

**2<sup>nd</sup> Ostrom Retreat on “Redefining Diversity and Dynamism of Natural Resources Management in Asia”, held at the AIT & Chiang Mai University, during – 11-15 July 2019, Organized by the Asian Institute of Technology (AIT) and Chiang Mai University (CMU)**

**I. Summary Report of the Ostrom Retreat**

The Ostrom Retreat 2019 was held at the Asian Institute of Technology and the Chiangmai University, respectively between 11-12 and 13-15 July 2019. The formal Inaugural Session of the Retreat was started with the Opening Remarks by Prof. Ganesh P. Shivakoti, followed by telecast of a short video on Prof Elinor Ostrom.

**Day 1 – 11 July 2019 - Inaugural Session (8.30 – 10 am):**

The Inaugural Speech by delivered by Honorable President of AIT Dr. Eden Y Woon. In his Inaugural Speech, Dr Eden Y Woon highlighted AIT’s long-drawn commitment and sustained efforts in championing the cause of Conservation and Management of Natural Resources in terms of Research and Development activities cutting across science, technology and society. Following the inaugural speech, two keynote speeches were delivered. Prof. Rajendra P. Shrestha, Dean of the School of Environment, Resources and Development (SERD) proposed the Vote of thanks.

The first keynote speech was delivered by Prof. S.S. Acharya (Former Chairman, Commission for Agricultural Costs and Prices, Government of India) on the theme, “Convergence of Natural Resource Concerns and Food Security Objectives: Issues and Reflections from India’s Approach”. Prof Acharya invited attention to some basic concepts like sustainable development, sustainable agriculture, sustainable livelihoods, millennium development goals, and sustainable development goals to establish the linkages between food security objectives and natural resource concerns. The focus of his speech was that hunger, poverty and food security are worst polluters of environment and hence these need to be addressed on priority as India could do successfully. The speech contained a very detailed assessment of India’s 72 years’ long journey of agricultural development with tremendous successes in achievement of the goals/objectives of assured food & nutritional security (at macro/national level as well as at household/individual level) and poverty reduction while simultaneously keeping in view the need for conservation of natural resources and protecting the environment.

Apart from mentioning the policy instruments used in the process, he discussed the initiatives like National Green Tribunal, expansion in forest cover, ‘clean India movement’ (*Swachh Bharat Abhiyan*), free cooking gas connections to rural households etc. that are helping in convergence between food security and natural resource conservation. Prof.

Acharya also discussed some important emerging concerns related to water, land & urbanization and how these are being addressed. The speech was concluded with the following highlights: (a) There is a need to recognize that welfare of poor, hungry & food insecure vs. conservation of natural resources is not the question of either/or, hence the attempt should be to reduce or abate the damages to natural resources or the environment; (b) wherever private benefits are more than the social losses, the principle of 'polluter must pay' should be strictly enforced; and (c) In a situation of trade-off between the interests of present and future generations, the search for a genuine win-win situation must continue because he believes that 'those who continue trying, never fail'.

The second Keynote Speech was delivered by Prof. Helmi- (Professor, Andalas University, Indonesia), on the topic, "Moving beyond research for knowledge generation toward science-based innovative solutions for delivery of SDGs". The keynote speech was quite distinct in terms of approaching the issue of Sustainable Development Goals (SDGs) and linking it with science based innovative solutions from a multi-disciplinary perspective. In his speech, Prof Helmi explained, "why we need to move from mono-disciplinary research for knowledge generation toward science-based solutions to support delivery of SDGs?". Prof Helmi also highlighted that "Physics, chemistry, biology and the environmental sciences can deliver wonderful solutions to some of the challenges facing individuals and societies, but whether those solutions will gain traction depends on factors beyond their discoverers'. If social, economic and/or cultural factors are not included in the framing of the questions, a great deal of creativity can be wasted. Hence, all efforts should be to establish multidisciplinary projects that integrate natural sciences, social sciences and humanities from the outset. Quoting the work by Miller et al (2014), Prof Helmi underscored that there is a need for participatory approach in dealing with sustainability problems, not only by scientists (from both natural and social sciences), but involving affected society/community, practitioners, and related stakeholders to solve the problems.

