Part IV: Enterprise webs

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The Enterprise Web

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"We had better search for what the market can do for the poor, giving appropriate support for them to compete in these markets."

Wood, 1994

INTRODUCTION

In the research-extension continuum many good agricultural technologies are not adopted by farmers. At times, this may be due to inappropriateness of the technology, but often a misplaced emphasis on the process of developing the technology hinders an examination of the broader social and organisational reasons behind farmers' so-called rejection. There is more to extending a technology than giving the technical specifications to the extension department or other service providers. Drucker, a lead thinker in business organisation presents a more holistic view of a technology in his book *Innovation and Entrepreneurship: Practice and Principles*. He stresses that too often, the developer of an innovation only considers the specific technical requirements and ignores factors that are social, organisational, economic or perceptual, resulting in a lack of adoption or a failed enterprise (Drucker, 1985). In this section, we start with the assumption that a technology has satisfied the criteria of acceptability and suitability for farmers with limited resources, and then zoom in on the organisational aspects of technology delivery.

This chapter introduces a visual analytical tool, the enterprise web, that can be used by service providers to unpack the many discrete activities that are undertaken for the introduction and dissemination of an innovation (Magor, 1996). It is followed by three case study chapters that illustrate the use of the enterprise web for three contrasting technologies. It may help readers in developing dissemination strategies for other innovations, whether agricultural or non-agricultural.

THE ENTERPRISE WEB: A HOLISTIC TOOL

A generic example of an enterprise web

Figure 11.1 illustrates an enterprise web, for which all discrete activities and causal links between activities have been identified. Developing one is an iterative process. The centre stage is given to the principal client. In our case, the clients are resource-poor farmers, but could equally be a processing mill. All activities for a farmer to receive necessary knowledge and inputs to effectively adopt the technology are drawn above and all activities utilising the products are drawn below. The latter may also involve a new client for which a follow-on set of discrete activities is identified. The enterprise web is technology specific and adapted to the governance structure of the principle disseminating agency. The potential discrete activities, as depicted in Figure 11.1, are given in the paragraphs below.

Ecosystem identification

Agriculture technologies are generally quite ecosystem specific. The suitability of a rice variety can be plot specific and depend on the cropping sequence. This activity involves researcher input and possibly discussion with local extension service experts. The service provider must have sufficient expertise to interpret the suitability of an ecosystem.

Selection of poor households

Under the present political economy of Bangladesh, effort must be given to specifically identify poor households. The governmental Department of Agriculture Extension, for instance, could ask local NGOs to complete this task. For a large NGO, it may be the social development section that manages this activity and not the technical persons themselves.

Technical activities

In a seed variety enterprise web the discrete activities may be: i) a government agency supplies breeder seed to a seed company; ii) this company grows foundation seed; iii) farmers grow truthfully labelled seed; iv) the company markets to local dealer; or v) a local dealer supplies seed to resource-poor farmers. For any enterprise, all activities can be listed and linked. In the generic example, two series of technical activities are given as 1a, 1b, 1c and 2a, 2b. Each of these is potentially performed by a different organisation.

Microfinance supply

If a technology cannot be adopted without microfinance support, a series of activities related to this will need to be shown.

