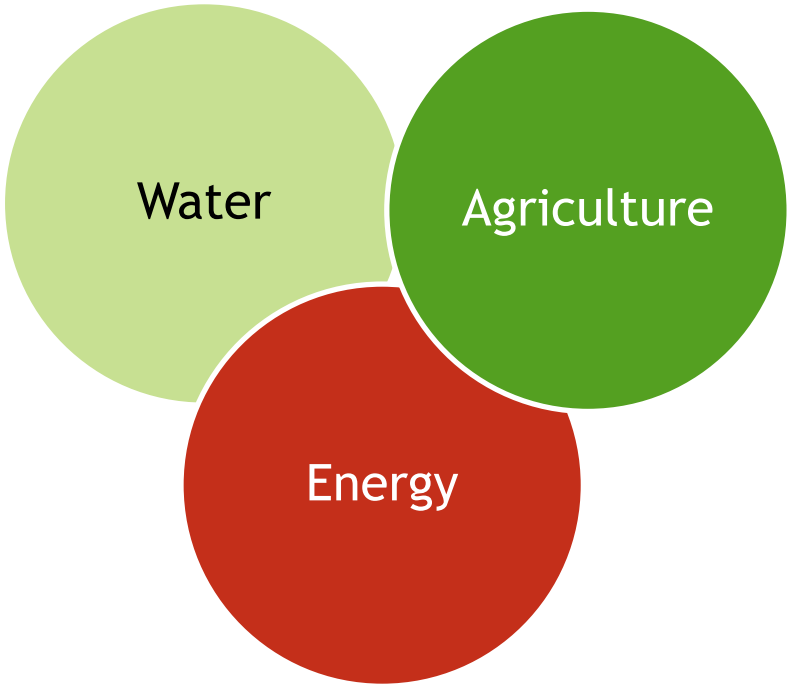
India: Direct Delivery of Electricity Subsidy for Agriculture

An Innovative Pilot in Punjab



A Venu Prasad
Principal Secretary (Power)
Government of Punjab, India
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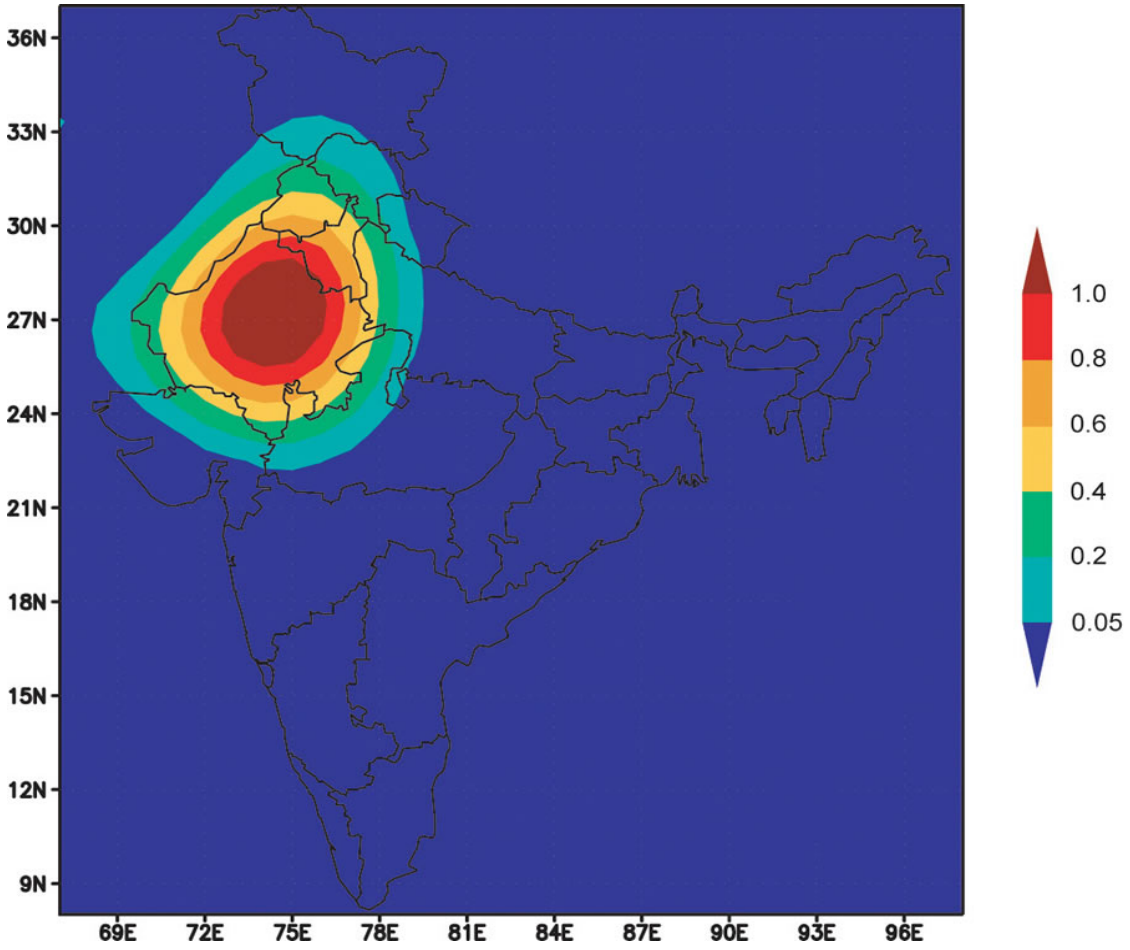
Genesis of Electricity Subsidy for Agriculture in India

