



CIPT Sandesh

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Issue I.

March 2014

Editorial

Dear Friends,

I am happy to share with you the inaugural newsletter of the Centers for International Projects Trust (CIPT) – CIPT Sandesh.

The quarterly newsletter will be CIPT's mouthpiece to inform readers about our work and to develop a discourse on important issues concerning water, environment, energy and livelihood sustainability. It will include details on our efforts towards achieving sustainability and will contain perspectives of important stakeholders in the water-energy-food nexus.

The release of the first issue of CIPT Sandesh coincides with the World Water Day, which was formally proposed in Agenda 21 of the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil.

Ever since then, World Water Day is celebrated on March 22 with programmes pledging support for the cause of water conservation and management. Every year, a theme is selected to commemorate World Water Day. The theme for 2014 is – Water and Energy.

There is a strong and bi-directional connection between water and energy. While water is required for energy generation and transmission, a large chunk of energy is utilized in pumping out the groundwater, water treatment and its transportation. Such complex relationship leads to fierce inter-sectoral competition for water and energy reflecting the need for optimal allocations. CIPT aims at long-term sustainability of the water-energy-food nexus by maximizing the synergies and minimizing the trade-offs and by working closely with various stakeholders.

The current issue of CIPT Sandesh provides a snapshot of our work in Punjab and Gujarat. Working with farmers in some of the water-stressed regions of these states, our interventions have reduced water use in paddy cultivation and promoted models for incentivising optimal use of energy for irrigation.

We look forward to your comments and suggestions.

Kamal Vatta
Director, CIPT

Solutions for agricultural water sustainability in Punjab

Kamal Vatta and Sandeep Dixit



Punjab - the land of five rivers has been the pioneer of green revolution in the country. The state has 1.57 per cent of India's total geographical area but accounts for 12 per cent of the national food grain production. Farmers in the state have moved from the traditional cultivation of wheat, maize, pulses and vegetables to predominantly rice-wheat cultivation. Consequently the cropping intensity in Punjab has increased from an already intensive 140 percent to more than 189 percent during the period 1970 to 2010.

The increase in agricultural production in the state has resulted in rapid depletion of groundwater tables. During the period from 1982-87, the water table in Central Punjab fell at an average of 18 cm per year. This rate accelerated to 42 cm per year from 1997-2002, and to a staggering 75 cm during 2002-06 (Singh, 2006). Water tables are now falling over about 90 percent of the state, with Central Punjab most severely affected. A study by Central Soil Salinity Research Institute, Karnal indicated that 103 out of 142 blocks in the state are categorised as over-exploited. It is important to mention that groundwater extraction uses energy which has been heavily subsidised. It is estimated that the power subsidy for agriculture in the state till 2010-11 has amounted to a whopping Rs. 27.75 billion (Columbia Water Center, 2012).

CIPT and Punjab Agricultural University, Ludhiana have been working on a water sustainability program since 2008 to address the challenges emerging out of the unsustainable agricultural practices. The program seeks to address the water-agriculture-livelihood connect through on-field engagement with farmers, to test and scale up adoption of appropriate water saving technologies and practices while maintaining yield and income; providing them with access to reliable markets and technologies through corporate engagement in

farming; and enabling on-farm best practices to manage chronic risk induced by groundwater depletion and climate risk, through the use of ICT system that helps customize guidance to farmers.

Approaches

The project interventions cuts across different themes and areas ranging from -

- Sensitisation of farmers,
- Capacity building, awareness programmes and exposure visits,
- Promoting the use of low cost technologies for enhanced water savings,
- Development of forecasting models for soil moisture, temperature and rainfall,
- Development of ICT tools such as web portals and mobile application to promote sustainable agricultural practices,
- Develop public-private partnerships to provide modern extension services.

The development of low cost tensiometers, costing Rs. 450/- each is an innovative means of measuring soil moisture and scheduling irrigation. Farmers across villages in the districts of Amritsar, Barnala, Jalandhar, Kapurthala, Ludhiana, Moga and Tarn Taran have installed tensiometers and are using them.

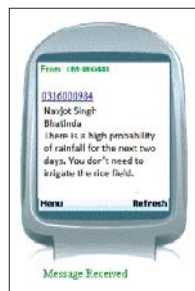
The Departments of Soil and Water Engineering, Agronomy and Soils at Punjab Agricultural University, Ludhiana are working for the deployment of soil moisture sensors (developed by TORO-a US based company). At present, 35 sensors have been used in the field.



