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Enhancing technology generation and transfer through coalition approach: a case of sorghum poultry coalition, Andhra Pradesh, India

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Abstract

This paper describes an innovative institutional arrangement for the generation and dissemination of new knowledge and the formation of sustainable economic inter-linkages through coalition among researchers, farmers, farmers associations, poultry feed manufacturers and the poultry producers. The goal of this arrangement is to enhance on-farm productivity of sorghum and increase poor sorghum farmers' income by establishing market linkages between poor sorghum growers and poultry feed manufacturers. Under this project, farmers were supplied with seed of improved sorghum cultivars and were trained in bulking and storage of grain; feed manufacturers developed poultry feed rations with sorghum replacing maize at varying proportions; and scientists conducted poultry trials with sorghum-based feed rations with appreciable results. Finally, the project linked sorghum-growing farmer groups with end-users i.e. feed manufacturers, thus assuring a market for the poor sorghum growers. The coalition system was successful as it provided an opportunity to members to contribute knowledge in their respective fields, work towards a common goal with clearly defined roles and responsibilities, articulating problems, finding solutions, exploiting the synergies of working in groups and sharing the lessons learnt. Success of the coalition approach was facilitated by frequent review meetings with specific agenda, consensus approach to resolve issues,

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openness in interactions with various partners and use of electronic media, which helped to enhance the effectiveness of each partner's role.

Introduction

India is the second largest producer of sorghum in the world after the USA, with an area of around 11 million ha under cultivation, which is the largest in the world. Sorghum is grown during the rainy season (June–October) and post-rainy season (September–January). The rainy season crop accounts for 53 per cent of the total crop area and contributes to 65 per cent of the total production (Kleih et al. 2000: 7). The demand for rainy season sorghum grain for food use has declined over the years primarily due to increased production of rice and wheat and public policies that make these cereals more accessible to the poor and low-income consumers. Further, the deterioration in grain quality of rainy season sorghum due to grain mould leads to large fluctuations in price. At the same time, the fast growing (10–15 per cent per annum) poultry industry, which uses maize as its principal energy source in feed rations, has been facing shortages in the supply of cereal ingredients (Marsland and Parthasarathy Rao 1999: 24). Although sorghum is used in poultry feed rations, apprehensions of poultry feed manufacturers on energy levels, tannins and mycotoxins of normal and mouldy sorghum grain have been major limiting factors for its use.

In this context, overcoming the apprehensions on the use of rainy season sorghum in poultry feed rations and creation of sustainable marketing linkages between sorghum growers and the poultry industry through innovative institutional systems assume importance for ensuring continuous sorghum grain supply to industry and assured incomes to poor sorghum growing farmers. This paper discusses the formation of a coalition and the significance of a coalition approach in creating sustainable market linkages for small-scale sorghum growers.

Beyond linear approach to research and development (R&D)

The myth of the smooth progression of research from experimental farms/labs to adoption and diffusion among farmers still continues to influence the theory and practice of extension (Rasheed and Hall 2002: 1). However, in the last twenty years, there has been a change in the thinking on the nature of agricultural technology development and promotion process (Rasheed and Hall 2002: 1). There is now widespread agreement for replacing the conventional model of formal R&D as the central source of innovation with something more suited to the contemporary development agenda (Byerlee and Alex 1998; Hall et al. 2000, 2001; as quoted in Hall et al. 2004: 2). By the 1990s, there was growing realization that a more fundamental reform of institutional relationships was needed (Emma 2005: 2).

Crop Post-Harvest Programme (CPHP), which is funded by the British Department for International Development (DFID) and managed by Natural Resources International (UK), is one among those who moved quickly to respond to the latest demands for change of direction in agricultural R&D. Since its inception in 1995, the CPHP South Asia programme has become

increasingly aware of the importance of the institutional context of research (Emma 2005: 2). The term 'institutional context' refers to the embedded rules and norms of different organizations and the wider environment that governs the way partnerships between these organizations operate (http://www.cphpsouthasia.com/strategy.pdf). CPHP's experience indicates that innovation is successful when appropriate groups of actors, including producers and users of new knowledge and practices, work effectively as a *system*. Furthermore, it is the institutional context that, to a large extent, determines the winners and losers of the research and innovation process. As a result of this learning, CPHP has adopted what it called a 'coalition approach' based on the following three principles:

- *Strength through diversity*: This refers to the combined effort of many organizations including government, NGOs, scientific research establishments, universities, entrepreneurs in the market chain, producers and consumers.
- *An appreciation of partnership dynamics*: The way partnerships between organizations emerge and the nature of the relationships involved play an important role in determining how research priorities are negotiated and selected, and what impact the research has on different stakeholder groups.
- *The joint value of technological and institutional development*: Technology alone may only provide short-term solutions. For long-term solutions, it is necessary to get the right groups of organizations to innovate jointly. It is such coalitions that will collectively form the future capacity of local systems to generate, promote and sustain innovations relevant to the livelihoods of poor people (www.cphpsouthasia.com as quoted by Emma 2005: 2).