In conclusion, Prof Helmi proposes an enabling framework, which consist of important components, such as: (a) participatory formulation of the problems; (b) inter/trans-disciplinary scientific knowledge co-production and formulation of innovative solutions; (c) piloting the implementation of the innovative solutions at community and local levels; and (d) scaling-up the implementation in synergy and partnership among SD actors. The speech concluded highlighting the need to move out from the silo of disciplinary and sectorial approach of development toward strong synergy and partnership for a more meaningful sciences generation, policies and actions which can support delivery of SDGs.

**Day 1, Session 2 (10:30-12:30) - Thematic Presentations, "Community Forestry and Social Ecological Systems":**

The Session 2 of Day 1 was started with thematic presentations and there were six presentations slotted in the session. The six papers presented in the session covered the broad thematic area of "Community Forestry and Social Ecological Systems" and the presentations in the order of sequence were the papers by: (a) Prof Ambika P Gautam, titled, "Community Forestry and Social Ecological Systems Prof. Ambika P. Gautam: Nepal's Community Forestry at Crossroads"; (b) Prof. Kailash Pyakuryal, "Community forestry for

livelihoods and sustainable development”, (c) Ms. Megha Bajaj, “Status of plant biodiversity and management practices in Panbari community forest (A case from Sunsari, Nepal)”; (d) Prof. Yonariza, “Searching for Payment for Watershed Services (PWS): Case of Koto Panjang Hydro Power Plant Catchment Area, Sumatra, Indonesia”, (e) Ms. Farah Sevilla, “Understanding how community-based mangrove management supports local livelihoods: preliminary observations from Samut Songkhram and Trat, Thailand”; and (f) Dr. Dung and Ms. Kieu Le, “Assessing the nature of a ‘forest transition’ in Vietnam”.

**Day 1, Session 3 (13:30-15:00) - Thematic Presentations, “Community Irrigation and Robustness Challenges”:**

The Session 3 of Day 1 was focused on theme, “Community Irrigation and Robustness Challenges”. The session included four presentations, viz., (a) Prof. Ren Xiaodong and Dr. Xia Huang, “Indigenous and Community Conserved Areas Registry (ICCA): Application of Design Principles in Laozhai Liriodendron Community Conserved Area, China; (b) Mr. Naveen Mangal Joshi, “Interaction between role of farmer manager irrigation systems and International Commission on Irrigation and Drainage (ICID) for food security”; (c) Prof. Pampa Mukherjee: Institutional governance of farmer managed irrigation systems in Kangra (Himachal Pradesh): Intersection of state, market and community”; and (d) Ms. Sumaira Zafar, “Impact assessment of watercourse rehabilitation program using geospatial techniques”.

Amongst the presentations in this session, the presentation by Prof Pampa Mukherjee was focused on the preliminary assessment of the data being collected using the proposed AIIS framework, which is a modified framework to be used for analysis of institutional and governance performance of Asian Irrigation Systems. The presentation raises few questions that needed empirical testing using the new AIIS framework, which included: (a) In what ways changing socio- ecological context have impacted the management of Kuhls; (b) What is the perception of different stake holders- community, state, private institutions, new settlers regarding management of kuhl water; (c) With state and new users coming in – has there been any change/revision water rights of farmers? If so what is the impact?; (d) How market and technology impacted these irrigation channels?; and (e) What is the role of gender/caste in running of this institution?

**Day 1, Session 4 (15:20-17:00) - Thematic Presentations: “Climate Change, Natural Resources Dynamics and Landuse Challenges”**

Session 4 was focused on the theme, “Climate Change, Natural Resources Dynamics and Landuse Challenges” and there were three presentations, viz., (a) Dr Chandra Sekhar Bahinipati, Vijay Kumar and Viswanathan, “Systematic review of adoption climate smart agricultural practices in India”; (b) Dr. Dharm Raj Uperty, “Community based climate technologies in natural resource management and disaster risk reduction”; and (c) Dr. Khuda Bakhsh, “Adaptation to climate change in arid and canal irrigation systems of Pakistan”. While the first paper by Bahinipati, et al., was a systematic review of studies on the adoption of climate-smart agricultural practices in India; the second paper by Dr Dharam R Uperty discussed the importance of community based climate technologies in natural