Low cost tensiometer



SMS to farmers on weather forecast



Soil Moisture Sensor



The aim of using these sensors is to develop an efficient irrigation scheduling plan. In addition, these sensors will help in better calibration of the existing tensiometers. The successful use of these sensors is also expected to provide a strong and viable platform for the dissemination of irrigation information to and from the farmers in a digitized form by removing the human element of error involved in personal data collection.

Farmers in the project area have access to real time weather information and efforts are on to create a web portal providing information about the entire package of practices for various crops grown in the region. This will be gradually developed as a user interface between farmers and experts to provide quality information to the farmers in a short span of time.

There are regular interactions with farmers in form of Kisan Goshtis, trainings, exposure visits and interaction with experts. Regular interface with farmers is also helping in addressing queries and generating evidences from the ground. The team of field workers also act as extension agents providing valuable information to the farmers at each stage of the cropping cycle.

Success and way forward

The use of water saving technologies especially the tensiometer has resulted in water savings in the range of 22 per cent per acre by majority of the farmers. This has been demonstrated by initial trails and the wide coverage of the tensiometers in the project is bound to have wide ramification for future water savings across the project area. If just 40 per cent of the area under rice cultivation in Punjab were to adopt tensiometer use, it would save an estimated 3 million dollars in energy per year, and 22 billion cubic meters of water.

Less use of water for irrigation has a direct implication on the use of energy for pumping groundwater. Evidences are being generated to ascertain the exact decrease in energy consumption due to the use of tensiometers.

The program has provided a platform to build partnerships for cross learning and policy advocacy. Efforts have been initiated to get stakeholders to work on building value chains in agriculture. CIPT in association with USAID organised a consultative workshop to bring together private sector representatives, government officials, donors, stakeholders, farmer organizations and academics to share experiences on value chain development. The brainstorming on integration of smallholders into value chains in order to promote agricultural and rural development now presents an opportunity to develop meaningful public private partnerships in this area. It is essential that this happens simultaneously with the creation of a robust knowledge base for the promotion of sustainable value chains, including training and information-sharing needs.

The interventions carried out in Punjab as part of the USAID supported Water-Agriculture-Livelihood Security in India program (in operation since June 2012) marks the beginning of our attempt to understand the intrinsic link between cultivation of crops-water and energy usage-livelihoods and impact on environment. Based on the current interventions there are evidence to indicate that the project will generate outcomes in areas of water and energy savings, enhanced production and development of a knowledge platform for future use. We intend to use the model the project will establish towards preservation of natural resources for replication through awareness and advocacy.

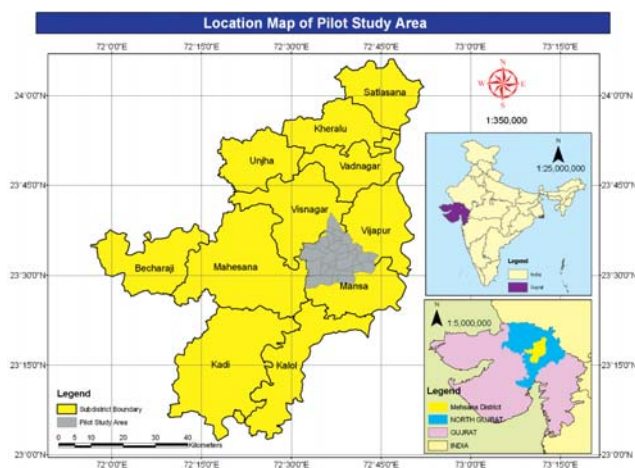
Understanding water-energy-agriculture-livelihood connect

Nikunj Parekh, Ankur Patel, Anil Rohilla and Dishant Patel

The use of groundwater occupies a major share across all water intensive sectors – agriculture, industry and domestic. India is one of the largest groundwater user in the world. Groundwater extraction is mainly by private wells, whose number has increased phenomenally across the past few decades.

North Gujarat provides one of the most extreme example of groundwater depletion in India. Due to unsustainable water use in agriculture, which is central to the state's economy, water tables have been rapidly falling over the last three decades. More so, groundwater extraction is linked directly with the subsidized power supply thereby forming a vicious cycle.

