Sustaining ground water stocks in South Asian agricultural lands: Assigning new roles to communities (SUGSTANANCE)

Submitted by

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1. Introduction

Groundwater depletion is a global problem though south Asia represents a unique case. In India alone, groundwater extraction structures (tube wells) expanded from less than a million to 19 million units within a time span of 40 years (1960-2000) and are increasing exponentially (Shah, 2003). According to David Seckler, director of International Water Management Institute, a quarter of India's harvest is under immediate risk (Shah, 2001) due to groundwater depletion. In the opinion of Shah (2007), growth of groundwater extraction can lead to distinct socio-ecological phases indicating the 'bubble' like economic growth pattern in rural India and the bubble could soon burst, casting immiserizing impacts on rural areas and hurling them to an anarchical phase. Such a growth pattern is aggregated by the policies that are intended to promote growth at the cost of groundwater sustainability. The result is reflected by the fact that groundwater extraction exceeds the recharge in 28% of the administrative blocks in India in 2004 while it was merely 4% in 1995 (Shankar *et al.*, 2011). As groundwater dependence is high among millions of small and marginal farmers, policy measures to sustain the groundwater resources are vital to sustaining their livelihood.

In this scenario, the current study look at developing policy measures for groundwater sustainability. This initial attempt aims at building the model, calibrating and simulating policy scenarios. Until now the model building, data collection and calibrating the model are completed. The proposed policy simulations are

1) Introducing an energy cap

In this scenario total energy supply to the farmer community will be restricted. The restrictions represents the optimal water use overtime. The attractive feature is that the power subsidies that are prevalent in an Indian context do not have any effect on total groundwater extraction.

2) Introducing community use fee

If the groundwater is defined as a common property that belongs to the user community, a usefee can be charged by the community to individual users and hence proving economic (dis)incentives to groundwater extraction. Optimising the user fee over time representing the optimal water use overtime will be attempted here.

3) Use of controlled free-riding

Formation of groups among groundwater users (farmers) and pooling their costs can cause free-riding behaviour and the number of groups and the incentive setup of the farming community can make use of the free-riding incentives to optimize the water extraction of farmer groups and lead the total extraction to the sustainable trajectory.

4) Using crop permits

As the water use is inextricably linked to the cropping pattern, use of crop permits that mirror the sustainable trajectory will be portrayed as one of the policy options.

5) Manipulating the subsidies

The power subsidy that triggers overexploitation can be decoupled or restructured so that it can support other policies that are described above.