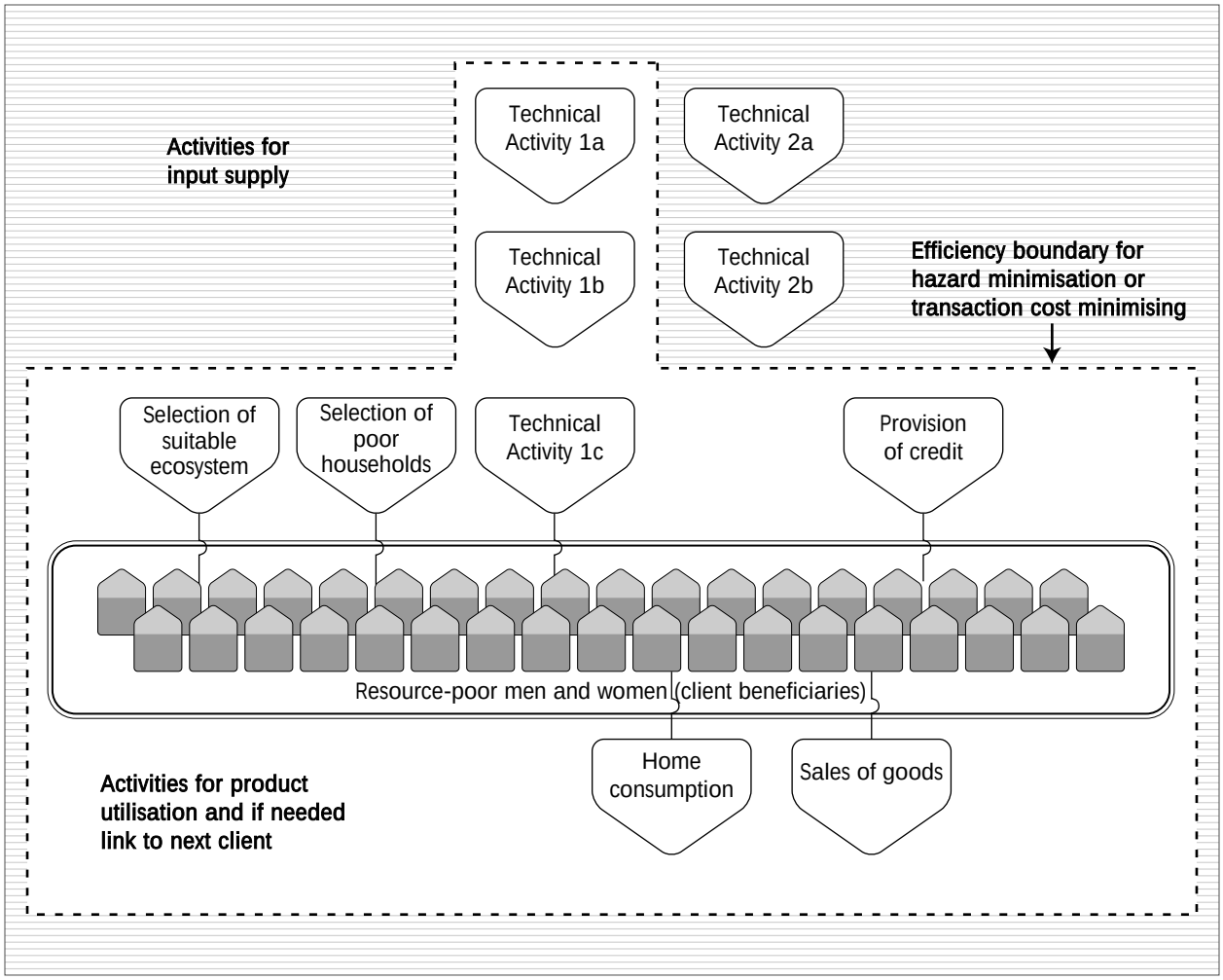

Figure 11.1 Enterprise web with potential generic activities

Utilising the products

This may simply be family consumption or a number of linked activities for marketing to urban or even international markets. As farmers participate more and more in the market economy, linking with a marketing client may be essential for the successful adoption of the technology.

After visualising the discrete activities, an efficiency boundary can be drawn. All activities within the boundary are integrated and performed by the service agency. Activities outside the boundary are performed by another organisation.

