



# 2nd Asian Irrigation Forum

## Securing Water and Food for the Future

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### Thematic Paper

#### Session 4: *Promoting Good Governance in Irrigation*

#### I. Background

1. Persistent development problems reflect failures of governance. Whilst there is much potential for improving water productivity for agriculture, performance has remained weak over the past decades. Institutional weaknesses, like inadequate financial management skills, insufficient budgetary allocation for operation and maintenance (O&M) and lack of stakeholder engagement in system management continue to plague performance. Externalities are a major influence with subsidies further distorting what farmers choose to grow and efficiencies in resource utilization. Physical interventions alone cannot resolve the issues and more rigor is required to consider governance actions in congruence to infrastructure development.

2. Studies have found a positive relationship between the quality of institutions and governance structures, and economic growth. Good governance is recognized as an important factor in eradicating poverty and promoting development.<sup>1</sup> Water governance, more specifically, is best described by the Global Water Partnership as, "... the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society".

3. Increasing populations and changing social and economic patterns are placing the irrigation sub-sector under pressure to improve performance and make more productive use of the available water supplies. As land and water resources for new development have become scarce and demands from other sectors have grown, the focus has shifted from construction of new irrigation schemes to better management of existing schemes. Many river basins are now in the critical management phase where the amount of renewable water resources that can be developed are small, non-existent or already over-developed through mining of groundwater resources, resulting in closed or closing basins.

4. Rural economies in Asia are changing with increasing rural-urban migration rates. The People's Republic of China (PRC) dominates in absolute numbers with over 51 percent of its entire population of nearly 1.35 billion living in cities. Smaller countries like Lao PDR and Cambodia are also transforming rapidly with 7.3 and 4.3 percent annual urban expansion. By 2030, over two thirds of Asia's population will be living in cities.

5. As male farmers leave rural areas in search of better livelihoods women become responsible for traditional roles in farming. Those women who migrate to cities may also become responsible for peri-urban farming, while men take on alternate employment. On average, 43 percent of Asian farmers are women. Since 1980 the share of women in agricultural work force has increased – in PRC about 48 percent, Pakistan at 30 percent (triple the level of 30 years ago) and Bangladesh more than 50 percent.<sup>2</sup> This has significant implications for inclusiveness in irrigated agriculture.

<sup>1</sup> Fourth High Level Forum on Aid Effectiveness, Organization of Economic Development and Cooperation, Busan (2011)

<sup>2</sup> Gender Equality and Food Security Women's Empowerment as a Tool against Hunger, ADB 2013



6. Women work as unpaid or poorly paid labor, in rice transplanting, crop harvest and post-harvest support - in addition to household responsibilities. Yet inaccessibility to resources and services, and being unrecognized as farmers by irrigation agencies, has significant impacts on agricultural productivity. Research suggests that women farmers who are supported to reach their full potential can produce 20 to 30 percent more food.<sup>3</sup> This can be a significant contribution to the overall 60 percent increase in food production which is needed to meet global demands by 2050.

7. Irrigation is a heavily distorted sub-sector, with multiple subsidies for inputs like water, energy, fertilizer, etc. Asia spends more on subsidies than the rest of the world combined. The PRC pays farmers an unparalleled \$165 billion, Japan (\$65 billion), Indonesia (\$28 billion), and South Korea (\$20 billion). These are far in excess of the United States (\$19 billion) and the European Union (\$67 billion).<sup>4</sup>

8. International trade policies, price support and global food prices also influence what farmers choose to produce. Irrigation subsidies in developed countries can also affect the relative competitiveness of developing countries. Countries like India and PRC adopted protective actions and other trade distorting policies to support domestic farmers by limiting imports from developed countries where farming is heavily subsidized. This may explain the inherent reluctance of many countries to increase water charges in irrigation and remove or reduce subsidies for agricultural inputs.

