



**'Irrigation revitalization in the Asia & Pacific region :  
Technical approach and future roadmaps'**

**WORKSHOP**

**28 February to 2 March 2013**

**WORKSHOP REPORT**



## Contents

|   |    |
|---|----|
| Background.....   | 3  |
| About the workshop.....   | 3  |
| Summary of the workshop .....   | 4  |
| Main outcomes of the workshop .....   | 4  |
| Immediate follow up by key partners .....   | 6  |
| Timeline proposed for next steps.....   | 6  |
| Detailed workshop report .....  | 8  |
| Day 1 -28/2 - REVIEW .....  | 8  |
| 1-Introductory Session: .....   | 8  |
| 2-Case Study session – Review user experiences in using MASSCOTE tools: .....   | 9  |
| 3-Technical Session 1 – Review and discuss gaps .....   | 12 |
| Day 2-1/3 –RE-DESIGN & LINKING to POLICY .....  | 14 |
| 4-Technical Session 2- CHANGE / REDESIGN.....   | 14 |
| 5- Policy session.....  | 16 |
| 6- Vision/Redesign -Towards MASSCOTE 2.0.....   | 22 |
| Day 3 -2/3 (half a day) .....   | 23 |
| 7- Synergies and Partnerships .....   | 24 |
| 8- Planning.....  | 24 |
| Annex 1 : WORKSHOP AGENDA February 28 –March 2, 2013, Nanjing, China.....   | 28 |
| Annex 2a– DAY 1- expectations from the participants .....   | 33 |
| Annex 2b – DAY 1 - Case studies review – lessons and gaps .....   | 34 |
| Table 1 - Specific lessons and gaps: working group session (1) .....  | 35 |
| Table 2 - GAP Analyses: working group session (2).....  | 39 |
| Annex 3 – DAY 2 - Working groups on gap filling and redesign of MASSCOTE (group session 3) .....  | 45 |
| 1-groundwater.....  | 45 |
| 2 Legal and gender aspects .....  | 46 |
| 3- automation /new technologies (Facilitator : Peter Smith) .....   | 47 |
| 4- Modeling (Facilitator: Robert Carr) .....  | 48 |
| 5- Climate change adaptation (Facilitator: Chen, Zhijun).....   | 48 |
| 6- Open source (Facilitator: Thierry Facon).....  | 49 |
| 7- Planning Smart Investments (Facilitator Raza Farruk) .....   | 51 |
| Annex 4– DAY 2 -Policy session – Strategic Planning and Investments to transform irrigation – What is needed to support it effectively? ..... | 53 |
| Annex 5 – DAY 3 - Working groups on MASSCOTE 2.0.....   | 58 |
| Annex 6: List of Participants .....   | 68 |

## ***Background***

At the 1996 FAO Regional Expert Consultation Meeting on Modernization of Irrigation Systems, a new definition of modernization of irrigation systems was coined to guide future understanding and efforts, namely “Irrigation modernization is a process of technical and managerial upgrading and water delivery services to farmers”, which calls for systematic strategies to address institutional, physical and technical issues coherently through participatory approaches.

Since then, FAO has been advocating irrigation modernization in the Asia region and initiatives have been taken by the international community as the World Bank and ADB, regional institutions and governments. In 2005, the International Workshop on the Future of Large Rice-based Irrigation Systems in Southeast Asia (Ho Chi Minh City, Vietnam) enabled to review progress, analyze lessons and experiences and draw a new roadmap to introduce irrigation modernization into both existing systems improvement and new systems development.

Significant recent developments in the thinking on modernization and the transition towards service-oriented management have been the recognition of the Multiple Uses and Services nature of the vast majority of medium and large irrigation systems, the development of decision-support tools such as the MASSCOTE family of methodologies by FAO since 2007.

In that context capacity development activities and analysis of selected irrigation systems were carried out as part of a series of initiative in the region. These MASSCOTE family of methodologies were applied in many countries of the region including China, India, Pakistan, Vietnam, Nepal, Sri Lanka, Kyrgyzstan, Tajikistan, Uzbekistan, Thailand and Malaysia. These tools proved useful for evaluating performance of irrigation systems, their multiple uses functions and planning for modernization.

After 5 years of implementation, it is proposed to review critically the results of MASSCOTE application in the region, and discuss revision needed. This is why the regional initiative to “revitalize irrigation and agricultural water governance regional” (TCP/RAS/3304) decided in its inception workshop to concentrate on modernization among 3 pillars of action. Under that pillar, were included various activities including : evaluation and revision of the methodologies and testing; national guidelines, proposal to move towards demand driven approach. They were discussed in the regional workshop. FAO has secured funding in 2013 for the revision and testing of a revised MASSCOTE 2.0 in the region and the workshop will aim at defining the arrangements and action plan for this immediate follow up activity.

## ***About the workshop***

The workshop was technical targeted at professional and academics of the irrigation sector.

The workshop had multiple objectives, including to:

- **Review critically** with users the experience on irrigation modernization (in particular using MASSCOTE applications) in the region ( discuss what works, does not work, limitations, expectations from decision-makers, financiers and system managers)
- **Strategize** - Discuss relevance of national guidelines for transforming the irrigation sector, including policy, strategy and investments
- **Redesign** – propose improvements and new elements for the next generation of methodologies (TORs for MASSCOTE 2.0 and for those beyond it)
- **Plan** – prepare a joint work plan for 2013 and beyond to move forward towards a more demand-driven partnership approach to continuous development of tools and guidelines and related capacity development requirements;;

It was also used by FAO as guidance for its future technical programs on irrigation modernization at global and regional level. Finally it also was relevant for ICID and FAO to plan their common actions on irrigation modernization with a first milestones at the World Irrigation Forum in September 2013 in Turkey.

**In preparation, participants were requested to contribute to an online survey on users feedback on irrigation modernization.** This survey asked in particular comments on the MASSCOTE family of tools. The online survey was available in English, Chinese, Russian, Farsi, French. The survey was launched on the 31 January and closed on the 22 February and its main conclusions were used to prepare the workshop content. 113 people answered, most of them with an experience in irrigation modernization as a whole, about 50% with a knowledge of MASSCOTE in particular. Some respondents indicated their interest of the topics but had not yet worked on that type of issues. As some countries who implemented MASSCOTE did not have time to contribute, a shorter version of the survey will be relaunched in the near future and will be used for the preparation of the session on irrigation modernization at the World Irrigation Forum.

More details on the **MASSCOTE methodology and case studies** is available online on the FAO website- [http://www.fao.org/nr/water/topics\\_irrig\\_masscote.html](http://www.fao.org/nr/water/topics_irrig_masscote.html). All the presentations and reference documents were distributed at the end of the workshop on a USB key and will also be available for download.

### **Summary of the workshop**

The workshop brought together about 60 representatives –government representatives or academics/researchers- from Australia, China, India, Indonesia, Iran, Nepal, Philippines, Sri Lanka, Thailand, Vietnam, Malaysia, Uzbekistan, Kyrgyzstan, Tajikistan, Pakistan. It also had representatives from international organizations such as ICID, FAO, IHE-Delft, IRRI, IWMI, ICARDA/ICBA. FAO was represented by various divisions (TCI-Center of Investment ; NRL:Land and water division ; LEG: legal department) and two regional Offices (RAP-Asia and Pacific ; SEC-Central Asia).

The workshop was organized over 2 days and a half in a step wise approach:

- Day 1 focused on the review of irrigation modernization experiences and in particular the practical use of MASSCOTE tool in 6 irrigation schemes;
- Day 2 focused on the need for improvements and redesign of the tools as well as the link to policy;
- Day 3 (half a day) was focused on refining the redesign –towards MASSCOTE 2.0 and planning the next steps.
- On Day 4, participants were able to go to the field and visit one irrigation scheme in the province going through modernization, as well as see some historical highlights.

### **Main outcomes of the workshop**

- **Ownership:** National ownership and a demand-driven approach are keys for the sustainability of MASSCOTE interventions: Participating countries in the region now own and share the irrigation modernization agenda. National ownership was registered at the inception workshop and confirmed at the Nanjing and Manila workshops.
- **MASSCOTE review :** The workshop participants confirmed the relevance of a tool like MASSCOTE to support the irrigation modernization strategies. This statement is in agreement with the outcomes of the online surveys where more than 50 % people indicated they recommended the use of the tool as it is. They acknowledged its use at the scheme level and that it helped identify areas for improvements and plan investments. In both the survey

and the workshop, were recommended some revisions and complements to enable to go beyond the scheme level and link better to decision making level.

- *Demand for Irrigation modernization tools:* There is a big demand for MASSCOTE application in South East Asia, South Asia and Central Asia. A number of countries are planning to make the use of MASSCOTE mandatory. Meeting this demand implies to develop **organizational and** individual capacities for training on MASSCOTE while promoting an “accreditation process of organizations” and a “certification process for individuals” on MASSCOTE. These processes will contribute to achieve a critical number of certified trainers with the appropriate set of knowledge, skills and attitude required for the task.
- *Experience sharing important:* Only 15 out of the 60 participants had used the MASSCOTE tools themselves. However, the workshop was instrumental in facilitating maximum learning through experience sharing. It resulted for all in a lot of interest and a good understanding of the usefulness of the tool, and the conditions in which it can be used, as well as its limitations. Most of the participants indicated an interest to use it in the future, and some already planned to use it in the coming months. The participants familiar with the tool were interested to learn more about some of the modules developed but not applied in their countries such as MASSMUS, MASSPRESS etc. The demand reaffirmed by the participants of the workshop calls for a de-multiplication of the training capacity and was taken up by the workshop on capacity development (4 to 6 March 2013) that was organized immediately after this workshop.
- *Simplify, Complete and Tailor for local needs:* There is a call from users for simplified versions of MASSCOTE adapted to local characteristics but also for a more complete but more practical version to address key issues of climate change adaptation, multiple uses in irrigation systems, drainage and salinity, modeling, economics with an increased focus on farm-level issues and an improved stakeholder consultation process, gender, legal issues, policy and stakeholder consultation processes among others. The approach adopted at the workshops was to revisit MASSCOTE and prepare a new version MASSCOTE 2.0 that will organize all the existing MASSCOTE modules (MASSMUS, MASSIF ,etc.). In addition, training materials and modules will be developed to support the application.
- *Contextualize –“ Move out of the irrigation scheme level only”-* It is essential to link the system level to basins as river basin planning is key to sustainable water resources management; and relevant policies and strategies happening at higher levels.
- *MASSCOTE redesign:* The workshop enabled to discuss a range of issues (including salinity and drainage, legal aspects and gender, climate change, groundwater, management, field level assessment, policy linkages, etc.) and agree on a number of related improvements and additions that could be made on MASSCOTE tools. The suggestion was to keep the existing step approach but add some plug ins at different points of the process, for example opportunities for stakeholder consultation (e.g. communication of insights to decision-makers) and add maybe new steps, for example one related to capacity development (particularly, a task analysis) as a last step of the process. Terms of references for the redesign or adaptation of MASSCOTE 2.0 will be prepared on the basis of the outcomes of the workshop. FAO will start working immediately after the workshop and a proposal for MASSCOTE 2.0 should be available in June 2013 and proposed for piloting by interested partners.

- *National guidelines on irrigation modernization.* Participating countries confirmed the need to promote an enabling environment by developing national guidelines for irrigation modernization and agreed on the contents that these guidelines should cover. They suggested that a. a guidebook/supporting document could be useful for countries to develop their own guidelines, and b. a specific community of practice could be established to construct a framework for the formulation of national guidelines.
- *Engaging in partnerships and policy dialogue for a shared vision on irrigation modernization.* The community of practice on irrigation modernization should gather a wide range of stakeholders dealing with irrigation, with adequate communication of technical insights to decision-makers for the establishment of an enabling policy, legal and economical framework. This community of practice with the knowledge centers, the centers of excellence (research and training) would enable to support the necessary streams of conversation and linking multiple stakeholders. FAO was invited to play the role of Secretariat as it has recognized technical leadership. ICID, the CGIAR, UNESCO-IHE will be key partners and will contribute to thematic conversations as representing the “coalition of “irrigation and drainage professionals”. National level “communities” will enable feedback loops from the field.

## Immediate follow up by key partners

- Link to professional network: ICID wishes to continue the review process and re launch the irrigation modernization survey as part of the preparation process of the World Irrigation Forum.
- Link to university curricula: As an immediate follow up of the workshop, IHE-Delft , international academic organization is planning in April a 2 days information training course on MASSCOTE for its students and plan to add it to the new MASTER course starting in October 2013.
- Link to research: IWMI, an international research organization part of the CGIAR system, aims also to pilot MASSCOTE 2.0 as part of the new global research program CRP5 (water, Land and ecosystems) and more specifically its activity on canal irrigation. IRRI, international research center specialized on rice, has a similar interest and in particular on the module on rice and fish.
- Link to investments: China, ADB , the World Bank are interested to get MASSCOTE included as a requirements for modernization of large irrigation systems.
- Link to country irrigation revitalization program: Indonesia, Tajikistan, Vietnam, Thailand, Malaysia, Pakistan, Uzbekistan indicated they will use MASSCOTE as part of their upcoming irrigation modernization process at scheme level in the coming months.
- Link to capacity development for professionals: India, Malaysia, Vietnam, China will set up center of excellences to develop the capacities of professionals in agriculture water management. In particular they plan to offer the certification of individuals on MASSCOTE. The certification process for both centers of excellence and individuals is being defined with FAO.

## Timeline proposed for next steps

Key milestones proposed for the short and medium terms.

- **11 March 2012:** Final workshop on the Regional initiative on irrigation revitalizing and improved agriculture water governance.
- **April/June 2013:** Setting of the secretariat of the “community of practice on irrigation modernization; including 1) Set a workspace @ FAO (as FAO will act as the Secretariat) . All those involved in the workshops and who indicated interests in the online surveys on

irrigation will be invited to join. 2) development of TOR for the secretariat, the centres as well as accreditation and certification criteria (initial draft); 3) Develop specs for the web-based open source platform and develop the web-support if requirements exceed the functionality of the FAO workspace. 4) fund raising for the secretariat; 4) start identifying “candidates” with the potential for becoming certified MASSCOTE trainers.

- **April/July 2013** : Development of the Improved MASSCOTE methodology/tool (prototype of MASSCOTE 2.0). This tool 2.0 will be discussed with a small group of experts (virtual) and will be tested in the future MASSCOTE applications.
- **May/August 2013**: 1) first round of MASSCOTE application/training in various countries (Tajikistan –first RAP and MASSCOTE a month later with FAOSEC; Vietnam with World Bank Project; Pakistan with ADB; Iraq in Italy with IWMI-CRP 5; 2) These trainings will also be used to start preparing the concept of the “training package” -include an e-learning component-; 3) these applications will also be used for the program of training of trainers –each time 2 people more will be involved if they indicated interest to become MASSCOTE trainers.
- **May 2013 to June 2014**: Preparation of “training packages” for professionals (MASSCOTE application at field level) and for University introductory Curricula on MASSCOTE.
- **August 2013**: MASSCOTE 2.0 proposal, and prepared for testing.
- **September 2013**: World Irrigation Forum, Turkey: session on irrigation modernization (MASSCOTE 2.0) and technical Panel about the accreditation and certification criteria for centers of excellence/FAO-reference centers and individuals.
- **September/November 2013**: 2d round of MASSCOTE application/training in various countries, will include piloting and evaluation of version 2.0) in Indonesia, Philippines, Karnataka, (Indonesia and Philippines under SO2 Regional Rice Initiative<sup>1</sup>). Vietnam, Malaysia and China will be included if possible, otherwise included in a 3<sup>rd</sup> round, together with Thailand and Iran.
- **November/December 2013**: finalization of MASSCOTE 2.0 draft.
- **January / June 2014**: preparation of training packages on MASSCOTE 2.0.
- **January to June 2014**: third round of MASSCOTE trainings.
- **March 2014** : Session as the 2014 Asian Water Week (MASSCOTE users meet and exchange) and MASSCOTE short training
- **June 2014** : centers of excellence should be set and functional and ready to be accredited; it is expected that a first group of MASSCOTE trainers will be pre-certified.
- **July 2014**: Panels review/grant applications for accreditation of centers, and certifications of individuals.
- **September 2014**: ICID conference. Event announcing accreditation of centers, and certification of individuals.

---

<sup>1</sup> Representatives of BAPPENAS, Ministry of Public Works and Inland fisheries have requested in Nanjing and confirmed in Manila their intention to test MASSCOTE 2.0 in two irrigation systems in Java in 2013 and ADB has confirmed its willingness to finance local costs under a sectoral project preparation. For the Philippines, NIA has confirmed its willingness to host a MASSCOTE 2.0 piloting in September under SO2 Regional Rice Initiative, to the visiting SO2 Country Mission, on 11-13 March.



## Detailed workshop report

This section provides more details about the workshop content, details about the presentations, main points of discussions and key outcomes from working groups. The report follows the daily agenda (Annex 1) and provide the working groups outcomes in the other annexes.

### ***Day 1 -28/2 - REVIEW***

(Facilitator: Robina Wahaj, FAO & Daniel Renault; Lead Reporter: Khrisna Prasad, IHE-Delft supported by Sessions and working groups reporters)

#### **1-Introductory Session:**

This session started with the welcome address by **Mr. Yan**, Deputy Director General, Department of Irrigation, Drainage and Rural Water Supply. He provided also a statement on the vision in China for irrigation modernization . In addition, Mr Thierry Facon, Senior Officer, Regional Office for Asia and the Pacific, Food and Agriculture Organization of the United Nations welcomed the participants and provided some background on the regional initiative and specifically the pillar on irrigation modernization .

#### ***Introductory Presentations***

After the welcome and a round of presentation of participants, two presentations from FAO experts set the scene for the workshop discussions.

- First Thierry Facon (FAO-RAP) set the scene discussing the transformation of the Asian economies, and the implication for irrigation (PPT 1.1). In particular he highlighted the conclusions of the FAO/IWMI study on revitalizing irrigation in Asia that identified 5 areas of actions: 1) Modernise yesteryears' schemes for tomorrow's needs ; 2) Go with the flow by supporting farmers' initiatives ; 3) Look beyond conventional PIM/IMT recipes ; 4) Build for the future: Expand capacity and knowledge; 5) Look beyond irrigation: Invest outside the water sector. He highlighted that countries need 1) to 're-think the irrigation sector', considering the economic growth in the region, adopting a new framework for action 'water, food and economy' 2) to adopt a multi-sectoral approach when considering food and water security – with agriculture holding the key to sustainable water resource use to meet social, economical and environmental development objectives 3) to manage transitions 4) to focus on smallholder farmers and 5) to explicitly consider policy dilemmas and difficulties. This set a new context for irrigation modernization that has to be taken up.
- Then Robina Wahaj (FAO, NRL) introduced MASSCOTE family of tools for those participants not familiar with them (PPT 1.2). **MASSCOTE stands for "MApping System and Services for Canal Operation TEchniques."** The MASSCOTE is a stepwise methodology to evaluate and analyze different components of an irrigation system and then develop a modernization plan. The modernization plan consists of physical, institutional, and managerial improvements in different components to improve water delivery service and cost effectiveness of operation and management. The first part deals with evaluation and analysis of the current situation, practices and processes. In the second part a vision for the irrigation system is developed and targets are established. The modernization improvements are then planned to achieve these targets. In addition, various more details modules have been developed or are being developed to improve the understanding on certain elements of the irrigation system: MASSMUS, a module that looks at multiple use systems of irrigation schemes; MASSLIS is a module that analyzes in particular lift irrigation systems; MASSPRESS is a module that focuses on the characteristics of pressurized systems; MASSFISH is a module in development that focuses on the systems where fishery is an important activity. In addition, a Gender



Mainstreaming module is developed to take into account the different gender roles and responsibilities

The discussion that followed the presentations highlighted the following points.

1. The Need for a demand driven approach for using/testing MASSCOTE;
2. The fact that diverse settings require diverse solutions
3. The Need to consider both demand management and supply management
4. The need to focus also on field level performance (water productivity )instead of only on service delivery;
5. Non-uniform distribution of returns matters
6. Importance to communicate the modernization plan to decision-makers.

## **2-Case Study session – Review user experiences in using MASSCOTE tools:**

MASSCOTE family of tools have now been developed and used for more than 5 years. In fact, its first step, the Rapid Appraisal Process, had already been used for the past 15 years and its implementation was reviewed to develop MASSCOTE.

Six Experiences in implementing MASSCOTE were shared first briefly in plenary in a panel. In that first stage, each presenter provided an overview of what they did, and why and also what they got out of it. After these set of quick presentation, each presenter was able to discuss the experience more in details in smaller groups. The group task was to analyze and document the experience And more particularly the lessons learnt, ideas for improvement and critical gaps (see table 1 in Annex 2).

### ***Panel on user experience***

The following cases studies were presented (name of presenters in brackets) and discussed in smaller working groups:

1. CHINA / MASSMUS & MASSCOTE (Mr.Gao Zhanyi)
2. CHINA / MASSCOTE (Mr.Kunlun Ding)
3. VIETNAM/MASSCOTE (Ms. Cam Thi Lan Huong; PPT2.3)
4. NEPAL/MASSCOTE (Mr. Suman Sijapati, PPT2.4)
5. KYRGYZSTAN/MASSCOTE (Mr.Matraim Zhusupov, PPT2.3 in Russian and note)
6. THAILAND/MASSCOTE (Mr. K. Srapratoom, PPT2.6)
7. INDIA / MASSMUS: (Mr. D. Renault / Mr. S. P. Rao; PPT 2.7 and note)

Note: PPT = power points presentations available.

Initially, a case study from Iran was to be shared but due to late arrival, Mr, Ehsani could only join later and contributed to the working groups discussion (a PPT 2.8 on Iran experience is available). In addition, the experience of Sri Lanka was not presented in a specific working group but was shared in the discussions (a PPT 2.9 is available also). Most of those cases, as well as many more were also documented in the online survey organized in preparation of the workshop.

