Blog 38: September 2014

Quantity Vs Quality: The great dilemma of livestock research

Extension is not merely about promoting research based knowledge among farmers. Providing feedback on knowledge use and raising new and relevant research questions are equally important. Dr S V N Rao and Dr. K Natchimuthu take a critical look at the contribution of livestock research in India in this blog and suggest a shift in emphasis in livestock research from increasing quantity to improving quality of livestock products.

CONTEXT

Livestock Research is considered as an inevitable tool for livestock development. Application of livestock research has demonstrated its impact on increased production of milk, meat and eggs, reduction in losses in livestock production. Many research articles contain the gains accrued through livestock research, but rarely delve into the losses of research application (all scientists have pro-innovation approach). One potential reason is that the negative consequences of research application will be known only after several decades of its wider adoption in the field. This blog focuses on what we paid or lost to gain the advantages from application of livestock research with special focus on breed improvement.

CROSSBREEDING

Crossbreeding of native livestock with exotic livestock is an accepted technology to improve the genetic potential of livestock and thereby enhancing livestock output. Crossbreeding of cattle has been recommended and vigorously pursued for wider application since 1970s in India. As a consequence we could produce different varieties of crosses in livestock species including poultry. Efforts are still on to stabilize the crosses to produce higher yields and at the same time retain the resistance to diseases which many of our native breeds of livestock possess in abundance. The negative consequences of the crossbreeding which by now are very well discernible include:

Ongole cow and crossbred cow

1. ***Loss of native germplasm*:** This has been noticed in all livestock species. Some breeds are already on the verge of extinction. Realizing this damage to our indigenous breeds, the Indian Government has initiated programmes to conserve threatened breeds which are likely to be lost. A stage has come that we need to search for our native germplasm outside the country (Ongole cattle in Brazil and Murrah buffaloes in Israel). In institutes like National Dairy Research Institute (NDRI) which has been associated with research on crossbreeding of cattle succeeded in developing new breeds like Karan Fries, Karan Swiss at the cost of disappearance of Tharparkar and Sahiwal cows from the institute's farm (Rao et al, 1995).

Murrah buffalo and bull (Pride of India)

2. ***Increased dependence on purchased inputs and resultant increase in costs:*** Increased production (output) requires increased feed and management (inputs) leading to increased cost of production and many times increased competition for food grains (Humans Vs livestock) which suits to western countries that consume more animal protein than India. Availability of land for production of grains and fodder in addition to grazing of animals is an indispensable factor in sustaining higher productivity. Land being limited and fixed in nature is already showing its limitation in sustaining livestock production. The dependency of the livestock farmer on researchers, technical personnel and other input providers is increasing with increase in the application of research that focus on increasing production. We converted many of our time tested sustainable farming systems which are "low input and low output" to "high input and high output" systems leading to commercialization of livestock farming and marginalization of small farmers who are finding it difficult to rear their livestock on purchased inputs. Take the case of improved back yard poultry in India (Box 1).

The livestock rearing in the past was based on crop by-products with minimal purchased inputs like oil cakes and less dependency on veterinary medicines and veterinary services. Although the research has come out with very good vaccines to protect the animals from various infectious diseases, the causative agents are also actively getting mutated posing serious challenges to the researchers. The net result is development of polyvalent vaccines which protects the animals only from those strains incorporated in the vaccine. Foot and mouth disease occurs in cattle, buffaloes, sheep, goats and pigs, and protecting all these species of animals against several strains of FMD virus remains a utopian thinking. By now it is well known that the crossbreds require more attention from the vets compared to our local animals which are far superior in resisting the diseases.

Box 1: Promotion of Backyard Poultry Strains

Improved Backyard Poultry (BYP) strains (Giriraja, Vanaraja, Gramapriya, Swarnadhara, Krishibro, Krishilayer, Caribro, Carired, Naked neck broiler, Dwarf broiler, Krishna J, Namakkal chicken1, etc) were developed through research for increased production of eggs and meat. These strains have been released and promoted to improve the nutrition and supplementary income of farm households. However there are several issues which remain unaddressed (Rao and Natchimuthu, 2012: Athilakshmy and Rao, 2012). These include:

- No brooding ability and less mothering instinct among improved strains to protect from natural predators which makes the BYP farmers dependent on hatcheries for chick supply continuously.
- Improved strains cannot thrive on scavenging alone and they need feed supplementation to get the expected body weight gain in time and to support the increased egg production.
- BYP may not be suitable in places where farm mechanization is very high (reduces the availability of grain waste), lack or low availability of backyard area for rearing chicks etc. It is ideal in places where there is abundant food base for scavenging.
- Though, most of the farmers are interested to rear day old chicks of improved strain (few chicks), the difficulties in transporting chicks from the production unit, lack of training, poor delivery of vaccination and de-worming services, are the barriers preventing them to adopt this technology.

3. ***Perceptions on quality:*** Despite all the advancements in livestock research, the consumers of livestock products still perceive the products of local animals (desi cow milk, desi chicken, desi chicken egg, desi goat meat) superior in terms of taste, minor nutrients and energy and this perception is reflected on their premium prices. With the realization that organic farm products are better than the products obtained by the conventional faming (which uses synthetic fertilizers, pesticides and growth promoters) the researchers have been recommending organic farming, akin to good old traditional Indian farming system which sustained over centuries. Now a stage has come that the consumer does not know what is he consuming and the health conscious people are looking for healthy food, free from chemicals and pesticides.