9. Whilst we may not overtly consider the impact of macroeconomics and international trade in our understanding of irrigation governance, these are powerful driving forces in the performance of irrigated agriculture. Farmers who have guaranteed (minimum) prices for crop production like rice will opt for this low risk option especially where irrigation service delivery may be unreliable. Driving the debate on cost recovery and crop diversification through a bottom up approach may be naïve given the overriding impacts of international trade and politics.

10. This paper supports session 4 (Governance) of the Second Asian Irrigation Forum by presenting a broadened perspective of governance in irrigation.<sup>5</sup> The paper discusses three key aspects in this regard: (i) lessons learned and opportunities to strengthen institutional, policy and legal frameworks to improve performance; (ii) changing rural dynamics and the feminization of agriculture; and (iii) the influence of subsidies and price distortions on water productivity.

## **II. Strengthening Institutions**

11. Fundamental change is required in the way that politicians, policy makers and water managers address water resources and irrigation management. Fundamental change is required in the structure and staffing of water resources and irrigation agencies, and greater access to communication and involvement of stakeholders. It also calls for improved knowledge, information and control over water resources and re-education and training of water professionals.

12. The 1990s saw the advent of governance related actions, like institutional reform and irrigation management transfer (IMT) based on the need to boost productivity and respond to

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<sup>3</sup> The State of Food and Agriculture 2010-2011, Food and Agriculture Organization, 2011

<sup>4</sup> <http://www.theguardian.com/sustainable-business/agricultural-subsidies-reform-government-support>

<sup>5</sup> Second Asian Irrigation Forum held in Manila, Philippines from 20-22 January 2016 and co-organized by the Asian Development Bank, the Australian Water Partnership, Food and Agriculture Organization, International Water Management institute.

evolving needs. The results of major reform programs (like the National Drainage Program in Pakistan) have been mixed. Yet the focus on governance needs to be revived given the urgency to increase productive use of water. Policy and legal frameworks, organizational structures and management decisions require a step change to be more responsive to the evolving rural economy and critical status of natural resources.

#### **a. Separating Roles in Water Governance**

13. In many countries in Asia, irrigation has dominated the water resources agenda for the last 40 to 50 years. Only in the last two decades has the voice of other water users, such as those for domestic, industrial and power use, begun to be heard more strongly. The World Bank has been leading the separation of the water resources management functions from the irrigation service delivery functions. This is due to concerns over conflict-of-interest with the agency responsible for 80-90 of the total water consumption also being responsible for the management of the resource for other competing water demands.

##### **i. India**

14. India recognized the urgency for a range of institutional reforms in the water resources and irrigation sectors.<sup>6</sup> Specifically it considered the importance of self-sufficiency of state irrigation departments and increased cost recovery from farmers, and irrigation management transfer to water users' associations (WUA).

15. Several water scarce and rapidly urbanizing states participated in the reform process.<sup>7</sup> In Madhya Pradesh, the aims were to provide separation of roles through the creation of state water resources management agency, data collection and analysis centre, and state water tariff regulatory agency. Whilst the necessary political and financial commitment to fully staff a separate water resources management organisation did not materialize, a separate Water Resources Management Wing has been formed within the Water Resources Department.

16. Maharashtra undertook reforms through the development of a State water policy, water pricing, the establishment of a state water resources regulatory authority, mandatory formation of WUAs and irrigation supplies on a volumetric basis, creation of irrigation corporations and benchmarking, and water auditing of irrigation projects. Results indicate improvement in cost recovery and improved financial performance of irrigation projects.

17. India demonstrates mixed performance across the states. This highlights the need for deep and sustained political commitment – backed up by demonstrable results to strengthen the support of farmers and political leadership. Most importantly, farmers and local champions need to be made central to the reform process, rather than being solely reliant on the dictates of high level officials.