The enterprise web as an explanatory and micro-analytical tool

The enterprise web is relevant to understanding, planning and implementing initiatives to promote rural innovations in the following ways:

Beyond professional compartmentalism

As a visual tool, the enterprise web is holistic. It enables professionals to step outside their disciplines. Soil scientists, agronomists, plant breeders, agronomists, microcredit specialists, development generalists and so on compartmentalise their knowledge, and they often lack capacity to incorporate non-technical knowledge. The glasses of knowledge of a technical profession restrict a person from seeing non-technical organisational and social issues as essential considerations in the extension of a new innovation. Even in research that strongly engages with farmers, subtleties in testing the technology have to be recognised in the future dissemination of that technology. For example, the scientist may not be aware of the types of support that are given in the very act of testing the technology with farmers. The scientist may hand-carry the seed of a promising new variety from his or her research station for testing. If the variety is found promising, the spread to neighbouring villages is still not guaranteed. The local seed dealer needs knowledge of the new variety and needs to know from where the seed can be procured. The enterprise web provides a focus that clearly shows all activities and links. It can act as a bridge for seeing all critical actors.

Identifying all activities and highlighting any potential weak links

The very process of naming all activities provides opportunity for discussion. Drawing out visually each discrete activity parallels the activity chain used by Porter (1985) in the analysis of competitive advantage in business. A linchpin activity may be identified and special steps taken to ensure that it is managed effectively.

Analysis of organisational structure for managing weak links and minimising costs

The enterprise web allows one to draw on business theory such as identifying core competencies, joint ventures or strategic alliances for dissemination (Jarillo, 1988, 1995; Thorelli, 1986; Prahalad and Hamel, 1990). In Bangladesh, discussion about which organisation does what can create conflict. The major service provider is the Department of Agriculture Extension and, more recently, donor-supported NGOs and to a minor extent the private sector. Plurality is increasing. Organisations need to look closely at their core competencies to determine exactly what they are best at doing and also what activities it may be better to implement in partnership. Organisational experience in this area is limited. The enterprise web helps to structure the decision-making as to who could best implement which activity. This application in micro level planning is illustrated in the case studies in Chapters 12 to 14.

The enterprise web also allows the tools of transaction cost theory and governance structure to be used. See Box 11.1 for a layman's explanation of transaction cost theory.

Box 11.1
Transaction Cost Theory
(drawing on Williamson 1979, 1981 1985, 1991 1996).

Transaction costs are different from production costs and measurable service delivery costs. For service providers, transaction costs include: time and expense to get up to date knowledge about a technology, to identify and establish links with farmers, to negotiate terms of service delivery with clients, and so on.

Transaction costs have implications for the way service provision is organised. Depending on these costs, an actor may decide whether or not to deliver certain services to a particular client.

High transaction costs resulting from limited access to inputs, markets or knowledge may also impede a poor farmer from adopting a technology.

The NGO organisational culture in Bangladesh is to integrate activities and to do all things themselves. This approach has arisen from efforts to minimise risk in service delivery. Contracting between organisations and particularly between NGO and government has tended to be unreliable and inconsistent. Dependence on someone else may mean seed arrives too late or not at all. Governance is related to 'to do or not to do a particular activity'. If an organisation chooses to do an activity itself, this activity is controlled; hazard is minimised through vertical integration. If the organisation chooses not to perform the activity but to have it provided by another service provider, then it must give attention to the contractual relationship between them. The transaction cost for vertically integrating as opposed to a contract with another organisation must be analysed. By having all discrete activities visually shown in the enterprise web, the choice can be highlighted and critically discussed.

In Figure 11.1, the service provider decided it could cover activities 1a, 1b and 1c itself, but that another organisation was better skilled to complete activities 2a and 2b. The boundary between what is and what isn't done by the organisation itself is indicated by the dotted line and is called the efficiency boundary. According to Williamson (1981), the arrangement minimises risk and is an economising decision for a business.

It is also possible to use the enterprise web to identify the transaction costs faced by a farmer in adopting a new technology. For each activity that is not coordinated by the service provider, the farmer faces a corresponding risk and increase in transaction costs. If he or she needs to travel to several sources of knowledge and inputs to have all the necessary inputs for implementing the technology, risks of non-adoption go up rapidly. From this perspective, the one-stop shop has appeal for a farmer and can be visualised with the enterprise web.