### **The key points discussed after the panel discussion**

- Making link to the policies is important
- MASSCOTE, mainly RAP and MASSMUS being applied widely, but selectively and in pieces
- Need for more insights into ways to improve efficiency
- Vietnam: Did not improve the hydraulic performance of the systems much. Need for new guidelines for modernization.
- Uzbekistan: Terminology (including Russian translation) is inadequate. Local specificities were not fitting. Conditions of delivering water up to the farm boundary were difficult to be conceptualized in MASSCOTE.

### **Group Work (1)**

The following outcomes came out from the group discussion on lessons learnt. More details are available in Annex 2b (table1).

#### **Common points**

- Use easier-to-understand indicators
- Maybe good to do capacity assessment before training
- Unclear sequence in the approach
- May need better clarification on concepts related to scale, irrigation service, and related criteria
- Maybe good to improve incorporate 'climate-smartness', amenable to 'green economy'
- Need to make various components better integrated
- Difficult to address the modernization as a whole only by using MASSCOTE
- Does not deal with groundwater
- Water quality issues are unaddressed
- Definition of 'service orientated management' be made more clear
- Need to focus on adequacy, reliability, and timeliness
- Focus on service delivery (income depends of several others factors: First-thing-first)
- Data intensive, expensive and time consuming
- Also needs to look at comparative benefits from other sectors
- Asset management component needs due emphasis
- Should relate resource input to outcomes
- Current indicators are not easy to be measured.
- Capacity assessment and development are essential for the successful implementation of MASSCOTE
- Based on a participatory approach but the challenge is how to involve several stakeholders
- Need to accommodate different methods for different crops & different water sources (SW and GW).
- Clarify the target user for each step of MASSCOTE and prepare appropriate versions for the defined target (e.g. farmers, engineers, scheme manager)
- Need to simplify the terminology for members of WUAs
- Link application of MASSCOTE with crop productivity and measurement of progress towards food security
- Make it region-specific
- Include a river basin planning
- Systematic approach is one of the fundamental objectives of the tool but, in practice, it does not work.
- Missing: environmental impacts; water quality and food safety; drainage water management
- Is MASSCOTE big enough to accommodate all issues? Are there any other tools to meet various aspirations?
- Systematic approach is one of the fundamental objective of the tool but, in practice, it does not work.
- Irrigation services: reliability/efficiency/equity are not sufficiently highlighted.

- Missing - Climate smart agriculture (mainstreaming CC adaptation and mitigation).
- Which Possible improvements: Resources allocation; harmonization of modules for improved river basin planning

### **Country specific lessons**

#### China

- Need for different methods for different crops & different water sources (SW and GW).
- Allow to be simplified and selectively applied (some steps are more relevant for the policy-makers while other steps are more relevant for technicians)
- Make design standards adaptable
- Handy manual for less/low professionals

#### Vietnam

- Consider supplying water for multiple purposes/ MASSCOTE + MASSMUS.
- Maybe useful to prepare different versions based on the target groups (e.g. farmers, engineers, scheme manager).
- Integration of technology with provincial programs proposed.

#### Kyrgyzstan

- Clarify target user
- What to do in data poor contexts, e.g. alternative sources for irrigation
- Include water measurement components

- Book is academic: simplify for WUAS

#### Nepal

- Difficult to involve varied stakeholders (mixed group of decision-makers and engineers)
- Lacks water measurement options
- Time consuming - A mini version of MASSCOTE?

#### Thailand

- Language barrier
- Misses river basin planning

#### India

- Importance of a champion of modernization at highest level of irrigation hierarchy
- Masscote instrumental to bring a new era of changes in the mindset of irrigation engineers
- Rotation of staff is an issue for considering developing masscote capacity
- Sustain the capacity development on a long term by creating center of excellence
- Ensure initial trainings of engineers on performance, management issues

### 3-Technical Session 1 – Review and discuss gaps

The first technical session started with three presentations presented different dimensions. (in brackets are indicated where presentations are available upon request).

#### ***Presentations***

- Mr. Mathritilake Herath (International Water Management Institute, IWMI), provided a critical review of MASSCOTE from a Research view point . He indicated that needs have changed and therefore there is a need to re-think! He raised a number of questions for example on the possibility to focus on Canal only – delink from others, on How close this to asset management? How do we aim this to SOM (Service Oriented Mgt)? What are advantages against other models – PRA, BenchMarking, etc? How do we bring the system management to the level of efficiency of an commercial activity? How do we this model flexible to real needs of each system . How much data is needed -Resource input versus outcome – impact assessment? (PPT3.1)
- Ruben Lampayan and Sudhir Yadav (Water Science Unit Crop and Environmental Sciences Division, IRRI) provided another research perspective on the Pathways to improve performance of large rice irrigation. He first reminded some basic facts : Rice – very inefficient water use at farmer field scale largely due to: runoff, seepage, deep drainage to groundwater. IRRI works on Helping farmers to use water more productively (& cope with water scarcity where this occurs). Various technologies are explored to support this. For example the **alternate wetting and drying (AWD)** can be used for mild water scarcity conditions The farmers by measuring a number of simple indicators can improve its productivity using that method. (30% reduction in water, no yield reduction). This method now well tested could be used more in large irrigation system to improve the productivity provided some incentives are given to farmers. (PPT 3.2)
- Mr. Blaise Kuemlangan, FAO, LEG highlighted the Critical legal aspects to consider when thinking of irrigation modernization . He indicated legal considerations for two reasons: 1) MASSCOTE as a process towards modernization (as part RAP and the mapping exercise) because **Law is essential to change as:** it governs relationships, accords rights and responsibilities; Provides clarity, certainty, Protects rights by providing means for enforcement and redress; 2) the environment supporting the outcome of MASSCOTE i.e. the implementation of the modernization and plan for example **-Is the legal framework appropriate for:** Modernization, technological advancements, Increasing demand from a range of uses. For these reasons, it is proposed to add some legal consideration in the MASSCOTE step wise approach: Need to map legal landscape – identify water laws and other laws that apply; Other laws: land law, environmental law, financial regulations etc.; Gaps analysis - Need to map legal and policy environment and identify gaps and obstacles (PPT3.4).
- Finally, Robina Wahaj (FAO-NRL) presented the outcomes of the Global Survey on irrigation modernization that aimed among other objectives to obtain feedback on the existing tools and products developed by FAO and in particular MASSCOTE family of tools and methodologies. The survey was filled by 113 respondents of which about 50% had been trained in MASSCOTE at least once. More than 80% were satisfied with the training they had received. Within that group more than half indicated that they will not change anything to MASSCOTE but indicated some suggestions for improvements such as adding calculation sheets and format for each steps, provide an economic assessment tool, provide GIS support or link to GIS support tools, provide water modeling or hydraulic modeling. In addition, Others suggested a number of addition related to drainage, farmer owned pumps, farm level, link to policy legal aspects, climate risks, environmental aspects, etc... and supported

the idea of a revised version (MASSCOTE 2.0). Most indicated that they wish to be involved in the next phase. (PPT 3.5)

The following set of **Additional issues/ opportunities** were raised by the presentations and follow up discussions.

- How to disseminate Alternate wetting and Drying (AWD) in the canal irrigation systems?
- Quantifying irrigation and real water savings
- Possible legal aspects as a process towards modernization (mapping)
- Environment supporting the outcome of MASSCOTE, modernization plan
- Mapping: physical **landscape only**, but should also consider **the legal landscape** ( institutions and policy environment)
- Good to check legal framework for modernization and increase demand from a range of uses
- How to go from canal irrigation systems to pressurized irrigation systems?
- Un clear definition of what are large scale system
- Unclear definition of what is irrigation service quality

### ***Group work session (2) – Improvements areas***

After the presentations and discussion, participants went back into their smaller groups to discuss a series of key areas for improvements to be addressed. Six topic areas were discussed more in depth. Some of the Key conclusions are summarized thereafter:

#### **1. Field level / Policy scaling down**

The group focused on 4 areas : drainage off site, on farm water storage, percolation, modernization of farm irrigation facilities.

#### **2. Pumping: individual and collective**

The group working on pumping suggested to add maintenance, cost of pumping (station). Kilo watt / m<sup>3</sup> water (self comparison).

#### **3. Scaling up to basin level (Facilitator:**

The group proposed to look at the following dimensions: 1) Multi scheme -Need to address more than on irrigation system ; 2) Multiple stakeholders unaddressed: domestic, industry, aquaculture, tourism, recreation, environment, hydropower, sewerage, floods ; 3) Multi-sectoral managers/management Models: 'One manager – multiple users' versus 'multiple uses -multiple users' ; 4) Inter-sectoral governance: Sectoral demand-supply allocations; 5) Service level.

#### **4. Technical modeling and remote sensing (Facilitator:**

The group proposed to consider two subjects: 1) Decision making tools for delivering the surface water by using GIS approach; 2) Prediction of ET and rainfall using GIS.

#### **5. Drainage and quality**

The group proposed the following areas: 1) Availability and use of agricultural drainage water (Surface and subsurface) ; 2) Reuse of drainage water for other productive uses such as aquaculture (Arnasay Lake system); 3)Salinity Assessment (trends, severity, extent and costs of reclamation of irrigated lands subject to salinization/waterlogging); 4) Control, monitoring and evaluation to identify mitigation measures; 5) inventory, survey and performance assessment of drainage systems and impacts of drainage water use Reuse of treated Wastewater; 6) Water pollution of main sources of water (including contamination with heavy metals).

#### 6. Group 6- Policy, Legal and institutional scaling up and down

The group recommended two areas : 1) Linkage to be make more explicit; 2) Proactive engagement.

#### 7. Economic approach

The group recommended to address the following fundamental issues to be addressed : 1) more comprehensive economical approach could be adopted; 2) how to optimize investment options to satisfy various stakeholders at different levels. This can be done through comprehensive economical approach to assess the achievements in economic return (mainly for farmers), financial improvement (mainly for irrigation management agencies) and social and environmental impacts (mainly for river basin and national levels), and balance relevant investments

The detailed outcomes of the group discussion are available in Annex 2 b/ Table 2.

The day 1 was closed after the feedbacks from the groups on “ proposals to fill gaps, way forward for improvement”.

### ***Day 2-1/3 –RE-DESIGN & LINKING to POLICY***

(Facilitator: Domitille Vallée; Lead Rapporteur: Daniel Renault with support from the sessions and working group rapporteurs).

The second day started with a reflection on the review process of the first day by Mr. Krishna Prasad (Rapporteur of Day 1).

## **4-Technical Session 2- CHANGE / REDESIGN**

The second day was focused on “change and redesign”. In that aim, it was introduced with a technical session on “new tools and methodologies” including Modeling, open source approaches, automation at farm level, as well as new investments frameworks for modernizing large irrigation schemes in Pakistan. After the series of presentations, another working group session was organized around 7 key questions to follow up on the work of day 1 and move to a proposal phase.

### **4.1 Presentations**

- **Mister Robert Carr** (eWater and Source, Australia ) introduced the experience of Australia’s national Hydrological modeling platform . e source is a Modeling frameworks to manage human & ecological use of water. That has been developed over 6 years, engaging 46 Partners and \$160M. It was perceived as a need because of the multiplicity of modeling tools used and the inability to have a comprehensive view of the situation. The tool developed is based on 5 core principles: 1)adaptive complexity -matching models, data and outcomes; 2)flexibility-no one right solutions, multiple options to avoid knowledge and vendor lock-in); 3) openness –new knowledge all the time; 4)defensible –best practice by providing range of tools and application no more complicated than necessary checking data availability versus mode complexity . It uses TIME, a free open library of tools ([www.toolkit.net.au](http://www.toolkit.net.au)). EWater Source is an integrated framework for supply and demand of water quantity and quality from local to basin scale. MASSCOTE could used a similar process as it builds towards system thinking for irrigation areas. The right kind of simulation model can be used to support integration and rapidly deploy lessons learnt. The suggestion is to start simple with the supply/demand water balance, the comparison of requested versus supplied; then add complexity looking at capacity constraints and downstream user. It is suggested to develop a web based community of practice for MASSCOTE that will be based around the steps in MASSCOTE approach and could use a range of training tools, demonstration videos, reference materials warehouse of tools and methods. (PPT 4.1)

- **Mister Peter Smith** (Tamworth Agricultural Institute, Australia) completed the description of Australia's more details on the current status of modernization of irrigation in Australia. In particular he explained the drivers of changes and efficiency for irrigation in the country such as the high cost and lack of labor, the water scarcity and the trading systems that force farmers to plan their water consumption. Many new technologies support that process, for example: Farmers will use computer based water audit (farmer order their water online); On farm- development timing of irrigation according to census to deliver the water to what the plan required (Not so good in small industries); Visual plan sensing; Weather based scheduling / altering crop coefficient – comparing remote sense and weather based information. In addition, there is a change in how irrigation is done, for example: Development of irrigation on field (replace channel); a lot of moving of reservoirs and lining of channel; idea of precision of irrigation, using automatic scheduling – sub-surface drip, also pivot. (high energy inputs). Another type of development that occurs is linked to the reduced labor for surface irrigation with more energy use but it leads to search for trade-offs between the labor, energy. (PPT 4.2)
- **Mister Raza Farrukh** (ADB, Pakistan) discussed the investment strategies and the implications on irrigation projects. He illustrated his presentation with the example of Pakistan, the Indus irrigation system. It is the largest contiguous irrigation system in the world, it is spread over 4 provinces, with 2 major reservoirs, 16 dams and irrigating 16 million hectares and contributing for 25 % of the GDP. However the system has major issues among which aged infrastructure, low efficiency, high subsidized O&M, low cost recovery, water charging political, complex management, but no asset management and failed institutional reform. The impacts are clear today: inequitable water distribution with conflicts between provinces, water logging and salinity, low water productivity; etc. The assessment of what is actually needed to modernize and rehabilitate provides steps of the investments strategies: 1) understanding problems and raising awareness; 2) diagnostics; 3) focus on service delivery; 4) integrated planning for resources development; 5) automation of gauging systems; 6) robust monitoring and evaluation; 7) participatory decision making. (PPT 4.3)

#### Discussions points

- Planning models eventually can become operation model.
- MASSCOTE is more meant for managing perturbations compared to forecasting. It is also because of the data poor contexts. Other option is to go for full water control, which is not always feasible.
- On-farm efficiency can be improved by 20-30% by automated on-farm level water management. It is also helpful in reducing conveyance efficiency.

#### 4.2 Working Group Session (3) – addition and redesign

As a follow up of the series of presentations, the participants split in working groups and discussed critical gaps identified on the first day, and also some of the new tools to be addressed in the redesign of irrigation modernization support tools such as MASSCOTE. Each group analyzed the issue related to the subject, tools and methods that could be used, how to include it in the process, and who to involve in that process.

The following seven subjects were discussed in small groups with two rounds of discussion.

1. Addressing Groundwater
2. Gender and legal aspects
3. Implication of Automation / new technologies
4. Integrating Modeling



5. Integrating Climate Change aspects
6. Open source
7. Smart Investments

The detailed reports of each group are available in Annex 3.

## 5- Policy session

### 5.1 Introduction & Discussion on Policy Dilemmas

Thierry Facon presented the policy Dilemmas in the Asia-Pacific region and outlined key challenges (PPT 5.1) :

- All the well-known challenges (climate change, increasing competition for W & L leading to scarcity, declining ecosystem health, widespread poverty and hunger);
- Greater interconnectedness between the water cycle, ecosystems and users;
- Decision-making is extremely complex;
- There is often a widening gap between official irrigation discourse and on-the-ground reality;
- Many old 'solutions' are not working as expected;
- Conflicting policy objectives and incoherent policies;
- Irrigation agencies and the 'development mission'.

Against this background and that provided by key findings, emerging solutions and outstanding questions, moving towards a new framework would entail the following elements. First a consideration of how water policies, allocation, management and investment can support green growth strategies while having explicit food and nutrition security and poverty reduction targets. Another important aspect is the ability to measure progress on a regional system for monitoring of investment and results. A third element would be practical guidance for the implementation of water rights. The fourth element would be policy tools to help design a feasible set of effective and coherent policies and interventions that are aligned with triple bottom line goals and can function in a dynamic transition landscape. A fifth element aims to support the shift towards a renewed Framework for Action on water and green growth for economic, food and water security to achieve coherent, feasible and effective policies and interventions. The next element would be a review of existing objectives through a water lens taking a multi-sectoral approach: Consider solid water accounting as a prerequisite to decisions; Develop risk management strategies for national food security; Recognize political difficulties; Improve negotiation processes; Monitor investment and results ; Explicitly address policy dilemmas and trade-offs. Finally addressing dilemmas and difficulties is necessary to achieve coherent set of feasible and effective policies and better water management outcomes.

### ***Feedbacks from the participants on the relative importance of the Policy Dilemmas***

The participants were asked to indicate the significance of each of the following Dilemmas and difficulties (the more the votes the more significant the dilemma or difficulty).

1. **12 votes** - Managing Transitions: supporting continuity or a combination of improvement and exit strategies
2. **6 votes** -Informal water economies: to manage or not to manage
3. **8 votes** - Is the pursuance of agricultural productivity (economic efficiency) always compatible with other strategic goals such as food security, rural stability and equity
4. **8 votes** - Efficiency or resilience and redundancy?
5. **(not clear)** Implementation of ideal or second-best/Plan B options?
6. **23 votes** - Prioritizing: national objectives, local objectives or basin objectives? How do we better align goals  
Local objectives are different from local objectives

7. **27 votes** - Realistic financial arrangements and incentives for performance  
Incentives important for public irrigation water managers – without incentives they will not perform  
e.g. how to reestablish fee when farmers cannot afford it being below poverty line

## **5.2 Panels 1 – POLICY AND STRATEGY TO TRANSFORM IRRIGATION**

This Panel was organized as a series of three conversations (fish bowl format) between two country to discuss about their respective irrigation transformation strategies and how it happened. They described the general context, the key elements included in their policies to revitalize the irrigation sector, the environment in which changes and reform happened (triggers for those changes to happen?), the policy dilemmas and strategic choices made. For some countries presentations or detailed statements are available in the annex 3.

### ***INDONESIA (Mr. Ir. Mohammad Zainal Fatah ) interviewed by SRI LANKA (Mr. Upali Sarath Wijesekara)***

**How transformation happened and why** (driver and context): This is due to: socio-environmental changes (e.g. increasing population) – infrastructure change (e.g. outdated/obsolete systems) and challenges (e.g. fragmented authority/decentralization)

#### **Key elements and environment/framework for modernization**

1. **Vision** (participatory system for food security and farmer prosperity)
2. **Mission** – development of irrigation system – improvement of irrigation management
3. **Environment** : Participatory, conjunctive use, harmonization of downstream/upstream management, improving farm level management

**These are based on 5 pillars:** increasing water availability, better irrigation infrastructure, improving irrigation management, institutional strengthening; empowerment of human resources

**Enabling frameworks:** law and regulation; institutions; others (e.g. financial policy, knowledge and technology and information systems)

#### **Discussion**

The workshop discussed the issue of implementation and enforcement of law and strategies. It noted that often the law or strategies may exist but implementation and enforcement remains a problem. This is the case in Indonesia, Malaysia and Sri Lanka

On the issue of institutions, the workshop noted that for most developing countries institutions may change but the same people are still in the institutions with same mindset which may lead to lack of real change. It noted that institutions need to get right people.

As regards decentralization of management functions, the workshop remarked that when this takes place, it should not be a mere shedding of financial burden by the national level institution. There needs to be continuous financial and technical assistance to decentralized institutions. It was acknowledged that change to modernization must consider where the stakeholder e.g. farmer will be placed in stakeholder in the irrigation system. In Sri Lanka, there is a need to strengthen WUAs. Responsibility cannot just be handed over to them when they have not been given the skills to manage.

### ***MALAYSIA (Mr. Mohd Adnan Bin Mohd Nor) interviewed by THAILAND (Mr. Somchit Amnatsan )***

In Malaysia, a systematic approach to irrigation development and management began in 1930. 1930s which ensures a commitment to investment in irrigation. The irrigation goals were to address poverty and food supply.

Transformation moved from single crop to double crop system. The system was upgraded with primary, secondary and tertiary systems.

The 1980s was marked by the success of the economic diversification plan and the peak of irrigation development. However, the diversified opportunity led to the populace leaving the agriculture sector leading to abandonment of irrigation schemes. Only large systems survived providing the basis for adaptation by farmers to less labor intensive agriculture. But the continuing economic diversification also means irrigation is no longer the strategy for poverty alleviation. The current strategy is an exit plan for farmers.

Into the future, the issues to address in irrigation management modernization are:

Lessons learnt:

1. Poverty eradication objectives for irrigation are more for economies that are still largely agro-based.
2. A large-scale irrigation system is more resilient to economic changes.
3. A dedicated Department facilitates capacity building to a high level.
4. Rules and regulations (Governance) are necessary to protect investments in irrigation.
5. Investment in Science, Technology and Innovations are necessary for effective and efficient systems.
6. issues to address in irrigation management modernization are:

Issues to be addressed in irrigation management modernization are:

1. Water scarcity due to increase inter-sector competition.
2. The need for agriculture to justify the economics of water use vis-à-vis the Self-Sufficiency Target.
3. The need to improve Water Demand Management between and within the irrigation sector
4. The need to justify values of quantity of water use. (the need to have a more accurate measurement tools and system.
5. The need for forecasting tools that is integrated with other water sectors.
6. The need to build the capacity of the farmers and public for an effective public participation.

In Thailand, there is a problem related to the increase in planting for additional harvest but the land is not left to fallow and therefore this results in loss in fertility and make crops susceptible to disease. It is key to let land to rest for sustained productivity. In Malaysia, when there is continuous rice cropping, it means that the land is always kept wet. A mitigation strategy was to restrict production to two crops a year. There is a need to measure usage so that farmers can know how much they use. There is a need for building capacity of farmers so that they can participate in dialogue.

### ***CHINA (Mr Gao Zhanyi) interviewed by NEPAL (Mr. Suman Sijapati)***

The situation in China is marked by water scarcity and competition between users (agriculture, industry and domestic). Grain production continues to increase over the years.