resource management and disaster risk reduction; and the third paper by Dr Khuda Bakhsh examined the climate change adaptation in arid and canal irrigation systems in Pakistan. The paper by Bahinipati et al., advocates for more evidences/ observation across the Indian states, so that we can effectively implement the flagship policies related to climate change, viz. National Mission on Sustainable Agriculture and Climate-smart agriculture. The paper by Dharam R Uperty highlighted that community based Forestry is the most appropriate management modality for reducing the risk of critical forest ecosystem loss, and thereby build ecosystem resilience in the face of growing climate induced risk, and vulnerabilities. The paper by Khuda Bakhsh observe that the types of adaptation vary across rain-fed and irrigated districts, showing the need for targeted policies. Also it suggests for more interdisciplinary research approach to find the most suitable adaptation strategies at individual and community levels. This necessitates to tailor adaptation policies while considering different biophysical and socioeconomic circumstances.

Following the presentations at the fourth session, a quick wrap-up session was arranged, which was mainly to discuss about the major outcomes of the deliberations of the first day and brief on the planning for the Chiang Mai University sessions. The first day program came to a close with the Banquet dinner and networking session.

#### **Day 2, 12 July 2019, Session 5 (08:30-09:30) – Keynote speeches**

Day 2 of the Retreat was started with Session 5, which included two keynote speeches by Prof. P.K. Viswanathan (Amrita School of Business, Kochi, India) and Dr. Asif Kamran (senior Scientist, Nuclear Institute for Agriculture and Biology, Pakistan). The first keynote by Dr P.K. Viswanathan was titled, “Natural Resources and Livelihoods Management Challenges of Western Ghats Region states of India”, and the second keynote paper presented by Dr. Asif Kamran was titled, “Nonconventional mountain irrigation systems of Pakistan: Adaptation strategies in the fragile ecosystem”.

The first keynote paper by Dr P.K. Viswanathan was a critical review of the challenges surfacing the sustainable development of the Western Ghats Region (WGR) in India, as caused by both human induced as well as natural factors induced climate change impacts. In his speech, he highlighted that the coastal communities in the WGR in India face a two-way eviction process, in view of shrinking employment and income opportunities through the traditional occupational pursuits of fishing and related activities. The two-way eviction process happens due to increasing climate change induced uncertainties as well as expansion and spread of industrial/ coastal infrastructure development activities. Hence, there is a need for sustainable NRM and livelihood protection strategies, as the state interventions in NRM are often in conflict with the community interests and larger welfare goals. An alternate coastal management strategy could be through the engagement of the private sector players (PPP model of NRM), as they are the key actors in the development process: coastal economic zones, industrial corridor, townships, etc. The partnership with the private sector can attract crucial financial resources and also drive technological innovations that can help resolve the local conflicts (people industry) over resources sharing and management. However, in the current context, the community based resource restoration activities as happening, deprive the community their access to the resources and

subsequent benefit sharing opportunities. Several challenges to be addressed if it has to be scaled up as an institutional strategy for mitigating the climate change effects in the coastal regions of the WGR states.

The second keynote paper by Dr Asif Kamran was discussing on the adaptation strategies with respect to the non-conventional mountain irrigation systems of Pakistan. Following a brief description of the background of conventional and non-conventional irrigation systems as well as their biophysical contexts, the speech talked about the commonalities and self-governance of the irrigation systems. While the irrigation systems had survived through centuries, currently they are facing survival risks due to several factors, such as: (a) New technology along with non-prudent policies; (b) impacts of climate change; (c) Commercial crops and new trade opportunities; (d) lack/ poor horizontal markets in mountain areas; (e) transmission failure and youth migration, etc. The speech concludes by suggesting that lessons should be learnt from the conventional irrigation systems in terms of promulgation of IMT efforts in canal irrigated areas.

**Day 2, 12 July 2019, Session 6 (09:30-10:10) – Thematic Presentations: “Understanding Diversity in Governing the Natural Resources”**

The Session 6 included two presentations. The first presentation was by Dr. Jiban Ranjan Majumder, titled, “Crafting a multi-agency coordination to make a trade-off between emergency humanitarian assistance and long-term environmental and sociology-economic sustainability: the case of Rohingya influx in the Cox’s Bazar district of Bangladesh”. The second paper was by Ms. Ami Sukma Utami, titled, “Indicative issues for improving irrigation management in the context of SDGs: The case of irrigation system in West Sumatera, Indonesia”.

