11.4 Fourth Presentation of Session 1

Dr. Madar Samad, Acting Theme Leader -Water and Society, IWMI, Sri Lanka on **Wells and Welfare: The Sri Lankan Case.**

I had been working at IWMI for the last 20 years on welfare implications of the agro-wells. As Thushaar rightly pointed out there has being a groundwater boom in Sri Lanka, which is a silent revolution. It has escaped not only the private eye but also the public eye, and it has not been reflected in any lateral statistics either. We talk about minor irrigation, major irrigation and rain-fed irrigation but there is no statistics at all for the groundwater sector. We also know that, fortunately or otherwise groundwater development has escaped from the eye of the politicians. Up to now, we do not see politicians inaugurating a tube well or a public well; that has not been done so far. We also do not see bureaucrats around that. It is purely only farmers' incentive, farmers' initiative, and farmers' capital. And we also do not hear groundwater farmers protesting in front of the ministries or the Mahaweli Authority or Irrigation Department asking for more water. There is no water diverted for hydropower or electricity or urban water supply. So it is quite rightly a kind of silent revolution. I am going to talk about what this revolution has done in Sri Lanka from a welfare point of view based on some fieldwork study I have done. In doing so, first I will give an overview of my presentation.

The groundwater (agro-well) boom since mid -1980s "The silent revolution".

Figure 11.4.1. Dug agro-well.

Photo credit: IWMI.

Overview of the presentation

- Trends in agro-well development.
- Tank-agro-well interrelationship.
- Changes and results in agrarian systems development.
- Outcomes of the change.
- What the future scenario looks like.

In the early 1980s Kikuchi, Debagae and myself did a study on groundwater development in Sri Lanka but there were no statistics at all. So Kikuchi, Parakrama, another colleague of mine, and I went to the field to derive some statistics from what was available, do a rapid appraisal, and meeting DSDs of various divisions to look at the trend in 1985. That was the time when Agricultural Development Authority (ADA) was involved in promoting and funding groundwater development.

Diffusion of agro-wells

There has been a remarkable increase in developing agro-wells in the last three decades.

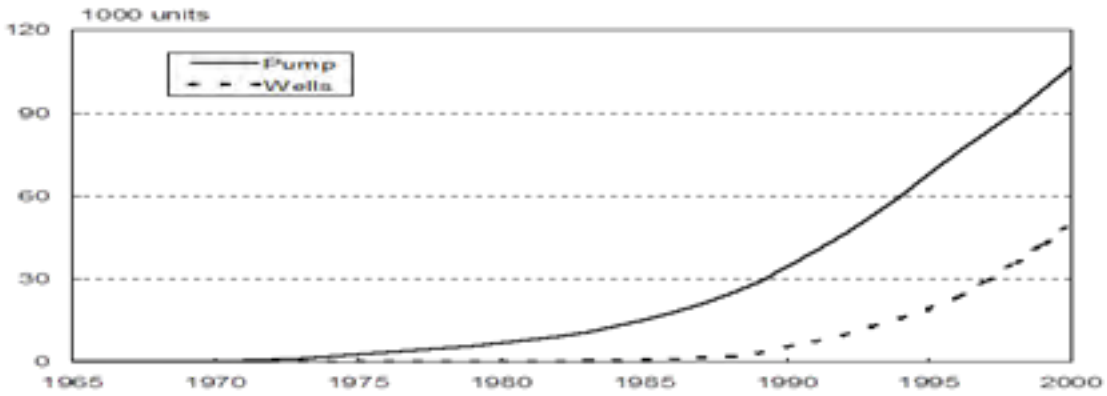


Figure 11.4.2. Diffusion of agro-wells and irrigation pumps in the command and highland areas of irrigation schemes in the dry zone of Sri Lanka, 1965-2000.

Source: Kikuchi et al. 2003.