The challenge was aging irrigation infrastructure/facilities. Modernizing irrigation was priority. In 2011, the water sector reform and development entered an accelerated phase with:

- The 2011 No.1 Document titled the Decision of the Central Government on Accelerating the Water Sector Reform and Development;
- Highlights the role of Water Resources under the New Situation
- Increase investment in water sector

Goals of the water reform:

1. To optimize water allocation
2. To develop water-saving agriculture
3. To expand effective irrigation area
4. To enhance development of small irrigation project
5. To improve the capacity for disaster prevention and mitigation
6. To actively promote integration of advanced science and technology
7. To promote reform in rural areas
8. To increase investment for irrigation and drainage

On top of these, there is need to promote/adopt comprehensive way of thinking i.e. aim for economic benefits, social benefits and environmental impact.

Improvement water management should occur at different scales through an integrated water management approach: on farm; irrigation scheme and basin level.

The discussion noted that China not only known for economic development but also in terms water management. There is a lot to be learned from China

It was noted that the issues was fundamentally the same in China but differed in scales and approach.

## Discussion points

### LESSONS

- Agriculture to be treated as a business not just habitual activity
- Transition (increase size from small to large)
- Water saving in irrigation
- Size of land holding is important – land consolidation
- Change of economics of farming
- Institutional reforms (land, labor) – also a governance issue – water scarcity and competition among sectors – look into new areas for investment – to increase investment or efficiency
- Resilience looking at farmers – sometimes can be reversed in crisis
- Misunderstanding of institutional reforms

*Gaps* : A diversity of points were raised by the participants after the first panel on strategy and policy. They highlighted the key points that were key but did not come out.

- Not addressed - Resilience. Farmers tenants – process to understand farmers visions and their issues
- Misunderstanding of institutional reforms – *redefine Participatory Irrigation Management (PIM)*
- Not mentioned: Increasing water productivity
- Not mentioned: Government intervention/support to issue relevant policies to guide/encourage transition e.g. transition from small scale to large scale farming in China was supported by policies
- 4 Key elements to integrate: 1) Agriculture is a business – this should be the new driver of modernization; 2) Science and technology – more investment; 3) Investment by government – important (for example in China, there is a program to rehabilitate small size irrigation systems); 4) Rural urban immigration can be reversed in certain economic situations
- Improved infrastructure
- Land - consolidation - management
- Social reconstruction with a series of elements : 1) Commercial farming/changing the economics of farming/addressing transitions; 2) Accommodation of social issues/ farmers should be encouraged? In planning – in framework/vision;
- Institutional reforms/land/labour (including governance issues)

- Water scarcity and competition among sectors
- Water saving in irrigation and its sustainability
- Instead of increasing efficiency/productivity – new investment for expansion

### 5.3 Panel 2 - Strategic Planning and Investments to transform irrigation

The second Panel brought together the experience of five countries - India, Tajikistan, Uzbekistan, Iran and Australia. Each panelists were asked to discuss the current process of strategic planning and investments to transform irrigation in their own countries.; in particular the elements that guided the transformation that could inform national guidelines on that topic.

**In INDIA, Mr Chawla** indicated that the priority has clearly shifted now towards modernization with a strong willingness to improve performance (process of performance evaluation), favor crop diversification and automation of the systems. To achieve this, both institutional reform and education are needed. India has 1869 billion cubic meters of renewable water resources of which about 1123 are estimated as utilizable. Due to rising population and increasing demand from domestic and industrial sectors, share water for irrigation is likely to decrease in coming years. In India, water is a state subject and the Ministry of water resources provides overall guidelines which may not be mandatory to the States. Many states are still investing their major budget in building of water storages. Presently about 62 million ha are irrigated (net area). About 6 million ha are under pressurized (sprinkler and micro) irrigation and the government provides liberal subsidy for these water saving systems. Most irrigation infrastructure is old and is in need of rehabilitation and modernization. Many States are in the process of modernization of the irrigation conveyance network. The Central Government has been encouraging Participatory Irrigation Management and today more than 60,000 WUAs have been established, mostly in major and medium irrigation schemes. Increasing share of groundwater irrigation and depleting groundwater tables is matter of great concern in India. The Government of India through its “national irrigation mission” has planned to increase the prevailing irrigation efficiency/ water use efficiency in surface water irrigation schemes from 30% to 36%.

**In Tajikistan, Mr Husniddin Tursunovich Sharofiddinov** indicated that the irrigation sector is considered as part of the ongoing process of reforming the water sector in the country. This process will redefine even the administrative boundaries. The main objectives of reform are: 1) Well coordination and regulation of activities of all water use sectors; 2) Secure water supply for water users; 3) improvement of land situation; 4) Developing new land; 5) Rehabilitation of embankments and protection of land against flooding. In order to do that, there are some key tasks to be performed: 1) Conduct of inventory of irrigation infrastructure and development of national data base (RAP and identify owners); 2) Establishing of water User Associations and strengthening their capacity. There are a number of concerns related to irrigation, in particular the viability of high lift irrigation systems and associated pumping stations (many irrigation schemes have major lifting stations); and how the shifting to the concept of integrated basin management with users and polluter pays principles for rehabilitation (in the old system – nobody pays).

**In UZBEKISTAN, Mr Ikrom Ergashev and Mr Shukhrat Mukhamedjanov** reminded that cotton is the main crop of the country. The central economy has now collapsed and the transition is towards a market oriented economy with land fragmentation. Farmers were used to an excellent water supply in the past. Due to fragmented landholdings, water distribution becomes difficult. Average holding is about 50 h and there is no policy to support large farms/ farmers. Farm land is given to those who farm it better. People who may not have access to the right tools and water will be disadvantaged . The situation in Uzbekistan is similar to other countries in Central Asia shifting away from a centrally planned economy. Now efforts are needed for Water accounting , tailored incentives.

**For IRAN, Mr Mehrzad Ehsani** summarized the key elements of the document (Iran Vision 2025) that guides social and economic development of the country in the long term. The vision defines the frame for what can happen in term of research, credit, economy and industrial programs. Food sufficiency remains a national objective. In that context, the general policy objectives relevant to water sector and food security, as included in vision 2025 are as follows: Increasing water productivity; Maximizing water supply (including water recycling and reusing), while minimizing natural and artificial water loss throughout the country; Establishing a comprehensive program to consider the execution of projects such as dams, watershed management, aquifer formation, irrigation systems, equipping and leveling lands and water sanitation. Iran has the 5<sup>th</sup> largest irrigated area (8million ha) in the world. The government's policy is to purpose only those strategy measures which are implementable. For example, there is a remote sensing network for discharge measurement and toady there are some 200 remote water measuring points have been established. In Iran, pressurized (sprinkler and micro) irrigation is practiced on about 1 million ha and there are plans to expand it another one million ha in coming 5 years. It was told that the government will be withdrawing the subsidy support to farmers in irrigation water supply through a five steps. The goal is to charge the full cost of irrigation water delivery to farmers.

**In Australia, Mr Peter Smith** presented the Strategic Planning and Investments to transform irrigation – What is needed to support it effectively? . First he introduced the **Key policies that steered Australia in better direction** : 1994 Water Reform Framework, 1995 Ministerial Cap on surface water subdivisions, 2004 National Water Initiative. The Key elements of NWI were : 1) Water entitlements defined as access to a share of the water resource available for consumption as specified in a water plan ; 2) Improved specification of environmental outcomes for particular water systems, improved accountability arrangements for environmental managers, and statutory recognition for water that is provided to ensure environmental outcomes are met; 3) Over-allocated systems to be returned to sustainable levels of use to meet environmental outcomes; 4) Clear assignment of the risk of future reductions in water availability beyond 2014 (ie. shared between governments and water users); 5) Water entitlements defined as access to a share of the water resource that is available for consumption as specified in a water plan ; 6) Improved specification of environmental outcomes for particular water systems, improved accountability arrangements for environmental managers, and statutory recognition for water that is provided to ensure environmental outcomes are met; 7) Over-allocated systems to be returned to sustainable levels of use to meet environmental outcomes; 8) Clear assignment of the risk of future reductions in water availability beyond 2014 (ie. shared between governments and water users) . The process for **Planning and investments for transformation was multiple fold and included** : 1) Identify over-allocated or stressed catchments/water sources; 2) Identify poorest performing locations eg. where substantial losses from irrigation infrastructure on permeable soils occurs, poor irrigation layouts, etc.; 3) Agreed plan of action through stakeholder consultation eg. Murray-Darling Basin Plan <http://www.mdba.gov.au/basin-plan> ; 4) State government funding eg. NSW DPI 'WaterWise on the Farm' program (\$20 million AUD 1998-2005), Federal government funding eg. Aust Govt 'Water for the Future' (\$5.8 billion AUD 2009-2017) <http://www.environment.gov.au/water/australia/index.html>.

#### **Elements for national guidelines in Australia:**

- substantial investment in irrigation research, development and extension
- genuine consultation with stakeholders, especially irrigators to develop and implement a strategy and plan
- using best available science, establish key problems and quantity of water available
- enable trading of water entitlement
- reform and streamline regulatory and administrative processes at all levels of authority
- provide relevant education and training for managers, system operators, irrigators, etc.
- provide incentives to irrigation water suppliers and to irrigators to encourage transformation

- Question: Water reuse - Water –reuse a debate now raging
- Question: Water trading – entitlement of water is now a share (percentage) - no longer a specific amount – volumetric but proportionate
- Total allowable usable water is determined by a regulator at the beginning of year – can be adjusted during year.
- Environmental water holder is considered a water holder

#### 5.4 Working group Discussion (4) – National guidelines

After a discussion in small groups, the following key elements were proposed for national guidelines to support policies and strategies in irrigation revitalization:

1. **R&D:** investment in irrigation research, development and extension
2. **Dialogue-** genuine consultation with stakeholders, especially irrigators to develop and implement a strategy and plan
3. **Knowledge:** using best available science, establish key problems and quantity of water available
4. reform and streamline **regulatory and administrative processes** at all levels of authority
5. **Capacity Development-** provide relevant education and training for managers, system operators, irrigators, etc.
6. **provide incentives** to irrigation water suppliers and to irrigators to encourage transformation
7. **Enable Water reuse** in sector & cross sectors
8. Enable forms of Water trading – entitlement of water use in term of quality & quantity
9. **Add flexibility** -Total allowable usable water determined by a regulator at the beginning of year – can be adjusted during year.
10. Include - **Environmental water** use to be considered a water holder

In addition the following point were raised

- water accounting at river basin level
- Genuine willingness to implement/enforce policy
- Reform and streamline regulatory processes (institutional reform)
- Penalties and incentives (Enforcement of regulations)
- Financial/budget allocation
- Define role of public and private sector agencies
- Dialogue/consultation at different levels

## 6- Vision/Redesign -Towards MASSCOTE 2.0

### 6.1 Introduction

Thierry Facon presented the FAO Vision for redesign / MASSCOTE 2.0 by Thierry Facon. He proposed a process for moving forward in the redesign of MASSCOTE that will be used for the working groups on MASSCOTE 2.0 of the last day. He listed the aspects that came out from the discussion so far on improvements, gaps and the realization on the 2d days that already a lot is addressed in the current MASSCOE 11 steps but improvements can be brought in specific steps. For example, the table lists the issues raised and what participants recommended. The last column indicate if it exist or not in MASSCOTE, or at least partially.



|                        | step | aspect | process | option | objective | tool | exist       |
|------------------------|------|--------|---------|--------|-----------|------|-------------|
| Economic               | X    |        |         |        | X         | X    | Part.       |
| Drainage               |      | X      |         |        |           |      |             |
| C. Smart Ag.           |      |        |         |        | X         |      |             |
| Policy                 |      |        |         |        |           |      | Part.       |
| Pumping stations       |      | X      |         |        |           |      | X           |
| Pipes                  |      |        |         |        |           |      |             |
| Energy                 |      | x      |         |        | x         |      | Part.       |
| Gender                 |      | x      |         |        |           |      | x           |
| Farm-level analysis    | X    |        |         |        |           |      | Not really  |
| automation             |      |        |         | x      |           |      |             |
| Basin level            |      | x      | ?       |        | x         |      | Part.       |
| Legal issues           |      | x      |         |        |           |      | ?           |
| Part. stakeholder pro. | x    |        | x       |        | x         |      | Part.       |
| Modeling               | ?    |        | ?       |        |           | x    | Things ex.. |
| ET. , RS, GIS          | ?    |        |         |        |           | x    | Things ex.  |

The vision for MASSCOTE 2.0 would include all this: Complexify, Simplify , Adapt, Some are already doing (China, Jamaiko irrigation scheme), Some are proposing to contribute (drainage), Different versions to different users, Participatory stakeholder process, Web-based open source ideas, Language.

Thierry Facon proposed the following process for an improved master MASSCOTE 2.0 : 1) Steps; 2) Aspects –flexibility, link to field and implementation; link to policy; 3) Process: Builds on what exists - MASSCOTE modules, Practice, Available tools (COSTAB)-; Add to/change: FAO and technical partners; Develop/tests and validate : Developers, Users; 4) Continuous development; 5) reflect on the idea of Different versions for different users?; 6) establish a Warehouse of tools and solutions/steps.

### ***Day 3 -2/3 (half a day)***

(Facilitator: Domitille Vallée; Rapporteur: Robina Wahaj and Mehrzad Ehsani)

The last day started with a summary of the outcomes of the previous day by Daniel Renault.

### **6.2 Working Group session (5) - MASSCOTE 2.0**

Then participants split into groups to refine the proposal for MASSCOTE 2.0 initiated the previous days in the group works. The outcomes of the last group work (5) are presented in the Annex Table 3. They groups addressed the following issues:

| Group | Topic   | Facilitator                  |
|-------|---|------------------------------|
| 1     | Drainage and salinity   | Kristina Nikolaevna Toderich |
| 2     | technical options: pumping stations, pumps, pipes, farm technology, automation, SCADA, etc. | Peter Smith                  |

|   |   |                |
|---|---|----------------|
| 3 | farm level (including fishponds etc.) level considerations                            | Krishna Prasad |
| 4 | policy and stakeholder processes and legal issues                                     | Thierry Facon  |
| 5 | economic aspects and issues   | Raza Farrukh   |
| 6 | water accounting, evapo-transpiration, link to basins, multiple uses, environment et. | Robert Carr    |
| 7 | climate change and energy   | Zhijun Chen    |

## 7- Synergies and Partnerships

The last morning was an opportunity to discuss the next steps and areas for synergies with ongoing regional and International programs. IWMI introduced the CRP5/WLE (PPT 7.1), IRRI presented its program of work (PPT 7.2). In addition, FAO presented its new regional initiative related to a strategic framework SO2, and ICID provided further details on the upcoming World water forum started the 28/9 in Turkey.

## 8- Planning

Key milestones proposed for the short and medium terms.

- **11 March 2012:** Final workshop on the Regional initiative on irrigation revitalizing and improved agriculture water governance.
- **April/June 2013:** Setting of the secretariat of the “community of practice on irrigation modernization; including 1) Set a workspace @ FAO (as FAO will act as the Secretariat) . All those involved in the workshops and who indicated interests in the online surveys on irrigation will be invited to join. 2) development of TOR for the secretariat, the centres as well as accreditation and certification criteria (initial draft); 3) Develop specs for the web-based open source platform and develop the web-support if requirements exceed the functionality of the FAO workspace. 4) fund raising for the secretariat; 4) start identifying “candidates” with the potential for becoming certified MASSCOTE trainers.
- **April/July 2013 :** Development of the Improved MASSCOTE methodology/tool (prototype of MASSCOTE 2.0). This tool 2.0 will be discussed with a small group of experts (virtual) and will be tested in the future MASSCOTE applications.
- **May/August 2013:** 1) first round of MASSCOTE application/training in various countries (Tajikistan –first RAP and MASSCOTE a month later with FAOSEC; Vietnam with World Bank Project; Pakistan with ADB; Irak in Italy with IWMI-CRP 5; 2) These trainings will also be used to start preparing the concept of the “training package” -include an e-learning component-; 3) these applications will also be used for the program of training of trainers –each time 2 people more will be involved if they indicated interest to become MASSCOTE trainers.
- **May 2013 to June 2014:** Preparation of “training packages” for professionals (MASSCOTE application at field level) and for University introductory Curricula on MASSCOTE.
- **August 2013:** MASSCOTE 2.0 proposal, and prepared for testing.
- **September 2013:** World Irrigation Forum, Turkey: session on irrigation modernization (MASSCOTE 2.0) and technical Panel about the accreditation and certification criteria for centers of excellence/FAO-reference centers and individuals.
- **September/November 2013:** 2d round of MASSCOTE application/training in various countries, will include piloting and evaluation of version 2.0) in Indonesia, Philippines,

Karnataka, (Indonesia and Philippines under SO2 Regional Rice Initiative<sup>2</sup>). Vietnam, Malaysia and China will be included if possible, otherwise included in a 3<sup>rd</sup> round, together with Thailand and Iran.

- **November/December 2013:** finalization of MASSCOTE 2.0 draft.
- **January / June 2014:** preparation of training packages on MASSCOTE 2.0.
- **January to June 2014:** third round of MASSCOTE trainings.
- **March 2014 :** Session as the 2014 Asian Water Week (MASSCOTE users meet and exchange) and MASSCOTE short training
- **June 2014 :** centers of excellence should be set and functional and ready to be accredited; it is expected that a first group of MASSCOTE trainers will be pre-certified.
- **July 2014:** Panels review/grant applications for accreditation of centers, and certifications of individuals.
- **September 2014:** ICID conference. Event announcing accreditation of centers, and certification of individuals.

As a follow up of the presentations and the discussions of the main milestones, participants were invited to indicate what they would like to do or to see done in the immediate future as a follow up of the workshops. The following proposals for inputs or actions were made by participants :

#### ***Milestones ICID World Irrigation Forum, September 2013, Turkey***

- 1) propose a side event on “Water quantity and Quality measurements : tools in irrigation, what is new?” ;
- 2) side-event or group discussion on “platform for public participation”;
- 3) side-event or group discussion on “preparing farmers for change: tools, techniques”. ;
- 4) Recommend to have a session to present “real case study of MASSCOTE application showing the advantages and disadvantages of using that tool.
- 5) recommend a session on climate change impacts on irrigation and irrigated agriculture and how to climate proof investments in the sector (contact: Raza M. Farrukh, ADB, Pakistan).
- Question to ICID : how can Chinese company attend the exhibition?

#### ***TOPICS to follow up***

- FAO/RCI: Organize a special activity targeted at project design to reverse the trend towards canal lining Contact: Chen)
- China: Want to know more about new technologies in Australia for irrigation modernization (automation etc.) (contact: [mausenju@sina.com](mailto:mausenju@sina.com))
- Malaysia: water accounting

#### ***MASSCOTE application and refining***

- China: 1) wish to apply MASSCOTE in an irrigation system and modify it according to local conditions (from step 2 to step 10) ; 2) understanding research findings on effective and comprehensive stakeholder engagement in the process. (contact: Gao Zhanyi; interest to be involved: Dong Bin)

---

<sup>2</sup> Representatives of BAPPENAS, Ministry of Public Works and Inland fisheries have requested in Nanjing and confirmed in Manila their intention to test MASSCOTE 2.0 in two irrigation systems in Java in 2013 and ADB has confirmed its willingness to finance local costs under a sectoral project preparation. For the Philippines, NIA has confirmed its willingness to host a MASSCOTE 2.0 piloting in September under SO2 Regional Rice Initiative, to the visiting SO2 Country Mission, on 11-13 March.

- India : Karnataka : As part of an ongoing ADB program 2 to 3 MASSCOTE applications are planned in Karnataka state. Willingness to work on the improvement of the water accounting component as well as get a MASSCOTE certification. ;
- India: wish to get a similar workshop in INDIA with MASSCOTE trainers from various states to learn from their experiences and inform the redesign process of MASSCOTE 2.0.
- India: In India performance evaluation studies are already being taken in irrigation projects. Suggest adoption of MASSCOTE as a management tool for evaluation and taking decision about renovation / modernization (after some training to see the benefits). (contact: Mr.Chawla).
- Indonesia : In 2013, preparation of a pilot MASSCOTE implementation in one irrigation scheme; this will be used to enhance the Indonesian plan on irrigation modernization and prepare the Indonesia Roadmap on irrigation modernization based on MASSCOTE use. (Contact: Sirait; Fatah)
- Indonesia: 1) assessment of rice-aquaculture interactions in irrigation field in West Java and Bali (Siebak) using MASSCOTE.
- Iran: plan to apply MASSCOTE in Iran
- Kyrgyzstan:1)Conduct a course for trainers on MASSCOTE for others regions on the country; 2) replicate the course (advanced) for participants who already attended the first one.
- Malaysia: 1) strategic planning and modernizing of an irrigation granary area (large scheme) ; 2) RAP and MASSCOTE in at least one granary area. ;3) mechanical and electrical component survey of existing conditions and improvement needed.
- Nepal: 1) wish to conduct a MASSCOTE application in one large government managed irrigation scheme; 2) pilot MASSCOTE in one farmer managed scheme; 3) Conduct MASSCOTE training for irrigation staff. NOTE: request support in carrying out these activities from FAO (Contact: Sunam Sijapati, INPIM Nepal)
- Pakistan: 1) apply MASSCOTE in Lower Bari Doab Canal system, punjab,with FAO involvement ; 2) Pilot test economic and financial analysis for MASSCOTE 2.0 in the same ; 3) use MASSCOTE for designing a new prokject in federally administered tribal areas (FATA). (contact: Raza M. Farrukh, ADB Pakistan).
- Thailand : plan to apply MASSCOTE at the Maetang Irrigation Project in Chang Mai province. (Contact: Jansark Limpiti ; Somchit Amnatsan)
- Vietnam: 1) Will carry out various irrigation systems assessments using MASSCOTE as part of a large project “support for irrigated agriculture in Vietnam” funded by the World Bank in Phu Ninh Irrigation system, NOTE: hope to receive technical assistance from FAO to do it; 2) cooperate with FAO to establish a center of excellence to provide training and research in support to the irrigation modernization in the country. MASSCOTE will be one of the main component of the training in that center.; 3) conduct training course on MASSCOTE 2.0 for Vietnamese scientists, engineers and irrigation managers.
- Tajikistan: to adapt and test MASSCOTE 2.0 with first a RAP workshop (May), then a MASSCOTE workshop in June and possibly a MASSMUS + gender workshop in September. This will be used as a support to the implementation of the water sector reform. (Contact: Husniddin).
- Uzbekistan: 1) pilot of MASSCOTE ; 2) testing of RAP in the different canal levels ( Contact: Ikrom Ergashev)
- Sri Lanka: Application of MASSCOTE for Pahala andara wewa in Hambantota district (contact: wswijesawana@yahoo.com)
- FAO: 1) will work on MASSCOTE 2.0 (Contact: Thierry Facon, Robina Wahaj; want to contribute: Sunam Sijapati/INPIM, Nepal);
- Request to FAO: prepare a set of tutorials for MASSCOTE family to help learners grabbing the concepts. (Contact: Daniel Renault)

- IHE-Delft/Holland: 1) will provide MASSCOTE training to its MSC (26 people) in April, 2013 with the Support of FAO ; 2) will like to do similar capacity development activities globally in the future-see thereafter; 3) would like to contribute to implement MASSCOTE methodology.
- ICRISAT/ICBA: 1) contribute to the development and testing of indicators for water salinity assessment in RAP (plug in) ; 2) attend and contribute to the workshops organized in central asia on MASSCOTE. (contact: Kristina)
- IWMI: 1) plan trainings on MASSCOTE.; 2) Manthritilake: want to learn MASSCOTE to become a master trainer.

