Scenario Planning to Guide Long-term Investments in Agricultural Science and Technology: Theory and Practice from a Case Study on India

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The objective of this note is to summarize the process and key findings from a scenario analysis applied to guide India’s agricultural technology system and, in particular, planning of the National Agricultural Innovation Project in India. This note is based on the paper ‘Scenario Planning to Guide Long-Term Investments in Agricultural Science and Technology: Theory and Practice from a Case Study on India (Rajalahti, et al. 2006).’

A number of global changes are taking place with implications for the rural and agricultural sector. Population growth, improved incomes, market development, climate change, dissemination of contagious diseases, and shifting dietary patterns continue to increase in importance and diversify the demand for food and other agricultural products (Rajalahti, et al. 2005; World Bank 2006). While it is clear that agricultural research systems need to reform, the investments in agricultural science and technology tend to pay off in the long run more than in the short term. Nevertheless, the decisions on the investments in, and reforms of, the science and technology systems for tomorrow need to be made today. This necessity requires that the decisions should be based on an informed assessment of what the future will hold (Rajalahti, et al. 2006).

SCENARIO PLANNING AND DEVELOPMENT PROCESS

Traditional planning and forecasting practices on their own are not enough to serve our needs in getting the insights and answers needed. For example, trend analysis is based on the assumption that the factors that drove change in the past will continue to drive it in the future. Scenario planning is a structured process of thinking about and anticipating the future—aimed at helping break out of the mindset that the future will be a continuation of the past (van der Heijden 1996). It entails the development of a set of scenarios that are narratives of alternative environments and show how different interpretations of the driving forces can lead to different plausible futures (Ogilvy and Schwartz 2004; van der Heijden 1996).

Scenarios are an important and useful tool in providing a neutral space for discussion and in helping to build consensus among various stakeholders. The objective is to examine possible future developments that could impact individuals, organizations, or societies to find directions for decisions that would most benefit any future environment. Besides being useful in strategy formulation, scenarios can be used in policy development, conflict resolution, group learning, and rehearsing management decisions (Strategy Survival Guide; van der Heijden 2005).

Scenario development process. Although the process is usually customized to the needs of the client—often an organization or a company—it often includes elements related to scanning (broadening the perspectives, gathering unbiased information and knowledge), design (mapping general development trends to form a base for the scenario framework), story outlining (the scenarios are developed with substance and body), and discussions on implications (looking at today’s strategic agenda and alternatives in light of the alternative scenarios). Other important elements include elicitation, such as interviews or strengths, weaknesses, opportunities, threats (SWOT) analysis; research to build robust comprehensive scenarios; consultation to verify the relevance of the scenarios; strategic conversations; and out-of-the-box thinking. The main steps in a scenario development process can be organized around a series of workshops and knowledge gathering activities (Scenarios Network, van der Heijden 1996, 2005).
Figure 1 illustrates the key steps in an adaptive scenario development process in which scenarios can be seen as testing conditions for the client’s survival strategy. Scenarios are used as a means to think through future policies and decisions. By using more than one scenario, robustness of the client’s strategy is tested (and adapted as needed) in different conditions (van der Heijden 1996).

SCENARIOS FOR THE NATIONAL AGRICULTURAL INNOVATION PROJECT

To address the challenges facing agriculture in India and to consolidate the gains under the completed National Agricultural Technology Project, the Government of India and the World Bank agreed to undertake a new National Agricultural Innovation Project (NAIP). In project preparation, it became clear that many uncertainties face agriculture and agricultural science and technology in India: how will global warming affect the production characteristics of Indian agriculture? How will the technology system embrace the growing importance of the private sector? Will Indian agriculture remain competitive in the global marketplace? What is the fate of the small-scale farmer?

A scenario analysis was done to explore these uncertainties, and to identify the key decisions that need to be taken to ensure that India’s agricultural technology system is prepared for the future. The assessment enabled participants to develop a shared perspective on a future that is not necessarily a continuation of the past.