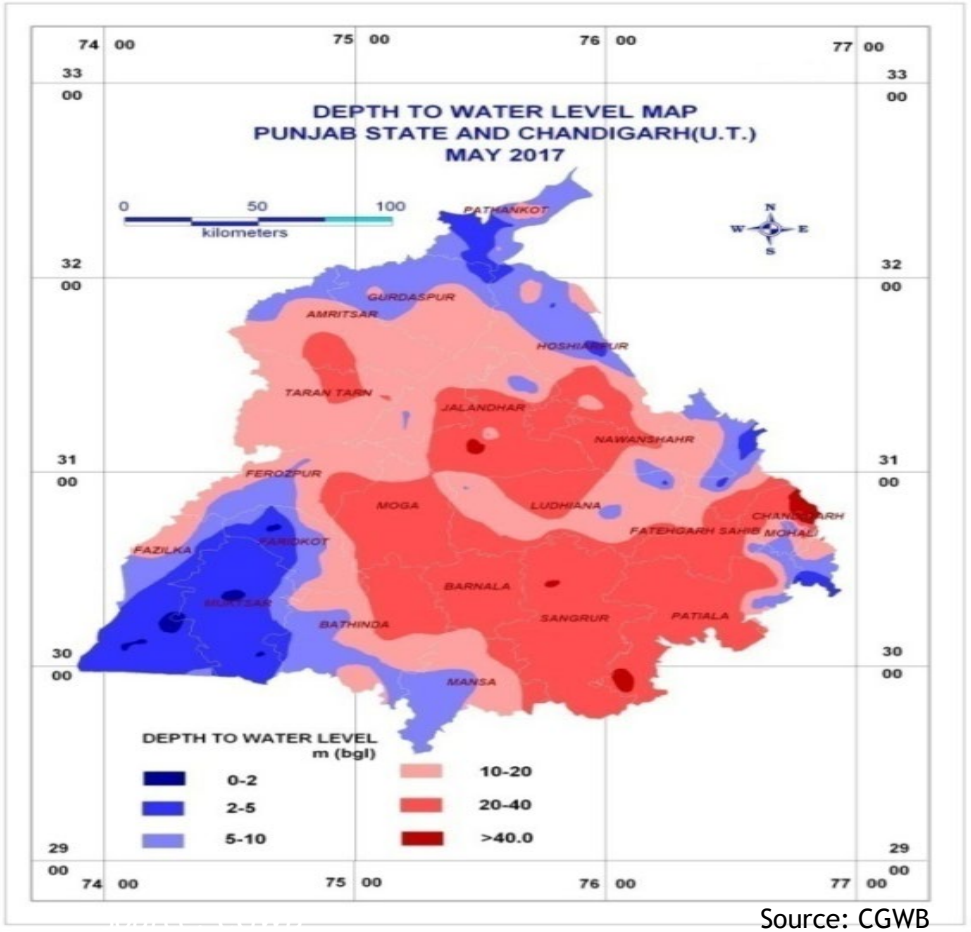
- India's Food Security concerns in the 1970s: need for reliable irrigation for Green Revolution
- Agriculture contributes only 15% of GDP but 65% population lives in rural areas and depends on agriculture that is growing at less than 2% per annum
- Rural livelihoods depend on water economy, which in turn depends on energy economy
- Public Procurement and Distribution System of food grains critical for meeting India's food security.
- Energy-Groundwater-Agriculture Nexus at the core of political economy constraints of subsidy reforms.