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The time farmers spend in training sessions, going to the market to sell their produce, and negotiating prices with the middleman all add up to their transaction costs. To get involved in the aromatic rice value chain, the number of separate transactions may be too great. A service provider, by consolidating some of the activities, effectively reduces the transaction costs of farmers.

Visualising complexity

An innovation may be quite simple with a minimum of activities and no contracts between actors or it may be very complex. Figure 11.1 shows an activity 'sales of goods'. This could be expanded to link to a processing plant for which there are also a set of discrete activities. In turn, this may link to an independent export house with another set of discrete activities (Chapter 14). As the complexity of organisations increases, risk increases. A failure by the export house will jeopardise the adoption by farmers, not because the technology was inappropriate but due to market failure.

SELECTION AND DOCUMENTATION OF CASE STUDIES

This book covers a wide range of extension methods and organisational models that emerged under the PETRRA project. Of the case studies presented in this book, three illustrate the versatility of the enterprise web. We present the practice of integrated rice-duck production, the manufacturing and marketing of the mobile pump and the production, processing and marketing of aromatic rice.

The technologies and organisational requirements in the three case studies were quite different. Integrated rice-duck farming (Chapter 12), which was a new concept in Bangladesh, required training and changes in people's perception on the joint cultivation of rice and ducks. Critical linkages were needed to ensure ducklings at the right age and on time, and access to vaccines through government supply channels. For the mobile pump (Chapter 13), the development of local capacity to produce and market the pump was key to getting the pump to the farmers. For the production, processing and marketing of aromatic rice (Chapter 14), the emphasis was more on grower contracts, improving rice processing facilities to export standards, and marketing. Grower contracts required purposeful links with resource-poor farmers; processing to standard necessitated mill modifications, and training; whereas marketing required drawing different millers together, analysing markets and ensuring quality. This last case study links to market chain analysis. A common activity for all three enterprises was the identification of resource-poor farm households, as per PETRRA's criteria.



Promoting rice-duck farming, mobile pump markets or an aromatic rice value chain has complex organisational requirements. To better understand these, along with the weak links in the dissemination model, a visual analytical tool called the enterprise web has been developed.

Various steps were used to develop the case studies:

The editors of this book held a workshop with the three sub-projects to list discrete activities, link activities and identify indispensable steps. This did not occur spontaneously. Specifying all the linkages usually took a great deal of time. Principal investigators of the technology development sub-projects often did not distinguish between activities which were only required during the research phase and those required in the dissemination phase. We prepared a first draft enterprise web diagram, while one of us questioned and tested the validity of each activity.

Based on the workshop outputs, we developed guidelines for authors that differed slightly from those used for other case studies in the book: sections would deal with actors, the enterprise web, keys for success, pitfalls, and a conclusion.

The principal investigators prepared their first draft case studies, but still tended to

focus on the technical aspects of the innovation; hardly any reference was made to the enterprise web diagrams. The concept was foreign. The enterprise web was an add-on that made little sense to them.

We rewrote the guidelines. One section was reserved for simply writing about the technology. The case study authors were then encouraged to write about each discrete activity presented in their enterprise web. This was then edited and further enriched through discussion and collecting additional information from farmers or other stakeholders. Only at this stage the principal investigators responded to the enterprise web as a useful tool for clarifying the steps required to extend their specific innovation. Visualisation coupled with writing was important for institutional learning.

