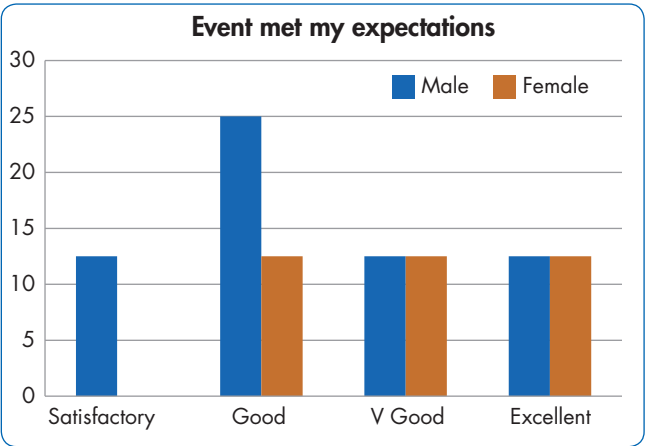


3. Are you male or female?

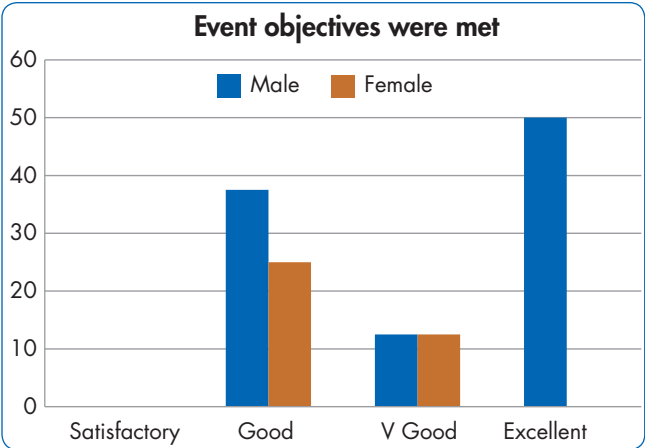


B. About the event

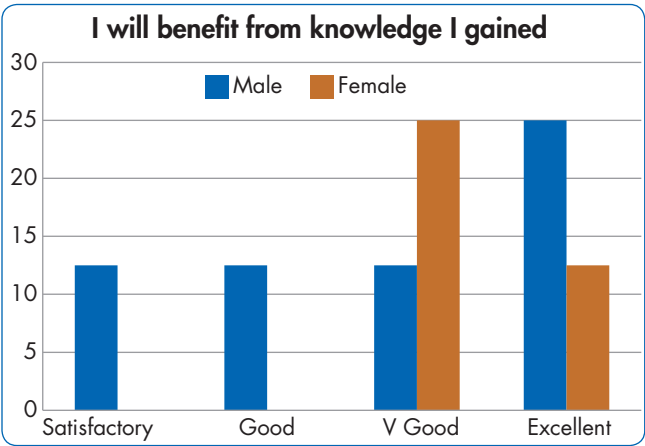
4. The event met my expectations.



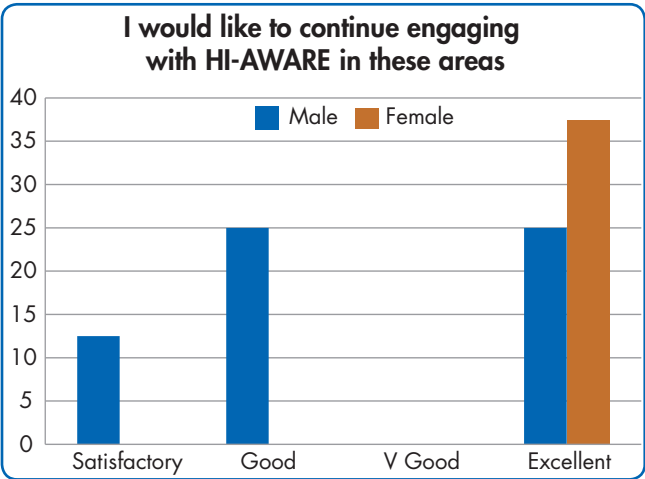
5. The event objectives were met.