### **Collaboration**

- ICID wished to collaborate with IRRI on its water saving initiative (contact : [kid@icid.org](mailto:kid@icid.org))
- Central Asia :May 2013: to support the development and implementation of the learning initiative on irrigation modernization in central asia.
- Request to FAO : support people to have discussions among countries about RAP or MASSCOTE
- Indonesia: Development of marine center for aquaculture in Bali for training and producing fish that will be used in ponds such as milkfish, seabass.
- Indonesia: continuing and finalizing formulation of Indonesia irrigation modernization plan as a member of task force comprising academicians, senior lecturers, researchers, practitioners and policy makers. (Contact: Fatah)
- Malaysia: assistance from FAO and other related agencies in developing training modules in water management of irrigation schemes.
- Philippines: IRRI wish to link their existing initiative Philippines food self sufficiency Program, with the planned MASSCOTE implementation (SO2/Rice by FAO). (Contac; R. Lampayan)
- UNESCO-IHE and University of Nebraska (Water for Food Institute) have formulated a Double Degree MSc programme on Advanced Water Management for Food Production which we aspire to start from October this year. This may be a good opportunity to have a few MSc-ers testing MASSCOTE for irrigation modernization at some sites or perhaps even helping to upgrade the methodology as part of their MSc project/thesis.

# Annex 1 : WORKSHOP AGENDA February 28 –March 2, 2013, Nanjing, China

Lead Facilitators: Robina Wahaj and Domitille Vallée (FAO)

| Time        | Day One: 28 February<br>Lead Rapporteur: Krishna C. Prasad  | Day Two: 1 March<br>Lead Rapporteur: Daniel Renault   | Day Three: 2 March<br>Lead Reporter: Kristina Toderich  |
|-------------|---|---|---|
| 8:00-8:30   | <b>Registration</b>   | Debrief by Lead Rapporteur and key points from Day 1<br><b>Rapporteurs:</b> Krishna C. Prasad/ Kunkun Ding  | Debrief of Vision Redesign Session and key points from Day 2 & Discussion (40')   |
| 8:30-9:00   | <u>INTRODUCTORY SESSION</u><br>Welcome address, and statements<br><b>Mr. Yan (20)</b><br><b>Mr. Hao Jao</b><br><b>Mr. Thierry Facon (10)</b>                      | <u>TECHNICAL SESSION- REDESIGN</u><br><b>Rapporteurs:</b> Krishna C. Prasad/ Kunkun Ding<br><br><u>PRESENTATIONS</u><br><ul style="list-style-type: none"> <li>Modeling (<b>Robert Carr</b>) (10)</li> <li>New technologies (<b>Robert Smith</b>) (10)</li> <li>Investment (<b>Raza Farrukh</b>) (10)</li> </ul> Questions (15) | - Introduction to morning Agenda. (5')<br><br><b>Rapporteurs:</b> Daniel Renault/Thierry Facon  |
| 9:00-9:40   | Introduction to agenda & round of presentation of experts<br><b>Ms. Robina Wahaj (30)</b>   |   | <u>Panel of Regional and International partners-</u> (25')<br>Introduction to group works (5')<br><b>Rapporteurs:</b> Kristina Nikolaevna Toderich / Pham Thi Phuong Thao |
| 09:40-10:05 | <i>Setting the Scene:</i> <b>Mr. Thierry Facon (10)</b><br><br>Plenary discussion (15)<br><b>Rapporteurs:</b> Kristina Nikolaevna Toderich / Pham Thi Phuong Thao | <u>Plenary Discussion</u> on critical questions and tools to support irrigation modernization (20')<br><br>Introduction to GROUP session (5')<br><br><b>Rapporteurs:</b> Daniel Renault/Thierry Facon   | <u>Working groups (80')</u> – Roadmaps for moving forward irrigation revitalization<br><br>(each group will designate a facilitator and a rapporteur)                     |
| 10:05-10:30 | <i>MASSCOTE in brief:</i> <b>Ms. Robina Wahaj (10)</b><br><br>Plenary discussion (15)<br><b>Rapporteurs:</b> Krishna C. Prasad/ Robert Carr                       | <u>WORKING GROUPS–CHANGE &amp; REDESIGN</u> (change, addition, redesign ) (40)  |   |
| 10:30-11:00 | <b>Coffee Break</b>   | <b>Coffee Break</b>   | <b>Coffee Break</b>   |
| 11:00-11:45 | <u>CASE STUDY SESSION -REVIEW</u><br><b>Facilitator</b> Daniel Renault (TBC)<br><b>Rapporteurs:</b> Krishna C. Prasad/ Robert Carr                                | Group session Continue (40)   | Continue (Working groups) with exchange between groups.   |
| 11:45-12:00 |   | Debriefing (20')  | Debriefing from groups and synthesis of the roadmaps (45')<br><b>Rapporteurs:</b> Kristina Nikolaevna Toderich / Kunkun Ding  |
| 12:00-12:30 | <i>Panel of users (case studies presents will give a quick snapshot) (45')</i><br><br><i>Working groups each around a case study (60')</i><br>Debriefing (15') .  | <u>POLICY SESSION</u><br><b>Rapporteurs:</b> Blaise Kuemlamgan/Suresh Kulkarni<br><br><u>Presentations</u><br>-Policy Dilemmas ( <b>Thierry Facon</b> ) (10)<br><br><u>Panel 1</u> (50') Policy and strategies to Transform Irrigation<br><b>Facilitator:</b> Domitille Vallee (TBC)<br>Wrap up by Reporter (10')               | <i>Focus for Regional actions and partnerships</i><br><br>Plenary discussion (45)   |
| 12:30-13:00 |   |   | Pledges ( participants)<br><br>Wrap up and conclusions<br><br>Closing ( <b>Gao Zhanyi and Thierry</b> )   |

| Time        | Day One: 28 February<br>Lead Rapporteur: Krishna C. Prasad  | Day Two: 1 March<br>Lead Rapporteur: Daniel Renault  | Day Three: 2 March<br>Lead Rapporteur: Kristina Toderich |
|-------------|---|--|--|
|             |   |  | Facon)   |
| 13:00-14:00 | Lunch   | Lunch  | Close  |
| 14:00-15:00 | <u>TECHNICAL SESSION</u><br><b>Rapporteurs:</b> Ines Beernaert/<br>Sudhir Yadav<br><u>Presentations</u><br>review of MASSCOTE<br><b>(Manthritilake Herath)</b> (10')<br>Pathways to improve<br>performance <b>(Rubento</b><br><b>Lampayan TBC)</b> (10')<br>Discussion (10')<br>Critical legal aspects <b>(Blaise</b><br><b>Kuemplangan)</b> (10')<br>Global Survey Results <b>(Robina</b><br><b>Wahaj)</b> (10')<br>Discussion (10') | <u>POLICY SESSION (continue)</u><br><b>Rapporteurs:</b> Blaise Kuemplangan/Suresh<br>Kulkarni<br><br>- <u>Panel 2-</u> (50') Strategic Planning and<br>Investments to transform irrigation<br>(UZBEKISTAN, TADJIKISTAN, INDIA, IRAN,<br>AUSTRALIA) (statement and facilitated<br>discussion)<br>Facilitator : <b>Henrich Weis (TBC)</b><br><br>Wrap up by Rapporteur (10') | FREE or individual meetings                              |
| 15:00-15:30 | <u>Working groups (80') – improve<br/> irrigation support tools and fill<br/> gaps –</u><br><br><i>(groups will work flexibly over<br/> coffee break)</i><br><b>Rapporteurs (each group<br/> rapporteur)</b>  | <u>VISION /REDESIGN</u><br>Introduction –Towards MASSCOTE 2.0<br><b>(Robina Wahaj)</b> (10)<br><br>Group work introduction (5')  |  |
| 15:30-16:00 | Coffee Break  | Coffee Break   |  |
| 16:00-16:30 | (working group continue)  |  |  |
| 16:30-17:00 | <u>Debriefing – key conclusions of<br/> each group on “ proposals to fill<br/> gaps, way forward for<br/> improvement”</u><br><br><b>Rapporteurs:</b> Ines Beernaert/<br>Sudhir Yadav   | <u>Working Group (45')</u><br><br>Vision and content for redesigning irrigation<br>modernization support tool and MASSCOTE<br>2.0.<br><br>(rapporteurs will present key outcomes in<br>debriefing on Day 3)<br><br><b>Rapporteurs:</b> Daniel Renault/Thierry Facon  |  |
| 17:00-17:30 | Plenary discussion (30)<br><b>Rapporteurs:</b> Ines Beernaerts/<br>Kristina Nikolaevna Toderich   | Wrap-up and close  |  |
| 19:00       | Dinner Reception  |  |  |



## DAILY AGENDAS

| Day One: 28 February  |  |   |   |
|---|--|---|---|
| Lead Facilitator: Robina Wahaj & Lead Rapporteur: Krishna C. Prasad   |  |   |   |
| 8:00-8:30   | <b>Registration</b>  |   |   |
| 8:30-9:00   | <p style="text-align: center;"><b>INTRODUCTORY SESSION</b></p> <p><b>Facilitator:</b> Thierry Facon<br/> <b>Rapporteurs:</b> Kristina Nikolaevna Toderich / Pham Thi Phuong Thao</p> <p>Welcome address by,<br/> - <b>Mr. Yan</b>, Deputy Director General, Department of Irrigation, Drainage and Rural Water Supply – Welcome with a statement on the vision in China for irrigation modernization (20)<br/> - <b>Mr Thierry Facon</b>, Senior Officer, Regional Office for Asia and the Pacific, Food and Agriculture Organization of the United Nations (10)</p>   |   |   |
| 9:00-9:30   | <p>Introduction to agenda &amp; round of presentation of experts (30)<br/> <b>Facilitator:</b> Ms. Robina Wahaj , FAO</p>  |   |   |
| 9:30-10:00  | <i>Setting the Scene: transformation of the Asian economies, and the implication for irrigation. Mr. Thierry Facon, FAO-RAO</i> (10) and Plenary discussion (15)   |   |   |
| 10:00-10:30   | <p>MASSCOTE in brief: Introduction of the MASSCOTE family of approaches; &amp; survey<br/> <b>Ms. Robina Wahaj (FAO, NRL) (10)</b><br/> Plenary discussion (15)</p>  |   |   |
| 10:30-11:00   | <b>Coffee Break</b>  |   |   |
| 11:00-13:00   | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; vertical-align: top;"> <p style="text-align: center;"><b>CASE STUDY SESSION -REVIEW</b></p> <p><b>Facilitator</b> Daniel Renault and each group will have a facilitator.<br/> <b>Rapporteurs:</b> Krishna C. Prasad/ Kunlun Ding &amp; each group will have a rapporteur<br/> <b>Panel of users</b> (case studies presenters give a quick snapshot) (45')<br/> <b>Working groups 1</b> around each an individual a case study (60') – lessons learnt and gaps (starting with complement of panel presentation - 10'max)<br/> <b>Debriefing</b> (15') – key conclusions of each group on “ gaps, improvement” will be gathered using cards.</p> </td><td style="width: 40%; vertical-align: top;"> <p><b>Case studies presented</b><br/> INDIA / MASSMUS &amp; gender: (Mr. S. P. Rao/D. Ranault)<br/> CHINA / MASSMUS (Gao Zhanyi)<br/> CHINA/MASSCOTE (Kunlun Ding)<br/> VIETNAM/MASSCOTE ( TBD)<br/> NEPAL/MASSCOTE (Suman Sijapati)<br/> KIRGIZSTAN?MASSCOTE (Matraim Zhusupov)<br/> THAILAND/MASSCOTE (K. Srpratoom, TBC)</p> </td></tr> </table> | <p style="text-align: center;"><b>CASE STUDY SESSION -REVIEW</b></p> <p><b>Facilitator</b> Daniel Renault and each group will have a facilitator.<br/> <b>Rapporteurs:</b> Krishna C. Prasad/ Kunlun Ding &amp; each group will have a rapporteur<br/> <b>Panel of users</b> (case studies presenters give a quick snapshot) (45')<br/> <b>Working groups 1</b> around each an individual a case study (60') – lessons learnt and gaps (starting with complement of panel presentation - 10'max)<br/> <b>Debriefing</b> (15') – key conclusions of each group on “ gaps, improvement” will be gathered using cards.</p> | <p><b>Case studies presented</b><br/> INDIA / MASSMUS &amp; gender: (Mr. S. P. Rao/D. Ranault)<br/> CHINA / MASSMUS (Gao Zhanyi)<br/> CHINA/MASSCOTE (Kunlun Ding)<br/> VIETNAM/MASSCOTE ( TBD)<br/> NEPAL/MASSCOTE (Suman Sijapati)<br/> KIRGIZSTAN?MASSCOTE (Matraim Zhusupov)<br/> THAILAND/MASSCOTE (K. Srpratoom, TBC)</p> |
| <p style="text-align: center;"><b>CASE STUDY SESSION -REVIEW</b></p> <p><b>Facilitator</b> Daniel Renault and each group will have a facilitator.<br/> <b>Rapporteurs:</b> Krishna C. Prasad/ Kunlun Ding &amp; each group will have a rapporteur<br/> <b>Panel of users</b> (case studies presenters give a quick snapshot) (45')<br/> <b>Working groups 1</b> around each an individual a case study (60') – lessons learnt and gaps (starting with complement of panel presentation - 10'max)<br/> <b>Debriefing</b> (15') – key conclusions of each group on “ gaps, improvement” will be gathered using cards.</p> | <p><b>Case studies presented</b><br/> INDIA / MASSMUS &amp; gender: (Mr. S. P. Rao/D. Ranault)<br/> CHINA / MASSMUS (Gao Zhanyi)<br/> CHINA/MASSCOTE (Kunlun Ding)<br/> VIETNAM/MASSCOTE ( TBD)<br/> NEPAL/MASSCOTE (Suman Sijapati)<br/> KIRGIZSTAN?MASSCOTE (Matraim Zhusupov)<br/> THAILAND/MASSCOTE (K. Srpratoom, TBC)</p>  |   |   |
|   | <b>Lunch</b>   |   |   |
| 14:00-15:00   | <p style="text-align: center;"><b>TECHNICAL SESSION 1 - REVIEW</b></p> <p><b>Facilitator :</b> Robina Wahaj and each group will have a facilitator<br/> <b>Rapporteurs:</b> Ines Beernaert/ Sudhir Yadav &amp; each group will have a rapporteur</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 80%; vertical-align: top;"> <p><u><b>Presentations</b></u><br/> -Research view point-a critical review of MASSCOTE (Manthritilake Herath, , IWMI) (10')<br/> -Pathways to improve performance of large rice irrigation: research agenda for modernization (R. Lampayan, IRRI) (10')<br/> -Critical legal aspects to consider when thinking of irrigation modernization (B. Kuemlangan, FAO, LEG) (10')<br/> - Global Survey on irrigation modernization / Results (Robina Wahaj) (10')</p> </td><td style="width: 20%; vertical-align: top; text-align: right;"> <p>Discussion (10')</p> <p>Discussion (10')</p> </td></tr> </table>   | <p><u><b>Presentations</b></u><br/> -Research view point-a critical review of MASSCOTE (Manthritilake Herath, , IWMI) (10')<br/> -Pathways to improve performance of large rice irrigation: research agenda for modernization (R. Lampayan, IRRI) (10')<br/> -Critical legal aspects to consider when thinking of irrigation modernization (B. Kuemlangan, FAO, LEG) (10')<br/> - Global Survey on irrigation modernization / Results (Robina Wahaj) (10')</p>  | <p>Discussion (10')</p> <p>Discussion (10')</p>   |
| <p><u><b>Presentations</b></u><br/> -Research view point-a critical review of MASSCOTE (Manthritilake Herath, , IWMI) (10')<br/> -Pathways to improve performance of large rice irrigation: research agenda for modernization (R. Lampayan, IRRI) (10')<br/> -Critical legal aspects to consider when thinking of irrigation modernization (B. Kuemlangan, FAO, LEG) (10')<br/> - Global Survey on irrigation modernization / Results (Robina Wahaj) (10')</p>  | <p>Discussion (10')</p> <p>Discussion (10')</p>  |   |   |
| 15:00-16:30   | <p><b>Working groups 2</b> (80') – improve irrigation support tools and fill gaps –<br/> <i>(group topics will be defined by facilitator over lunch on the basis of morning outcomes)</i><br/> <i>(groups will work flexibly over coffee break)</i></p>  |   |   |
| 16:30-17:30   | <p>Debriefing by rapporteurs – key conclusions of each group on “ proposals to fill gaps, way forward for improvement” (30)<br/> Plenary discussion and wrap up (30)</p>   |   |   |
| 18:30   | <b>Dinner Reception</b>  |   |   |

| Day Two: 1 March   |   |
|--|---|
| Lead Facilitator: Domitille Vallee & Lead Rapporteur: Daniel Renault |   |
| 8:00-8:30  | <b>Rapporteurs:</b> Krishna C. Prasad/ Kunkun Ding<br>Debrief by Lead Rapporteur and key points from Day 1  |
| 8:30-9:20  | <b>TECHNICAL SESSION 2- CHANGE / REDESIGN</b><br><b>Rapporteurs:</b> Krishna C. Prasad/ Kunkun Ding<br><u>PRESENTATIONS</u> <ul style="list-style-type: none"> <li>MASSCOTE, modeling, web based and open source approaches (Robert Carr, eWater CRC) (10)</li> <li>Game changing with new technologies for irrigation modernization? (Robert Smith, Tamworth Agricultural Institute) (10)</li> <li>Investment strategies and implication for irrigation projects (Raza Farrukh, Asian Development Bank) (10)</li> </ul> Questions (20) |
| 9:20-9:40  | Plenary Discussion on critical questions and tools to support irrigation modernization (20')  |
| 9:40-10:30   | <u>WORKING GROUPS-CHANGE &amp; REDESIGN</u><br>Introduction to GROUP session (5')<br>(change, addition, redesign ) (90)<br>(Organized as a World Café session, with various facilitators and rapporteurs)   |
| <b>Coffee Break</b>  |   |
| 11:00-11:45  | Group session Continue<br>Debriefing (20')  |
| 11:45-13:00  | <b>POLICY SESSION</b><br><b>Rapporteurs:</b> Blaise Kuemlamgan/Suresh Kulkarni<br><u>Presentation:</u> Policy Dilemmas and a renewed framework for action for economic, food and water security for Asia (Thierry Facon) (10)<br><u>Panel 1</u> (50') <b>Facilitator:</b> Domitille Vallee (TBC)<br>Policy and strategies to Transform Irrigation<br>1- INDONESIA with SRI LANKA;<br>2- MALAYSIA with THAILAND<br>3- CHINA with NEPAL) (teams Speaker with interviewer / Conversation)<br>Wrap up by Reporter (10')                     |
| <b>Lunch</b>   |   |
| 14:00 - 15:00  | <u>Panel 2</u> (50') <b>Facilitator :</b> Heinrich Weis (TBC)<br>Strategic Planning and Investments to transform irrigation<br>(UZBEKISTAN, TADJIKISTAN, INDIA, IRAN, AUSTRALIA) (statement and facilitated discussion)<br>Wrap up by Reporteur (10')   |
| 15:00-15:30  | <b>TECHNICAL SESSION 3 - VISION &amp; POLICY for REDESIGN</b><br><b>Rapporteurs:</b> Daniel Renault/Thierry Facon<br>Introduction –Towards MASSCOTE 2.0 (Robina Wahaj) (10) & Discussion (10)<br>Group work introduction (5')   |
| <b>Coffee Break</b>  |   |
| 16:00-17:00  | <u>WORKING GROUPS – VISION &amp; POLICY for REDESIGN</u> (50')<br>Vision and content for redesigning irrigation modernization support tool and MASSCOTE 2.0.<br>(rapporteurs will present key outcomes in debriefing on Day 3)  |
| 17:00-17:30  | Wrap up and conclusions   |

|                           | Day Three: 2 March  |
|---------------------------|---|
|                           | <b>Lead Reporter:</b> Kristina Toderich   |
| <b>8:00-8:45</b>          | <ul style="list-style-type: none"> <li>- Debrief of Vision Redesign Session and key points from Day 2 &amp; Discussion (40')</li> <li>- Introduction to morning Agenda. (5')</li> </ul> <p><b>Rapporteurs:</b> Daniel Renault/Thierry Facon</p>   |
| <b>8 :45-09 :15</b>       | <p><b><u>PLANNING SESSION</u></b></p> <p><b>Rapporteurs:</b> Kristina Nikolaevna Toderich / Pham Thi Phuong Thao</p> <p><u>Panel of Regional and International partners</u>-(25')</p> <p>Brief round of presentations of International and Regional initiatives in 2013 –objective and synergies :</p> <ul style="list-style-type: none"> <li>-ICID/International irrigation Forum;</li> <li>-FAO/SO2 Initiative, ADB/FAO/World Bank initiative</li> <li>-ADB investment agenda</li> <li>- IWMI- CRP5/Research agenda on irrigation (IWMI),</li> <li>- IRRI new agenda</li> </ul> <p>Introduction to group works (5')</p> |
| <b><u>09:15-10.30</u></b> | <p><u>Working groups (70')</u> (each group will designate a facilitator and a rapporteur)</p> <p>(Groups will be country specific, or regional or Thematic)</p> <p>Prepare Plans 2013-2015 and Roadmaps for moving forward irrigation revitalization</p>  |
|                           | <b>Coffee Break</b>   |
| <b>11.00-11.30</b>        | Continue (Working groups) with exchange between groups.   |
| <b>11.30-12.10</b>        | Debriefing from groups and synthesis of the roadmaps (40')  |
| <b>12.10-12.40</b>        | Plenary discussion on the <i>Focus for Regional actions and partnerships</i> (30)   |
| <b>12.40-13.00</b>        | <p>Pledges ( participants)</p> <p>Wrap up and conclusions</p> <p>CLOSING (Gao Zhanyi and Thierry Facon)</p>   |
|                           | <b>LUNCH</b>  |
| <b>14.00-17.00</b>        | <p><b>FREE or individual meetings</b></p>   |

## **Annex 2 a- DAY 1- expectations from the participants**

The list below illustrates what participants said were their expectations when they started.