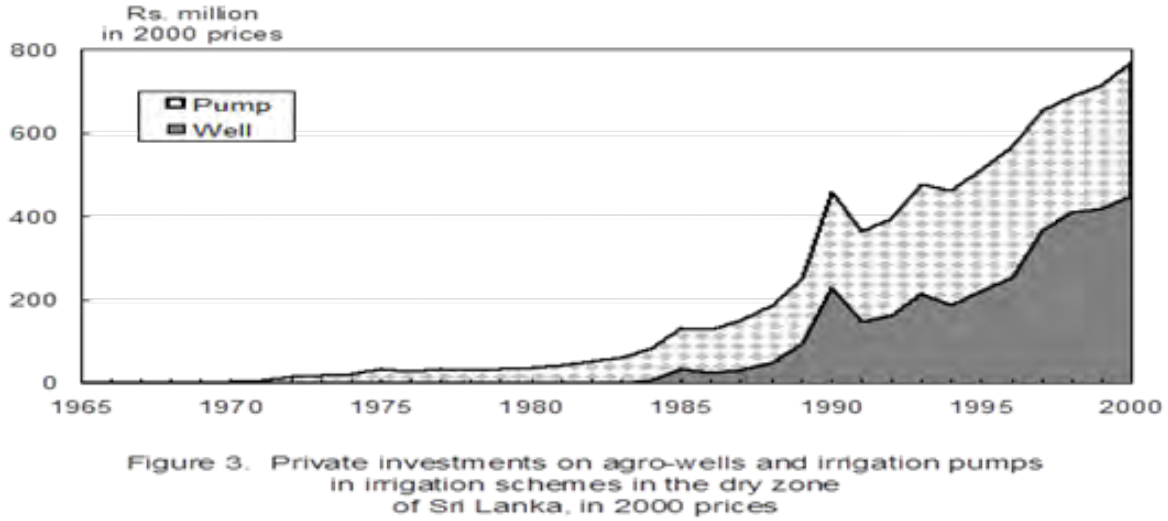


Figure 11.4.3. Private investment on agro-wells and irrigation pumps in irrigation schemes in the dry zone of Sri Lanka, in 2000 prices.

- Investment in agro-wells and pumps by farmers is estimated to be about Rs0.8 billion in 2000 in current prices. Now it may be more with the easy availability of pumps and opening up of the North and East.
- By the late 1990s, private investments in agro-wells and pumps exceeded the total public expenditure for the operation and maintenance (O&M) of the entire major irrigation schemes in the country.
- In 2000, private investment on agro-wells and pumps was as much as 20% of the total investment and expenditure in the irrigation sector.
- The diffusion of wells has been very rapid and pervasive in minor irrigation schemes in North Western Zone and the North Central Dry Zone. This is still more in the Northern and Eastern areas.
- The difference in agro-wells in Sri Lanka as compared to other South Asian countries is their shallowness. As a result, the pumps are small and the sizes of irrigable areas are small. In India, Pakistan and in other parts of South-East Asia groundwater is used for cereal cultivation in the low valleys. In Sri Lanka, groundwater is used to cultivate high economic value crops while tank water is used to cultivate cereals and rice. Most of the agro-wells are located in the highlands and form a component of the small tank farming system.
- For analytical and resource management purposes groundwater irrigation from agro-wells should not be considered as a separate entity but considered in conjunction with surface water irrigation from tanks.

Impact of small tank farming systems

This is a very sustainable system which had been in use for more than 2000 years. But the farmer income has been low. Studies were carried out on small tank irrigation systems.

Figure 11.4.4. Production conditions under small tanks were embedded in a low equilibrium trap.