The first paper by Dr Jiban Ranjan Majumdar discusses about the long-term implications of the Rohingya influx in the Cox’s Bazar district of Bangladesh, which has already resulted in the cutting down of about 4,300 acres of hills and forests has been in order to provide temporary shelters and cooking fuel for the Rohingya immigrants. It also had caused worsening of air pollution due to increased vehicular traffic (about 3,000/day in 2015 to 7,000/day in 2019) and smoke from fire-wood burned for cooking. The paper concluded with a note of caution on the contradiction between short-run interventions and long-term sustainability issues in the regions affected by the Rohingya influx.

The second paper by Ms. Ami Sukma Utami discussed the important indicative issues for improving irrigation management in the context of SDGs, using the case of irrigation system in West Sumatera, Indonesia. The study has identified irrigated farming related sustainable development goals (SDGs) based on a review of literature and related document on sustainable development goals. Some of the important findings from the study included: (a) a decline in irrigated rice production; (b) Increasing of water pollution from agriculture and fisheries; (c) weak irrigation institution in farmer-managed irrigation system; (d) Unequal access for woman to irrigation technologies, etc.

**Day 2, 12 July 2019, Session 7 (10:30-12:00) – Thematic Presentations: “Understanding Diversity in Governing the Natural Resources” (contd..)**

In the last Session of the day, there were three presentations, by Dr Elizabeth T Cairg, Mr. Nguyen Dai Anh Tuan and Dr. Thang Nam Tran. The presentation by Dr. Elizabeth T. Carig was titled, “An Assessment of resource users' willingness to participate in a payment-reward scheme: The case of Barobbob Watershed in Nueva Vizcaya, Philippines”. The paper provides a useful management information on what aspects should be given attention if a payment-reward scheme for Barobbob Watershed is to be institutionalized. It is also important to understand the characteristics of upstream and downstream communities and their willingness to participate in a PWS scheme.

Following the Session 7, the workshop at AIT was formally concluded and majority of the participants of the proceeded to Chiang Mai University in the afternoon of 12 July 2019.

**Day 3, 13 July 2019, Session 8 (09:00-10:00) – Inaugural Session and Opening of the Meeting at Chiang Mai University**

At the Meeting at Chiangmai University, the Inauguration and key note speech was delivered by Prof. Ora-orn Poocharoen (Director, School of Public Policy Chiang Mai University) on “Smart and sustainable cities and transnational issues in the context of climate change”. In her Inaugural keynote speech, Prof. Ora-orn emphasised on the Principles of Effective Governance for SDGs, defined in terms of: effectiveness, accountability and inclusiveness. According to her, the key skill sets for SDGs and Policy Design are: critical thinking, complexity thinking, futures thinking, design thinking, deliberation skills and emotional intelligence.

Vote of Thanks at the Inaugural session was proposed by Dr. Juthathip Chalermphol (Department of Agricultural Economy and Development).

**Day 3, 13 July 2019, Session 9 (10:30-12:30) – Thematic Presentations: Understanding Diversity in Governing the Natural Resources**

Session 9 of the Workshop was held at the Chiangmai University and it included six presentations. The first presentation was by Dr. Sukit Kanjina on “Thailand's water law of 2018”. The second presentation was by Prof. S. S. Burark on “Sustainable water resource use in India: Issues and the way forward”. The third presentation was by Dr. Takuji, titled, “Interactions between Social Capital and Natural Capital: The case of Gravity Irrigation in the Central Philippines”. The fourth presentation was jointly done by Prof. Viswanathan P. K. and Ms. Kavya Krishnakumar on the topic, “Reinventing the institutional architecture and water governance paradigms in a dynamic context: the case of irrigation systems in the Deccan Region”. The fifth presentation was by Dr. Ei Ei Swe Hlaing, on “Multi-level Forest Governance in Community Forestry”. The sixth presentation was by Dr. Dharam R. Uprety, titled, “Strengthening of Early Warning System Governance in the context of growing climate change impact in federal Nepal”.

While the first paper presented by Dr Sukit Kanjina dealt with Thailand’s latest water law (2018), the second paper by Prof S S Burark discussed the issues and challenges of sustainable water resources use in India. These two presentations broadly discussed the

water management challenges and governance systems in both the countries and highlighted the need for new institutional approaches for development and management of water sector from the long-term perspective.