### **Capacity development**

To create a high spirit of performance, concerns and achievements among the irrigation community  
To attract young bright engineers in the profession

### **Knowledge**

What is MASSCOTE?

To acquire new knowledge to increase performance of irrigation systems

To learn : new tools to improve irrigation efficiency, new concepts to increase rice production, selection criteria of irrigation systems to be rehabilitated and modernized, how to design and rebuild canal irrigation systems, how to calculate the environmental impacts, ...

To learn the new proposed development of MASSCOTE tools

To know how MASSCOTE can be used by the people who are working on field scale level

To learn how MASSCOTE has already helped in improving performance of the irrigation sector in selected countries, i.e. which successes have already been achieved

To learn how MASSCOTE can help improve irrigation service to the farmers in technically, financially and environmentally attractive manners.

To share experience of MASSCOTE applications in various countries (including issues related to Central Asia)

What could be research topics?

To learn lessons and best practices on use of alternative sources of water for optimization of crop systems in arid-semi-arid regions

### **Networking/partnership**

Become an active member of MASSCOTE and link up CA with other countries

Establish partnership on sustainable use of water resources

Masscote 2.0 is a tool for modernization and a media for 'worldwide' attractive platform

Create an irrigation community with a high spirit of performance, concerns and achievements

### **Workplan**

To identify what worked, what didn't and how to improve steps of MASSCOTE

To obtain clear guidance on how to improve MASSCOTE and establish partnership and workplan for developing and piloting MASSCOTE 2.0

To improve MASSCOTE by taking policy and legal considerations into consideration

To simplify terminology and questionnaires (RAP)

To improve irrigation management indicators and evaluation systems

To identify action to move forward on irrigation modernization in Central Asia based on countries 'priorities/needs and communities of practices ( Asia-Pacific).

To appreciate how MASSCOTE can be applied in Australia and contribute to MASSCOTE review from an Australian viewpoint

To produce an irrigation water use evaluation method that is easier and faster to use, generate results that are credible and acceptable by the sector as well as by the non-irrigation sector

To identify clear follow-up action to take for the application of MASSCOTE in the region

To seek for application of MASSCOTE in the region

## Annex 2b – DAY 1 - Case studies review – lessons and gaps

In this section are included the review of the groups as well as a detailed statement prepared on india.

### India: (detail on the MASSCOTE experience in india).

*a practical experience in using Irrigation Modernization support tools & MASSCOTE/MASSMUS/MASSLIS/ GENDER module in an irrigation scheme – results & lessons learnt by Dr. P.S. Rao, Former FAO Staff, Consultant – Asian Development Bank & Government of Karnataka*

#### MASSCOTE family journey in India

- MASSCOTE applied on 12 Irrigation (large) systems - in Karnataka , Andhra Pradesh & Uttar Pradesh
- MASSMUS applied on 3 Irrigation systems in Karnataka & Andhra Pradesh
- MASSLIS applied on 2 irrigation systems in Karnataka
- GENDER module tested in one system in Andhra Pradesh
- Water Supply module explored/tested in Andhra Pradesh
- FAO I&D Paper No.63 published after field testing in India

#### The Rationale

- Step-by –step simple approach inbuilt into the MASSCOTE tools enthused engineers to dare to engage with the monster called irrigation management
- On-the-job, on-hand training provided much needed motivation for the engineers to reflect on their own professional skills
- Policy makers saw a handle in these tools to understand what-is-what of the large irrigation systems & enable discussions with engineers
- These tools had enough to quench the engineers thirst for new knowledge
- The results provided for engineers a well structure & detailed basis for discussion with various stakeholders incl. politicians & farmers

#### The Driving Force

- A friendly tool providing comprehensive understanding of the complex large irrigation systems – for all stakeholders
- Capacity building given a new dimension with on the job training of engineers in new concepts/methods/techniques
- Enabled discussions among various groups of engineers – opportunity for engaging professionally (networking/sharing)
- Partnership with FAO/UN – enabling exposure outside the state and country; pride in being part of new developments

#### Interesting Outcomes

- 400+ engineers trained in using MASSCOTE tools – 270 in Karnataka, 85 in Uttar Pradesh & 45 in Andhra Pradesh
- A resource trainers pool of 20+ engineers emerged who supported introducing these in other states and countries (central Asian)
- Facilitated testing and validating MASSLIS (MApping System and Services for Lift Irrigation Scjemes); MASSMUS (MApping System and Services for Multiple USes) & the Gender module development
- proposal by FAO to develop Karnataka as a Centre of Excellence for irrigation modernization in Asia
- engineers applying tools to other systems (Karanja in Karnataka)
- emergence of policy issues in Karnataka for discussion at a larger reforms platform
- Central Water Commission/Gol now on-board to support the use of these tools and enhance modernization proposals from states

#### Follow-up

- Certification of engineers in using modernization tools (MASSCOTE family) – for institutionalizing
- Looking for partnership on MASSPOT – with huge investments being made in the pressurized systems
- Option to partner & develop MASSBASIN(!) – drive to move towards RBM and IWRM
- CWC/Gol push for mandatory use of these tools to enhance the impact of irrigation modernization in India

**Working Groups composition (initial grouping – were modified on the day by Robina)**

| Group | Case study                          | Speaker                 | Facilitator         | Rapporter            | Member                              | member                          | member               | member                 |
|-------|-------------------------------------|-------------------------|---------------------|----------------------|-------------------------------------|---------------------------------|----------------------|------------------------|
|       |                                     | 1                       | 2                   | 3                    | 4                                   | 5                               | 6                    | 7                      |
| 1     | CHINA / MASSMUS                     | Mr. Gao Zhanyi          | Peter Smith         | Krishna C. Prasad    | Ir. Mohammad Zainal Fatah           | Syed Abdul Hamid Bin Syed Shuib | Pham Thi Phuong Thao | Gao Benhu              |
| 2     | CHINA / MASSCOTE (chinese only)     | Kunlun Ding             | Zhang Xuehui        | Wu Yinxing           | Zhou Kezhi                          | Jiang Ping                      | Zhao Guowei          | Shi Weidong i Xinjian  |
| 3     | VIETNAM/ MASSCOTE                   | Cam Thi Lan Huong (TBC) | Rubento Lampayan    | Anang Hari Kristanto | Mohd Adnan Bin Mohd Nor             | Dong Bin                        | Robert Carr          | Nguyen Duc Long        |
| 4     | Kirgizstan/ MASSCOTE (Russian only) | Mr Matraim Zhusupov     | Manthritlake Herath | Atakulova Gulnara    | Husniddin Tursunovich Sharofiddinov | Kristina Nikolaevna Toderich    | Ikrom Ergashev       | Shukhrat Mukhamedjanov |
| 5     | THAILAND/ MASSCOTE:                 | Somchit Amnatsan        | Thierry Facon       | Sudhir Yadav         | Dra. Nova Dorma Sirait              | Upali Sarath Wijesekara         | Blaise Kuemlangan    |                        |
| 6     | NEPAL/ MASSCOTE                     | Suman Sijapati          | Raza Farrukh        | Suresh Kulkarni      | Kanchadin Srapratoom (TBC)          | Ines Beernaerts                 | Robina Wahaj         |                        |
| 7     | INDIA/ MASSCOTE                     | Daniel Renault          | Zhijun Chen         | Zalilah Selamat      | Zhou Mingyao                        | Jansark Limpiti                 | V.K.Chawla           |                        |

**Table 1 - Specific lessons and gaps: working group session (1)**

| WHAT WORKS WELL  | WHAT DOES NOT Work WELL                | WHAT DID NOT WORK WELL BUT HAS EASY SOLUTION | FOLLOW UP?   | UNEXPECTED FINDING | CHANGE PROPOSED | IMPROVEMENT IDEAS   | GAPS: WHAT IS MISSING  |
|--|--|--|--|--------------------|-----------------|---|--|
| <b>Group 1- MASSMUS/MASSCOTE- China</b>  |  |  |  |                    |                 |   |  |
| Clearer identification of problems: ecological problems, declining Ground Water Table, etc | Step 2 and 3 Massmus not fit for China | Too complicated                              | Training for concerned/related professional and also for decision makers |                    |                 | China ICID simplified RAP to make it better usable                            | No provision for considering deviation in design standards and climate change factors, etc |
| Water saving potential known and understood  | Further training needed                | Further training needed                      |  |                    |                 | Suggestion: (a) Design standard be updated/adapted (used by Ministry designer | Handy manual for less/lower level professionals (e.g. Vietnam-applicable for               |

| WHAT WORKS WELL  | WHAT DOES NOT Work WELL  | WHAT DID NOT WORK WELL BUT HAS EASY SOLUTION | FOLLOW UP?  | UNEXPECTED FINDING | CHANGE PROPOSED   | IMPROVEMENT IDEAS   | GAPS: WHAT IS MISSING  |
|--|--|--|---|--------------------|---|---|--|
|  |  |  |   |                    |   | team/technicians; (b) - regular/further training/intermittent   | large schemes).  |
| Eco-service/water for ecology  | Very technical   |  |   |                    |   |   | Training for concerned/related professional and also for decision makers   |
| Understanding about water use for industry/other uses  | Need training for professionals (some engineers and researchers were trying to use)  |  |   |                    |   |   | Lack of suitability to local condition   |
| Gives idea of cost and benefit being shared by various stakeholders  | Regular employees cannot handle  |  |   |                    |   |   |  |
| Information on different water uses became clearer (e.g. in Dujianyan Irrigation Scheme)   |  |  | Need for training about 500 people every year   |                    |   |   |  |
| Helpful in rationalizing investments   |  |  |   |                    |   |   |  |
| <b>Group 2 –China – Jamaikou – MASSCOTE</b>  |  |  |   |                    |   |   |  |
| <ul style="list-style-type: none"> <li>- RAP is good to identify problems and weaknesses</li> <li>- MASSCOTE is a systematic and comprehensive method</li> </ul> | 1) too many steps and complicated.<br>2) some indicators may not be applicable for some irrigation scheme (i.e. pumping, reservoir, river net type) so difficult to schematize.<br>Difficult to fill or data not available |  | 1) 6 duck-bell weirs constructed after apply RAP.<br>2) the Accuracy of water measurement increased to 5mm in terms of water measured |                    | Different methods /MASSCOTE developed for different type of irrigation schemes, e.g. For different water sources of reservoir by gravity and by pumping groundwater etc. and for rice area and for wheat crop, etc. | different MASSCOTE for different type of irrigation scheme in terms of crop, water source, or major water users | To make clearer and more specific on who are the users of the MASSCOTE, e.g. Government? Irrigation managers? Or the engineers and technician within the irrigation district |
| <b>Group 3 – Vietnam</b>   |  |  |   |                    |   |   |  |
| Case study presented:  |  |  |   |                    |   |   |  |



| WHAT WORKS WELL   | WHAT DOES NOT Work WELL   | WHAT DID NOT WORK WELL BUT HAS EASY SOLUTION   | FOLLOW UP?  | UNEXPECTED FINDING  | CHANGE PROPOSED  | IMPROVEMENT IDEAS   | GAPS: WHAT IS MISSING   |
|---|---|--|---|---|--|---|---|
| <p>The Ke Go Irrigation Scheme (KGIS) in Vietnam was established in 1976 with an irrigated area of 21,136ha. The scheme, as a reservoir-canal- system supplies water for paddy rice and hydropower generation. In 2007, the RAP was introduced and then the MASSCOTE to this scheme.</p> <p>The water fee for KGIS is 20 USD per year per ha, but the farmers did not pay water fee and received a farm subsidy from the government. There is no measurement structures and water meters in the scheme.</p> |   |  |   |   |  |   |   |
| <ol style="list-style-type: none"> <li>1. RAP</li> <li>2. Quantify the service level</li> <li>3. Improve the level of water users' awareness</li> <li>4. Strengthen the capacity of the staff</li> </ol>  | <p>The process is too complex and takes longer time</p> <p>No incentive for farmers to improve efficiency.</p>      | Measurement structures installation.   | <ol style="list-style-type: none"> <li>1. Monitoring and evaluating the scheme</li> <li>2. Training workshops for capacity building for lower-level staffs</li> <li>3. Technical support from water management experts</li> </ol> | no  | <ol style="list-style-type: none"> <li>1. Combine the MASSCOTE with the MASSMUS for the multiple-use schemes</li> <li>2. Transmit the information/results of RAP, modernization plan etc.. back to the farmers/water users for fully participatory</li> <li>3. Prepare different version of MASSCOTE based on the target audiences (farmers, engineers, system managers, etc.)</li> <li>4. Simplify the process and make it short</li> </ol> | <ol style="list-style-type: none"> <li>1. Water quality → food safety</li> <li>2. Environmental impact</li> </ol>                           | <ol style="list-style-type: none"> <li>1. Water quality indicators</li> <li>2. Food safety</li> <li>3. Drainage water management</li> </ol> |
| <b>Group 4-Kirgystan</b>  |   |  |   |   |  |   |   |
| <p>Comprehensive approach</p> <ul style="list-style-type: none"> <li>- Step by step procedure</li> <li>- Participatory approach</li> </ul>  | <ul style="list-style-type: none"> <li>- Involving stakeholders</li> <li>- Long implementation procedure</li> </ul> | <ul style="list-style-type: none"> <li>- Continuity to the implementation process from all stakeholders</li> </ul> |   | <ul style="list-style-type: none"> <li>- Vulnerability to national political changes</li> <li>- Effect of transfer of irrigation staff</li> <li>- Prioritizing modernization as per budget</li> </ul> |  | <ul style="list-style-type: none"> <li>- Based on implementation strategy</li> <li>- Monitoring and evaluation on periodic basis</li> </ul> |   |
| <b>Group 5-Thailand</b>   |   |  |   |   |  |   |   |

| WHAT WORKS WELL  | WHAT DOES NOT Work WELL  | WHAT DID NOT WORK WELL BUT HAS EASY SOLUTION | FOLLOW UP?  | UNEXPECTED FINDING  | CHANGE PROPOSED  | IMPROVEMENT IDEAS  | GAPS: WHAT IS MISSING  |
|--|--|--|---|---|--|--|--|
| <ul style="list-style-type: none"> <li>-Format of evaluation sheet</li> <li>-Core indices helped in finding weaknesses</li> <li>-Baseline information helped to compare effectiveness of the system and other irrigation schemes</li> <li>-Rapid evaluation</li> </ul> | Training shortage<br>Training time was too short<br>Availability of quality data   | Training can be organized in better way      | No govt. support.<br>Limited budget allocation.<br>Lack of awareness.<br>MASSCOTE was not part of budget allocation.<br>Budget allocation for development vs. operation and maintenance   | Big difference of expected and actual index for irrigation scheme without their own irrigation and irrigation scheme with groundwater pumping   | Taking govt. official in confidence for implementation of MASSCOTE<br>Joint planning between users, operators and govt officials | Complete training including all steps of MASSCOTE<br>Benchmark for subjective and objective decision<br>Run full MASSCOTE to evaluate it's performance | MASSCOTE version in local language<br>Addressing current and future issues e.g. Climate change |
| <b>Group 6-Nepal</b>   |  |  |   |   |  |  |  |
| Step by step procedure and participatory approach are the strengths of the tool  | Effective involvement of all the stakeholders is not guaranteed, it is a complex process; the implementation process is lengthy (launched in 2003 and completed in 2009) |  | There is a need to prepare/ formulate region/ country specific model of the MASSCOTTE in view of unique socio-economic and political situation of each region/ country. Thus we may have MASSCOTTE models for South Asia (India, Nepal, Pakistan), East Asia and pacific (Malaysia, Indonesia, Thailand, Vietnam), Central Asia (Uzbekistan, Tajikistan, etc), China, A mini version of the MASSCOTTE may be evolved so as to implement top five priority interventions towards modernization in those irrigation | The process is vulnerable to changes the changes in the national politics; the process may get hampered if the political support is not secured; transfer of irrigation managers/ staff in which MASSCOTTE is being implemented affects the implementation process adversely. | Indicators –easy for monitoring and evaluation   | Capacity assessment<br>Checklist for data requirement for each steps   | Systematic approach  |

| WHAT WORKS WELL  | WHAT DOES NOT Work WELL      | WHAT DID NOT WORK WELL BUT HAS EASY SOLUTION | FOLLOW UP?  | UNEXPECTED FINDING   | CHANGE PROPOSED   | IMPROVEMENT IDEAS   | GAPS: WHAT IS MISSING   |
|--|------------------------------|--|---|--|---|---|---|
|  |                              |  | schemes whose performance is apparently low   |  |   |   |   |
| <b>Group 7-India/ Karnataka</b>  |                              |  |   |  |   |   |   |
| <p>Opened the eyes of engineers;</p> <p>Turned the investment into a consistent plan in which each element fitted into a comprehensive approach;</p> <p>Canal lining was limited to specific sections, and 80% project cost was reallocated to innovative interventions such as on SCADA and buffer storage.</p> | Seems everything worked well |  | More cycles of MASSCOTE are needed in the future; the purpose was to revisit the system every two years after the project | <p>The overall success of the project; and eagerness of young engineers in adopting the new approach</p> | <p>Conduct capacity assessment and include needed capacity building for MASSCOTE implementation;</p> <p>Indicators shall be easy for measurement.</p> | <p>Add a checklist on data requirements for each step</p> | <p>Systematic approach to be highlighted;</p> <p>Incorporation of Climate smart agriculture options to capture the synergies and manage the trade-offs among climate change adaptation, mitigation and food security;</p> <p>Highlight considerations on social, environmental and food security issues in deciding resource allocation;</p> <p>Incorporate green economy consideration, especially water-energy-food nexus in system planning;</p> |

Other comments : Provide clear definition on large scale system; Provide clear definition of irrigation service quality