Integrated rice-duck production

Travelling through the countryside you may occasionally see ducks in rice paddies, but it is relatively uncommon; the systematic practice of integrated rice-duck is new to Bangladesh and was introduced by some keen scientists who saw it in Japan. A specific output in the logical framework was on articulating the organisational requirements for extending the technology. Three organisations were involved in the technology development sub-project: the Bangladesh Rice Research Institute (BRRI) that provided leadership overall and expertise in rice; the NGO Friends in Village Development (FIVDB) that gave duck management expertise and had an extensive village network in the Northeast; and the NGO Bangladesh Development Services (BDS) that had a network of farmers in the tidal South-central region. The technology proved promising and generated a lot of enthusiasm concerning its potential. BRRI scientists and the duck technologist of FIVDB conducted good research with farmers in two potential ecosystems. However, both the BRRI and the FIVDB staff were very technically orientated and struggled to unpack the essential steps required for a service provider to extend the technology. The enterprise web came in as a useful tool around which to analyse discrete and essential activities (see Figure 12.1).

Clearly, a link to the government livestock services is required, as they are the only agency in Bangladesh supplying the vaccine. Timely supply of ducklings of the right age also underpins rice-duck technology, opening up the discussion on who does what. Here, the NGO may be considered to be like a firm that needs to make strategic decisions (governance structure; Williamson, 1996 and Reve, 1990).

To illustrate the different efficiency boundaries which may apply to the same technology, let us consider the two different NGOs involved in the project. The first is BDS that had no prior experience with ducks and only limited agriculture expertise, but it had a strong village network of poor households. Through BDS the households have access to microcredit. Should BDS establish its own hatchery? Should it be dependent on a government poultry farm for the supply of ducklings?

Should it encourage a business man to establish a large duckling production unit? Or should it develop local hatcheries with farmers? Each of these questions relates to the boundaries that BDS sets for its own activities. BDS decided not to set up its own hatchery: the cost to establish and maintain one was too high and would make the overall cost to promote rice-duck unacceptable. On the other hand, the government poultry farm was unreliable in supplying ducklings and these inadequacies might have resulted in farmers' rejecting the technology. Helping local farmers to establish small-scale hatcheries seemed the most efficient method. It placed no extra transaction costs on the potential rice-duck farmer to access the technology, and being organisationally more efficient it reduced the costs for BDS. As they focus mainly on education, health and credit, they chose not to vertically integrate, but to outsource to local entrepreneurs, a choice relating to its core competencies (Prahalad and Hamel, 1990).

For the second NGO FIVDB, the efficiency boundary was completely different. FIVDB pioneered the introduction of ducks as a viable stand-alone enterprise in Northeast Bangladesh in the mid 1970s. It has its own hatchery and has established numerous village level hatcheries in its target area. FIVDB can incorporate the extension of the rice-duck technology into its own programme with minimal transaction costs as it is building on existing expertise coupled with village networks. In fact, FIVDB has the opportunity to further expand the activities in the enterprise web: they could provide training and advice to other NGOs that, like BDS, may wish to take up the technology.

The discussion around the enterprise web for integrated rice-duck shows that the extension strategy for a given technology is organisation dependent.

Dr. Gazi Jashim Uddin Ahmed, sub-project leader and head of the Agronomy Division for BRRI suggested scaling up to a level that would link producers to Dhaka markets. This would introduce a new scenario of a joint venture between a commercial hatchery, an NGO working in a suitable ecosystem with poor farmers, and a marketing outlet. A joint venture may have the advantage of bringing together the social and organisational expertise of the NGO, the equity aspect of targeting marginal families, and the technical capacity of the business partner (Hennart, 1988; Kogut, 1988).

From the farmers' perspective, anybody who wants to try out this new practice must have access to a knowledge source, ducklings of the right age at the right time, vaccine at the right time from the government and possibly a source of credit. Accessing each source independently results in high transaction costs for the farmer and may be so high that he or she does not take up the technology. For those members who were interested in rice-duck farming, BDS and FIVDB provided training in all aspects of the technology and removed the need for them to approach the government poultry farm and vaccine service, as such reducing the transaction costs for farmers.