The third presentation was by Dr. Dr. Takuji, titled, “Social Capital Spillover through Common Pool Resources Management: a Gravity Irrigation System in the Central Philippines”. The paper was quite interesting in terms of proposing a new methodology for assessing the CPR governance regime in the context of irrigation systems, which was based on a game theoretical approach (public goods game). The important research question revolved around the mobilisation of social capital in the rural setting, especially, examining the question, “how does the availability of gravity irrigation affect individual social behavior?”. It was observed that farmers’ altruistic behavior and contributory behavior spill over to their neighbors, indicating that collective actions required in irrigation water management induce the emergence of social norm. This signifies that farmers decide on their social behavior more or less by following the way their neighbors behave socially. Further, it was observed that cooperative resource management also promotes a community mechanism, through which, free riding acts are corrected. This approach as proposed in the paper was considered to have immense potential to be validated empirically in the irrigation system contexts of the countries to be covered in the proposed study under the Ocean research programme.

The fourth presentation by Dr P.K. Viswanathan and Ms Kavya Krishnakumar was a case study of irrigation systems in the Deccan region of India that attempted to use the modified AIIS framework for analysing the institutional performance of irrigation systems. The paper concluded that empirical validation of AIIS framework in the Indian context should need a careful scrutiny in terms of understanding how the existing rules and policy regimes need to be revamped to accommodate the dynamism happening in the irrigation system contexts. This further calls for examining the: (a) constraints in enhancing the system level efficiency; (b) changing technological interventions in farming practices (climate resilient agriculture) and water management (water saving technologies); (c) seed choices/crop varietal choices; (d) crop shift from food to non-food crops and the resultant food insecurity problem, etc. The presentation also raised some important points for discussion and incorporation of the same in the modified AIIS framework. In conclusion, the paper highlighted the need for broad-basing the concept of “FMIS” from the perspective of canal irrigation systems to “groundwater governance” in view of groundwater becoming the dominant source of irrigation in large parts of India and several regions of Pakistan.

**Day 3, 13 July 2019, Session 10 (13:30-15:30)– Review of NIIS Forms & Field Trip Preparation:**

The post lunch session on the 13<sup>th</sup> July was solely dedicated to discuss on the AIIS Presentations, to prepare the AIIS framework (modified NIIS framework) based on the inputs and feedback received from the participants from various partner countries. Dr Ram Chandra Bastakoti made a comprehensive review of the NIIS Framework Questionnaire and its important components for the benefit of all participants to engage into detailed discussions and deliberations on the same. Following the review by Dr Ram Bastakoti, there

were different component wise reviews of the proposed AIIIS Questionnaire by Dr Raza Ullah, Dr P.K. Viswanathan, Dr Juthathip and Dr Pampa Mukherjee. Accordingly, Dr Raza Ulla discussed the Location and Resource Forms, followed by Dr Viswanathan and Dr Juthathip discussing on the Agriculture and operational level Form. Dr Pampa Mukherjee discussed the Organizational inventory and structure forms. The other component, ie., Subgroup and Rules forms were discussed by Prof. Ganesh Shivakoti and Prof. Helmi.

The day's programme was concluded with a Wrap-up for the Day and discussing the details of the Field Trip proposed for the next day, i.e, 14 July 2019.

**Day 4, 14 July 2019, Field visit to interact with the farmers and NIIIS forms administered for two irrigation system**

Participants were divided into two groups for site visits. The first group went to Mae Taeng district and the other went to Mae Kampong village in Mae On district.

**1.1 Mae Taeng group**

Visiting Mae Faek – Mae Ngad Operation and Maintenance Project at Mae Ngad Somboonchon Reservoir office, we got the information and discussed with the officers and head and committee of farmer irrigation group. Mr.Nattapon Apinuntano is the head of staff of Mae Faek - Mae Ngad Operation and Maintenance Project who provided information about the history and irrigation management in the project area. Mae Faek – Mae Ngad Operation and Maintenance Project is the first governmental irrigation project in northern Thailand. The project developed from the Lanna local wisdom people irrigation project called “Meung-Fai” which has been regulated since B.E.1839 (A.D.1296) of Mung Rai dynasty (more than 700 years). Mae Faek – Mae Ngad O&M Project is a combination project including Sinthukit Precha Weir and Mae Ngad Somboonchon Reservoir. The project area covered 14 sub-districts in Mae Taeng District, San Sai District, Mae Rim District and Mueang District of Chiang Mai province. The number of households in the project area is 37,133 households with an average land ownership of 3-5 Rai per household. They mainly engaged in agriculture. In rainy season, 70 percent of the land is rice field and 30 percent is other crops.