Electricity-Groundwater-Agriculture Nexus in Punjab: *At the forefront of India's Green Revolution*

- In 2016, Punjab (1.5% of India's area) produced 17% of country's wheat, 12% of rice; contributing 30% rice and 46% wheat to national pool.
- 99% cropped area (with cropping intensity of 192%) is irrigated - 72% through tube-wells, 28% through canals
- Subsidized power for tube-wells led to Green Revolution but also led to exponential increase in number of tube-wells, leading to approximately 1.4 Million.
- 85% blocks overexploited/critical (53% in 1984), mostly wheat-rice rotation, excessive use of fertilizer causing water pollution; excessive use of water causing soil degradation
- Electricity subsidy in the form of free electricity: bigger issue than subsidy is "unmetered power"
- 25% power consumed by agriculture and annual subsidy claimed by utility (SOE) is ~US$950 million ; with depleting groundwater levels, power consumption by agriculture is likely to double in 15 years

Perilously Depleting Groundwater: Hot spot detected by NASA





Source: CGWB

Red: -3 feet/year (total 18 feet); Dark Blue: +3 feet/year

India- Electricity Subsidy policy has since mutated:

Current system of subsidy delivery through "duration restricted" "unmetered power" has led to:

Subsidy

Free power

Unmetered power

- Inefficient use of power and water
- Overexploitation of groundwater
- Deterioration of water quality
- Increased production risk and reduced productivity of agriculture
- Undermined energy accounting practices of utilities resulting in approximate estimation of subsidy and insufficient reimbursement by the state government
- Operational inefficiency and financial distress of state power sector; inadequate investment in maintenance;

Questions Punjab asked itself?

Is our agriculture water efficient? Water footprint of agriculture? ("more crop per drop")

Is our groundwater irrigation energy efficient? kWh per litre of groundwater? Energy footprint of agriculture? ("more drop per kilowatt- hour")

Do the farmers have strong incentive to use groundwater and electricity efficiently AND conserve both?

Is water allocation across sectors (agriculture, industry, domestic) efficient and effective in achieving targeted growth?

How to reduce climate vulnerability of agriculture (changing intensity and variability of monsoon) and increase productivity

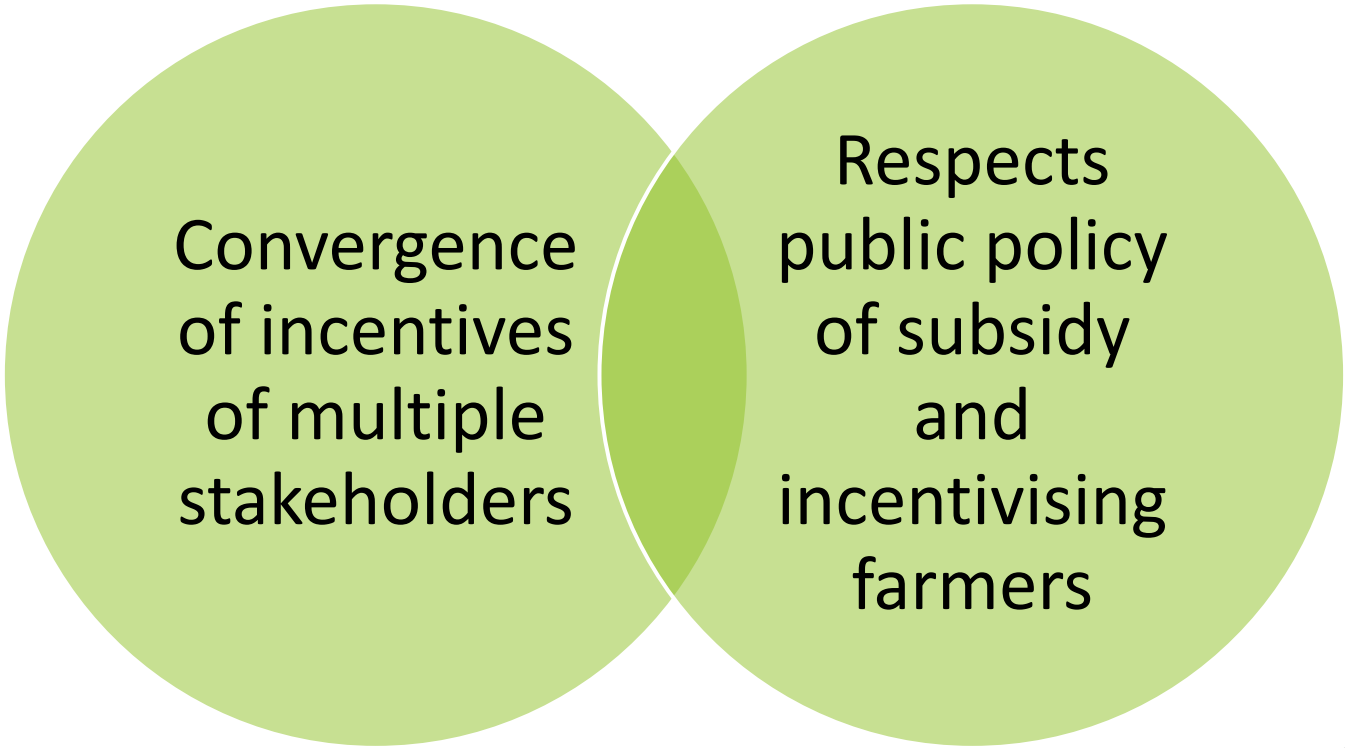
"Direct Delivery of Power Subsidy to Agriculture in India"

ESMAP funded Study published in 2015 (based on active participation of Punjab)

Objective: to evaluate feasibility of direct delivery of power subsidy to agriculture that:

- Does not require change in policy of free/subsidized power
- Meets requirements of agriculture
- Incentivizes farmers to use power and water efficiently
- Reduces fiscal cost of subsidy for the government
- Reduces financial burden on power distribution companies
- Reduce "agro-dependence" of rural economies.