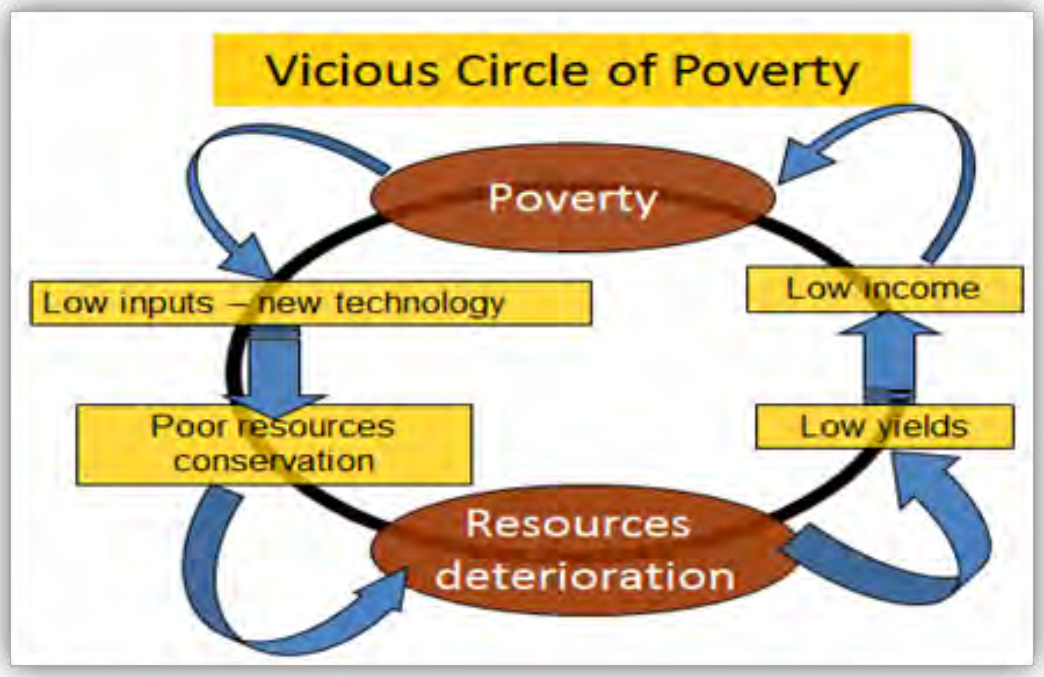


Figure 11.4.5. Rapid rural appraisal (RRA) to assess the impact of agro-wells on the small tank economy.

Source: Samad et al. 2011-2012; Shah et al. 2012.

People depending on small tank systems had no escape mechanism. They were stuck in the small tank system due to constraints imposed by the hydrology of the system, institutional constraints and, most importantly, the land tenure system that was evolved due to intense demographic pressure, e.g., distribution of family-owned land among their children. So, over time, it was all embedded in a vicious circle of poverty.

Study Objective

To document the dynamics of agrarian changes in four small tanks systems in Sri Lanka due to technological innovations, especially groundwater irrigation, mobile phone communication and market linkages.

The escape route came to the people who depended on small tank systems through groundwater. The kind of dynamism that was taking place in the upland areas with the use of groundwater made a revolution. They cultivated high-value crops there, and the cropping intensity too had increased against lowland cultivation; linked to that the mobile phone revolution took place. People started using cell phones to get information on the prices in the markets. It was noticed that three things were happening: groundwater irrigation, markets and commercialization. This was the trend in those villages.

- Since 2000, the construction of agro-wells has intensified.
- The numbers of agro-wells in each sample village (they did not have agro-wells before 2000) are given below.

Table 11.4.1. Location of wells.

Location	Galkandegama	Moragoda	Gallallegama	Galenbindunuwewa
Purana Wela	0	0	0	0
Akkarawela	3	12	5	6
Goda idam	48	124	100	78
Home gardens	8	11	12	9
Chena	0	1	0	0