##### **ii. Kyrgyz Republic**

18. Efforts were undertaken to promote the separation of the water resources and irrigation management functions. In early 2005 a new Water Code was introduced which recognized integrated water resources management, economic value of water and the consolidation of water resources stewardship functions under a new, single apex government water council. In

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<sup>6</sup> World Bank. 1998. India – Water Resources Management Sector Review: Report on the Irrigation Sector, Report 18416-IN, World Bank/Government of India, September.

<sup>7</sup> Water Sector Restructuring Projects (WSRP) initiated by state governments in Maharashtra, Andhra Pradesh, Madhya Pradesh, Rajasthan, Tamil Nadu and Uttar Pradesh and the Government of India (with financing from the World Bank).

2002, the formation of WUAs and the transfer of on-farm irrigation infrastructure to WUAs were passed as law – this strengthened the role of farmers in on-farm water management.

19. The Kyrgyz Republic government (with support from the World Bank) supported formation of a specialist cadre within the water resources management wing for river basin planning using modern planning approaches, including remote sensing. Other measures proposed include preparing a National Water Strategy, developing and implementing procedures for water and wastewater permits, strengthening the main government body responsible for policy and strategy oversight and building a comprehensive water information system. Comprehensive support has also been provided for the formation and strengthening of WUAs as critical organizations for O&M.

20. The overall reform process has been beset with political changes, civil unrest, high staff turnover in relevant institutions and overall weak political commitment. The expected results of institutional reform have yet to be realized.

### **iii. Pakistan**

21. Perhaps one of the most ambitious reform programs is the National Drainage Program (approved in 1997).<sup>8</sup> The aim was sustainable improvement of irrigation and drainage through institutional reforms and infrastructure investments. The institutional reforms component comprised:

- strategic reorientation, streamlining and capacity-building of the Water and Power Development Authority's (WAPDA) Water Wing;
- drainage and irrigation decentralization and management transfer activities in the Provinces;
- restructuring of Provincial Irrigation Departments resulting in the establishment of autonomous Provincial Irrigation and Drainage Authorities, area water boards and farmer organization (FO); and
- Transfer of management of drainage and irrigation services.

22. The program was completed in 2004. Whilst it did not achieve its overall intended objective, it was able to take legislative actions to transform irrigation departments to irrigation and drainage authorities. Whilst FOs have commenced collection of water charges (of which 40 percent are to be kept and 60 percent transferred to the area water board), no change has been recorded in the level of O&M expenditure.

23. The implementation completion report recognized the importance of the following: (i) simple and tailored approaches which are relevant for each province; (ii) continued government commitment for the process; (iii) capacity building of existing and new organizations created and; (iv) champions to drive the process.

### **b. Irrigation Management Transfer**

24. Central to current institutional interventions to improve service delivery at the on-farm level is the formation of viable and sustainable WUAs, either as part of a programme of participatory irrigation management (PIM) or IMT. Experience with PIM/IMT over the last four decades has been mixed, with success in some countries including Australia, Chile, Colombia, Mexico, Turkey and the Kyrgyz Republic.

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<sup>8</sup> <http://documents.worldbank.org/curated/en/2007/05/9753256/pakistan-national-drainage-project>

25. Challenges are due to a range of reasons including resistant irrigation bureaucracies, inadequate legal frameworks, lack of adequate training of nascent WUA organisations, and insufficient delegation of responsibilities (particularly in relation to service fee setting, collection and use).