What is innovative in the proposed approach?



Four Key Elements

Segregated feeders :

- Improve supply to village habitat;
- Smart rationing;
- Peak load management: and
- Alignment of electricity supply schedule with seasonal agriculture requirements

Minimum Energy Allocation:

- Annual electricity allocation to each farmer
- Electricity savings en-cashed by the farmer;
- Complementary schemes to save water (laser levelling, tensiometers, micro-irrigation)

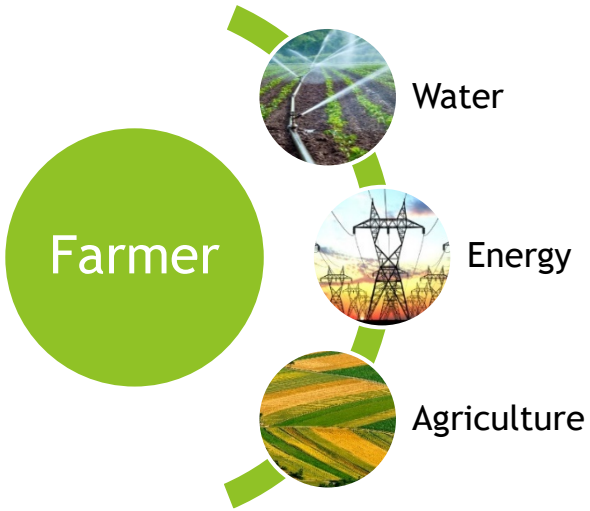
Remotely read meters

- Cash for savings through direct transfer into linked Bank accounts
- Scheme optional--decision through majority of consumers on a feeder,
- Regulatory acceptance

Coordination of electricity-water-agriculture sectors

- Package of agriculture and water schemes offered to opting farmers
- Cropping incentives to address shift to less water intensive crops
- Alignment of electricity supply schedule with seasonal agriculture requirements

A learning-by-doing Pilot: launched in June 2018 on 6 feeders in 2 agro-climatic zones



1. Working closely with farmers for successful implementation

2. To overcome trust-deficit among stakeholders:
   - established high-level inter-agency steering committee and ground- level field committees .
   - committed adequate financial and managerial resources to pilot.
   - extensive communication and consultation program with farmers, utility & government staff.
   - feeder-level User Community and expert facilitators.
   - transparent monitoring and sharing of information

3.
   - A few “Demonstration Farms” to showcase a combination of technologies- EE pumps, laser levelling, tensiometers, micro-irrigation, remote switching (planned)
   - Extensive knowledge disbursement and training on water conservation schemes by government departments (planned)

Progress (July-October 2018)

First Benefit Transfer on 31st August 2018 calculated on Pro-rata basis from the date of installation of Meter.

Feeder	Dhanoya	Nawajipur	Bambiwal	Sunderpura	Kharora	Haripur	Total
Total AP consumers	158	231	178	125	170	78	940
Enrolled consumers (22 Oct)	60	14	15	20	23	3	135
Billing and subsidy data as of 30th August 2018							
Enrolled consumers using more than allocation	20	7	7	3	5	1	43
Enrolled consumers using less than allocation and eligible for payment	35	6	6	15	4	1	67
Average subsidy/eligible consumer (Rs.)	713	1282	2265	2744	4451	1730	

Implementation Challenges

- Consumer data clean-up: Challenges in changing name of deceased/non-resident consumer (farmer)
  : Availability of accurate consumer- level administrative data(Land data)
- Challenges with integration of meters with servers to automatically download electricity consumption data
- Inter-agency coordination among electricity, water, agriculture, district administration
- Partisan politics often manifests at village level
- Lack of defined property rights on water, difficulty in measuring and monitoring use of groundwater
- Farmer outreach and engagement has to plug into the rhythms of agriculture

Way Forward

- Extension of the Pilot Project to multiple feeders in every district.
- Better coordination among different departments such as Power and Agriculture.
- Grow alternative crops to paddy in Kharif season.
- Alternative model for subsidy based on cropping pattern, land and agro climate zone.
- Replicating the selective model to whole of the state.