**Table 2 - GAP Analyses: working group session (2)**

| WHAT<br>(specify something to be changed, added, improved) | HOW<br>(how can this be done in practice)                                  | WHO<br>(can contribute to this improvement; who has already done it) | WHERE<br>(where can this improvement be tested, piloted) | PRIORITY |
|--|--|--|--|----------|
| <b>Group 1- Field/Farm</b>                                 |  |  |  |          |
| Drainage: off-site   | Evidence of facility on the ground checked through farmer interview /field | On-farm water management experts                                     | Bangladesh, India (Bihar)                                | 1        |

| WHAT<br>(specify something to be changed, added, improved)                           | HOW<br>(how can this be done in practice)   | WHO<br>(can contribute to this improvement; who has already done it)   | WHERE<br>(where can this improvement be tested, piloted)  | PRIORITY   |
|--|---|--|---|--|
|  | observation: Yes, somewhat, no<br>(Scaled: 3-1)   |  |   |  |
| On-farm water storage  | Evidence of facility on the ground checked through farmer interview /field observation: Yes, somewhat, no<br>(Scaled: 3-1)  | On-farm water management experts   | Indonesia, India, Sri Lanka, North Africa   | 1  |
| Percolation  | Evidence of facility on the ground checked through farmer interview /field observation: Yes, somewhat, no<br>(Scaled: 3-1)  | On-farm water management experts   | India, Pakistan, China, Central Asia  | 1  |
| Modernization of farm irrigation facilities  | Evidence of modernization efforts on the ground checked through farmer interview /field observation: Yes, somewhat, no<br>(Scaled: 3-1)   | On-farm water management experts   | India, Central Asia, South East Asia  | 1  |
| <b>Group 2- Pumping (individual and collective)</b>                                  |   |  |   |  |
| Add maintenance, cost of pumping (station)<br>Kilo watt / m3 water (self comparison) | Monitoring and record the maintenance cost/m3 of water pumped<br>Measure and record the kilowatt per m3 of water pumped   | FAO or research institute<br>The pumping station staff (within the irrigation scheme)                              | (for 10 years) Jamaikou Irrigation scheme   |  |
| <b>Group 3- Scalling up to basin level</b>   |   |  |   |  |
| Multi scheme   | <ul style="list-style-type: none"> <li>- Analysis by inter sector (quantity, quality and service level)</li> <li>- Basin efficiency</li> <li>- Need inventory and resource</li> </ul> | <ul style="list-style-type: none"> <li>- River Basin Organization</li> <li>- Sector in control of water</li> </ul> | <ul style="list-style-type: none"> <li>- Muda/kedah river basin</li> <li>- Citarum river basin</li> </ul> | 1. Scalling up to basin level<br>2. Policy scalling down<br>3. Field/farm<br>4. Drainage and quality<br>5. Economical approach<br>6. Technical/modeling and remote sensing Pumping |
| Need to address more than on irrigation system                                       | Inter-sectoral analysis by:<br>Quantity<br>Quality<br>Service level (delivery, etc)   | Water resource managers (River Basin Organizations)<br><br>Sector-in-control of water                              | Muba/Kedah river basin in Korian<br><br>Citarum   |  |

| WHAT<br>(specify something to be changed, added, improved)   | HOW<br>(how can this be done in practice)  | WHO<br>(can contribute to this improvement; who has already done it)   | WHERE<br>(where can this improvement be tested, piloted)  | PRIORITY |
|--|--|--|---|----------|
| Multiple stakeholders unaddressed: domestic, industry, aquaculture, tourism, recreation, environment, hydropower, sewerage, floods                             | Basin efficiency:<br>Sectoral efficiency<br>Sectoral management improvements (demand management)<br><br>Inventory & resource baseline study  | <ul style="list-style-type: none"><li>Agriculture</li><li>Hydropower</li></ul>   |   |          |
| Multi-sectoral managers/management   |  |  |   |          |
| Models: ‘One manager – multiple users’ versus ‘multiple uses -multiple users’  |  |  |   |          |
| Inter-sectoral governance: <ul style="list-style-type: none"><li>Sectoral demand-supply allocations</li><li>Service level</li></ul>                            |  |  |   |          |
| Group 4- Drainage and Quality  |  |  |   |          |
| Agricultural drainage water (Surface and subsurface) availability and use  | In the areas where deficit of water exist the drainage water can be used :to be considered as a part of Irrigation system; RAP is the first step (assessment indicators); water accounting (Step 4) ; Step 10- integrating options | <b>Development:</b> ICBA; WUAs; Scientific Information Center; IWMI; Ministry of Agriculture and Water Economy Water ; Ministry of Melioration and Water Resources; Department of Water Economy ; Institute of Desert and Flora (Research, Development and Evaluation) | To identify Benchmark sites upon clear selection criteria ; Uzbekistan and Turkmenistan (Syrdarya River Basin -middle stream) | 1        |
| Drainage water is used for other uses such as aquaculture (Arnasay Lake system);   | MASSFISH   | <b>Development:</b> ICBA; Scientific Information Center; World Fish Centre; <b>Field testing:</b> Farmers and Fisheries associations;  | To identify Benchmark sites upon clear selection criteria ; Uzbekistan and Turkmenistan (Syrdarya River Basin -middle stream) | 5        |
| Salinity Assessment (trends, severity, extent and costs of reclamation of irrigated lands), Control, monitoring and evaluation to identify mitigation measures | In the areas where deficit of water exist the drainage water can be used :to be considered as a part of Irrigation system; RAP is the first step (assessment indicators); water accounting (Step 4) ; Step 10- integrating options | ICBA; WUAs; Scientific Information Center; IWMI; Ministry of Agriculture and Water Economy Water ; Ministry of Melioration and Water Resources; Department of Water Economy ; Institute of Desert and Flora (Research, Development and Evaluation)                     | To identify Benchmark sites upon clear selection criteria ; Uzbekistan and Turkmenistan (Syrdarya River Basin -middle stream) | 2        |
| Inventory, survey and performance assessment of drainage systems and impacts of drainage water use   | In the areas where deficit of water exist the drainage water can be used :to be considered as a part of Irrigation system; RAP is the first step (assessment   | ICBA; WUAs;Scientific Information Center; IWMI; Ministry of Agriculture and Water Economy Water ; Ministry of Melioration and Water  | To identify Benchmark sites upon clear selection criteria ; Uzbekistan and Turkmenistan (Syrdarya River Basin -middle stream) | 3        |

| WHAT<br>(specify something to be changed, added, improved)  | HOW<br>(how can this be done in practice)   | WHO<br>(can contribute to this improvement; who has already done it)  | WHERE<br>(where can this improvement be tested, piloted)   | PRIORITY |
|---|---|---|--|----------|
|   | indicators); water accounting (Step 4) ;<br>Step 10- integrating options  | Resources; Department of Water Economy ; Institute of Desert and Flora (Research, Development and Evaluation)   |  |          |
| Reuse of treated Wastewater   |   | Municipality  | Urban and per urban areas (Tashkent and Almaty)  | 4        |
| Water pollution of main sources of water (including contamination with heavy metals)                                    |   |   |  |          |
| <b>Group 5- Technical/modeling and remote sensing</b>   |   |   |  |          |
| Decision making tools for delivering the surface water by using GIS approach<br>Prediction of ET and rainfall using GIS | Mapping<br>-using existing resources<br>-investing more to collect data<br>-participatory mapping<br>Detail modeling<br>Scenario analysis and impact assessment | International organization like IWMI, IRRI?<br>Wageningen University and Research Centre<br>Others?<br>In Australia, Murrumbidgee Irrigation company already using these decision tools in collaboration with CSIRO | Starting point can be the area where good data set is available<br>who are doing river basin programming e.g. Java, Indonesia<br>Area where operational area has been increasing | 3        |
| <b>Group 6- Policy, Legal and institutional scaling up and down</b>   |   |   |  |          |

| WHAT<br>(specify something to be changed, added, improved)   | HOW<br>(how can this be done in practice)   | WHO<br>(can contribute to this improvement; who has already done it)   | WHERE<br>(where can this improvement be tested, piloted)   | PRIORITY  |
|--|---|--|--|---|
| <ul style="list-style-type: none"> <li>- Linkage to be make more explicit</li> <li>- Proactive engagement</li> </ul>   | Consultation / dialogue to take place early with all stakeholders. Consultation / dialogue to take place at all stages - linked to each step of MASSCOTE  | <ul style="list-style-type: none"> <li>- Varies from country to country</li> <li>Different at different levels: <ul style="list-style-type: none"> <li>- International level (FAO, ICID, IWMI, etc.): support in adaptation and improvement</li> <li>-National level: Water related ministries</li> <li>-State/province level: management departments, System level: managers</li> </ul> </li> </ul> | In systems where there is need for modernization   | 4 to 5 needs needing wider application  |
| <b>Group 7- Economic approach</b>  |   |  |  |   |
| <p>Current MASSCOTE modules only include few economical indicators, more comprehensive economical approach could be adopted;</p> <p>Irrigation modernization involve stakeholders at different levels who may have different expectations and objectives, and sometimes conflict each other; one of the fundamental issues to be addressed in modernization is to optimize investment options to satisfy various stakeholders at different levels;</p> <p>This can be done through comprehensive economical approach to assess the achievements in economic return (mainly for farmers), financial improvement (mainly for irrigation management agencies) and social and environmental impacts (mainly for river basin and national levels), and balance relevant investments</p> | <p>First to conduct a general survey of available methods and tools for economical analysis (such as COSTAB system used by international financing institute such as WB and ADB), and if:</p> <ol style="list-style-type: none"> <li>1. can be simply adopted, provide a link to relevant tools/methods in the MASSCOTE method;</li> <li>2. something is available but need simplification/ adjustments, make relevant alteration before adoption;</li> <li>3. Nothing is suitable, develop relevant method/tool specifically for MASSCOTE</li> </ol> | Need a multidisciplinary team comprising of economists, engineers and agronomists  | It would be good if this approach could be first tested and piloted at pressured irrigation systems in arid region with diversified crop pattern where water scarcity is a real concern, irrigation cost is high, and economic verification is crucial | <p>The following key issues need to be addressed:</p> <ol style="list-style-type: none"> <li>1. Cost-benefit analysis, to reach agreements among stakeholders on modernization investment level against irrigation services quality standard;</li> <li>2. Sustainable O&amp;M, to verify the suitability of settings of water pricing policy, O&amp;M institutions; and rights and obligations of various stakeholders;</li> <li>3. Environmental and social impacts, to assess the investment efficiency in achieving social and environmental objectives</li> </ol> |

**Additional comments about scaling up at river basin level.**

1. Since Masscote only deal with one irrigation scheme, it misses the interrelations between schemes at river basin level. *Multi scheme*
2. *Multi user*, The basin river are for 1. Domestic, 2. Industry, 3. Aquaculture, 4. Recreation, 5. Hydropower, 6. Environment, 7. Flood issue
3. Multi sector manager/management
4. One manager – multi user
5. Inter sector governance



## **Annex 3 – DAY 2 - Working groups on gap filling and redesign of MASSCOTE (working group session 3)**

As a follow up of the series of presentations, the participants split in working groups and discussed critical gaps identified on the first day, and also some of the new tools to be addressed in the redesign of irrigation modernization support tools such as MASSCOTE. Each group analyzed the issue related to the subject, tools and methods that could be used, how to include it in the process, and who to involve in that process.

The following 7 subjects were discussed

1. Addressing Groundwater
2. Gender and legal aspects
3. Implication of Automation / new technologies
4. Integrating Modelling
5. Integrating Climate Change aspects
6. Open source
7. Smart Investments

### **1-groundwater**

Participants: **Sudhir**, Rubento Lampayan, P.S.Rao, Pham. T.P.Thao, Suresh Kulkani, Suman Sijapati, Robina Wahaj

#### **Issues**

Depletion of groundwater: sustainability and quality  
Absence of aquifer mapping  
Accounting for groundwater  
Pricing for energy of pumping water  
Property right for groundwater  
Access of data  
Conjunctive use of surface and groundwater

#### **Options available**

Groundwater mapping and accounting  
Accounting of energy  
Monitoring and controlling of energy  
Learn lesson from experienced (how not to do things)  
-Andhra Pradesh: water accounting  
-Gujarat: energy accounting  
-Australia: water rights  
- China  
Technological solutions  
-SMART cards  
Policy and legal  
Improve surface water supply to discourage groundwater use

#### **Tools and Methods required**

Indicators of groundwater data in RAP which reflect status of GW both for quantity and quality

#### **How to add them**

Use excel sheets e.g. FAOAP model.

### **At what stage to add them**

In first step- RAP. Then improve water balance (step 4), and come back to it in improvements.

### **Specific requirements**

Invest in groundwater mapping and accounting. Invest in accounting for energy.  
Some hydrogeological model to generate GW information. Access to available data

### **Who to involve**

FAO, IFI, Experts, others?

## **2 Legal and gender aspects**

Facilitators: Ines Beernaert, Blaise Kuemlangan,

### **2a-gender aspects (facilitator: Ines Beernaerts)**

What do we want to achieve by mainstreaming gender in irrigation modernization?

- EQUITY – to promote ‘gender equality’ in the irrigation sector / schemes
- Definition: Gender equality = both men and women enjoy equal rights, opportunities and entitlements in their civil and political lives.

Why is it important?

- Feminization of the rural population is an on-going transition in Central Asia. The farmer of tomorrow is more likely to be women!

Remark: As reported in the State of Food and Agriculture, there is a clear link between gender equality and increased agricultural productivity. Gender equality in irrigation modernization does also contribute to livelihood improvement and ethnic reconciliation (role of women in the reconciliation process between ethnic communities in irrigation systems after period of water between Kyrgyzstan and Uzbekistan).

What are the issues?

- In Kyrgyzstan and Tajikistan, about 30% of women own land. How to increase their participation in the planning and operation processes of irrigation modernization? How can they make more legitimate decision within the irrigation community?

Tools/methods?

- To have separate meetings (consultation, training, etc.) for men and women. Quote ‘In Uzbekistan, meeting with women only gives a more systematic diagnosis of the performance of the irrigation scheme’.
- To include gender – disaggregated data in the MASSCOTE criteria
- In regions with strong gender bias, to carry out a gender analysis within irrigation systems before carrying out RAP/MASSCOTE. To carry out gender (as part of MASSMUS) as a last step may not be the most appropriate sequential process.
- To increase percentage of women being trained for RAP/MASSCOTE and related products.

When?

- From the beginning of the process.

Specific requirements?

- Gender issues are sensitive issues. Cultural issues need to be considered & analysed carefully when adopting participatory approaches

Who?

- At all levels (farmers, NGOs, prof. associations, GFP of respective ministries).

## **2 b–Legal Framework (Facilitator : Blaise Kuemlangan)**

Why

- Unless requirement is in law, modernization will not happen
- Legislation is required to allocate budget
- Any law should be linked with land and aggregation reform
- Law can mainstream/strengthen issues such as gender and can accord/protect access use rights
- Many types of laws impact on irrigation (not just water law). Need for awareness
- How to add them
- Should be precondition for planning
- Awareness of legal requirements that support change

At What stage to add

- From the beginning (of the visioning and planning process so that is awareness)

Specific requirements

- Need enforcement
- Need to address frequent political and intuitional change
- Need to ensure continuity

Who to involve

- All levels
  - Ministries
  - Directorate General
  - Local authorities
  - Technical, scientific, irrigation Council,
  - Irrigation companies
  - Farmers
  - Future - Large farm cooperatives learning alliances

## **3- automation /new technologies (Facilitator : Peter Smith)**

Participants : Peter Smith, Chen ; Chinese participants

- Planning models eventually can become operation model.
- On-farm efficiency can be improved by 20-30% by automated on-farm level water management. It is also helpful in reducing conveyance efficiency.

Tools required:

- automation of pump stations is adequately covered in MASSCOTE current version
- automation of canals is not covered well in MASSCOTE current version
- Remote observation is common (cameras) but remote control is not common
- Questions to include could be:
  - how can debris be managed?
  - Irrigators block or damage automated gates – rendering automation inoperative
  - In-stream sediment load when deposited may alter channel dimensions, therefore upsetting channel capacity and accuracy of automation

- Irrigation forecasting is also not well covered in current version of MASSCOTE (it is more meant for managing perturbations compared to forecasting. It is also because of the data poor contexts. Other option is to go for full water control, which is not always feasible)
- Questions to include could be:
  - Is weather data collected? – to allow estimate of ET
  - Is farm-based water requirement collected?
  - Is soil moisture monitoring data collected?
  - Is remotely sensed data for crop water demand available eg. satellite imagery

What stage in MASSCOTE should these be added?

- in the Mapping Management Unit
- automated gates could be added in Capacity and Sensitivity section
- a new section could be added: water saving practices on farm

Who could help with this?

- Wuhan University (Dong Bin)
- Zhang Xuehui

#### **4- Modeling (Facilitator: Robert Carr)**

Tools are needed to:

- Communicate the process and benefits of the irrigation modernization process to the many layers of managers and stakeholders within government and to show the trade-off between different scenarios of development pathways. These tools are more like management communication tools rather than technical tools. The tools need to communicate the essence of issues to the decision-makers and therefore need to be in the language and style that is comfortable for decision makers.
- Improve the reliability of predictions (over 10-30 years ahead) so that the decision makers become confident that the process is giving them advice that they can trust. For policy makers to invest in a process that is longer than the political cycle will require very strong evidence.

The time frame for these tools to be available and with good case studies and examples is around 5-10 years countries where there is significant donor activity helping the process but more like 3 years for countries which are closer to self-funding because of the political cycle.

It was felt that the decision makers would respond to tools which expressed the following three main parameters:

- a) Productivity (i.e. how much crop is grown/Ha or MCM of water)
- b) Efficiency (how much water/energy etc) is used per Tonne or Ha
- c) Operation and Maintenance costs (also by Tonne or Ha)

With an overarching goal of reducing conflicts and build consensus around the benefits and risks of irrigation modernization.

#### **5- Climate change adaptation (Facilitator: Chen, Zhijun)**

Tools/methods

- Guidelines to make MASSCOTE climate proof

How to add them

- A simple way is to build linkage with existing tools/methodologies (large numbers of tools already exist, including TCI Guidance Document on Incorporating Climate Change

Considerations into Agricultural Investment Programs; AG publication on Climate Smart Agriculture; World Bank Guidelines on Climate Change Mainstreaming; IFAD checklist for Climate Change screen; OECD guidelines on climate change mainstreaming and NRL publication on climate change and water)

- In case none of the existing tools/methods is suitable, add specific step or activities in MASSCOTE

At what stages

- Modernization visioning
- System planning
- Engineering design
- Monitoring and Evaluation

Specific requirements

The tools and methods shall be able to:

- Guide the assess of climate change impacts on:
  - Water balancing (supply and demand)
  - Extreme weather events (water disasters)
  - Cropping pattern (implications for irrigation requirements and timing)
- Guide selection and implementation of relevant options for addressing the above impacts, including:
  - Adjustment of engineering design
  - Change of system operation strategy
  - Inclusion of specific activities on data monitoring and analysis
  - Inclusion of capacity building in climate smart agriculture
  - Promotion of system efficiency improvement
- Guide selection and implementation of no-regrets options for addressing CC uncertainty, including:
  - Targeting priority areas for modernization
  - Promotion of water saving irrigation
  - Dissemination of SRI
  - Improvement of information collection and dissemination
  - Establishment of disaster insurance schemes

Who to involve

Hydrologist, engineers and irrigation managers

## **6- Open source (Facilitator: Thierry Facon)**

Web-based, open-source approach

The group is proposing to set-up of an open-source, web-based development and practice community of MASSCOTE as the vision on how to move forward

How?

Groups participants felt that the vision of an open-source web-based proposed by Robert Carr and inspired by eWater Source was very attractive and endorsed this vision as the way forward for the future development of modernization tools and MASCOTE 2.0.

This vision and its modalities were the way to address and organize discussions about future development of MASSCOTE 2.0 discussed so far:

- A decentralized approach supported by a common central framework
- A community of users and developers adding value
- Flexible and adaptive to local contexts

- Cross-fertilization
- Accelerating development and adoption, cutting the knowledge development and sharing process short
- Accelerate the diffusion of research findings
- Link to the field, action and implementation
- It is the good practice and modality for today
- It is attractive for experts and resources mobilization
- It allows a modular development approach wherein new countries-sub-regions can join based on a proposed model to organize themselves awhile accessing a global knowledge development and warehouse.

#### Specific requirements

- 70% of irrigation is in Asia. The need for large-scale promotion and adoption of MASSCOTE 2.0 is there: huge investments are being lined up. There is a demand and a gap to fill urgently in capacity and methods to improve the performance and quality of investment.
- A question should be further discussed: should this system also cover legal aspects, policy, climate change ?
- It was proposed that countries organize themselves into sub-groups that share common characteristics and changes with a center of excellence, or every country can have its center or centers of excellence.
- Centers of excellence should both contribute/be responsible for to the global development on specific fields or step in areas where they have specific expertise and take care of local adaptation and simplification of MASSCOTE 2.0. The China example that adoption of RAP and MASSCOTE have already modified thinking and influenced policy.

#### Who Could help with this

- Malaysia is fully supportive of this idea for the Center of Excellence they are developing.
- China (Gao Zhanyi) is fully supportive and there could be two centers of excellence in China.
- Beijing (the Beijing-based ICTR in Irrigation and Drainage) and Wuhan University.
- eWater Source, but also google and Wikipedia illustrate that this is a powerful model to share the development of the various steps of MASSCOTE as a continuous process, and warehouses of tools, options and solutions.
- This proposal allows to re-think the proposed purpose and modalities of (integration with/link to centers of excellence network s proposed by FAO.) in a more dynamic way. It was felt that linkages to the field, system managers and capacity development functions should be integrated.
- In order to avoid completion and conflict with similar networks in water-related areas, which would be a killer for the development of the system, this network should keep a focus on irrigation modernization, where the demand exists and offer is not organized or met. This set-up allows cooperation rather than competition.

#### Who to involve

- Particular targets are consulting firms and design institutes which need to understand and learn the tools as most design work is done by/outsourced to them.
- UNESCO-IHE has particular strengths in developing training curricula and on-line training systems.
- Links with other initiatives (CapNet, APWF knowledge hubs. GWP) should be explored, analyzed.
- This set-up will require an organizer and regulator at the center. FAO with IWMI should take that role. The center would manage the comprehensive “mother MASSCOTE 2.0. Centers of excellence would contribute in their respective areas and adapt in their sub-region/country

with a link to national programmes and system managers. The improved expanded MASSCOTE 20 provides the framework for organizing the warehouse of tools and methods as contributions to the steps, options available at each step, as well as results. A web-based approach can consider longer periods for implementation of MASSCOTE with a link to on-line training.

Development of the platform will take time and resources that need to be mobilized but we should start moving in this direction now with available resources. The development in 2013 of an improved MASSCOTE 2.0 and its testing should be based on this modality, in spirit, and if possible also in implementation. Investment projects provide opportunities.

Financial modalities for access/use of the tools in the future and sustainable financing should be examined. Options can be explored: a modest fee as for Google?

ICID would be a partner in development and management and national committees would provide a promotion/advocacy role towards policy and a dissemination role towards practice in countries.

The centers are a cross between a virtual entity and a physical entity. They should be existing organizations or be based on organizations being developed for the purpose of supporting irrigation modernization. But they do require a group of persons working and dedicated to this. Regulation and quality control and maintenance will be essential functions. Submissions to the methods, as tools or options must be reviewed and certified. FAO is expected to play a leadership role.

The group proposed to continue discussions on this vision and its implementation at the network, looking at proposals in the table for FAO reference centers and recognized knowledge centers, with the organizations present at the workshop and the prospective FAO Reference Centers.

## **7- Planning Smart Investments (Facilitator Raza Farruk)**

### **Issues**

- Diagnostics tools – Problem Tree, MASSCOTE
- Identify “criticality”.
- Prioritize
- Is the Policy Goal only Water Productivity?
- Service Levels – e.g. Tail ender problem; equity; are indicators of Productivity.
- There may be a conflict between productivity and equity. Conflict between economic of water use.
- Water use efficiency in Orissa is better than Punjab but productivity is better in Punjab.
- There is a trade off between sectors. Different between countries.
- What is smart investment? Investment that efficiently achieve the desired objectives. Decide outcome and output. Decide the inputs.
- Can we define UN smart investments?