Formation of coalition to promote sorghum for poultry feed

Sorghum poultry coalition grew out of a long-standing partnership between International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the private sector. ICRISAT played a nurturing role, often through informal networks, to the emerging private seed industry and relied, in turn, on them to ensure that the new material they developed reached farmers. In 2000, ICRISAT signed an agreement with eight private sector seed companies to develop sorghum hybrids whereby each company makes a grant to ICRISAT and the scientists then make their results available to all the companies in the consortium. Thus, the scene was set for a broader institutional coalition to promote marketing opportunities for sorghum farmers.

ICRISAT sorghum breeders and economists were aware that this crop has potential market demand in animal feed, especially for poultry feed. Promoting the use of sorghum in poultry feed industry would require the involvement of all the actors in the sorghum innovation system including farmers, poultry industry, poultry researchers, farmers' organizations and all key actors in the supply chain right from the outset of the research.

As a result of this thinking, in 2002, ICRISAT scientists developed a project (funded by DFID-CPHP) for developing institutional linkages between different stakeholders in sorghum production and the marketing chain. The careful selection of member organizations relied on both long

experience and personal contacts. A list of eleven organizations that might take part in the sorghum coalition was drawn up. This was then narrowed down to four. In addition to ICRISAT, those included were Acharya N.G. Ranga Agricultural University (ANGRAU), Federation of Farmers Associations (FFA), Andhra Pradesh Poultry Federation (APPF) and Janaki Feeds. Personal knowledge of the individuals in the organization did not influence the choice of partners. But personal networks did help in quick induction of partners and in establishing trust in them. Members had their own reasons for joining the coalition. The ANGRAU poultry scientists and the ICRISAT plant breeders were interested in forming links with farmers and feed manufacturers to improve the uptake of their research outputs and findings. The sorghum farmers, represented by the FFA, saw the potential to increase the security of their livelihoods. Janaki Feeds saw the business potential of the new knowledge generated by the project and the opportunities for more reliable grain supplies. The APPF saw the potential benefits to its members by way of spending less on purchasing feed than they would if they relied only on maize.

Coalition objectives

The main purpose of the project is creation of marketing opportunities for poor farmers' sorghum grain by developing sustainable economic interlinkages in sorghum poultry feed chain through innovative coalition systems. The four objectives set out for the project are:

- Poultry feed formulations with sorghum cultivars available
- Formation of a sustainable farmer–scientist–industry coalition
- Technology access to the target groups accelerated
- Understanding coalition system as a process.

Roles of coalition partners

The scientists from ICRISAT took the initiative and convened a meeting with potential project partners in October 2002. They discussed objectives and approaches, agreeing to a shared overall goal – to improve the livelihood security of poor farmers – and subgoals that would meet the interests of each member organization. The question of who should lead the coalition provoked considerable debate. Since the key beneficiaries were sorghum farmers, the FFA felt that they could lead the coalition, but other members favoured ICRISAT because it is neutral, not pushing for any particular interest. The discussions also helped to identify the roles and responsibilities of the partners. A steering committee was formed to oversee the poultry feed trials with Janaki Feeds as convenor, since the success of the project depended upon buy-in of the outcomes of feed trials by the poultry feed manufacturers.

The coalition members discussed the advantages of trying to get the private seed industry involved, but their initial response was lukewarm. By the second year, however, three seed companies participated by providing new cultivars at a subsidized price as a way of promoting them and stimulating demand among farmers.

The clarity and appropriateness of roles – agreed jointly at the beginning of the project – was recognized as an important ingredient of success.

The monitoring plan, for example, stipulated the precise responsibilities of each partner organization in relation to each other.

Thus, ICRISAT would be responsible for the selection of suitable cultivars for poultry feed, multiplication and distribution of seed to participant farmers through FFA, networking of partners, and project implementation and monitoring. ANGRAU would conduct poultry feed trials with sorghum as principal cereal ingredient and provide technical guidance on consumption and quality of sorghum in poultry feeds, improved cultivars production for the target areas. FFA would represent the interest of the farmers; identify suitable sorghum growing areas and farmers; disseminate the information on improved technology to the farmers, market opportunities and foster effective linkages with end-users. APPF would represent the interest of poultry producers; take lead in the interaction with poultry producers; and facilitate on-farm poultry feed trials. Janaki Feeds would represent the interests of feed manufacturers, prepare feed formulations using different proportions of sorghum and up-scale project findings after completion of the project.