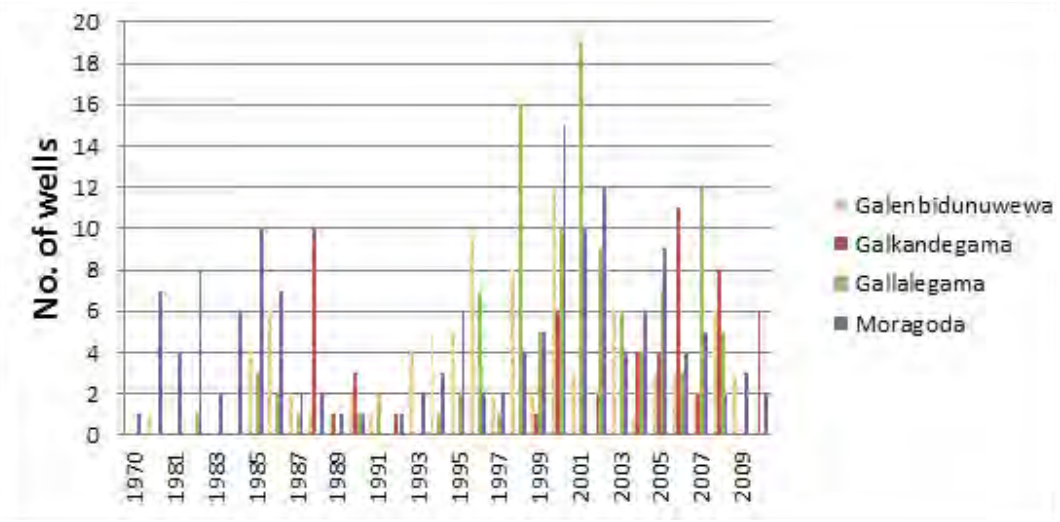
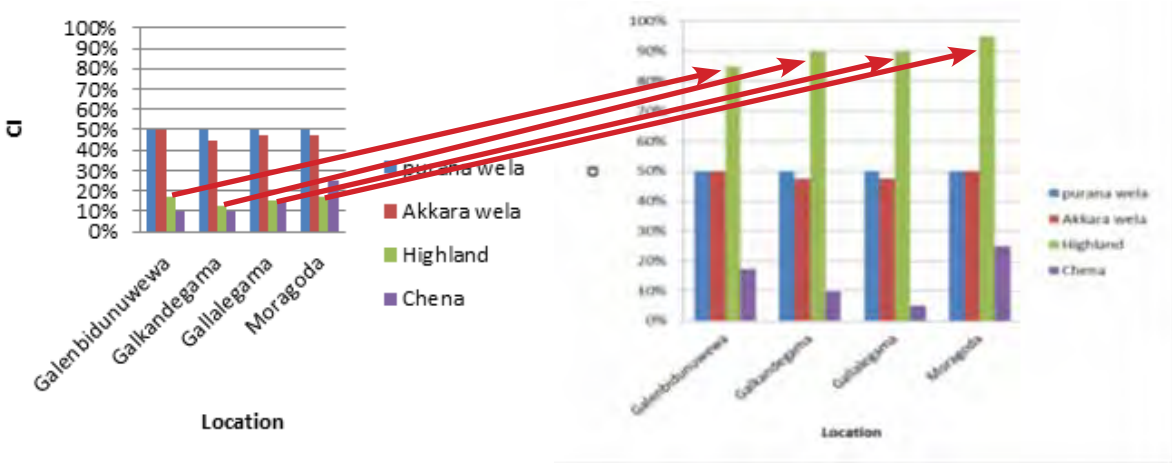


Figure 11.4.6. Trend in establishment of agro-wells at Galenbindunuwewa, Gallallegama, Galkandegama, Moragoda (n=151).

Figure 11.4.7. Current well density in the study sites: Galenbindunuwewa, Gallallegama, Galkandegama, Moragoda.

Table 11.4.2.Agro-wells and agro-ecological transformation in Galenbindunuwewa (Shah et al. 2012).

	Before the agro-well boom	Now
Lowland maha season paddy cultivation	+++++	+++++
Lowland yala paddy cultivation	+++++	+++++
Supplemental irrigation to rice	++	+++
Mung bean and cowpea cultivation in chena land	+++++	++
Vegetable cultivation	++ (for home consumption)	+++++ (for market)
Other market crops	+	+++++
Cattle	++	+++++
Focus of dairy farming	Milk for home consumption; work animals	Milk production for the market
Approach to dairy farming	Extensive, based on grazing	Intensive based on stall-feeding
Green fodder cultivation as mulch for cattle	+	+++++
Tree crops	+++	++++



Before After

Figure 11.4.8. Cropping intensity before and after agro-well construction**.**

Market information via mobile phones

Figure 11.4.9. Market calls; market sources.

Figure 11.4.10. Daily prices received via SMS/voice.

Photo credits: IWMI.

Marketing Channels

Table 11.4.3. Before agro-well.