The scenario analysis was done in parallel with the design of NAIP. For the success of the project, the participation of high-level officials, farm leaders, senior leaders from the public and the private sectors, nongovernmental organization leaders, donor representatives, experts on agricultural development, and some ‘remarkable people’ (known as lateral thinkers) was required. The project was jointly managed by the regional and central Agriculture and Rural Development Departments of the World Bank. An Indian co-leader was invited and attended, and experienced scenario experts facilitated the process. The basic process included the following steps:

1. Identifying driving forces. Taking into consideration political conditions, economic developments, social developments, environmental trends, and technological changes, the driving forces for change in the future are identified.
2. Identifying predetermined factors. Which future developments will take place in any scenario?
3. Identifying critical uncertainties. The critical areas in which the future is uncertain are identified.
4. Developing scenario plots. A scenario is defined by a combination of two critical uncertainties, drawn out and shown as axes on which the scenarios are plotted. A comprehensive description of how the future would look under this scenario is then developed. These futures must be plausible.
5. Consultation. Scenarios are presented to a large number of people who have relevant expertise. Their comments are collected and incorporated in the scenarios. Consultation helps to identify knowledge gaps and guides decisions on additional knowledge gathering.
6. Assessing the implications of different scenarios. An assessment is made of the best possible responses of the client organizations to each of the plausible future scenarios.
7. Comparing possible responses to the different scenarios. Two elements in the comparison require special

Box 1. Key issues raised by the ‘remarkable people’, i.e., opinion leaders and policymakers in India.

The key question posed to the interviewees was: When thinking of the future of Indian agriculture, what keeps you awake at night? Four main themes emerged from these interviews:

1. Will there be enough water for future generations? How can water be managed sustainably?
2. What will drive Indian agriculture in the future: the government or the market? What is the right balance?
3. How will rural communities change? How fast will rural urban migration proceed, and what is the future of small-scale farming?
4. How can rural stakeholders voice their views—women, farmers, private sector?

In the India exercise the main steps included:

1. An initiation workshop at Bank Head Quarters to introduce the scenario planning concept and process and to receive wider buy-in among relevant staff;
2. Interviews with ‘remarkable people’ to explore the issues and concerns for future agricultural development in India – see Box 1;
3. An introduction workshop in India to launch the process and obtain inputs from the participants;
4. A scenario analysis and design workshop to identify the key scenarios that would be developed requiring identification of the critical elements of each scenario: driving forces, predetermined factors, and main uncertainties. See Figure 2 for an illustration of the final scenario plots developed during the process. The scenario plots were developed using two main dimensions: (i) economic management, which could be strongly market based and liberalized or more government controlled and centrally led; and (ii) social fabric of the countryside and the country in general, which could be strong, with rural people well organized in villages that are able to take care of their problems; or which could be weak, in which case the marginalization of the poor would be higher.

Box 2. Synopsis of initial four scenario storylines

Four storylines were developed in the scenario building workshop. The scenario titles reflect the historical development of economic management, which could be strongly market based and liberalized or more government controlled and centrally led; and of the social fabric of the countryside and the country, which could be strong, with rural people well organized in villages that are able to take care of their problems, or which could be weak, in which case the marginalization of the poor would be higher.

1. The scenario In the Valley starts from a strong desire for cohesion and equity in the economy that results in a societal preparedness to accept a significant degree of governmental control to achieve this. The price paid is a modest level of growth (around 3 percent per annum) in which most people share to some degree. Productivity develops slowly. Global warming hits hard.

2. The scenario Along the Edge assumes that economic development becomes the number one priority, and significant inequity is allowed to exist as a powerful incentive to increase productivity. The scenario explores how far such a view could be taken before inequity becomes so intolerable that the “collective” must step in to moderate the worst manifestations of market power. This is a story of societal limits to development and growth.

3. In the scenario Over the Mountains, a “free for all” society runs into serious problems to such an extent that people call for a return to strong governmental control. The potential positive effects of such a strong government are explored. After a period of very serious difficulties, the center takes hold of the situation and turns things around.