Figure 1: Study Area



The region has a semi-arid climate characterized by extreme temperatures, erratic rainfall and high evaporation. Over 90 per cent of the annual rainfall occurs during the southwest monsoon, during the period between June and September.

Approaches and initiatives

In Gujarat, CIPT is working with farmers associated with 400 tube-wells used for the irrigation. A single well can service a number of farmers for meeting their irrigation needs. This is peculiar to the district of Mehsana and some parts of Gandhinagar. During the survey, well operators of these tube-wells were the principal respondents. Respondents were asked about their perceptions of the groundwater situation, cultivated land, frequency and quantity of water applied etc.

Perceptions on groundwater

According to the farmers, the average life of a tube well is 3-4 years. Irrespective of time, 67 per cent of the farmer's indicate that the main reason for deepening of wells in the region is due depletion of water levels every year. Water tables in the study area have been falling steadily over last 15-20 years, and have reached about 200 meters below ground level. The rate of decline is anywhere between 3 to 6 meters per annum (based on the data from observation wells).

When asked about the strategy of the farmers in response to the depletion of groundwater, 32 per of the farmers said that they will prefer migrating to other areas in search of livelihood. Around 31 per cent farmers were of the opinion that further deepening of wells is the only solution for augmenting their water supply, while 30 per cent of the farmers indicated that they will be left with no choice but to cultivate only during the rainy season. The remaining farmers had no response.

CIPT's interventions

Gujarat is one of the intervention areas as part of CIPT's program. The program seeks to address the water-agriculture-livelihood connect through on-field engagement with farmers, to test and scale up adoption of appropriate water saving technologies and practices while maintaining yield and income; providing them with access to reliable markets and technologies through corporate engagement in farming; and enabling on-farm best practices to manage chronic risk induced by groundwater depletion and climate risk, through the use of ICT system that helps customize guidance to farmers.

The intervention cuts across different themes and areas which includes -

- Capacity building, awareness programs for farmers in the study area,
- Testing water savings potential of new wheat variety GW-11 developed by State Agricultural University directly with the engagement of farmers,
- Development and implementation of ICT based tools (one way and two way SMS service for farmers) to promote sustainable agricultural practices,
- Develop public-private partnerships to provide modern extension services to the farmers in the region.



One of the major initiative is with regard to the pilot testing of a novel incentive program to reform the energy subsidy structure in agricultural sector with direct involvement of farmers. The aim of the experiment was to reverse the groundwater depletion to result in greater and more sustainable water access and use for all needs. This was carried out in coordination with the Department of Energy and Petrochemicals, Gujarat Government and Northern Gujarat Utility, UGVCL.

Subsequently, taking a step forward to understand typical water-energy nexus, a pilot project activity was initiated -Integrated Water Energy Resource Management (IWERM) through smart metering and communication under Datamatrix Technology. The technology will meter and monitor (a) the energy use (b) the water withdrawals (c) the groundwater levels (d) the draw down levels at each point of withdrawal and monitor and optimize real time efficiency of each motor, pump and line.

The IWERM program will facilitate new researches based on evidences captured from the pilot, such as establishing 'Smart Water<<Energy Grid'; where farmer groups manage their own energy demand as per utility norms using Smart Grid. This will provide productivity gains for the farmers ensuring optimum water-energy use, while the utility can significantly improve energy efficiency, thus creating a win-win situation for all the stakeholders.

UGVCL has supported the program in terms of providing technical know-how on the implementation of the program which includes the installation of smart energy meters, testing of energy meters. The project is on its course of implementation and results of the pilot are still awaited.

Way forward

CIPT's interventions as a part of WEALS program primarily focuses on understanding the typical water-energy-agriculture-climate livelihood connect. Going forward, CIPT's initiatives under WEALS in Gujarat would focus on -

- Exploring the areas for future expansion of micro-irrigation systems in Gujarat in collaboration with state level agencies like Gujarat Green Revolution Company, State Agriculture and Water Departments.
- Explore the deeper integration of renewable energy (solar) and efficient water use brought together through innovation in using solar energy for irrigation pumping to facilitate demand side management in the state;
- Monitoring water-energy use through smart meters and bringing efficiency to the pumping systems;
- Engagement with state level technology and agricultural universities like NIRMA, SDAU would help in bridging the gap between the state and community (farmers and local people);
- Direct engagement with farmers on water-energy conservation techniques. This would be done with the help of modern ICT based extension services to farmers in coordination with state agricultural universities and departments.