6. I will benefit from the knowledge I gained.

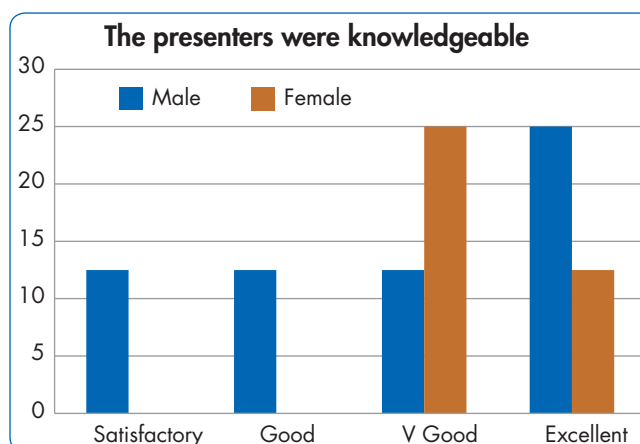


7. I would like to continue engaging with HI-AWARE in these areas.

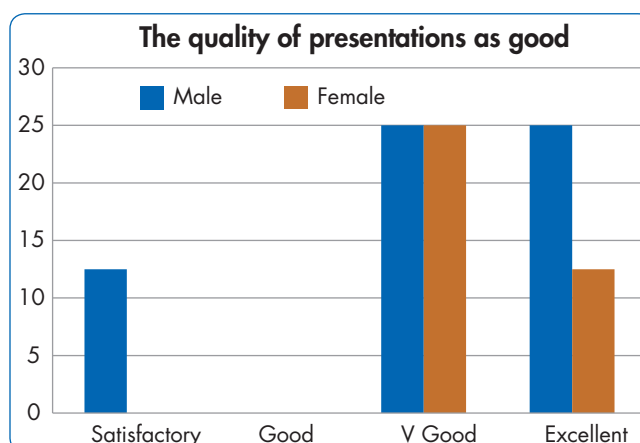


## C. Resource Persons

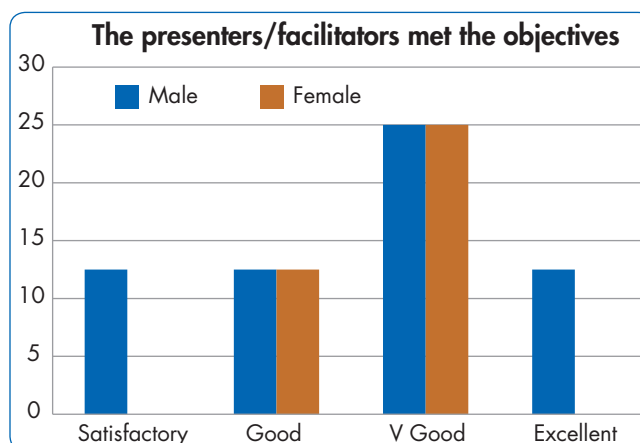
8. The presenters were knowledgeable.



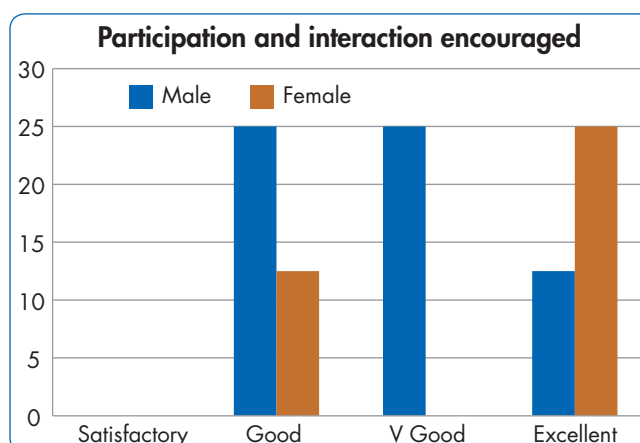
9. The quality of presentations as good.



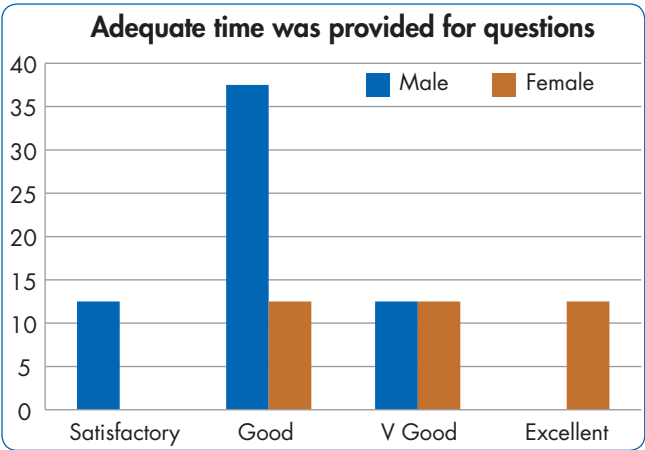
10. The presenters/facilitators met the objectives.



11. Participation and interaction encouraged



12. Adequate time was provided for questions









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