26. International experience<sup>9</sup> suggests that a PIM/IMT intervention succeeds only if: (i) it has a credible outcome of significant net improvement livelihoods for stakeholders; (ii) the irrigation system has become central to creating such improvement; (iii) the economic and financial cost of sustainable self-management is a small proportion of improved income; (iv) WUAs have authority over O&M, asset management, financing and dispute resolution; and (v) the proposed organization design is—and is seen to have—low transaction costs.<sup>10</sup>

27. Recent research in Nepal, Bangladesh and India concludes that: (i) PIM/IMT appears less successful for larger schemes - joint management arrangements are especially weak; (ii) support for WUA is a skilled activity which needs to be based on clear government policy for WUAs participation; (iii) expecting farmers to contribute free time for irrigation management is less attractive and conflicts with their parallel need to generating incomes; and (iv) PIM/IMT appears to have limited impact on agricultural productivity. Complementary agriculture support is also required.<sup>11</sup>

### **c. Can We Succeed in Irrigation Reform**

28. The overall experience with irrigation reform has been mixed. Proposed reforms of irrigation and drainage acts, introduction of regulatory authorities and restructuring of IAs have been modest. In some cases, changes made by one government administration have been reversed by subsequent administrations. In all cases, the existence of reforming “change agents” has been found to be central to any progress that has been made.

29. Despite challenges in the reform it is essential that efforts continue to modernize IAs. Several measures are considered central to this process like: (i) separating the governance and management of water resources from irrigation; (ii) building a service delivery culture within IAs; (iii) focusing on performance management and optimum delivery of agricultural outputs; (iv) broadening the cadre of staff in the irrigation and drainage agencies; (v) strengthening the role and involvement of water users system management; and (vi) adequate funding to sustain systems for optimum performance.

30. Most critical is the duration over which meaningful reform takes place. Considering the economic histories of developing countries which took place over decades and centuries, Asia is in an accelerated mode. Reform requires time – using more stepwise approaches rather than setting over ambitious targets, committed champions to lead the way and staying the course. Whilst we may not have seen perfect outcomes from the process to date, what is clear is that governance and water security are intrinsically linked. We cannot expect improved irrigation service delivery without sufficient emphasis and investment in continued reforms. Ultimately, it will be governance that paves the way for adapting to the new water resources environment.

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<sup>9</sup> IWMI. 2015. Innovations for More Food with Less Water Final Report, May. TA-7967-REG, Asian Development Bank, Manila

<sup>10</sup> In Colombia in the 1970's, the transfer of management responsibility to WUAs in the Saldana and Coello systems, without transfer of related rights and authority, did not work. This led to legal reform to empower WUAs to be able to define the service, set budgets and hire and release staff.

<sup>11</sup> Innovations for More Food with Less Water Task 2, Final Report-Nepal, Consultant Report to ADB, Lahmeyer, 2015.

### **III. The Changing Rural Economy**

31. Women play a critical role in irrigated agriculture from seeding and transplanting to post harvest support. Increasing migration of men to urban areas in search of improved livelihoods brings new emphasis on the importance of including women as equal stakeholders in irrigation. The PRC has the highest number of women farmers in Asia, at about 48%. As rural-urban migration continues, it will be increasingly women who will manage critical elements of agriculture and food production.

32. To date, their roles have been overlooked and remain constrained by limited access to resources, services and knowledge. Government institutions, irrigation practitioners and communities may not recognize the important role of women farmers and have continued to reinforce gender stereotypes. Demographic shifts and the changing rural economy highlight the need for greater inclusion and access for women to make significant improvements in productivity.

33. Women farmers are disadvantaged with limited access to adequate land, basic tools and inputs like fertilizers, credit and extension services. They manage agricultural activities in addition to household management. Whilst women farmers are less productive than male farmers, this is not due to inefficiency. Rather extensive evidence highlights the difference is caused by difference in use of inputs.<sup>3</sup>

34. To date, actions for more participatory approaches in irrigation management have focused on women's representation in the WUA. This is reflected in 79 percent of ADB loans (between 2012 and 2014) for agriculture (which also covers irrigation) being classified as gender mainstreaming. Whilst participation has increased visibility, engagement in decision making and understanding the role of women in irrigation, it may not have changed the fundamental parameters affecting women's productivity, like access to resources. Research has shown that improving women's access to resources can increase yields by 20-30 percent and raise total agricultural output in developing countries by 2.5–4.0 percent.<sup>12</sup> This coupled with improved water productivity are important parameters to consider as potential benefits.

