EVALUATING THE GREEN REVOLUTION

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The Indian green revolution provides a reference in debates on new green revolutions elsewhere in the world, particularly Sub-Saharan Africa, serving as an example from which valuable lessons can be drawn. What is the state of the debate in India regarding the evaluation of the green revolution? Do people talk about adapting or changing models?

Among the large body of literature evaluating India's green revolution, there is a consensus on three positive aspects. First, it is generally agreed that the green revolution played an important role in the avoidance of famines in the 1970s and 1980s, even though it did not completely alleviate hunger. Second, the green revolution has improved infrastructure (irrigation, marketing, transport) in many rural areas (with a similar caveat that improvements were not uniform). Third, it led to a greater investment in agricultural education and research in most regions.

However, there are also many criticisms. The first revolves around the disparities (i.e. rural/urban, agricultural/non-agricultural) that were exacerbated by the uneven distribution of the technology package in India. The second criticism concerns the focus on a limited number of crops, thus creating an imbalance in the supply of food grains that subsequently led to an imbalance in rural nutrition: there was a dramatic decrease of calories, protein and vitamin-rich foods. A third problem is the focus on a small number of technologies, namely chemical fertilizers, pesticides and irrigation. This narrow focus on both crops and technologies may not be the exact focus of the green revolution package as envisaged by M.S. Swaminathan (who states that early green revolution literature actually refers to the precautionary principle), but could be an unintended outcome of the dissemination of the technology change. Even though the green revolution was technology-driven, its impact and focus were affected by many other factors such as infrastructure, the availability of inputs and other policies.

The green revolution's requirement for technological advancement meant that incentives had to be created, i.e. that the necessary technologies were subsidized, giving rise to a fourth problem: input and output subsidies became integral to Indian agriculture. Subsidies are not only a budgetary burden but they also benefit farming industries and big farmers disproportionately and have negative impacts on the sustainability of farming systems.

Is the evaluation of the green revolution consensual or controversial?

During the 1970s and 1980s, much of the scientific literature highlighted the achievements of the green revolution in terms of the adoption of new varieties, a production increase and a decrease in rural poverty. In the 1990s, the amount of literature on the negative impacts started to increase, opening a debate between four stakeholder groups: (i) farmers, (ii) NGOs, (iii) researchers and (iv) policy makers.

Regarding the first stakeholder group, sixty percent of India's agricultural population is dominated by small farmers with less than two hectares, for
The four stakeholder groups have different approaches and advocate different development paths for Indian agriculture, but the contours are moving. For example, the national commission on farmers has called for a new green revolution, qualifying their aim by stating that we must first learn from the mistakes of the previous one. This represents a real concept change.

How does the discussion between mainstream and ecological agriculture play out in India? How does it relate to employment issues?

In India, the mainstream approach to farming is much more dominant as it receives federal and commercial support, while the agroecological school mainly involves the voluntary sector and independent researchers.

In India's rural areas, off-farm employment possibilities are limited. Agriculture is often the only employment source, thus favouring labour intensive agriculture in the context of a low opportunity cost. Conversely, productivity for small farmers is considered in terms of productivity per labour unit, and not per hectare. This does not mean that small-scale farmers are averse to technology, but they need appropriate technologies that take their circumstances into account.

Moreover, India cannot afford to move millions of smallholders and their families away from farming. Indian cities can no longer cope with an influx of unskilled workers, given that urban development is taking place at a gradual pace. Unskilled workers will not find stable employment in the service or manufacturing sectors.

To move forward, what should be done in terms of regulation and legislation?

As an academic I cannot make recommendations, but only suggestions that are based on extrapolations from my research. It is possible for India to meet the challenge of food and agricultural sustainability, but to do so requires policies that target the millions of smallholder farmers that want to engage
as both consumers and food producers. They do not go against the grain of development. They want their children to be educated and, if they so choose, to move away from the sector. But such ambitions should not be motivated by distress, but happen in due course in line with the acquisition of new non-agricultural skills.

Policies should not ignore the traditional skills and cultural peculiarities of these smallholder farmers. Furthermore, small-scale farming has the lowest ecological footprint; therefore an alternative development path for this sector could be an opportunity for India to reduce its carbon emissions.

So, how can policies be better designed to account for smallholders? There are at least three areas that must be addressed. The first two concern the marketing of inputs and outputs. Small farmers are at a constant disadvantage when they depend completely on markets since they are subjected to uncertainties, especially for outputs. It is also a question of getting good prices. In earlier times, Indian farmers had to gamble only with the monsoon, now they must also gamble in world markets. Furthermore, because small farmers lack storage and marketing infrastructure, they cannot get good prices on export markets and cannot therefore depend on them. This is an issue that needs to be addressed by policies, especially since the Indian domestic market is large. If the government could mitigate the risk linked to the connection to local markets, it would be an important contribution to the sustainability of the small farm sector. The second point to tackle is to reduce the dependence on market dependent inputs, in order to mitigate cost escalation risks; and the third point is the need for climatic risk management, by providing these farmers with insurance against climate variations.

It is only if these three areas can be successfully tackled that a fourth factor can be improved, namely the capacity to mobilise credits and loans. The extension of loan facilities is necessary to make small farming a sustainable enterprise, but this must be accompanied with a good output market and sufficient climate insurance. If not, the extension of loan facilities to farmers without upper limits would be a recipe for disaster, as shown by the large numbers of farmers that commit suicide in India. Although it must be said that farmer suicides are not always linked to farming activities and loans.

The much needed policy package should therefore be more than just a list of measures, but must be designed strategically. Furthermore, the issue of how policies are made is also critical. The agroecological school in agricultural management adopts a very decentralised vision in both policy implementation and formulation, and even the research agenda. In many cases centrally decided priorities do not fit with local realities. For example, the green revolution package extended irrigation to masses of farmers without assessing the costs and benefits to the specific ecosystem, sometimes leading to over-irrigation among other problems. This was due to a top-down imposition of technologies: where the extension process does not take specific local aspects into account, which may be crucial for the sustainability of a technology, or at least for it to have a neutral impact. Hence, in summary, policies should focus on smallholders, prioritise the mitigation of the three risk types and operate in a decentralised manner.