Innovation

For all members, this was their first experience of participation in a broad-based coalition involving different types of organization (public, NGO and private sector), and with different skills and expertise (science, farming, commerce). The 'coalition' allowed them to capitalize on the synergies deriving from sharing of skills from different disciplines with each member playing his/her role in the project.

The method of testing the sorghum was refined by the coalition to meet the interests of all. Although DFID had initially resisted the arguments for the necessity of these tests, they were eventually persuaded that these poultry feed trials were necessary since the recently released cultivars have some degree of mould tolerance and are free from tannins. To overcome feed manufacturers apprehensions, ANGRAU conducted the trials after replacement of sorghum for maize at different levels – at 50 per cent, 75 per cent or 100 per cent – adjusting the energy and protein content. The poultry farmers and feed manufacturers, however, wanted a simpler method, that is *part-for-part replacement* of sorghum in place of maize, which was taken up, although it was not in the original plan. A feed manufacturer's mill was used to prepare the poultry feed rations for this trial. The positive results from these trials (Laxmi et al. 2004: 39) are proof that the scientists extended their experiments to meet clients' views/expectations.

Another innovation to the methodology emerged from the poultry farmers' concern that the feed trials tests on layer birds should be validated for different breeds. At their behest, the tests were repeated on commercial layer birds (Bobcock). Even though ANGRAU had not thought this necessary (because previous research showed that all breeds would react the same way), this ensured poultry farmers' complete confidence in the results.

Although hypothetical, it is probable that if the scientists had been working in isolation, the poultry farmers and feed manufacturers would have less confidence in the feed trial results. The testing would not have reflected feed manufacturers practices and concerns and they would not

have been in a position to make requests for adjustments after the results of the planned trials had been published. Innovation within the project does appear to have been propelled by linkages between people. Learning from past experience, combining different perspectives to give rise to new, synthesized ideas and what is called 'creative imitation' (as quoted by Barnett 2004: 1), were all the product of the exchange of knowledge and experience among the coalition members.

In conjunction with shared interests, a non-domineering approach and informal communication or contact has been found to be a critical factor in the success of this coalition. Such informal discussion – without the rigid agenda or any emphasis on formal performance – allowed for creative and spontaneous thinking and consolidating relationships based on trust.

The coalition developed its own methods to respond to different types of evidence required to convince different groups of people. The scientists and poultry feed manufacturers required scientifically validated results, while the farmers (sorghum and poultry) needed to see the crop productivity and sorghum-based poultry feed rations for themselves. The coalition conducted experiments that generated evidence to satisfy scientists, but then also enabled some farmers to see for themselves, others to learn directly from the innovative farmers, and still more to be alerted to the market potential of sorghum through media, workshops and brochures. Thus, the coalition has been highly successful in forging links among different sectors.

Research, practice and coalition building

Various 'policy networks' have been identified in research on knowledge utilization and policy making, ranging from 'policy communities', with access to privileged information and decision-making, to 'advocacy coalitions' that share beliefs and aim at policy change. The sorghum coalition is a 'network' in the sense that the participants have voluntarily entered into the coalition. The participants also remain part of autonomous organizations and they come together for mutual or joint activities (Church et al. 2002: 14). As a group of organizations with different values and interests, the Sorghum Poultry coalition could also be labelled as an 'issue network' (Emma and Young 2002: 16). Alternatively, as distinct but related organizations, including private companies, who have come together to improve their performance or position, it might be categorized as a 'strategic alliance' (Creech and Willard 2001: 84). Although such labels are only of limited use, they can be helpful in exploring how different types of networks or coalitions will require different strategies for successful innovation, learning and communication to ensure impact on poverty reduction.

Shared and complementary interests

The need for clear objectives is now a *mantra* repeated by all those with experience in partnerships and networks. The sorghum coalition shared interest at the level of overall goal, and the complementary interests expressed through outputs at the lower level, allowed it to work as a team. Decision-making is based on consensus building rather than advocacy or

campaigning. This entailed the identification of incentives that drew each member into the coalition but also kept them investing in it. These incentives were primarily, but not entirely, financial.

Management and learning

Another aspect of planning that the coalition rightly took extremely seriously was selection of partners. It has been pointed out that it is better to have a small number of dedicated organizations in a network than dozens of marginally committed ones (Creech and Willard 2001: 59). The coalition followed this model as well as monitoring a complete membership involved from the start.