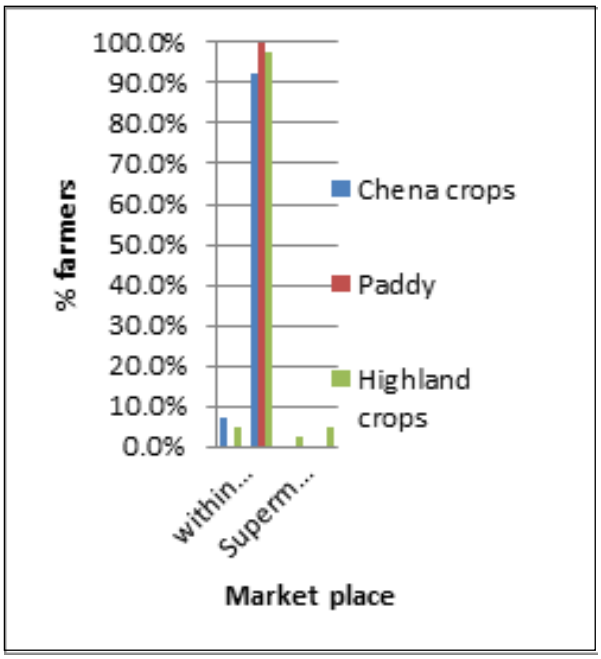
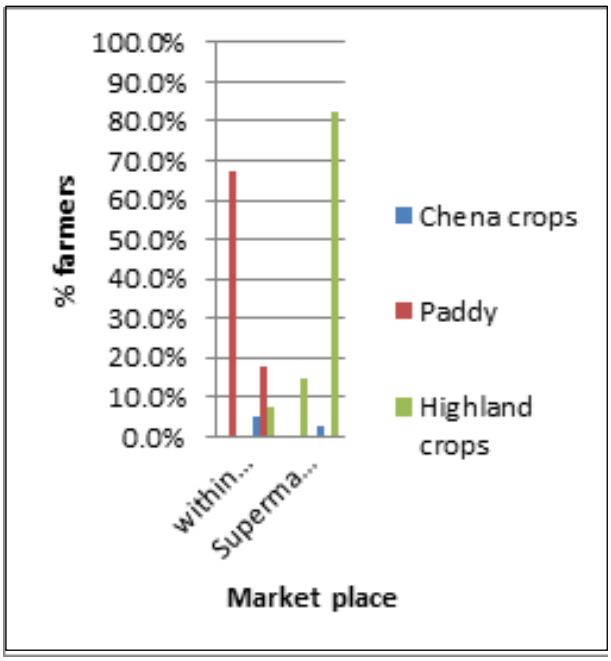


Table 11.4.4. After agro-well.



