BACKGROUND

Building Resilience in Agriculture for Food Security

What challenges we must solve in agriculture to ensure India's food security?

In the implementation of post 2015 development agenda, India faces a grand challenge and opportunity to accomplish food security while ensuring inclusive economic development and environmental well-being. There are three key challenges identified here that agriculture systems must address for ensuring food security:

Challenge 1: "Secure access to food for all, now and for the future".

Despite the tremendous growth and phenomenal industrial and economic performance, India is still home to 190.7 million under nourished people (FAO, 2014), a quarter of all undernourished population in the world. Moreover, projections of India's population reaching 1.6 billion by 2050 (Department of Economics and Social Affairs, 2013) shall entail much higher food requirements than today. ***Food availability*** can become a bigger problem than food accessibility if estimates of 2014 GAP Report stands correct. According to the report, India's domestic production will only meet 59 percent of the country's food demand by 2030 at the current growth rate of ***Total Factor Productivity*** (Global Harvest Initiative, 2014). Climate change may cause further decline in the total available food from domestic production in India. Various studies (Birthal, Khan, Negi, & Agarwal, 2014) (Pattanayak & Kumar, 2013) corroborate the decrease in the yield of wheat, rice and pulses production due to temperature rise and changes in precipitation caused due to climate change. ***Climate change*** will also impact the available water resources in the country. Rising temperature, changing precipitation patterns, and an increasing frequency of extreme weather events are expected to be the main reasons for reducing regional water availability and impacting hydrological cycles of evaporation and precipitation (Razzuzi & Shrivastava, 2012). Agriculture shall therefore witness ***shrinking resource base*** due to climate change and the resource crunch may further be aggravated with increasing demand of resources as projected from urban, industrial sectors of the country. The urban and industrial sector, being the nucleus of current economic growth may attract larger pool of resources and pose potential shortage of resources for agriculture.

Challenge 2: "Derive economic development from agriculture and allied sector for all farmers".

Agriculture is one of the primary sources of livelihood and income generation for around 263 million or 22 per cent of the population[1] (P, 2013). Farming as a ***livelihood is becoming unattractive*** to people living in rural areas, particularly small to medium farmers, due to high vulnerability and risk, high input cost, no control on market and low profits. About 85 percent of the farmers in India are marginal or small farmers with less than 2 hectares of land for farming. The average farm household makes INR 6426 per month. Over half of all agricultural households are indebted; the average loan outstanding for a farm household in India today is INR 47,000 (Shrinivasan, 2015). Apart from the 14 percent direct contribution to the GDP (Committee on Agriculture, 2013), food security further takes an enormous toll on the Indian economy having consequences on the ***economic capabilities*** of the vulnerable population. Thus agriculture also has the onus on indirectly contributing to India's GDP.

Challenge 3: "Conserve and prevent degradation of natural resources due to agriculture practices".

Agriculture, apart from its vulnerabilities and importance for food and livelihood security, is also one of the major sources of pollution to environment. India is losing 5,334 million tonnes of soil every year due to soil erosion because of indiscriminate and excess use of fertilisers, insecticides and pesticides over

[1] This number is only for cultivators (marginal and large) and agricultural laborers and does not include the array of related activities like fisheries.

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the years. About one millimetre of top soil is being lost each year due to soil erosion and the rate of loss is 16.4 tonnes per hectare (The Hindu, 2010). Non-judicious and imbalanced use of inorganic fertilisers and unsustainable irrigation practices over the years resulted in ***deterioration of soil fertility*** in large parts of productive agricultural land (Roy, Chattopadhyay, & Tirado, 2009). The run-off water from fertilizer and insecticide sprayed fields to the water bodies is ***polluting the water*** and making it unfit for human use. Choice of fertilizers, agriculture techniques, livestock management are factors that impact natural resources and must therefore be chosen with great discretion. Quality and availability of natural resources are elementary for agriculture production. Exploitation and degradation of natural resources will therefore impact food security in the long run.

Systemic Models for Sustainable Agriculture Systems

For the three challenges to be catered in the pathways chosen for practicing agriculture, all three elements must be seen as a part of one systemic model. Models for sustainable agriculture must encompass strategies that can produce food for all, in the phenomenon of shrinking land base, dwindling water resources, adverse impact of climate change and meager income of the farmer. A resilient agriculture system is the need of the situation and this would mean that sustainable agriculture must (FAO, Trainer's Manual, 1995):

- Ensure basic nutritional requirements of present and future generation, qualitatively and quantitatively, are met while providing a number of other agricultural products.
- Provide durable employment, sufficient income and decent living and working conditions for all those engaged in agricultural production.
- Maintain and, where possible, enhance the productive capacity of the natural resource base as a whole, and the regenerative capacity of renewable resources, without disrupting the functioning of basic ecological cycles and natural balances, without destroying socio-cultural attributes of rural communities, or without causing contamination of environment.
- Reduce vulnerabilities of agricultural sector to adverse impacts of climate change and other natural and socio-economic risk factors.

TARAgram Yatra 2015: India Post 2015: Investing in Sustainability

Building Resilience in Agriculture for Food Security

At **TARAgram Yatra 2015**, we aim to deliberate around systemic models that deal with all the key elements which help in building resilience of the agriculture systems and thus promote sustainable agriculture. After exploring some such existing models during the **field visit** to **Orchcha, Madhya Pradesh**, the round table discussions at Delhi will look at the roles and responsibilities of various stakeholders from Centre and state governments, industries, civil society and communities in adopting such systemic models of sustainable agriculture.

Round table discussions will be pointed to identify *policy interventions, capacity building initiatives, financial instruments and role of community institutions* in developing systemic models for sustainable agriculture that can be adopted at scale. The key questions that will be addressed in the *Yatra* are:

- What are the essential policy instruments required to make sustainable agriculture models more competitive?
- What are the innovative financing models will enable even small farmers' to make transition to sustainable agriculture models?
- What kinds of interventions are required for capacity building of and knowledge dissemination to farmers to enable their transition to sustainable agriculture?
- What sort of community based institutional mechanisms can facilitate adoption of such systemic models smoothly?

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