

ARE WE GENERATING NEED BASED AND RELEVANT LIVESTOCK TECHNOLOGIES?



Dissemination of improved livestock technologies is important to enhance livestock productivity. But investigating the relevance of these technologies and the process of technology generation is equally or more important argues Prakashkumar Rathod and Mahesh Chander.

CONTEXT

Poor productivity as well as the quality of production and products remains a cause of concern in Indian livestock sector (Chander *et al.*, 2010). Various efforts, therefore, are underway to generate and disseminate improved livestock technologies to improve the productivity. However, till date, most of the technologies or processes concerning livestock sector have recorded poor adoption at the field level, which might be due to various factors like attributes of technologies developed, socio-psychological and personal aspects related to users of the technology, availability and quality of support mechanism etc (Box 1). Only a very few studies have focused on the type of research being undertaken in the livestock sector. Many believe that "researchers know better than the farmers and extension personnel" who are considered mostly as clients of research outputs.



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Rao et al (1995), pointed out that researchers and extension agencies are often unaware of farmers' priorities. This leads to development and promotion of technologies that are seldom relevant for them. Hence, there is a need to analyse the technologies developed at research institutions as well as the process adopted for technology development by addressing few questions. Are the research institutions generating appropriate technologies? Do we need more farmers' involvement in technology generation? Or is there a missing link among research, extension and farmers?

Box 1. India's livestock sector: some concerns

India boasts largest livestock population (512.05 million) in the world but the productivity is one among the lowest in the world with that of the world average. For instance, the average annual milk yield of Indian cattle is 1172 kg which is only about 50 percent of the global average (FAOSTAT, 2014), and much less than New Zealand (3343 kg), Australia (5600 kg), UK (7101 kg), US (9332 kg) and Israel (10214 kg). Likewise, despite significant increase in livestock production, per capita consumption of milk (69 kg) and meat (3.7 kg) is much lower against corresponding world averages of 85 and 40 kg, respectively (GOI, 2012). The livestock sector in India is solely dependent on small and marginal farmers who are mostly traditional in nature and rarely follow scientifically recommended practices. Most of the livestock producers being small and marginal farmers, their capacity to mobilize resources required to absorb the latest technologies developed by research institutions is limited. Absence of an effective extension machinery and lack of access to institutional finance or inputs is a major constraint in improving productivity by adopting latest technologies (GOI, 2013). Further, only 5 percent of the households access any information on animal husbandry against 40 percent of households accessing information on modern technology for crop farming (GOI, 2005). Moreover, livestock farmers sought information largely from private rather than public sources. Although animal husbandry sector is feminized in India, most of the conventional training and extension programmes are men oriented and do not suit women. The youth in India has to be promoted to take-up livestock farming on commercial basis. All such issues have been great challenges and concerns for Indian livestock sector.

STATUS OF LIVESTOCK/ANIMAL SCIENCE RESEARCH IN INDIA

Public funded research agencies under the National Agricultural Research System (NARS) lead livestock/animal science research in India. The Animal Science Division of Indian Council of Agricultural Research, (ICAR), New Delhi (<http://www.icar.org.in/en/animal-science.htm>) coordinates and monitors research activities in its 19 Research Institutes and their Regional Centres. The Division has two Deemed Universities, seven National/Central Research Institutes, one Bureau, one Directorate, one Project Directorate and six National Research Centres. The Division coordinates seven All India Coordinated Research Projects (AICRPs) and six Network Research Programmes. In addition, four Outreach programmes and three Mega seed projects (poultry, sheep and pig) are also being operated in different parts of the country at different ICAR institutes, State Agricultural / Veterinary Universities/ State Animal Husbandry Departments and Non-Governmental Organizations.



Though the veterinary universities have greatly expanded in number with funding support from state governments but their research capacity has weakened (Pal *et al.*, 2012) leading to poor interface of research, extension and education. There has been no parallel increase in the number of scientists. This implies inadequate research staff at the universities and increased overhead costs due to the proportionally larger administrative burden of more institutes. Further, the investments for commodity-wise public Research & Development indicates that crop science has received highest focus followed by livestock, natural resources, fishery-related issues, and forestry related issues in India.

ISSUES IN LIVESTOCK TECHNOLOGY GENERATION

Organizational Mandates and Personal Motives Vs farmer needs:

Livestock technologies are generated and developed as per the mandates of the organization or personal motives but apparently not as per the needs and demands of the farmers or their field situations. The research activities that are conducted seem to be based on the review of global literature on livestock research which might not be relevant to local situations. Further, the professional competency of a scientist is deemed to be governed by the number of research publications produced than the technologies he has transferred effectively (Rathore *et al.*, 2008). Most often, the researchers highlight the advantages of their technologies without explicitly indicating the negative consequences of such technologies (Rao and Natchimuthu, 2015). Such scenario leads to generation and transfer of irrelevant livestock technologies to farmers as depicted in Box 2.

Box 2. Poor diffusion and adoption of Azolla and Urea treatment of straw

Azolla as animal feed:

- Experts state that it is an excellent feed, rich in protein, vitamins and other nutrients required by animals
- It is promoted by government agencies, dairy cooperatives, NGOs and KVKs and there are subsidies (financial incentives) to establish Azolla units.
- Farmers argue that the practice of cultivating and feeding azolla to animals is not practically feasible and the adoption is built around the subsidies. The animals do not accept *Azolla* as a sole feed and therefore it needs to be mixed with concentrates or jaggery water
- Extension functionaries too concur with the views of farmers and believe that this technology is impractical at the field level. Adoption of azolla as a livestock feed has failed in many of the South Asian countries.
- Yet, articles in praise of azolla are piling up, without any horizontal diffusion of this technology among farmers!