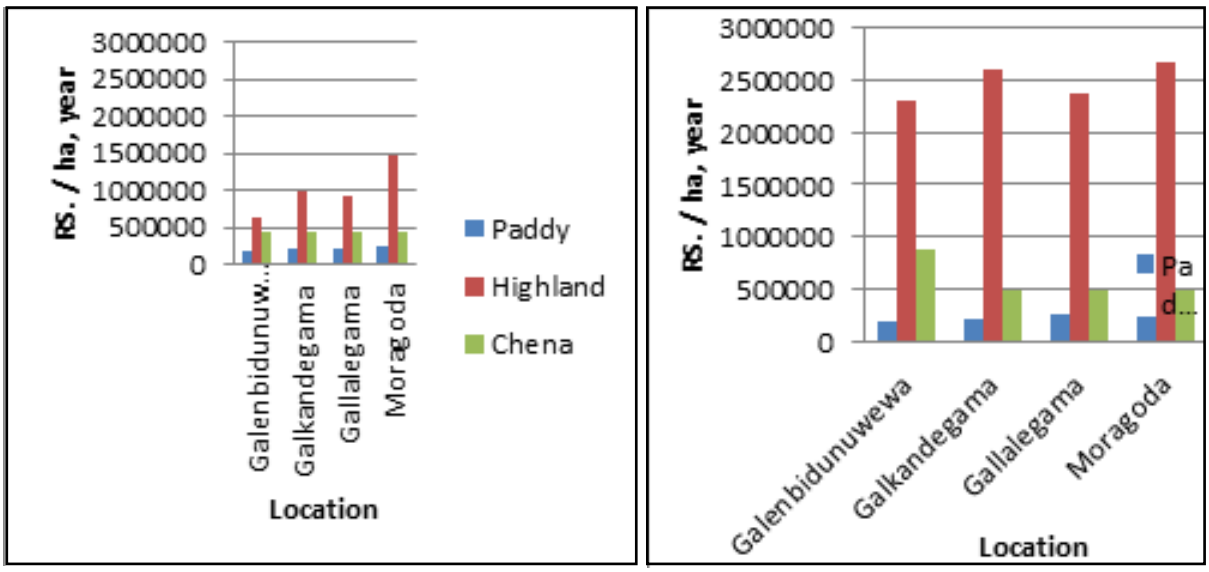


Figure 11.4.11. Gross income before and after agro-well construction.

Impacts

- Visible improvements in housing and living standards, school enrollments, health and the status of women. Social and cultural bonds persist but to a lesser extent.
- No threat to the major GW resource base - seasonally recharged with monsoonal rains.

Wells and Ill-fare: Some negative externalities

- Most of the benefits have gone to more well-off households who had the capital to invest in the necessary equipment and farm inputs.
- Increased encroachment on state land and private enclosures of common property.
- The poor and landless are increasingly marginalized raising questions of social and economic equity, and growing concerns about the environment.
- Groundwater quality – increased pesticide use, Chronic Kidney Disease?

Future Scenarios (Based on: Shah et al. 2012)

- Given the high returns it is very likely that agro-well irrigation will soon spread widely including in the wet zone
- Electricity use in agro-well irrigation in Sri Lanka at present is insignificant, but it is likely to grow rapidly because irrigating with kerosene/diesel pumps is progressively becoming more expensive:

Amount required to irrigate 1 acre of Bombay onions at 425 liters per acre = Rs. 425 x 120= Rs51,000. Electricity cost for irrigating 1 acre of onion = Rs. 15,000.
Source: A farmer in Pul Eliya.

- With rising energy costs there would be a strong demand for micro-irrigation for energy efficiency more than for water use efficiency.
- Sri Lanka's electricity pricing policies need to recognize growing electricity use in agriculture.

- There is a case for treating agro-well owners as a distinct category with a distinct pattern of electricity use.
- Rational electricity pricing and supply policies can be a powerful tool for pro-poor agricultural growth based on groundwater irrigation.
- High time a national policy on groundwater use was formulated.

Figure 11.4.12. Production gluts.

Figure 11.4.13. Storing onions.

Photo credits: IWMI

It is best to remember King Parakramabahu's words for economical use of water.

King Parakramabahu (1153-1186 AD):
"Let not a drop of water that falls from the sky reach the ocean without being of use to human beings."

Figure 11.4.14. Parakrama Samudraya.

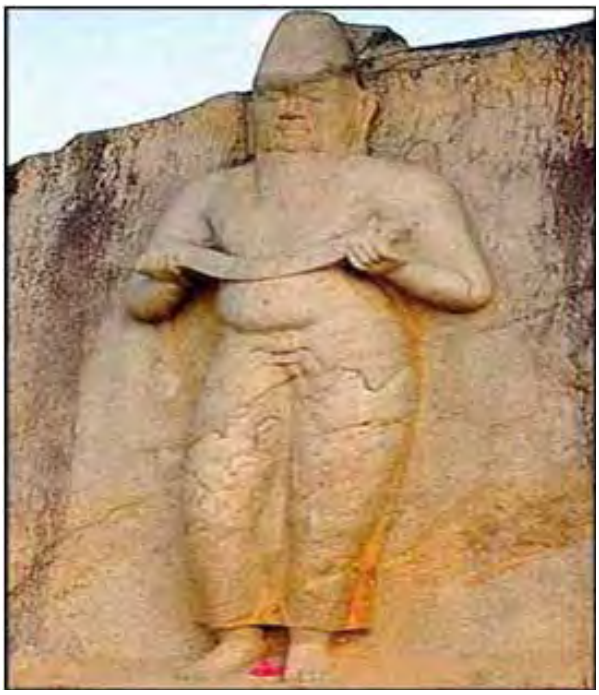


Figure 11.4.15. Potgul statue (generally believed to be that of King Parakramabahau).

Photo credits: IWMI.