Sustainable agricultural development program in Jharkhand

Romit Sen



Jharkhand, a state in eastern India is known for its rich forest cover and mineral resources. However, agriculture is the main stay for 80 per cent of rural population of the state. The agricultural economy of the state is characterized by dependence on nature, low investment, low productivity, mono-cropping with paddy as the dominant crop, inadequate irrigation facilities and small and marginal holdings. Of the total geographical area of 7.97 million ha, around 48 per cent (3.8 million ha) comprise the total cultivable land. It is interesting to note that 8.60 per cent of the total area of the state comprising 0.69 million ha remains under non-agricultural use.

Centers for International Projects Trust (CIPT) has identified Jharkhand as its intervention area under the USAID supported Water-Agriculture-Livelihoods Security in India (WEALS) program. CIPT organised the launch workshop 'Sustainable Agricultural Development in Jharkhand under Changing Climate' on March 07, 2014 at VISWA Training Centre, Ranchi. The workshop brought together government officials across major departments, academicians, civil-society organisations and representatives from the media discussing the opportunities for sustainable agriculture development in the state. Dr. MP Pandey, Vice Chancellor, Birsra Agricultural University, Ranchi was the Chief Guest for the ceremony.

In his inaugural address, Dr. Pandey remarked that the state will see a decline in the yields of rice and wheat in the coming years. He indicated that rice and wheat (irrigated) yields in the state will decrease by 4 per cent and 6 per cent respectively by 2020. The irrigated area in Jharkhand is only 12 per cent and the state is

witnessing changes in the rainfall patterns due to climate change. This will compound the problem and will pose a challenge in meeting the food grains requirement, he added.

Dr. Pandey urged the scientific community, civil society and government departments to join hands for developing a roadmap for sustainable agricultural production for Jharkhand. This should as a must involve interaction with the farming community, stressed the vice-chancellor.

Dr. Kamal Vatta, Director, CIPT shared various initiatives undertaken as part of the Water-Agriculture-Livelihood Security in India program. CIPT's interventions address the fundamental issue of capacity building. It explores the development of low cost technologies and integration of information on markets, weather, resources and production. Dr. Vatta asserted that workshop will pave way for more focused approach towards conserving water and energy and enhancing farm incomes in times of increasing weather uncertainty.

Dr. A Wadood, Chairman Department of Agricultural Physics and Meteorology indicated the changing trends in rainfall, temperature and humidity in the state across past few years. Mid season drought is the major threat for agriculture in the state and he called for in situ rainwater harvesting in the fields to address the problem of water scarcity. Addressing climate change will require a balance of measures both in areas of mitigation and adaptation involving communities, he added.

Mr. R.B Sinha, Chief Engineer, Drinking Water and Sanitation Department, Government of Jharkhand called for sustainability of sources to meet the drinking water requirements. Assuring water security and meeting the competing demands for agriculture, industry and domestic would pose a challenge. This will require identifying localised solutions for water harvesting, recharge and convergence of programmes across various departments, added Mr. Sinha.

Mr. S.L.S Jageshwar, Former Director, Ground Water Directorate, Water Resources Department, Govt. of Jharkhand highlighted the groundwater fluctuations in the state. Both urban and rural areas are witnessing rapid decline in ground water levels, but problem is more pronounced in urban areas of Ranchi, Dhanbad and Jamshedpur. Rainwater harvesting through identification of locations based on hydro-geological studies is critical for augmenting water sources. He called for sensitisation of people for addressing the challenges of growing water scarcity.

Dr. BK Aggarwal, Chief Scientist and Professor, Department of Soil Science and Agricultural Chemistry, BAU informed that 49 per cent of the total geographic area of the state has acidic soils. This renders the soil infertile for cultivation of crops. Soils in the state contain low organic carbon, phosphorus and sulphur and suffer from micro-nutrients deficiency. Dr Aggarwal sought immediate measures to prevent loss of fertile soils due to runoff and called for popularising the use of right combination of fertilizers for enhanced agricultural production.

Dr. DK Singh Dron, Additional Director Research, BAU highlighted the opportunity to bring large area, currently under non-agricultural use in the state into agricultural use. Dairy, horticulture and floriculture presents immense opportunities for Jharkhand which needs to be explored. Availability of water, labour, power and inputs are critical to sustaining agriculture and will require a mix of research and innovation, demonstration and awareness, he added. Dr. Singh called for developing right pricing signals for inputs and final produce to enhance the economic well being of the farmers.