### **Tools / methods**

- E.g. Investment in institutional reform (JICA, ADB). Investment 4% for reform and 96% infrastructure rehabilitation. Flawed assumption was farmers could manage the system. Also the 96% investment to be only after the institutional reform. Took a long time. The proposed reform not accepted by the Government of Pakistan. Using model from Mexico and replicated in Pakistan without local tests. Small schemes developed. The reform requires existing managers to hand over existing system to the new system. This was a non-

starter. A better approach would be to have a local blueprint and pilot test. This should be a prerequisite for investment. Test and modify first.

- A capacity building process should be in place. International Funders are constrained by the time to spend the budget. Investing in infrastructure and in a short time. The time should be longer say 10 years. ADB, World Bank and Japan work on a 10 year plan. No investment in developing new water resources. These should go in parallel i.e. capacity building hand-in-hand with infra development. All stakeholders to be involved in the project cycle. A long-term and continuous project.
- Presentation in a matrix form mapping.
- Need to put some concern on the project sustainability from a management point. How to internalize the international reform. This is to ensure the existing institutions can accept the reform. The existing institution should not be sidelined. Instead to be able to gain the acceptance of the existing institution. The Smart investment is the acceptance by the end users.
- Planners were going for water efficiency but farmers were for labor efficiency. SMART investment is to match differences in objectives.
- Planning is for the future and desired results. But any change must not hurt any stakeholders. SMART investment is to achieve acceptance. 100% acceptance is not achievable. But there must be a level of acceptance. Can it be a multi-level investment. A distribution of investment.
- Multi-level investments must also be agreed.
- What about risk management in investment?
- In Asian countries investment is top down. Farmers accept without much knowledge. E.g. pressurized irrigation – farmers accept but unhappy when realize that they have to pay to operate. Need to build the capacity and knowledge at the farming community level. A sharing of experience is a way of capacity building for decision-making.
- Cost recovery as an indicator for sustainability.
- Service oriented system – farmers pay for service
- Risk Management – Need to look into new factors eg climate change, biofuel, shift in agriculture patterns. To review traditional methodology. Farmers are not willing to take risks. Mostly taken by Government.
- Longer time – Even the MDG does not allow for it. Very little time to wait. Need to rush. Need to make it quick
- Failure of WUAs – Not all have failed. Those under PIM have failed. It does not undermine the strength of WUAs. Some have become very strong. Need to study reasons for failures.
- There are also questions on the credibility of professionals in irrigation. There is an inherent bias by professionals not to accept liability for failures. Need to be more accountable for it.

Summary : for Smart Investment need to address:

- All stakeholders must be involved in the project planning from the beginning.
- Sustainability is driven by cost recovery and social responsibility. In France farmers have to pay fees to local authority else legal action taken on the land.
- Acceptance
- Time frame to be long-term
- Consider risk management
- Need to match the field level goals National and Global goals – e.g. food security
- Objectives must be matching – e.g. saving water (Govt) vs. labour
- Hardware investment needed but equally important is investment in software (capacity building, extension services, MIS, GIS, tool development, operations and maintenance skills). So far countries are not responding to this requirements.
- Based investment on a real assessment on what has been done before. (e.g. rehab every five years – is repeating the past; inefficient). “Need to Learn from the Past”.



- Water Users Association has failed. Must recognise this. What do we do? There has been over training to “take over the engineers”. It does not work.
- We should leave water to the professionals; farmers to do farming. Farmers to be a partner. (Thailand).
- Need a long series of explaining about Water Users Association (Pakistan). WUAs as a “business” have failed in a short time after years of preparation. Capacity Building objectives need to be reviewed.
- Indonesia farmers manage tertiary system (200 ha) and collect fees. Main system collection by the government.

## **Annex 4– DAY 2 -Policy session – Strategic Planning and Investments to transform irrigation – What is needed to support it effectively?**

In this section are included the statements provided by the panelists. Some of them had prepared a presentation (ppt) not included in that annex but that was made available on the USB key. It is the case for Tadjikistan, Australia, Indonesia and China.

### ***AUSTRALIA - Peter Smith, (Director Irrigation Australia Ltd, Senior Irrigation Officer, NSW Dept of Primary Industries)***

#### *a) policy and strategies for transforming irrigation and investment strategies*

Some key policies and strategies in Australia:

- 1994 Water Reform Framework, agreed by the federal government and all state governments  
<http://www.environment.gov.au/water/publications/action/pubs/policyframework.pdf>
- 1995 The Ministerial Council agreed to a Cap (upper limit) on the surface water diversions in the Murray-Darling Basin <http://www.mdba.gov.au/programs/the-cap>
- 2004 National Water Initiative (NWI), Australia, agreed by the federal government and all state governments <http://www.nwc.gov.au>

Key elements of the NWI:

- water access entitlements to be defined as access to a share of the water resource that is available for consumption as specified in a water plan
- improved specification of the environmental outcomes to be achieved for particular water systems, improved accountability arrangements for environmental managers and statutory recognition for water that is provided to ensure environmental outcomes are met
- Over-allocated water systems to be returned to sustainable levels of use in order to meet environmental outcomes
- the clear assignment of the risk of future reductions in water availability beyond 2014 (risks arising from reductions in the pool of water available are shared between governments and water users according to an agreed framework)
- more efficient administrative arrangements to facilitate water trade in connected systems
- removal of institutional barriers to trade in water
- regional assessments of the level of water intercepted by land use change activities, and new activities expected to intercept water required to hold a water access entitlement if the catchment is at its sustainable level of water allocation
- continued movement towards full-cost recovery pricing for water in both urban and rural sectors
- national standards for water accounting, reporting and metering

*b) planning and investments for transformation*

- identify over-allocated or stressed catchments/water sources
- identify poorest performing locations eg. where substantial losses from irrigation infrastructure on permeable soils occurs, poor irrigation layouts, etc.
- agreed plan of action through stakeholder consultation eg. Murray-Darling Basin Plan <http://www.mdba.gov.au/basin-plan>
- State government funding eg. NSW DPI 'WaterWise on the Farm' program (\$20 million AUD 1998-2005)
- Federal government funding eg. Aust Govt 'Water for the Future' (\$5.8 billion AUD 2009-2017) <http://www.environment.gov.au/water/australia/index.html>

*c) elements for national guidelines from the experience in your country or state*

- substantial investment in water and irrigation research, development and extension
- genuine consultation with stakeholders, especially irrigators to develop and implement a strategy and plan
- using best available science, establish key problems and quantity of water available
- enable trading of water entitlement
- reform and/or streamline regulatory and administrative processes at all levels of authority
- provide relevant education and training for managers, system operators, irrigators, etc.
- provide incentives to irrigation water suppliers and to irrigators to encourage transformation

## ***IRAN - Strategic Planning and Investments to transform irrigation in Iran***

By: Mehrzad Ehsani

I.R. Iran Vision 2025 is the document that guides the social and economic development of the country in the long term. Therefore, the current and future endeavours on research, credit, economy and industrial programs shall follow the realization of these national aspirations during the vision period.

### **Agricultural Policy and Strategy**

Iranian major policy objectives and strategies that govern the agricultural sector are as follows:

- Achieving self-sufficiency (especially for wheat) in strategic products and improving food security.
- Providing financial and technical support to farmers in order to modernize irrigation methods.
- Supporting research and extension activities.
- Applying plant varieties better adapted to the different regions of the country.
- Controlling food markets and applying subsidies in order to regulate food prices that the population can afford.
- Increasing productivity and improving water consumption patterns in the agriculture sector. To fulfil this goal, the Iranian government has promised to provide inexpensive facilities, to allocate loans with low interests and to make all public entities cooperate with farmers. A special focus would be placed in under developed regions and provinces as emphasized in the National Master Plan (NMP) of 2004.

- Avoiding land fragmentation in order to improve technical efficiency, increase productivity and enhance utilization of land. In this respect a law was passed in 2007 by which the minimum acceptable area of farmers would be 4-10 hectares<sup>3</sup> for irrigated agriculture and 10-25 hectares in rainfed farms. In order to support landowners to join small holdings above the determined limits, the government would provide special financial and technical privileges and the required infrastructure. The government committed to pay the insurance fees of such farmers' products for at most 5 years after the land integration has taken place.

### **Water Resources Management Policy and Strategy**

The general policy objectives relevant to water sector and food security, as included in vision 2025 are as follows:

- Increasing water productivity; considering security, political and economic value of water in supply, conveyance, maintenance, management and consumption.
- Maximizing water supply rate of growth (including water recycling and reusing), while minimizing natural and artificial water loss throughout the country.
- Establishing a comprehensive program to consider the execution of projects such as dams, watershed management, aquifer formation, irrigation systems, equipping and levelling lands and water sanitation;

The *long term development strategies for Iran's water resources* was prepared by a group of experts in agriculture and water resources management and approved by the government in 2003.

The strategy includes specific targets to achieve in regards to water productivity increase, groundwater management and agricultural water share, as presented below:

- Groundwater withdrawal rate should increase in regions with negative balance and decrease in those areas with a positive balance. In this case surface water resources consumption should increase from the present rate of 46 percent to 55 percent in 20 years to compensate groundwater withdrawal decrease;
- Agricultural water consumption in Iran should fall from present 92 percent to 87 percent in 20 years. Moreover, agricultural water efficiency per cubic meter should be doubled from the present condition up to the future period of 20 years. This could be achieved by increasing irrigation efficiency and allocating water to the products with higher economic values.
- Water allocation priorities shall be considered for potable water, sanitation, industry, orchards and farming purposes.
- Incentives should be provided to the private and cooperatives sector to allocate capital investments in water supply, irrigation and drainage systems, soil and water projects.

Having the objective of optimum use of the country's water resources and improving water productivity, the Iranian government is determined to develop controlled irrigation methods such as pressurized irrigation, green houses and the application of pipes instead of open canals. According to the performed studies, there is the possibility of developing pressurized irrigation for about 4 million hectares. Hence, the government has committed to pay free-interest loans for investment in pressurized irrigation to provide an incentive for farmers to use such techniques. The Ministry of Energy has planned to establish about 100 000 hectares of modern irrigation systems in the downstream of dams in 2011 (IWRMCo, 2011).

The development of irrigation should follow the principles of integrated water resources management as emphasized in Iran vision 2025, and Iran Water Resources Long Term Strategies.

---

<sup>3</sup> The specific minimum hectares defined would depend on the climate conditions, cultivation patterns, mechanization criteria, quantity and quality of soil and water resources.

Iran's Economic Transition Program (IETP) started in 2011, is the most recent and important policy in water and energy supply and demand. It was approved in 2009 by the I.R. Iran Consultative Assembly with the following objectives: (i) to speed up national economic growth; (ii) achieving social justice; (iii) increasing the efficiency of economic agencies; (iv) increasing the shares of private and cooperative sectors in Iran national economy; (v) reducing the government's management and financial responsibilities in economic affairs; and (vi) achieving the goals of vision 2025.

According to IETP, real economic value of water and energy shall gradually be estimated and materialized so that water users pay the full cost of water and energy in the end of the 5th year of the programme. The real cost of water shall include costs of supply, conveyance, and distribution of water. With this measure, it is expected that consumers would use resources more efficiently.

## ***Malaysia***

### Malaysia Statement on Irrigation Transformation

Reflecting on the past era of irrigation development, irrigation the catalysts of transformation were based on the socio-economic needs of a particular era.

During pre-1800s, irrigation were community based and developed through localised initiatives. The science, technology and investment level were not adequate. Thus although the need was to increase food (rice), the capacity was only able to achieve subsistence level of production. A case of clear objectives but inadequate support – Administratively, finance and limited knowledge capacity.

The beginning of Government intervention in the 1800s facilitated transformation of the irrigation system with administrative skills, transparent rules and regulations (Governance), improved designs and management. This was through a dedicated team within a Technical Government Department (the Public Works Department). However this Department has a wide-ranging technical functions in providing engineering services. Thus irrigation function is just a small aspect of its main. This could not develop adequate capacity for an extensive irrigation development. As a result, poverty and rice supply issues worsened.

In 1930s, the Government responded by establishing a Department specifically dedicated to irrigation development. This is the beginning of a SYSTEMATIC APPROACH to irrigation development and management. It also ensures a commitment to allocate investments in irrigation. This move recognised that irrigation was the strategy (then) to address poverty and food supply issues as the country was still an agro-based economy. There were no other options to alleviate poverty through limited opportunities.

With a dedicated Department, the capacity development is focused on irrigation and thus irrigation transformation occurred and progressed smoothly. The transformation progressed from a single-cropping system that improved the chances of success for that single crop (previously the chances of success were very dependent on the vagaries of the climate and weather) and on to double cropped system. The system were gradually upgraded with Primary, Secondary and Tertiary systems. In addition was the investment in Water Management Capacity Building program that include the establishment of a National Water Management Training Centre dedicated to irrigation.

The Government economic diversification plan began in the 1960s. This strategy became successful in the 1980s. And that was also the period of peak momentum of irrigation development in the country. Nearly 1000 irrigation schemes were developed. Suddenly the population had diversified opportunity for income generation. The non-agriculture sector were more attractive. The irrigation schemes were abandoned. Many never had a chance for investment recovery particularly the numerous small schemes.

Only the large schemes survived due to economies of scale. The farmers there responded by switching to the less labour intensive direct seeding and gradually opted for more extensive mechanisation. The Government responded by introducing the Granary Policy. This determined that only the large 8 irrigation scheme shall be supported by the Government in terms of investments and management support. The non-Granaries are allowed to convert to other approved land-use. In addition, a Self-Sufficiency Level of 65% (later to 70%) was introduced.

As the economic diversification became more developed, interests in irrigation declined. Irrigation is not any more the strategy for poverty alleviation. Investment in irrigation is for Self-Sufficiency Level. This is now set at 70% level.

Now, the target is for the country to be a high income nation. The strategy adopted is for a farmers' exit plan. This is a special package to encourage a more commercial approach to paddy farming.

Both the Self-Sufficiency targets and the commercial production system requires more investments in tertiary systems.

Into the future, the issues to address in irrigation management modernisation are:

7. Water scarcity due to increase inter-sector competition.
8. The need for agriculture to justify the economics of water use vis-à-vis the Self-Sufficiency Target.
9. The need to improve Water Demand Management between and within the irrigation sector
10. The need to justify values of quantity of water use. (the need to have a more accurate measurement tools and system.
11. The need for forecasting tools that is integrated with other water sectors.
12. The need to build the capacity of the farmers and public for an effective public participation.

In summary, the lessons learned are:

7. Poverty eradication objectives are more economies that are still largely agro-based.
8. A large-scale irrigation system is more resilient to economic changes.
9. A dedicated Department facilitates capacity building to a high level.
10. Rules and regulations (Governance) are necessary to protect investments in irrigation.
11. Investment in Science, Technology and Innovations are necessary for effective and efficient systems.

By:

M.N. Mohd Adnan

## Annex 5 – DAY 3 - Working groups on MASSCOTE 2.0

### Group 1- salinity and drainage

|                                      |   | 1                         |   | 2                        | 3             | 4                | 5  | 6                | 7                     | 8                    | 9                             | 10                      | 11  |
|--------------------------------------|---|---------------------------|---|--------------------------|---------------|------------------|--|------------------|-----------------------|----------------------|-------------------------------|-------------------------|---|
|                                      |   | Rapid Appraisal Procedure |   | capacity and sensitivity | perturbations | Water accounting | Costs of operations  | Service to users | Management Units      | Demand for Operation | Operation improvements/ units | Integrating SOM Options | Vision and Plan for modernization   |
| Already treated in a MASSCOTE module |   | partial in the RAP        |   | No                       | No            | partially        | No   | No               | No (maybe monitoring) | No                   | No                            | No                      | Partially   |
| Need to complement a step            |   |                           |   |                          |               |                  |  |                  |                       |                      |                               |                         |   |
| Need to add a step                   |   |                           | Tool for diagnostic                           |                          |               | Water Balance    |  |                  |                       |                      |                               |                         |   |
| Objective of the add-on              | Drive force for IR Modernization at all level | Introduce new indicator   |   |                          |               |                  | It is important need to operated; sedimentation; maintaining |                  |                       |                      | Yes                           |                         |   |
| Task in MASSCOTE                     |   |                           |   |                          |               |                  |  |                  |                       |                      |                               |                         | Measures to avoid/preventing approach against salinization and waterlogging |
| Work needed for development          |   |                           | Survey and monitoring system/ mapping/ GIS/RS |                          |               |                  |  |                  |                       |                      |                               |                         | Alternative source for irrigation   |
| A tool exists                        | No  |                           |   |                          |               |                  |  |                  |                       |                      |                               |                         |   |
| The tools is from                    |   |                           | ICBA, WB; software; Crosyst; APEX             |                          |               |                  |  |                  |                       |                      |                               |                         |   |

|                                      |   | 1                         |  | 2                        | 3             | 4                | 5                   | 6                | 7                | 8                    | 9                            | 10                      | 11   |
|--------------------------------------|---|---------------------------|--|--------------------------|---------------|------------------|---------------------|------------------|------------------|----------------------|------------------------------|-------------------------|--|
|                                      |   | Rapid Appraisal Procedure |  | capacity and sensitivity | perturbations | Water accounting | Costs of operations | Service to users | Management Units | Demand for Operation | Operation improvements/units | Integrating SOM Options | Vision and Plan for modernization  |
| Expert/organization will do          |   |                           | ICBA; ICARDA; IWMI ;ICID, and others                       |                          |               |                  |                     |                  |                  |                      |                              |                         |  |
| FAO requested to:                    |   |                           | Introduce new criteria; indicators for salinity assessment |                          |               |                  |                     |                  |                  |                      |                              |                         |  |
| Other                                |   |                           |  |                          |               |                  |                     |                  |                  |                      |                              |                         |  |
| <b>NEW</b>                           | <b>New topic: Safety of Canal as results of anthropogenic influence</b> |                           |  |                          |               |                  |                     |                  |                  |                      |                              |                         |  |
| Already treated in a MASSCOTE module |   | Introduce new indicator   |  |                          |               |                  |                     |                  |                  |                      |                              |                         | Advice and recommendation to improve the safety of canal, less drown and sink in the canal, ecosystem health |

**Group 2- technical options:** pumping stations, pumps, pipes, farm technology, automation, SCADA, etc.  
*(are indicated only the steps where they were suggestions comments)*

|                                      | 1   | 2                        | 3             | 4                | 5                   | 6                | 7                | 9   |
|--------------------------------------|---|--------------------------|---------------|------------------|---------------------|------------------|------------------|---|
|                                      | Rapid Appraisal Procedure   | capacity and sensitivity | perturbations | Water accounting | Costs of operations | Service to users | Management Units | Operation improvements/units  |
| Already treated in a MASSCOTE module | None for pumping stations.<br>Need to add this item SCADA and Automation already in the RAP Pressurised system yes.<br>None for On farm crop water requirement technology |                          |               |                  |                     |                  |                  | Need to include how to improve technical options to be considered in the module |

|                             | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 9                                   |
|-----------------------------|---|---|---|---|---|---|---|-------------------------------------|
|                             | <b>Rapid Appraisal Procedure</b>  | <b>capacity and sensitivity</b>                 | <b>perturbations</b>  | <b>Water accounting</b>                         | <b>Costs of operations</b>  | <b>Service to users</b>   | <b>Management Units</b>   | <b>Operation improvements/units</b> |
| Need to complement a step   | Need to include pump and pumping stations   | Need to add item for pumps and pumping stations |   | Need to add item for pumps and pumping stations | Need to add item for pumps and pumping stations   |   |   |                                     |
| Need to add a step          | Need a small module to capture individual/smallholder pump users; small scale; informal users   | Add a step for lift system                      |   |   | Add the capital cost item. Automation is relatively new in terms of technology as well as current modernization effort. The cost of investment may be relatively easier to obtain |   |   |                                     |
| Objective of the add-on     | To get a better picture of overall performance especially the "informal" pump users   | For energy accounting                           |   | To have a more complete accounting              | For financial and economics   | To set the service level of the overall system and also account for the contribution of the individual. | The use of pumps by individuals can be due to inefficiency of the system as a whole; thus farmers response/innovate to overcome this inefficiency | To improve efficiency               |
| Task in MASSCOTE            |   |   |   |   |   |   |   |                                     |
| Work needed for development | Categorization of user types of lifting devices (pumps) e.g. self-owned; Govt owned; Privately owned; large volume; small volume. Need to capture the individual/smallholder users. Need a small module for this. | To define what are the levels of sensitivity    | To define what are the perturbations. Resilience, downtime, |   |   |   |   |                                     |



|                                      | 1   | 2                        | 3   | 4                | 5                   | 6                | 7                | 9                            |
|--------------------------------------|---|--------------------------|---|------------------|---------------------|------------------|------------------|------------------------------|
|                                      | Rapid Appraisal Procedure   | capacity and sensitivity | perturbations   | Water accounting | Costs of operations | Service to users | Management Units | Operation improvements/units |
| A tool exists                        |   |                          |   |                  |                     |                  |                  |                              |
| The tools is from                    | National Centre for Engineering in Agriculture (NCEA), University of Queensland, Australia for a range of performance assessment on certain aspects of automation and pumps |                          |   |                  |                     |                  |                  |                              |
| Expert/organization will do          |   |                          |   |                  |                     |                  |                  |                              |
| FAO requested to:                    |   |                          |   |                  |                     |                  |                  |                              |
| Other                                |   |                          |   |                  |                     |                  |                  |                              |
| <b>NEW TOPIC</b>                     |   |                          |   |                  |                     |                  |                  |                              |
| Already treated in a MASSCOTE module | Partly under Pressurised System   |                          | Need to have an idea of reliability of the components - downtime, source of energy and reliability of energy supply |                  |                     |                  |                  |                              |
| Need to complement a step            |   |                          |   |                  |                     |                  |                  |                              |

|                             | 1  | 2                               | 3                    | 4                       | 5                          | 6                       | 7                       | 9                                   |
|-----------------------------|--|---------------------------------|----------------------|-------------------------|----------------------------|-------------------------|-------------------------|-------------------------------------|
|                             | <b>Rapid Appraisal Procedure</b>   | <b>capacity and sensitivity</b> | <b>perturbations</b> | <b>Water accounting</b> | <b>Costs of operations</b> | <b>Service to users</b> | <b>Management Units</b> | <b>Operation improvements/units</b> |
| Need to add a step          |  |                                 |                      |                         |                            |                         |                         |                                     |
| Objective of the add-on     | Automation aims to address labour issues, timeliness of water supply, accuracy and measurement, crop yield response to water. The add on is to evaluate the performance of the system installed and if it has met the objectives Automation is also a way forward for water accounting and inter-sector accountability.. |                                 |                      |                         |                            |                         |                         |                                     |
| Task in MASSCOTE            |  |                                 |                      |                         |                            |                         |                         |                                     |
| Work needed for development | Need to categorize the level of automation i.e. systems level and farm level automation  |                                 |                      |                         |                            |                         |                         |                                     |
| A tool exists               |  |                                 |                      |                         |                            |                         |                         |                                     |
| The tools is from           | NCEA Australia is potential resource   |                                 |                      |                         |                            |                         |                         |                                     |
| Expert/organization will do | NCEA Australia is a potential resource   |                                 |                      |                         |                            |                         |                         |                                     |
| FAO requested to:           |  |                                 |                      |                         |                            |                         |                         |                                     |
| Other                       |  |                                 |                      |                         |                            |                         |                         |                                     |