4. In the scenario Through the Hills, concerns for cohesion and equity also are strong, but they are balanced by the desire to create incentives for productivity improvement through market forces. The two objectives often are not in harmony, particularly when the system experiences unexpected external shocks or when choices have to be made. In this scenario, cohesion wins out in such circumstances, but in the long run a powerful base for a successful market economy is created.


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Figure 2. Final Scenario Plots Developed During the Scenario Design and Consultation Processes

The Four Scenarios

1. In the Valley
   - India goes it alone.
   - Social progress but economic stagnation
   - Only limited agricultural reform
   - Concern for Inclusive Growth
   - Social Texture
   - Interventionist

2. Along the Edge
   - Freedom reigned in
   - Agricultural reform by compulsion
   - Economic Management
   - Liberalized

3. Over the Mountains
   - Centrally planned economy
   - Freedom reigned in
   - Agricultural reform by compulsion
   - Reliance on Personal Incentives

4. Through the Hills
   - Focus on investment climate
   - Public/private partnership
   - Enabling of agricultural reform

LESSONS LEARNED

Scenarios may help identify critical decisions that must be made to maximize the future role and impact of the technology system. While the process was effective for stimulating and increasing strategic conversation among a wide group of stakeholders, the following lessons learned and adjustments-limitations should be kept in mind.

**Recommendations** derived from the process:

1. The scenario analysis may best fit to realities with clear boundaries, for example, a Country Assistance Strategy (CAS), sector strategy, project preparation, or regional plans. However, applying the analysis on larger, global issues may be far more challenging.
2. Due to significant time requirements, particularly during the consultation process (validation), it is recommended that the scenario process be implemented ahead of project preparation.
3. It is essential to allocate sufficient time and resources for creating client ownership and understanding of the process.
4. It is of paramount importance to compose a multidisciplinary scenario team led by an experienced scenario leader(s).
5. The participant group should include people with multidisciplinary skills and different views, in this case, people also outside the agricultural sector. It is also very important to include participants of the groups that the process aims to influence.
6. The following require attention: the need for a full-time manager for the overall process; availability of research capability with adequate resources; the need to manage and guide research work performed by third-party research institutes; and the coordination effort associated with operating a virtual team over long distances and managing political sensitivities.

**Benefits to NAIP and implications for Science and Technology (S&T).** The scenario analysis contributed to the design of the NAIP in the following ways:

1. The scenario process truly engaged people to think outside their everyday domains and resulted in four very different, but plausible, scenarios.
2. It helped ICAR think about the issues beyond its own technical competence and to strengthen the realization that the world it serves requires new approaches, including incorporation of social organization and institutional innovation.
3. Scenarios were considered to be very useful for visioning long-term S&T needs. It also became clear that there is a major need to work on institutional arrangements (farmer organizations, sector boards, cooperatives) for research and development and to fully explore the potential of non-farm rural employment.
4. It helped the project design team define the scope of the NAIP project components, particularly the institutional development. It also helped to identify the importance of enhanced capacity for dialogue and interaction with other stakeholders. Flexibility, rather than pursuance of one reform strategy, was considered a key trait for a successful organization in a rapidly changing world.
5. The national scenarios are being used by the client organizations to strengthen visioning capacity and strategy development at the level of specific products (e.g., rice, dairy, medicinal plants) or regions. For this purpose, groups of stakeholders are asked to elaborate the country-wide scenarios for the product or region of their interest.

**Sources**


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1 The National Agricultural Innovation Project became effective in June 2006.
2 "Remarkable people" is a term applied in some of the scenario literature. For more information, see van der Heijden, K. 1996.
3 The scenario analysis and development exercise run from September 2004 to June 2006, including the following dates: the initiation workshop September 2004; planning workshop April 2005; scenario analysis and design workshop July 2005; research on validity August 2005; second generation scenarios February 2005; consultation process November 2005; and scenario analysis workshops April and June 2006. For more details on the theory and the process in India, the reader is referred to Rajalahti, et al. 2006.

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