Mr. J.S. Choudhary, Director SAMETI outlined the trends in agricultural production across the past few years. Procurement of food grains remains a challenge and the state is taking concrete efforts in improving public procurement and storage. The state is promoting the use of modern agricultural technologies, encouraging adoption of better inputs (seeds, fertilizers) and undertaking large scale capacity building programmes for development of agriculture in Jharkhand.

Based on the discussions the following were outlined as opportunities for engagement in Jharkhand— in-situ rainwater harvesting, judicious use of stored water, use of low-cost technology like tensiometers, crop diversification in upland areas, promoting less water intensive crops, integrated nutrient management, post-harvest management and food processing amongst others.

CIPT will develop a roadmap for its planned interventions and share it with the stakeholders in the days to come. The interventions will address major challenges facing agriculture development in the state and will engage diverse group of stakeholders.



The dark side of Punjab's power surplus story

Kamal Vatta, RS Sidhu and Romit Sen

On December 08, 2013, the Government of Punjab declared that the state in 2014 will turn into an energy surplus state. The Energy Department stated that with the commissioning of the new power plants (Talwandi Sabo, Rajpura and Goindwal Sahib) the state's total installed capacity will reach 11,991 MW, which will be much more than the projected maximum demand of 9,800 MW during the upcoming paddy season. However, the Central Electricity Authority in its Annual Report in 2013 indicated that Punjab is expected to experience an overall power shortage of 19.7 per cent and a peak shortage of 25.6 per cent in 2013-14. This will impact the industrial and domestic sectors.

A survey by Centers for International Projects Trust, New Delhi presents interesting realities across urban and rural households (HH) in Punjab. The survey covering around 800 households (rural and urban) across 5 districts of Punjab (Amritsar, Ludhiana, Kapurthala, Moga, Jalandhar and Tarn Taran) estimated the extent of power shortages, mitigation strategies; investments and people's preferences for tariffs in the power sector. The classification of households was based on land holding (landless, small, medium and large) in case of rural and annual incomes (< 15K, 15-30K, 30-75K, 75-120K and >120K) in case of urban households. The breakup of the sample size across rural and urban areas is indicated in Table 1 and 2 respectively.

Findings

The survey findings relate to the extent of power cuts faced in the urban and rural areas and coping mechanisms employed by the population. It depicts the satisfaction levels amongst the consumers and their willingness to pay for improved power services.

The major findings are enumerated below:

- In the rural areas the average duration of power cuts was 8.34 hours per day while in case of urban areas the duration of power cuts in a day was relatively less at 4.2 hours.
- Around 58 per cent of the rural households surveyed owned an inverter while 6 per cent had power generators to cope with the power shortages. In urban areas, 80 per cent of households owned inverters and about 20 per cent owned power generators.
- When it comes to satisfaction levels, only 36 per cent of the rural households are satisfied with the intensity of power cuts. More than half of the rural respondents (55 per cent) expressed the need to reduce the area under rice in Punjab for enhancing power supply to the household sector.

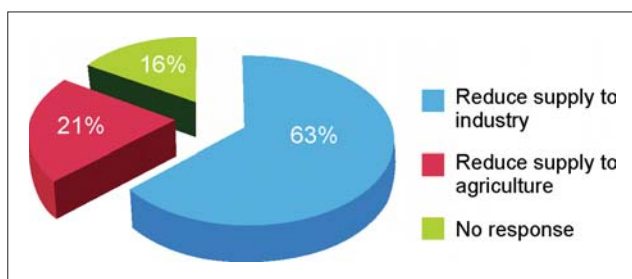
Table 1: Sample size across districts

Districts	Number of Villages	Total Sample	Landless	Small	Medium	Large
Amritsar	1	26	9	3	5	9
Ludhiana	5	125	40	13	46	26
Kapurthala	2	48	16	5	19	8
Moga	3	69	24	12	24	9
Jalandhar	3	76	25	11	26	11
Tarn Taran	6	145	47	24	59	15
Overall	20	489	161	68	182	78

Table 2: Sample size across income groups

Income Group (Rs/month)	Number of Households
Below 15,000	85
15,000-30,000	74
30,000-75,000	67
75,000-120,000	43
Above 120,000	32
Total	301

- It is interesting to note that an overwhelming section of the rural respondents (around 93 per cent) recognise that it is the diversion of power for irrigation that reduces the supply for households. 98 per cent of the respondents want a fair method of allocation of power between irrigation and domestic use.
- When asked about the means to enhance supply for the domestic sector, the response of the people is illustrated in figure below.