The irrigation group managed systematically. They formed a management committee of which members are jointly selected. The executive committee consists of head, deputy head, secretary, treasurer, hostess, public relations and other directors. They have a 2-year term. There are provision for water allocation and maintenance of irrigation systems and imposing penalties for those who violate or smuggle excess water such as who use the water more than scheduled must be fined 300 baht per day which is equal to the daily wage rate. The leader of the group is the village headman whose members are respected. He has been in the group leader position for 8 years. Members of the group participate in water management by attending the group meeting. They jointly dredged the canal every year and paid for water management expenses at the rate of 30 baht per Rai.

In the afternoon, we surveyed the area around reservoir and canal as well as explaining about the system of opening the water to the Longan garden, rice fields, fish ponds and vegetable field that had different amounts of water use. We observed the irrigation canals,



the water pipe connection to the agricultural area and the water gate with the officers and group of farmer.







1.2 Mae Kampong group had spent time undertaking field visit to Mae Kampong Village, which is one of an agro-forestry based coffee and tea plantation site and an eco-tourism spot. All of the participant involved were gather at Victoria Nimman Hotel Lobby and leave to Mae Kampong at 8 a.m. by vans that had been provided.

The group arrived at Mae Kampong Village at 10 a.m. and gather in front of The Museum of Villager – Forest – Miang of Mae Kampong Village for a short briefing for the whole day session by Dr. Warathida Chaiyapa. End of the short briefing, all of the participants went to community hall (a traditional home that had been a community gathering place) to have an interview session with the former Head of Village-Mr. Prommin Puangmala.

During the session, Mr. Prommin told us about the history, the socio-economic, socio-cultural and the eco-tourism development project around 20 years ago which has not only generated good income to villagers but also enabled the village to become a sustainable village with self-sufficiency economy philosophy. Later one he kindly answered many questions from participants. These were for example, the tea and coffee plantation and marketing process, sustainable home-stay business management, common fees collected from villagers and welfare distribution, penalty and incentives for villagers to follow common rules, environmental conservation, water resource management and electricity generation from hydro power, and etc. Throughout this session Dr. Warathida Chaiyapa helped as a translator. Participants spent around one-and-a-half-hour session (11.30 a.m.) interviewing Mr.Promnim and gained in-depth and invaluable knowledge about community-based natural resource management and self-governance in community affairs. After that the participants were divided into three groups for a tour around the village-namely tea and



coffee plantation sites, coffee processing factory, homestays around village and local craft site. Each group was led by a community leader serving as a tour guide, explaining insightful information about the village such as garbage collection, fermented tea leaves process and drinking water production. The site visits finished well at 3 pm and all participants went back to hotel with many inspiring experiences obtained from Mae Kampong village.







**Day 5 Day 5: 15 July 2019 (Monday): Panel Discussion on: on the future of OCeAN**

The morning session (Session 11) of Day 5 (ie., 15 July 2019) of the Retreat was specifically assigned to discuss on the future of OCeAN and the way forward for the cross-country research on irrigation systems using the AIIS framework.

The panel discussion on the future of OCeAN was moderated by Prof Ganesh Shivakoti and the Panellists were: Prof. Helmi, Dr. Asif Kamran, Prof. Ora-orn, Dr. Thang, Prof. Pampa Mukherjee. Following the panel discussion, it was suggested that Dr Raza Ullah, Dr Ram Bastakoti and Dr P.K. Viswanathan will take up the responsibilities in preparing the summary of the discussions and deliberations held during the 5 day event. There was a consensus at the event regarding the Ostrom Center spearheading the cause of establishing a new framework for the assessment of performance of irrigation systems in the larger Asian Context and it was felt that the proposed AIIS framework once is empirically validated through undertaking multi-country research, should be scaled up as an Asian Framework for assessment of irrigation system performance.

## II. Points noted during AIIS forms discussion

During the retreat AIIS forms were discussed and the following points were raised by the participants of the meeting.