#### **a. Women Leaders in Irrigation**

35. Women's representation has remained very much embedded at the field level through WUAs or dedicated women's groups. Whilst projects may build in gender aspects, their delivery may not be considered integral to the overall project activities. What remains a challenge is representation of women in irrigation and/or water resources institutions. In 2012, women held less than 6 per cent of ministerial positions for environment, natural resources and energy.<sup>13</sup> Decision and policy making at the highest level is more likely to omit gender and social dimensions given the lack of women representation.

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<sup>12</sup> The State of Food and Agriculture 2010-2011, Food and Agriculture Organization, 2011

<sup>13</sup> <http://unchronicle.un.org/article/women-and-agricultural-water-resource-management/>

## **b. Equal Access to Resources, Services and Technologies**

36. Access to land is a basic requirement for farming and provides security for obtaining credit. This is not so easy for women in Asia where access to land and property is embedded in law or tradition that men inherit land or receive a larger share of inheritance than women. These inheritance customs increases the dependency of women on men. Women across all developing regions are less likely to manage or own land and in all cases, have access to poorer quality and smaller plots. The disparities are noted across all regions and deprive women from accessing irrigated water, receiving agricultural extension services and obtaining credit given that land is often used as collateral. The outcome is low productivity.

37. Only 5 percent of women across the globe have access to extension services. Social mobility and lack of sufficient female agricultural extension services could be a root cause. This is a major challenge, and accessibility to support services has significant implications for productivity. Without demonstrating best practices to women in transplanting, harvest and post-harvest support production losses would be inevitably high. The Food and Agriculture Organization (FAO) suggests that bridging the gender gap in agriculture could increase agricultural yields to potentially reduce the number of hungry people globally by 100 to 150 million. Providing women with technical training in on-farm land and water management (technologies and best practices), post-harvest support and basic processing could make significant contributions.

38. Whilst the irrigation sub-sector cannot resolve all constraints, it is imperative that: (i) the significance of women farmers in irrigation is recognized – with 43% engaged in agriculture, this can no longer be ignored; (ii) the impact of changing rural demographics should be recognized and; (iii) there is potential to make productivity gains by providing women with equal access to resources as male farmers.

39. WUAs and participatory approaches have strengthened the role of women in irrigation through inclusion in process or representative bodies. But more can be achieved by: (i) recognizing women as independent users of water and enabling them to access water rights regardless of land ownership. This would also provide more meaningful engagement of women in WUAs; (ii) enhancing the capacities of relevant stakeholders from government, and development partners to better understand and address gender issues in irrigation and governance; (iii) collecting sex-disaggregated data to better understand and respond to women's needs in irrigated agriculture and (iv) using monitoring and impact assessments to develop more impactful interventions.

## **IV. Subsidies and Price Distortions**

40. Irrigated agriculture is heavily distorted by a range of in-built subsidies and more broadly due to international trade agreements. Subsidized power (electricity and petroleum products) and essentially free irrigation water in some countries have encouraged inefficient use of a scarce resource and distorted water resources utilization. Subsidy policies encourage overuse of fertilizers and electricity for groundwater pumping. Unless short term and targeted, they also impede innovations and sector development.

41. Though such policies have historically encouraged production and improved yields, they are increasingly causing a fiscal burden and impacting on water and soil quality. In PRC, over 40 percent of water pollution emanates from agriculture – specifically agrochemicals. Whilst subsidies are deeply embedded issues and are challenging to unbundle, they do have impacts on farmers' decisions on cropping, water productivity and the broader environment. They also

have political undertones when used for patronage and garnering support from rural communities.