Urea treatment of straw:

- Experts recommend it as an excellent technology for improving the nutritive value of straw
- Millions spent on research, development & promotion of this technology among farmers across the country, since the 1980's. This goes on even today. Farmers hardly use this technology, even in places where it is intensively promoted by researchers and extension workers
- Farmers find the treatment too technical and cumbersome to follow.
- No horizontal diffusion of this technology among farmers
- It is also promoted under government schemes
- Yet, papers are still being published in praise of this technology

Source: Chander, M. 2011 a&b; Tamizhkumaran and Rao, 2012

Varying perceptions on promoted livestock technologies:

Rathod and Chander (2015) pointed out that perception of researchers and farmers on the appropriateness and usability of livestock technologies vary significantly. For instance, farmers have poor favourable opinion on some of the technologies which researchers perceive as important and have recommended for adoption. Rathod and Chander (2014) through a Delphi study in India also depicted that only few of the technologies were field relevant and need based (Table 1).

Table 1. Perception of farmers about few selected livestock technologies

S.N	Livestock technology/ Innovation	Observations of farmers about the technology
1	Concentrate feeding	<ul style="list-style-type: none">• Costly at field conditions and hence, small and marginal farmers cannot afford the same.• Feed is perceived as non-palatable by few farmers.
2	Artificial Insemination (AI)	<ul style="list-style-type: none">• AI has poor conception rate• Higher chance of getting male calf• Calves susceptible to diseases
3	Clean milk production	<ul style="list-style-type: none">• Impossible to practice at field conditions• Price of milk is based on fat and SNF. So, microbial count or milk quality is not a priority.
4	Milking /milching machines	<ul style="list-style-type: none">• Not suitable for small dairy herd• Higher cost of machine for small and poor farmers.

Source: Rathod (2015)

Missing links among research, extension and farmers:

Research-extension linkages are very important for transferring developed technologies from researchers to the end users. Very often, the livestock related technologies developed or modified in the research institutes do not reach the end-users for want of efficient and effective extension mechanisms and procedures (GOI 2013). The research and extension experts do not absorb or use feedback from farmers due to passive nature and limited exposure to field realities. The researchers and extensionists generally contact farmers only for their capacity building and consultation programmes as per the mandates of their organization. Some of the suggestions of farmers on selected technologies are given in Table 2.



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Table 2. Suggestions of farmers about selected livestock technologies.

S.N	Technology/ Innovation	Suggestions of farmers about the technology for modification
1	Concentrate feeding	<ul style="list-style-type: none"> Locally available inputs/raw materials must be used to prepare concentrates at home and demonstrate the same at field conditions Need to add few components/ sweeteners to make concentrate feeds palatable
2	Artificial Insemination	<ul style="list-style-type: none"> Researchers need to study and confirm why there is more chance of getting male calf from AI Research is necessary to improve conception rate of AI
3	Clean milk production	<ul style="list-style-type: none"> Good quality milk having less microbial count must be promoted and such farmers must be given incentives or higher price Fat and SNF should not be continued as sole criteria for pricing but also should include microbial count Simple tests must be developed by scientists so that farmers can test milk at their farm before selling it in the market

Source: Rathod (2015)

Administrative and operational constraints include lack of infrastructure and resources in the process of technology generation. Under varying conditions, the research objectives are modified to fit- in the existing infrastructure and logistic support which ultimately affects the quality of the research and its output/outcome. The budget allocation and expenditure process is perceived to be complicated in majority of the organizations which creates stress on the researchers and extensionists. Under such circumstances, creation of congenial research environment including improving the number and quality of human resource would go a long way towards improving the process of livestock technology generation in India.



The rate of adoption of livestock-related technologies in smallholder crop-livestock systems worldwide is consistently low. In order to resolve this problem, approaches that guarantee effective linkages among researchers, extension workers, decision-makers and farmers, who have a complex knowledge base and widely dispersed expertise are needed. (Francis *et al* 1997; Conner *et al* 1998).

WAY FORWARD

Promote field trials: Livestock research must consider realistic advantages and disadvantages of traditional/conventional and modern methods of livestock production based on the field trials. As it is difficult to have standard package of practices suitable for all farming locations, the extension professionals must identify and advise the livestock owners based on field trials and also communicate the findings to the researchers as well. The feedback mechanism is inherently weak, which needs to be strengthened.

Strengthen linkages: The linkage workshops and brainstorming sessions among multi-stakeholders must be undertaken on priority basis to generate need-based and field relevant technologies (IVRI, 2014).

Include farmers as partners in research and extension: Farmers are no more mere passive recipients of technology. They should be encouraged to share their feedback and also their indigenous technical knowledge and other grassroots level innovations. Their demands and suggestions can help the research system in developing need based and relevant technologies.

Provide Infrastructure, resources and recognition for testing and adaptation of technologies: The research related to field level testing and adaptation of livestock technologies must be promoted and should be given equal importance like any other research in the form of necessary infrastructure and resources. This should also be one of the yardsticks for judging the researchers.

Reorient veterinary education: Orientation of graduate and post-graduate students towards field realities by having more field exposure visits is important to empower them with the right research orientation and to have appropriate skills for field extension. However, the current curricula provides only very negligible field exposure and this needs to change.

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Dr Prakashkumar Rathod is Assistant Professor, Department of Veterinary and Animal Husbandry Extension, Veterinary College, Bidar, Karnataka State (India). Email; prakashkumarkr@gmail.com and Dr. Mahesh Chander is Principal Scientist and Head, Division of Extension Education, ICAR-Indian Veterinary Research Institute, Izatnagar-243122 (India). Email: drmahesh.chander@gmail.com