Manufacturing and marketing mobile pumps

International Development Enterprises (IDE) is a unique NGO in Bangladesh specialised in the marketing of mechanical, agricultural inputs. IDE had extensive experience in the marketing of the foot operated treadle pump, of which the mobile pump is a modification. A key objective of this sub-project was to fine-tune and document the extension method that included building public awareness, drawing in local NGOs for microcredit and for farmer selection, and developing a manufacturer-distributor-mechanic market chain.

Producing, processing and marketing aromatic rice

APEX is an NGO with private sector expertise and strong linkages to business leaders and senior public sector bureaucrats. In this sub-project they linked to Mark Industries, a private engineering firm and the Bangladesh Rice Exporters Association. The group of individuals, including supporting consultants, had a specific interest in seeing the marketing and exporting of aromatic rice become a reality. Aromatic rice is a traditional rice with new varieties now becoming available, and fetches a higher market price than common rice. Milling to export standard is a problem and affects export potential.

The three principal clients for this series of linked technologies are farmers, millers and exporters, who each appears sequentially in the enterprise web. Figure 14.1 clearly shows that the aromatic rice value chain for an agro-processing commodity is still in an immature state. Value chains are the way the food commodity industry has developed globally (Kaplinsky, 2000).

APEX is strong at national networking for promoting the development of the aromatic rice industry. Besides, it has an ability to build partnerships: APEX successfully drew in the expertise of IRRI in rice processing and motivated millers to invest in mill modifications. It kept the Bangladesh Rice Exporters Association informed of all developments and enabled the upgrading of the skills of its lead members through monitoring tours. APEX initiated the Aromatic Rice Export Clearinghouse (AREC), which could be an essential body for promoting export. Identification of markets, timely information to millers with contracts for growers and assurance of export standards are all critical to this enterprise. The high level linking to policy makers and concerned business entities seems to be the core competency of APEX.

However, they do not have a network of poor farmers in the aromatic rice growing area. Using the enterprise web, APEX realised it faces fundamental choices as to who should manage the farmer contracts for supplying aromatic rice to millers. The transaction cost of developing farmer contracts, and ensuring their execution, may be kept low by developing the capacity of local NGOs to perform this function. In this way, it would not detract from the core competency of APEX.

INSIGHTS FROM THE USE OF THE ENTERPRISE WEB

Learning about process

The enterprise web provided a tool for describing each activity, discussing processes and each partner's contribution. In the first session in which the enterprise web was introduced, it was met with a sense of indifference. Investigators in each of the three case studies found it easy to talk about the technology and its adoption, but not about the organisational dimension of the extension process. This was a recurring hurdle in most of the sub-projects on extension methods research. Partners lost themselves continuously in the detail of talking about the technology. A breakthrough in understanding came when they engaged in developing promotional posters on their extension method. Each produced an enterprise web in Bangla to represent their method.

The visual nature of the enterprise web helped project staff to clarify essential activities. Listing of activities with coloured cards and then arranging these with causal links opened up the discussion. Writing on each discrete activity clarified weaknesses and any necessary remedial actions. Successive interactions enriched the case studies. For example, in marketing the mobile pump, the economic returns were included for all four clients: the manufacturer, the dealers, the mechanics and farmers.

The enterprise web was only introduced towards the end of the sub-projects, in response to the frustrations of individuals in describing organisational requirements to extend their technology. Its use was experimental and its development a little rushed. The increased clarity for analysis suggests that the enterprise web should be introduced at the beginning of a project rather than at the end.

In pro-poor extension social capital is critical

Each enterprise web included an activity of identifying poor farmers. NGOs that already have an established village level network have a comparative advantage. Built over many years, FIVDB and BDS can rely on extensive networks of resource-poor men and women. Each NGO has developed a strong social capital that includes working together and the development of trust (Coleman, 1988, 1990). Such social capital is crucial for economic growth (Fukuyama, 1995; Wilson, 1997) and offers great potential for companies who want to do businesses with the poor (WBCSD, 2004) or establish value chains in developing countries (Goletti et al., 2003). In contrast to FIVDB and BDS, neither IDE nor APEX has their own village network that can be mobilised for extending their respective technologies. Partnerships or outsourcing to an NGO with such networks offer great potential for minimising transaction costs and reducing the risk of not including resource-poor farmers.