- While 34 per cent of the rural households agreed to the idea of introducing partial tariffs in the agriculture sector, only 13 per cent agreed for introduction of full tariffs. This figure is significant considering governments of the day have always argued for power subsidies for agriculture.
- In case of urban households, more than 90 per cent preferred an increase in power production capacity in the state as a long term solution. Only 13 per cent agreed to the reduction in power supply to agriculture and industry. However, there

was a preference for introduction of tariffs in agriculture and enhancement of tariffs in industry as expressed by 61 per cent and 56 per cent of the urban households respectively.

- Dispelling all notions that people don't like to pay for power, the survey found out that 29 per cent of the rural households were willing to pay higher tariffs if the enhanced power supply is assured in future. The response of the urban households in respect of increased tariff is given in Table 3. This is for the households who are willing to pay an increased power tariff for uninterrupted power supply.

The proportion of urban households seeking increase in tariff is significant considering the fact that Punjab already charges a high tariff for the first 100 units (Rs. 4.65 in Punjab) for domestic consumption as compared to other north Indian states viz Rs. 4.00 (in Uttar Pradesh); Rs. 3.60 (in Delhi), Rs 4.10 (in Haryana). This is perhaps an indicator that people don't mind paying a higher price if quality of services improves.

Table 3: Willingness to pay in urban households	
Increase in Power Tariff	% of Urban Households willing to pay
By 10%	28
By 20%	22
By 30%	21
By 40%	11
By 60%	14



Incentivizing energy efficiency in agriculture: a pilot in Gujarat

Nikunj Parekh

The effect of acute water shortages goes beyond immediate impacts on farmers. Governments of the day across states continue financing increasing amounts of expensive electricity for groundwater extraction even as the benefit of pumping for farmer stagnates or declines as the amount of water available decreases with passage of time. In addition, increasing consumption of electricity for irrigation puts pressure on the power grid and reduces availability for other sectors.

Gujarat across the past few years has shown diversification in the agriculture sector. In north Gujarat, agriculture remains central to the economy and for more than three decades now, farmers have been utilizing groundwater resources for irrigation purposes. The World Bank has estimated that 70 per cent of agricultural production and 50 per cent of the country's population depend on groundwater. Groundwater pumping is dependent on electricity and a large share of available power in rural areas is given for groundwater extraction. Nationally, this share is estimated at around 20 per cent and in some water intensive rural areas like North Gujarat it can exceed a staggering 50 per cent.

Groundwater is an open access resource and is not regulated. Farmers therefore face no marginal cost on its usage. Most agricultural electricity consumers in India are not metered and are charged for the electricity they use to pump water at a low and flat rate, if at all. Attempts to restore metering and the full pricing of electricity in agriculture, however, have consistently failed for political reasons (Morris 2006), leaving policy makers with no real policy options with which to address the crisis, other than rationing the power supply, leaving debilitating effects on other sectors of the economy.

Initiative

Against this background, a novel policy mechanism to introduce metering and incentivize water-energy use efficiency was co-piloted by Centers for International Projects Trust (CIPT), the Government of Gujarat, and the Northern Gujarat Utility Company (UGVCL). The project was jointly implemented with UGVCL and agricultural consumers (farmers) served by four particular feeders (branches of electricity grid) belonging to the Kukarwada subdivision of UGVCL.



The study area is located in one of the most severe groundwater depleted regions of India. Water tables are as much as 250 meters deep, having declined annually at the rate of 3 m/annum over the last three decades. Borewells now reach as deep as 300 meters and require pump of 60-70 HP to lift water (Columbia Water Center, 2011). Our field measurements have indicated the usage of upto 10,000 units (KwH) per hectare of irrigated land annually, several times greater than reasonable estimates of the national average. At such depths and energy intensity, the value of energy used for pumping water may become comparable to the net value of the crops that are irrigated with it.