#### **a. Trade Implications**

42. International trade and heavily subsidized agriculture in developed countries directly undermines the poorest producers. Nearly two thirds of developing countries rely on primary commodity exports for more than 50 percent of their export earnings. The European Union spends about \$67 billion annually on farm subsidies. Whilst PRC and India provide large subsidies to agriculture, many poorer countries are unable to compete with the levels of government support as provided across the developed world. There remains scope for improving the balance of global subsidies and redressing the balance. This is particularly relevant under the prevailing circumstance of low food prices.

43. The World Trade Organization (WTO) Agreement on Agriculture in 2000 and subsequent Doha Development Agenda in 2001 consider market access, tariffs and export subsidies. By better managing these in developed countries and reducing exports, the aim is to limit the interventions required by developing countries to protect poorer farmers and agriculture. There is increasing concerns from the Group of 20 and Group of 8 on governance issues relating to the commodity prices and agricultural trade. The FAO Ministerial Meeting on Governance and International Commodity Markets in 2014 concluded the need for improving international policy coordination.

#### **b. Energy Subsidies**

44. Groundwater abstraction particularly in South Asia has been driven by the price of subsidized energy for agricultural tubewells. In India, about 50 percent of irrigated area is reliant on groundwater using about 26 million tubewells. Over US\$6 billion is spent on energy subsidies annually, and it is estimated that farmers pay only 13 percent of the true cost of electricity.<sup>14</sup> Heavily subsidized energy leads to expansion in cultivation of water-intensive crops and inefficient irrigation practices, resulting in the depletion of groundwater and energy resources.<sup>15</sup>

45. Groundwater management considers a range of instruments including<sup>16</sup>: (i) policy and regulatory frameworks; (ii) creation of organizations to better manage groundwater resources within a hydrological boundary and their capacity building; (iii) knowledge and monitoring of aquifer properties and behavior and; (iv) incentivizing improved groundwater management through improved irrigation technologies. The challenge to date is the fragmented approach by policy makers and investment interventions where groundwater utilization is often overlooked and data availability is almost negligible. Use of incentives to improve water and energy demand coupled with innovative reform strategies could improve the economy and have wider benefits for water resources management.

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<sup>14</sup> <http://www.worldwatch.org/reforming-energy-subsidies-could-curb-india%E2%80%99s-water-stress-0>

<sup>15</sup> Shah, T., Bhatt, S., Shah, R. K., and Talati, J. (2008). Groundwater Governance through Electricity Supply Management: Assessing an Innovative Intervention in Gujarat, Western India. *Agricultural Water Management*, 95(11), 1233-1242

<sup>16</sup> Samala V.K.Das and Jacob Burke. (2013) Smallholders and sustainable wells - A retrospective: Participatory groundwater management in Andhra Pradesh (India). Food and Agriculture Organization, Rome.

### **c. Irrigation Subsidies**

46. Irrigation supplies are often subsidized by governments with limited O&M cost recovery (see Second Asian Irrigation Forum, Paper 3: Improved Financing – Delivering Results). Irrigation subsidies influence farmers' decisions on cropping with underpriced water which in turn has supply effects in an already distorted market. With the increasing urgency of climate change impacts and water scarcity in Asia region, policy makers, irrigation practitioners and users need to have a better understanding of the true cost of public sector spending in irrigation.

47. In most countries, providing irrigation water is treated partly as a social service, to bolster domestic food production at an "affordable" price and to maintain rural welfare. Farmers operate in a highly distorted producers' environment and sell their output in markets where the real price is suppressed (including by international trade practices of other countries). Water and energy subsidies may be seen as an attempt to compensate for these other negative distortions. Attempting to remove these subsidies without attention to the wider farming environment, could make farmers worse off without improving the overall situation.

48. The irrigation service fee (ISF) paid by farmers is typically well below the actual recurrent cost of supply (i.e. the annual costs of management, operating and maintenance), and very rarely makes any contribution to recovering the investment cost of infrastructure. The losses incurred by the irrigation agency are covered by fiscal transfers from the central and state governments. A similar situation arises in subsidies for the electric power and diesel fuel used by farmers in pumping groundwater.