Introducing the concept of governance

Based on their core competencies and organisational culture, each service agency

had to weigh up the risk of establishing partnerships (contracting outside the organisation) as opposed to doing the activity oneself (vertically integrating).

The enterprise web enables complex delivery mechanisms with many distinct activities to be visualised by professionals from different technical backgrounds. This allows them to talk about it more easily and to identify potential weak links. It also unfreezes discussion on organisational structure to minimise risks in technology delivery and potentially to minimise costs, both principles of transaction cost economics.

The justification of 'who does what?' on the basis of risk or transaction cost minimisation is not an issue that is on the current development agenda. This could change, as the enterprise web helps to build cross-disciplinary bridges by neutralising language (Box 11.2).

Box 11.2
On the Struggle with Cross-Disciplinary Language

The language in business literature and new institutional economics can appear quite daunting to an agricultural extensionist or scientist. Let's look at some of the words: transaction cost minimising, transaction cost economics, efficiency boundaries, governance structure, vertical integration, contract law for partnerships, strategic alliances, core competencies.

The awareness of the importance of organisation in pro-poor development leads to wrestling with the above terms. Unfortunately, the language is not easy. The visual tool of the enterprise web is useful in breaking down language barriers to analyse the organisational aspects of extension and pro-poor business development.

CHALLENGES FOR THE ENTERPRISE WEB AS A TOOL

Achieving rigor in visualising the enterprise web

It is easy to miss activities or to clump activities together. The process of iteration itself can be conducted by different actors for validation of activities and for giving greater clarity on diversity of organisational structure that may be possible for extending a given technology.

Committing resources

The case studies presented here are a first learning experience. For most partners the enterprise webs still need to be tested in a discussion workshop with their senior management. APEX senior management were involved in the development of their case study and have already used their enterprise web diagram to talk with an international business group.

The steps indicated in the enterprise web must be recognised by the management of the service provider and resources committed to address all activities, either alone or in partnership.

Extension method costing (direct and transaction cost economising)

A common weakness in all the extension method case studies is their lack of costing, showing that this is not part of the current culture of NGOs.

To date, the donor community has not rewarded efficiency in terms of cost and risk minimisation. Donors that engage with government, NGOs and private sector could request greater analysis of costing for agricultural extension and reward accordingly. Without attention to cost minimisation and demonstrated risk minimisation the enterprise web may be met with indifference. Also, for more in-depth analysis of risk and costing, special facilitating skills will be required as most scientists and extensionist do not have this expertise.

Unfreezing the culture to go solo

Larger NGOs have tended to integrate vertically and to limit their interaction with government research institutions. Contracting out, in the context of Bangladesh, has tended to present greater risk. And yet, for sustainable extension of agriculture technologies service providers need to look more closely at partnership for technical and social quality. IDE relied on local NGOs to identify the poor farmers and BDS developed independent duck hatcheries to meet duckling supply. The need for ongoing links to technical expertise by a non-governmental service provider can easily be ignored. With the enterprise web, links can be identified and costed, and a contractual arrangement defined. The enterprise web does provide a way of highlighting research-extension linkage as an important contract.

Conclusion

The enterprise web helps to clarify essential activities in the dissemination of technologies; it is technology and actor specific. Each new technology can be analysed for the most effective and efficient pathway for extension in its own right. In addition, the cost of a specific activity in the extension process, such as identifying resource-poor farm households, can be accounted for. As marketing becomes increasingly critical, the enterprise web can be linked to supply chain management approaches. In other words, the divide between *development* and *business* is removed and this in turn allows the issues of poor farmer inclusion to be part of a wider debate.

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