**Group 3- farm level** (including fishponds etc.) level considerations

|                                      |     | 1   | 6  | 7   | 8                             | 11                                       |
|--------------------------------------|-----|---|--|---|-------------------------------|--|
|                                      |     | <b>Rapid Appraisal Procedure</b>                | <b>Service to users</b>                              | <b>Management Units</b>   | <b>Demand for Operation</b>   | <b>Vision and Plan for modernization</b> |
| Already treated in a MASSCOTE module | yes |   | Service delivery at the farm level is most important |   |                               |  |
| Need to complement a step            | yes | add the indicator of adequacy at the farm level |  | Will is at a higher level than at the farm level but has to include basic information at the farm level | Aggregate of individual farms | Need to be carried out earlier on        |
| Need to add a step                   |     |   |  |   |                               |  |
| Objective of the add-on              |     | Indicator for determining level of service      |  |   |                               |  |
| Task in MASSCOTE                     |     | MASSFIELD (incomplete)                          |  |   |                               |  |
| Work needed for development          |     | A group to formed to specifically work on it    |  |   |                               |  |
| A tool exists                        |     |   |  |   |                               |  |
| The tools is from                    |     |   |  |   |                               |  |
| Expert/organization will do          |     |   |  |   |                               |  |
| FAO requested to:                    |     | ?   |  |   |                               |  |
| Other                                |     |   |  |   |                               |  |

#### Group 4- policy and stakeholder processes and legal issues

(facilitator: Thierry Facon, Rapporteur Ines Beernaerts)

|                                      | 0  | 1   | 3   | 4  | 5   | 6/7   | 11                                | 12  |
|--------------------------------------|--|---|---|--|---|---|-----------------------------------|---|
|                                      | Pre-step   | Rapid Appraisal Procedure   | Perturbations   | Water accounting   | Cost of operations  | Service to users/Management Units   | Vision and Plan for modernization | Reporting and communication   |
| Already treated in a MASSCOTE module | No   |   |   |  |   |   |                                   | No  |
| Need to complement a step            |  |   | Consider losses due to illegal withdrawals as perturbations in the system | Assess current uses (including return flows and illicit use) against the water allocation framework (spatially and temporally) | Breakdown costs of operation for different levels of management (including levels of subsidies)                 |   |                                   |   |
| Need to add a step                   | 1. Study to review the policy and legal framework at all relevant levels of governance<br>2. Stakeholder analysis  | Policy dialogue (workshop) - End of Step 1  |   |  | Policy dialogue (workshop) - end of step 5  |   |                                   | Policy dialogue (workshop, field visit) and development of by-laws– last step |
| Objective of the add-on              | 1. Assess policies / laws affecting performance of key stakeholders and level of achievement of current policy objectives (social, economical and environmental)<br>2. Identify key stakeholders | Provide feed-back to decision-makers at both district/regional levels on policy and legal constraints |   |  | Alignment of policy objectives (scheme, district and regional), including policies to increase resilience to CC | Provide support to the implementation of water sector reform (institutional aspects) in the country, e.g. empowerment of WUAs |                                   | Communicate insights to decision-makers                                       |

|                             | 0  | 1                         | 3                   | 4                | 5   | 6/7                               | 11                                | 12                          |
|-----------------------------|--|---------------------------|---------------------|------------------|---|-----------------------------------|-----------------------------------|-----------------------------|
|                             | Pre-step   | Rapid Appraisal Procedure | Perturbations       | Water accounting | Cost of operations                                    | Service to users/Management Units | Vision and Plan for modernization | Reporting and communication |
| Task in MASSCOTE            | Selection of participants and resource persons   |                           |                     |                  |   |                                   |                                   |                             |
| Work needed for development | TOR  |                           | Review legal issues |                  |   |                                   |                                   |                             |
| A tool exists               | Stakeholder analysis (including gender analysis) |                           |                     |                  | Visionary exercise/ scenario approach (end of step 5) |                                   |                                   |                             |
| The tools is from           | Tool 7 of FAO Learning Module 2                  |                           |                     |                  | GCP/RAS/241/JPN                                       |                                   |                                   |                             |
| Expert/organization will do | FAO  |                           |                     |                  |   |                                   |                                   |                             |

#### Group 5- economic aspects and issues

|                                      | 1  | 5                          | 6   | 7                | 8                    | 9   | 11  |
|--------------------------------------|--|----------------------------|---|------------------|----------------------|---|---|
|                                      | Rapid Appraisal Procedure                                      | Costs of operations        | Service to users  | Management Units | Demand for Operation | Operation improvements/ units                                 | Vision and Plan for modernization   |
| Already treated in a MASSCOTE module | Economical gross outputs of the agriculture sector is assessed | Cost analysis is performed | Micro analysis of the farming system should be performed  |                  |                      | Cost analysis associated to improvements options is performed | A micro/macro economical and financial analysis should be performed with clear indicators of returns on investments |
| Need to complement a step            |  |                            | This step needs to be enriched by an analysis of water fees affordability and willingness to pay by end users |                  |                      |   |   |
| Need to add a step                   |  |                            |   |                  |                      |   | YES   |
| Objective of the add-on              |  |                            |   |                  |                      |   | Allows decision makers to select the best options for investments   |
| Task in MASSCOTE                     |  |                            |   |                  |                      |   |   |
| Work needed for development          |  |                            |   |                  |                      |   | Pilot test the approach   |

|                             |  |  |  |  |  |  |   |
|-----------------------------|--|--|--|--|--|--|---|
| A tool exists               |  |  |  |  |  |  | YES   |
| The tools is from           |  |  |  |  |  |  | Planning authorities, Academics, lending agencies                                 |
| Expert/organization will do |  |  |  |  |  |  | Local consultants to be recruited   |
| FAO requested to:           |  |  |  |  |  |  | Pilot test, develop guidelines tutorials and format excelsheets for this New STEP |
| Other                       |  |  |  |  |  |  |   |

**Group 6- Water accounting, evapo-transpiration,link to basins, multiple uses, environment et.**

*(are indicated only the steps where they were suggestions comments)*

|                              | 1   | 2                        | 3              | 4  | 5                   | 6   | 7                 | 8                       |
|------------------------------|---|--------------------------|----------------|--|---------------------|---|-------------------|-------------------------|
|                              | Rapid Appraisal Procedure   | capacity and sensitivity | perturbations  | Water accounting   | Costs of operations | Service to users  | Manageme nt Units | Demand for Operation    |
| Already treated              | Yes   | Not Applicable           | Not Applicable | Yes  | Not Applicable      |   |                   |                         |
| complement a step            | Sensibility checks & groundwater                                      |                          |                | Multiple Users should be addressed including Effect of Modernization on return flows and quality |                     | Address Conjunctive use & wide range of different users including quality | not applicable    | operation to understand |
| Need to add a step           | River Basin Level Constraints?  |                          |                |  |                     |   |                   |                         |
| Objective of the add-on      | To define boundaries/ limits  |                          |                |  |                     |   |                   |                         |
| Task in MASSCOTE             | Decision pathway to seek information about river basin level planning |                          |                |  |                     |   |                   |                         |
| Work needed for development  | decision tree   |                          |                |  |                     |   |                   |                         |
| A tool exists                | No  |                          |                |  |                     |   |                   |                         |
| The tools is from            |   |                          |                |  |                     |   |                   |                         |
| Expert/organiz ation will do |   |                          |                |  |                     |   |                   |                         |
| FAO requested to:            |   |                          |                |  |                     |   |                   |                         |

## Group 7– Climate change and energy

(are indicated only the steps where they were suggestions comments)

|                                      | 1  | 2                        | 3             | 4                          | 5                                     | 6   | 7                | 8                    | 9                                       | 10                      | 11   |
|--------------------------------------|--|--------------------------|---------------|----------------------------|---------------------------------------|---|------------------|----------------------|---|-------------------------|--|
|                                      | Rapid Appraisal Procedure  | capacity and sensitivity | Perturbations | Water accounting           | Costs of operations                   | Service to users                                      | Management Units | Demand for Operation | Operation improvements/units            | Integrating SOM Options | Vision and Plan                                  |
| Already treated in a MASSCOTE module |  |                          |               |                            |                                       |   |                  |                      |   |                         |  |
| Need to complement a step            | Yes  |                          |               | yes                        | Yes                                   | Yes   |                  |                      | Yes                                     | yes                     | YES very important                               |
| Need to add a step                   |  |                          |               |                            |                                       |   |                  |                      |   |                         |  |
| Objective of the add-on              | To incorporate climate change and energy considerations into these steps |                          |               |                            |                                       |   |                  |                      |   |                         |  |
| Task in MASSCOTE                     | Impact Assessment  |                          |               | impacts on water balancing | cost for adaptation and energy saving | options for climate variations and energy consumption |                  |                      | adjustment of system operation strategy |                         | consideration for both adaptation and mitigation |
| Work needed for development          |  |                          |               |                            |                                       |   |                  |                      |   |                         |  |
| A tool exists                        |  |                          |               |                            |                                       |   |                  |                      |   |                         |  |
| Tool from                            | Yes, TCI, WB, IFAD and OECD guidelines and NRL publications              |                          |               |                            |                                       |   |                  |                      |   |                         |  |
| Who will do                          | FAO, national experts  |                          |               |                            |                                       |   |                  |                      |   |                         |  |
| FAO requested to:                    | To find resource, produce a draft and consult with national agencies     |                          |               |                            |                                       |   |                  |                      |   |                         |  |

## Annex 6: List of Participants

| Country   | Name              | Title  | Organization  | email   |
|-----------|-------------------|--|---|---|
| Australia | Peter Smith       | Irrigation Advisory Officer                                  | NSW Department of Primary Industries ; Tamworth Agricultural Institute                        | <a href="mailto:peter.smith@dpi.nsw.gov.au">peter.smith@dpi.nsw.gov.au</a>  |
| Australia | Robert Carr       | Deputy CEO   | eWater CRC (eWater Ltd)   | <a href="mailto:robert.carr@ewater.com.au">robert.carr@ewater.com.au</a>  |
| China     | Dong Bin          | Professor  | Wuhan University  | <a href="mailto:dongbinh@public.wh.hb.cn">dongbinh@public.wh.hb.cn</a>  |
| China     | Gao Benhu         | Professor  | China Institute of Water Resources and Hydropower Research                                    | <a href="mailto:gaobenhu@iwhr.com">gaobenhu@iwhr.com</a>  |
| China     | Gao Zhanyi        | President  | National Centre for Efficient Irrigation Technology Research China                            | <a href="mailto:gaozhy@iwhr.com">gaozhy@iwhr.com</a> ; <a href="mailto:zhanyi.gao@hotmail.com">zhanyi.gao@hotmail.com</a> |
| China     | Kunlun Ding       | Professor  | China Institute of Water Resources and Hydropower Research (IWHR)                             | <a href="mailto:kliding@iwhr.com">kliding@iwhr.com</a>  |
| China     | Li Xinjian        | Director   | Guilin irrigation and drainage experiment station   | <a href="mailto:Lxj5719@163.com">Lxj5719@163.com</a>  |
| China     | Liping Jiang      | Senior Operations Officer, Senior Water Resources Specialist | The World Bank, Beijing Office  | <a href="mailto:Ljiang@worldbank.org">Ljiang@worldbank.org</a>  |
| China     | Sun Lu            | Irrigation water management                                  | Jiamakou Irrigation District  | <a href="mailto:Ziyun5021@sina.com">Ziyun5021@sina.com</a>  |
| China     | Zhang Xuehui      | Director   | Jiamakou Irrigation District  | <a href="mailto:Ziyun5021@sina.com">Ziyun5021@sina.com</a>  |
| China     | Zhou Kezhi        | Irrigation water management and modernization                | Gaoyou Irrigation Area  | <a href="mailto:421721263@qq.com">421721263@qq.com</a>  |
| China     | Zhou Mingyao      | Professor  | Yangzhou University   | <a href="mailto:Myzhouyz@163.com">Myzhouyz@163.com</a>  |
| France    | Daniel Renault    | FAO retired, ex-NRL and main author of MASSCOTE              | Consultant (ex. Senior Officer Irrigation Management FAO)                                     | <a href="mailto:Daniel.renault34@orange.fr">Daniel.renault34@orange.fr</a>  |
| Holland   | Krishna C. Prasad | Senior Lecturer  | Hydraulic Engineering - Land and Water Development Programme; Department of Water Science and | <a href="mailto:k.prasad@unesco-ihe.org">k.prasad@unesco-ihe.org</a>  |



| Country    | Name                     | Title   | Organization  | email  |
|------------|--------------------------|---|---|--|
|            |                          |   | Engineering; UNESCO-IHE Institute for Water Education   |  |
| India      | Somasekhar Rao Polisetti | Water Resources Planning Specialist<br>Karnataka IWRM program           | Asian Development Bank  | <a href="mailto:drpsrao88@gmail.com">drpsrao88@gmail.com</a>   |
| India      | Suresh Kulkarni          | Executive Secretary   | International Commission on Irrigation and Drainage, India  | <a href="mailto:kulsur@gmail.com">kulsur@gmail.com</a> ,<br><a href="mailto:kulkarni@icid.org">kulkarni@icid.org</a> ,<br><a href="mailto:icid@icid.org">icid@icid.org</a> |
| India      | V.K.Chawla               | Chief Engineer  | IMO, CWC, MoWR Government of India  | <a href="mailto:chawlavk54@yahoo.co.in">chawlavk54@yahoo.co.in</a>   |
| Indonesia  | Anang Hari Kristanto     | Researcher and Head of Program  | Research and Development Center for Aquaculture   | <a href="mailto:ananghari25@gmail.com">ananghari25@gmail.com</a>   |
| Indonesia  | Dra. Nova Dorma Sirait   | Head of Region I, Sub Directorate of Operation and Maintenance Planning | Directorate of Operation and Maintenance<br>Directorate General of Water Resources - Ministry of Public Works | <a href="mailto:novadss@yahoo.com">novadss@yahoo.com</a>   |
| Iran       | Mehrzad Ehsani           | Director General on Operation of Irrigation Structures                  | Operations and Maintenance Iran Water Resources Management Company (and IRNCID)                               | <a href="mailto:ehsani2@gmail.com">ehsani2@gmail.com</a>   |
| Italy      | Blaise Kuemlangan        | Legal Officer   | FAO Legal Office, Rome 00153, Italy   | <a href="mailto:blaise.kuemlangan@fao.org">blaise.kuemlangan@fao.org</a>   |
| Italy      | Domitille Vallee         | consultant  | FAO, NRL  | <a href="mailto:domitille.vallee@fao.org">domitille.vallee@fao.org</a>   |
| Italy      | Robina Wahaj             | Irrigation officer  | FAO, NRL  | <a href="mailto:robina.wahaj@fao.org">robina.wahaj@fao.org</a>   |
| Italy      | Zhijun Chen              | Irrigation and Rural Infrastructure Engineer                            | FAO, TCIO   | <a href="mailto:Zhijun.chen@fao.org">Zhijun.chen@fao.org</a>   |
| Kyrgyzstan | Atakulova Gulnara        | Chief specialist on training of Unit of WUA Support and regulation      | Department of Water Resources and Melioration   | <a href="mailto:ms.atakulova@mail.ru">ms.atakulova@mail.ru</a>   |
| Kyrgyzstan | Svetlana Podkuiko        | English-Russian Interpreter   |   | <a href="mailto:dmitry@elcat.kg">dmitry@elcat.kg</a>   |
| Kyrgyzstan | Zhusupov Matraim         | National Consultant   | FAO   | <a href="mailto:Matraim.Jusupov@fao.org">Matraim.Jusupov@fao.org</a>   |

| Country     | Name                                | Title  | Organization   | email   |
|-------------|-------------------------------------|--|--|---|
| Laos        | Rubento Lampayan                    |  | INTERNATIONAL RICE RESEARCH INSTITUTE (IRRI)   | <a href="mailto:R.Lampayan@cgiar.org">R.Lampayan@cgiar.org</a>  |
| Malaysia    | Mohd Adnan Bin Mohd Nor             | Deputy Chairman  | Malaysian Water Partnership  | <a href="mailto:mdadnan@rpm-engineers.com.my">mdadnan@rpm-engineers.com.my</a>  |
| Malaysia    | Syed Abdul Hamid Bin Syed Shuib     | Director   | Irrigation and Agriculture Drainage Division of the Ministry of Agriculture and Agro Industry (MOA)          | <a href="mailto:hamid@moa.gov.my">hamid@moa.gov.my</a>  |
| Malaysia    | Zalilah Selamat                     | Program Coordinator, Chief Assistant Director              | Irrigation and Agriculture Drainage Division, MoA  | <a href="mailto:zalilah@moa.gov.my">zalilah@moa.gov.my</a>  |
| Nepal       | Suman Sijapati                      | Senior Irrigation Consultant                               | INPIM Nepal  | <a href="mailto:sijapati@wlink.com.np">sijapati@wlink.com.np</a>  |
| Pakistan    | Raza Farrukh                        | Senior Project Officer                                     | Asian Development Bank   | <a href="mailto:rfarrukh@adb.org">rfarrukh@adb.org</a>  |
| Philippines | Sudhir Yadav                        | Post-doctoral Fellow                                       | Crop and Environmental Sciences Division International Rice Research Institute                               | <a href="mailto:s.yadav@irri.org">s.yadav@irri.org</a>  |
| Sri Lanka   | Herath Manthirithilake              | Head, Sri Lanka Development Initiative                     | International Management Water Institute (IWMI) Headquarters   | <a href="mailto:h.manthri@CGIAR.ORG">h.manthri@CGIAR.ORG</a>  |
| Sri Lanka   | Upali Sarath Wijesekara             | Director of Irrigation (Assets Management)                 | Irrigation Department  | <a href="mailto:uswijesekara@yahoo.com">uswijesekara@yahoo.com</a>  |
| Tadjikistan | Husniddin Tursunovich Sharofiddinov | Leading Specialist   | Ministry of Melioration and Water Resources of Tajikistan  | <a href="mailto:Husniddin.80@gmail.com">Husniddin.80@gmail.com</a>  |
| Thailand    | Jansark Limpiti                     | Director of Mae Tang Project, Regional Irrigation Office 1 | Royal Irrigation Department  | <a href="mailto:jansark@gmail.com">jansark@gmail.com</a>  |
| Thailand    | Kanchadin Srapratoom                | Chief of Loan Project Branch                               | Foreign Financed Projects Administration Division, Office of Project Management, Royal Irrigation Department | <a href="mailto:kanchadin@yahoo.com">kanchadin@yahoo.com</a>  |
| Thailand    | Somchit Amnatsan                    | Chief of Water Management Group (Irrigation Engineer)      | Office of Water Management and Hydrology, Royal Irrigation Department  | <a href="mailto:somnatsan@yaoo.com">somnatsan@yaoo.com</a> ; <a href="mailto:somnatsan@hotmail.com">somnatsan@hotmail.com</a> |
| Thailand    | Thierry Facon                       | Senior Water Management Officer                            | FAO-RAP  | <a href="mailto:Thierry.Facon@fao.org">Thierry.Facon@fao.org</a>  |

| Country    | Name                         | Title                           | Organization   | email  |
|------------|------------------------------|---------------------------------|--|--|
| Turkey     | Ines Emmanuelle Beernaerts   | Land and Water Resource Officer | FAO, Ankara  | <a href="mailto:ines.beernaerts@fao.org">ines.beernaerts@fao.org</a>     |
| Uzbekistan | Ikrom Ergashev               |                                 | SANIIRI  | <a href="mailto:ikram_barna@mail.ru">ikram_barna@mail.ru</a>             |
| Uzbekistan | Kristina Nikolaevna Toderich | Regional Representative         | ICBA-CAC (International Centre for Biosaline Agriculture for Central Asia and Caucasus) at the ICARDA office in Tashkent | <a href="mailto:k.toderich@CGIAR.ORG">k.toderich@CGIAR.ORG</a>           |
| Vietnam    | Cam Thi Lan Huong            | Specialist                      | Department of Hydraulic Work Management under Directorate of Water Resources   | <a href="mailto:huongctl@wrd.gov.vn">huongctl@wrd.gov.vn</a>             |
| Vietnam    | Nguyen Duc Long              | Expert                          | International Cooperation Department, Ministry of Agriculture and Rural Development                                      | <a href="mailto:longnd.htqt@mard.gov.vn">longnd.htqt@mard.gov.vn</a>     |
| Vietnam    | Pham Thi Phuong Thao         | Researcher                      | Institute of Water Resources and Environment - Vietnam Academy for Water Resources                                       | <a href="mailto:phuongthaopt172@gmail.com">phuongthaopt172@gmail.com</a> |