49. In many cases, the subsidy transfers do not fully offset the gap between the cost of the service and the proceeds of the ISF, which usually leaves the maintenance budget underfunded. Maintenance is postponed and skimmed. Because ISFs are so low, or remain uncollected, farmers have no leverage over their irrigation service provider. There is no penalty on wasteful use of water, nor any incentive to remedy leaks in distribution systems. The subsidies on energy are a potent factor in encouraging excessive abstraction of groundwater by farmers.

## **V. Moving Forward**

50. The irrigation sub-sector is clearly compounded by a range of governance-related challenges like weak institutions and low cost recovery leading to poor service delivery and system decay. It is further impacted by changing rural dynamics as we witness rapid urbanization and increasing feminization of agriculture. Price subsidies distort farmers' production choices and impact on returns. To limit the likely social implications of a sub-sector of which the true cost of production would be unaffordable, and to limit international trade impacts on domestic producers, the political economy ensures that suitable protective measures are in place.

51. The challenges are compounded and require broader stakeholder engagement to wrestle with trade policies, subsidies and social drivers. Resolving the situation through infrastructure development without tackling governance will not improve performance. Measures required to address these issues include:

### **a. Institutional Reform**

- Reinvigorate institutional reform dialogue with governments and development partners. Highlight the links between infrastructure decay, poor service delivery and low cost recovery for O&M.
- Leverage infrastructure investments to tackle the reform agenda through alternate instruments, like capacity building support and public financial management interventions.
- Assessment of the financial benefits accruing to water users from the services provided and comparison with the costs for management, operation and maintenance.
- Institutionalize asset management planning procedures to systemically tackle the core issue of low cost recovery and poor O&M budgeting.
- Consider outsourcing options for specialist activities, including performance based contracts, remote sensing and other information technology related interventions.

### **b. Changing Rural Dynamics**

- Greater emphasis on capacity building of women in irrigation or water resources departments – developing specific targets for women participation in technical trainings and access to continuing professional development.
- Development of inclusive strategies for water and food security – with women participation. Implementation and impact monitoring with sex disaggregated data.
- Increasing awareness of the key role of women in irrigated agriculture – gender sensitization trainings and inclusion of gender in technical curricula.
- Land certification or titling to facilitate significant gains to productivity (between 50 and 100 percent). Supporting women in equal access to land through titling can lift incomes and provide collateral to access credit.
- Greater inclusion of water users, including women, in project design and implementation – beyond just representation in WUAs. Inclusion of women-specific activities or gender targets to be achieved in irrigated agriculture would be beneficial, e.g. women specific agriculture extension training in land and water management, improved practices like line sowing, alternate wetting and drying, improved storage techniques and safe use of agrochemicals etc.
- Holistic planning of associated infrastructure to support integrated development. This includes improved roads and access to suitable market facilities and requires more cross sector approaches.
- Access to information – use of mobile phone technology to provide men and women with market price information and other data like water productivity using remote sensing.

### **c. Price Distortions and Subsidies**

- Complex and politically charged – phasing out subsidies requires strong political support and public confidence in alternate options to be introduced.
- Subsidies to be short term and targeted to drive innovation rather than stagnate and stifle development in agriculture.
- A bold option for targeted support to the poorest farmers is compensating or replacement of subsidies through conditional cash transfers. It is potentially a more effective mechanism than blanket, long term subsidies. This requires specific conditions of governance to ensure transfers reach the right farmers. These include transparency in

identifying the poor, biometric system to ensure funds actually reach the correct persons and beneficiaries to have bank accounts to receive funds.

- Irrigation subsidies need to be addressed in a holistic manner, attacking the problem from a number of directions (see Thematic Paper for Session 3) including data gathering, synchronizing tariff reform with investment in tangible improvements, improvements in collections, delegation of financial responsibility to WUAs, etc.