Communication and trust

It is in the area of communication that the biggest differences between networks can be found. The sorghum coalition members respect and trust each other, in ways that their enterprise requires. Newell and Swan (as quoted by Church et al. 2002: 18) have distinguished between three types of trust:

1. *Companion trust*: this is the trust that exists in the context of goodwill and friendship;
2. *Competence trust*: this is where we trust in others' competence to carry out the task agreed;
3. *Commitment trust*: this is a trust made fast by contractual or inter-institutional agreements, ones that can be enforced.

In this case, the sorghum coalition achieved all three, but most particularly, competence trust. Regular dialogue was critical, and nurturing relationships with courtesy was a feature; but equally important was the emphasis on results.

Poverty relevance

The small-scale poor sorghum producers with less than one ha of land benefited from this project. In the first year of project implementation, i.e. the 2003 rainy season, 74 farmers from four villages of Mahabubnagar and Ranga Reddy districts of Andhra Pradesh state were supplied with improved cultivars. In the 2004 rainy season, 529 poor sorghum farmers in twelve villages of the same two districts were supplied improved sorghum cultivars. These farmers suffer from weak social capital and poor access to markets, which restrict their ability to influence market demand. The improved technology propagation through this project led to augmented productivity by way of additional production to the tune of 45 metric tons in the 2003 rainy season and about 150 metric tons in the 2004 rainy season, safeguarding producers directly and consumers indirectly. This happened in spite of severe drought conditions during both years of project implementation. The increased stover from sorghum production provides security for livestock and additional income to the farmwomen, since livestock rearing is women-centred in poor households. Furthermore, households benefit from greater availability of sorghum for consumption. The project also explored institutional arrangements to establish an organic linkage between research,

Summary of lessons learned by the coalition

Generic – all partnerships	Specific – sorghum poultry coalition
Clear objectives	Financial accountability
Flexibility and creativity	Transparent and consensual management
Credible and 'legitimate' representation of stakeholders	Collective planning, innovation and learning
Matching evidence and communication to the audience	Competence trust important when undertaking joint activities
Monitoring of impact, not just outputs, on indirect as well as direct stakeholders	Appropriate division of tasks
Informal networking and contacts important	Stakeholders involved only when it meets their interests
Inclusivity required to ensure equitable impact	Regular face-to-face meetings
	Courtesy and the 'personal touch'

producers and end-users (poor consumers and industrial users) that is capable of enhancing overall welfare.

Lessons learnt

A unique feature of this project is the approach – that the process in which distinct/independent entities/institutions work together in innovation system as a single unit, while keeping their identity, for the common goal with synergistic effect.

It would be appropriate to draw some basic principles from the experiences of sorghum poultry coalition of Andhra Pradesh, India for broadening the understanding and future development strategies of researchers, policy makers and development specialists.

In nutshell, the sorghum poultry coalition, Andhra Pradesh, India was successful, because, the partners had:

- Common goal
- Clearly defined roles and responsibilities
- Ability to articulate problems and prospects
- Empathetic ability to fit themselves in broader objective
- Enthusiasm to work in groups and sharing the synergies

Conclusions

The coalition approach helped to present the right kind of incentives to benefit poor sorghum farmers, feed manufacturers, poultry producers and the scientists. The following points are apparent from the outcomes of the research programme.

- The practical concerns of industry addressed: the *part-for-part replacement* trial and experiments on another layer bird (Bobcock) reveals ample evidence for this
- *Scaling up*: private sector participation ensures the role of private seed industry in enhancing technology access to poor sorghum growers

- Poultry producers showed interest in partnering with the sorghum farmers by way of supplying poultry manure and purchasing the surplus sorghum grain making the linkage stronger
- Producer–processor economic inter-linkage between poor sorghum growers and poultry industry was successful at preliminary stages. This may go a long way in benefiting both producers and processors and consumers by eliminating the middlemen, and leading to minimum possible price spread
- *Increased income for the sorghum growers*: the project farmers realized three to fourfold increase in yields by adopting improved technology (improved cultivars and practices) with proportionate increase in net farm income (Parthasarathy Rao et al. 2004: 42)
- *Empowered local farmers associations*: village-level farmers associations experienced new strengths in bargaining with industry. The practice of grading and bulking will open new opportunities in other alternative uses
- *Time lag in technology transfer is minimized*: because, at every stage, stakeholder workshops were organized to disseminate the research results and receive feedback
- *Scientists sensitized to users expectations*: sorghum crop scientists got feedback on farmers' preferences in improved varieties; and poultry scientists expanded their knowledge in matching their research with end-user (feed manufacturers) requirements.

Clearly, it will take some more work to judge the strength of the research–farmer–industry coalition. But if that proves sustainable, being generic in nature, this coalition approach can suitably be adapted to other crops and in other places, where market linkage is constraining crop production.

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