Making it happen

Recognizing the political difficulty of charging farmers the full cost of electricity, the mechanism indirectly introduces a marginal cost, by transferring financial savings (in generation costs) to the farmers that result from voluntary reductions in usage. These reductions are calculated against a baseline allotment that is calculated on the basis of each pump's horsepower (all farmers receive power for an equal, rationed duration), and were rewarded on a per KwH basis. Contrary to prevailing belief, the pilot, which was launched in April 2011, has shown that a majority (75 per cent) of about 115 eligible well owners were willing to be metered in order to participate in the study, and that meters were not tampered with. This is a policy breakthrough with potential implications for large parts of India: for the first time in decades of groundwater scarce parts of the country, a public utility was able to effectively meter farmers' electricity usage and bill them on the basis of this usage, all on a completely voluntary basis.

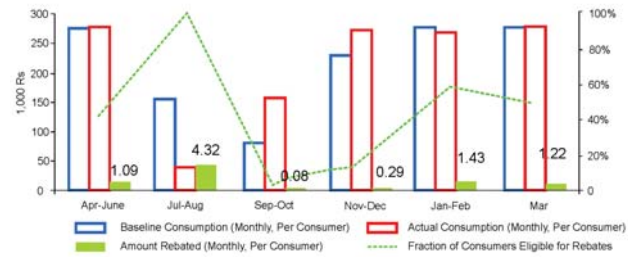
Results

Evidences from the pilot indicate a high degree of farmers' willingness – of the 115 eligible consumers who were asked to participate, 83 had consented, indicating an acceptance rate of over 70 per cent. There is high degree of compliance with not even a single evidence of farmer tampering with meters for availing the benefits of incentive.

Since the pilot began in April 2011, UGVCL has been able to take regular meters readings without interruption and calculate and issue six bills. CIPT staff supported UGVCL throughout and demonstrates effective administration of the intervention.

Figure below indicates the aggregate amounts of baseline and actual electricity consumption for the six billing periods of the 2011-2012 pilot experiment for the 83 farmers who participated in the study.

The monetary value (in Rs) of the baseline (red outlined bars) and actual (blue outlined bars) consumption, the number of consumers



who received a rebate (dotted green line) and the amount rebated to them by UGVCL (solid green bars, with value labels), per month, per consumer, are plotted for each of the six billing cycles.

Impacts and future

The pilot has demonstrated the potential to engage large number of agricultural power consumers and shift them to metering and usage based billing. Conversations and interaction with participating farmers have revealed that first rebates have helped build a sense of trust in the scheme/experiment that replaced prior suspicions. However, there limited indications of associated reductions in energy usage and increased adoption of water saving technologies that are economically attractive to farmers. This builds up the potential to develop and understand the economics from the farmer's perspective in the days to come.



The results of pilot implementation have been shared with the Principal Secretary, Department of Energy and Petrochemicals, Government of Gujarat. The Government of Gujarat has suggested exploring integration of renewable energy (solar) and efficient water use through innovations in using solar energy for irrigation pumping to facilitate demand side management in North Gujarat.

Partners' Voice



I congratulate CIPT for starting a newsletter which highlights important interventions in water management in agriculture for its sustainable and efficient use as well as build up a knowledge base in these areas for its further application for agricultural development. PAU and CIPT have

been working together to address

the problem of groundwater depletion in Central Punjab through promoting water saving technologies and suggesting cultivation of new crops that use less water through bringing farmers closer to agriculture supply chains.

During the last 5 years, we have reached out to more than 7,000 farmers across 8 districts in the state for better irrigation scheduling based on assessment of soil moisture. Both the organisations work towards creating sustainable models for agriculture development in future that brings higher water use efficiency while securing better livelihood for farmers.

Rajinder Singh Sidhu (PhD)

Dean - Basic Sciences and Humanities,
Punjab Agricultural University



I congratulate CIPT for developing a newsletter which will bring out case studies in the area of water, energy and livelihood security. CIPT has been a partner of UGVCL in demonstrating a unique policy mechanism for metering and incentivising energy use in Gujarat. We look forward for

strengthening the association with CIPT.

N. Srivastava, IFS

Managing Director, Uttar Gujarat Vij Company Limited



I am happy to hear that CIPT is developing a quarterly newsletter. SAMETI, Jharkhand and CIPT are embarking on a long term association to develop and implement a programme for sustainable agriculture development for the state.

We value our association with CIPT and look forward to working together

in addressing some of the challenges pertaining to agriculture in Jharkhand

J.S. Choudhary

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