### A. Agricultural forms:

1. Organic agriculture/conservation agriculture.
2. What kinds of crops are cultivated? (division by fruits or vegetables)
3. What are the practices of farmers in those areas (input use, pesticides, etc)
4. System of irrigation (Canal or other types)
5. Yield information of different crops (min to max)
6. Marketing of agricultural produce
7. Understanding of agricultural system (crops of different cropping system, including livestock)
8. Variations in agricultural system due to climate change.

### B. Operation forms

1. Water flow within system
2. Quality of water delivered in canal
3. Canal system maintenance
4. Mutual trust (trust between department: qualitative perspective)
5. Record on system level
6. Discussion on canal management problems
7. Availability of any crop insurance with respect to location
8. Change in cropping patterns (existing cropping patterns based on marketing availability and also climate change pattern)
9. Information regarding climate smart agriculture
10. Development of water market in command area
11. Property rights on lands (different country's policy)

### C. Organizational

1. How new users are accommodated based on change in rules
2. Transfer from traditional system to WUA: relationship between WUA and users (what happened to the traditional system after WUAs)
3. Nature of relationship between WUA and how do they interact with officials
4. How members of WUA selected (nominated or selected?)
5. Role of president (do they look at other institution and roles)

### Comments from:

***Prof. Pampa Mukerji***

1. Shift from traditional institutions to WUAs.
2. How members are selected in WUA

**Prof. Helmi:**

1. What are the purpose and use of these forms?
2. What kind of data are collected/
3. How to prepare transfer of management system
4. Profile of socio-economic interest of farmers
5. What kinds of institution are important for the management of these institutions?
6. Do we combine between database and scientific analysis or we use for practical purpose: specific intentions
7. How do we relate data in irrigation with issues (like how physical aspect, irrigation water mgmt, WUA are related to watershed)
8. Linking irrigation system multi-functionality with malnutrition and stunting growth.
9. Multi-functional entry of irrigation
10. Tendency of young people to get out of agriculture and food companies are coming to rural areas (how do we reflect this in form?)
11. Is it possible to develop techno-park? Learning extensions for bringing young back to irrigation system

**Dr. Asif Kamran**

1. Linking outcomes of irrigation systems to SGDs.
2. Data base should be complete.
3. What variables are more frequent based on NIIS form
4. For system level form: Basic information of irrigation should be included like land to irrigate, number of users, etc
5. SDGs goals: sustainable and responsible production of irrigation system
6. Ostrom framework (economic change, dynamic change variables, etc)

**Prof. Pyakurel**

1. Finding out commonalities and come out generalization for Asian region
2. Develop tools clearly and relevant ideas
3. Fundamental question should be good governance of irrigation system (physical performance, effectiveness in use, several rules of local level, etc)

A summary of the Steering Committee Meeting held for finalizing the tools for the proposed research using the AIIS framework is presented in the following:

### III. Steering Committee for Finalizing the tools:

1. Dr. Takuzi- AIT
2. PK Vishwanathan- India
3. Raza Ullah - Pakistan

4. Dr. Ram Bastakoti - Nepal
5. Prof. Helmi- Indonesia.

Deadline- end of December 2019.

**2. The questionnaire approximately should be organized as follows:**

System level- details- 1page

Household level- 1

Individual level -1

Policy level-1

Country specific and additional details- 2

Question/ variables related to the following:

Climate shocks, adaptation

Indigenous knowledge systems and social capital

Demographic transition

Migration

Economic changes

Market and technology changes

Variable related to allocation and use of water

Variables related to SDG1,2,5,6,8,13,16 to be incorporated

**Irrigation Systems**

Sources- Surface and groundwater

Methods/ Techniques of irrigation - Canal, Tubewells, Tanks, Micro-irrigation

**3. Target Study 200 irrigation systems- 20 irrigation systems per country- FMIS, joint partnership, agency managed**

**4. Plan for 2019-2021**

1st year- Data collection

2<sup>nd</sup> year it in the network- Indonesia- 2020 December

3<sup>rd</sup> year Research Sharing and finally putting it on the wall- Chiangmai-2021 December

5. Publication plan- Special volume of the International Journal of Commons

**6. Immediate POA**

- Take initiatives towards Decentralised Mode of Functioning
- Submit a proposal to SANDEE- India, Nepal, Pakistan – joint proposal
- Others institutions for project funding- CPEC, ICIMOD, IWMI
- Suggestions to rope in Government functionaries for support- civil servants etc.
- Takuzi- request for South eAST Asia level Collaboration