4. ***Implications on human health and environment:*** No doubt the research has contributed for increased production but with decreased focus on healthy food. “Chickens raised for their flesh (broilers) are fed large amounts of antibiotics and drugs to keep them alive in conditions that would otherwise kill them. The antibiotics/probiotics make chickens grow so large, so fast that they often

become crippled under their own weight. This reckless use of antibiotics also makes drugs less effective for treating humans by speeding up the development of drug-resistant bacteria. Because chickens are fed massive amounts of drugs and pesticides, these chemicals are also found in high concentrations in their feces, and this fecal pollution from chicken farms is especially disastrous for the environment (http://www.peta.org/living/food/top-10-reasons-eat-chickens/). The scope of recycling or reuse of outputs is becoming narrowed down leading to the issues like pollution of air, water and soil, with high degree of potentiality to generate carcinogens which are difficult to identify.

Box 2: Indiscriminate use of antibiotics in Poultry industry and Antibiotic resistance in human beings

A study conducted by the Centre for Science and Environment (CSE), New Delhi revealed that 40 % of the 70 chicken samples collected from Delhi, Noida, Gurgaon and Ghaziabad contained residues of six commonly used antibiotics - oxytetracycline, chlortetracycline, doxycycline, enrofloxacin, ciprofloxacin and neomycin. The study also revealed that large scale and indiscriminate use of antibiotics in the poultry industry has led to antibiotic resistance in Indians who are falling prey to many ailments that are otherwise curable.

The poultry sector has been growing at around 8 to 10 percent annually and poultry constitutes of more than 50% of all the meat consumed in India. In order to meet the growing demand and competition, poultry breeders resort to the use of antibiotics to make chickens plump quicker and ensure a steady supply (See also http://cooks.ndtv.com/article/show/do-you-know-your-chicken-403100). Since there are no restrictions or limits on the use of antibiotics, the poultry industry has been rampantly using them as growth promoters. The residues of these antibiotics are being transmitted to humans on consumption.

In India, there is growing evidence that resistance to fluoroquinolones is rapidly increasing," says Sunita Narain, Director, CSE. Antibiotics are becoming ineffective due to increased resistance and treating fatal diseases like sepsis, pneumonia and tuberculosis (TB) with fluoroquinolones is becoming tough because microbes that cause these diseases are increasingly becoming resistant to fluoroquinolones, says the report.

Source: Report from Centre for Science and Environment's (CSE) (http://www.livemint.com/Politics/zC3RHtP3iEeNLxnJgZXTJK/Antibiotics-critical-to-humans-used-as-growth-promoters-in-p.html?utm_source=copy)

It appears that we are caught in a situation where we have been compromising quality for quantity and it is high time that we do a review of our livestock research and reverse this trend.

WAYS FORWARD

1. Livestock research must come out with a position paper on the realistic advantages and disadvantages of traditional/conventional and modern methods of livestock production and its other implications for wider discussion among various stakeholders, including farmers. Wherever, traditional methods of farming predominate (tribal areas, interior or remote areas, virgin areas, etc), ways should be found to improve these methods, instead of promoting new types of livestock farming. Wherever intensive methods are followed, there is a need to educate the farmers/entrepreneurs on input use and its health and environmental implications and support options that focus on quality livestock production. Indian Council of Agricultural Research (ICAR) may take a lead in developing this position paper and in framing policies on livestock research that focus on quality.

An important share of poultry meat and eggs consumed in the country comes from small scale producers who make use of a variety of native breeds

2. Consumers and farmers should be made aware about the different methods of livestock production and their implications so that they could better decide on what they are consuming. For instance, the consumers must know what price they are paying for consuming the low priced broiler chicken. A very small population (health conscious and having high purchasing power) of consumers have started paying premium prices for organic products which are considered comparatively less harmful to human health. This could be one of the reasons for the consumer demand for poultry tapering off in the US, pushing local companies to increasingly depend on exports (*Indian Ban on Imports of US Poultry Sparks WTO Dispute,* 7 March 2012, http://www.ictsd.org/bridges).

3. Organic livestock production: The methods adopted in organic farming ensure the quality of products without chemical residues. Hence, there should be a policy to promote organic or natural farming which preserves the resources for our future generation (sustainability) by reducing the air and water pollution. Fortunately, the demand for organic farm products is increasing with increasing awareness about the negative consequences of the products of modern farming and perceived advantages of organic farming as well as increased purchasing capacity.

4. Initiate new research focusing on quality (again use science or the scientific principles) and develop breeds/strains which are sturdier and fit into the low input traditional livestock farming system.

5. Conservation of threatened breeds of livestock: Realizing the potentiality of the local breeds and negative consequences of crossbreds, the Government of India is encouraging conservation of local breeds with 100 % Central assistance (Annual report 2012-13, DAHD& Fisheries, GOI). This needs to be promoted vigorously by involving farming communities and NGOs.

6. Document and learn from use of Indigenous technical knowledge: It is also equally important to encourage and promote indigenous technical knowledge to enable the livestock farmers to take advantage of the approved practices in prevention and treatment of diseases in animals. The

efforts being taken by the National Innovation Foundation (NIF) in documenting, validating, field testing and facilitating product preparations by using local resources are laudable (www.nif.org.in) It is time for us to learn from our mistakes and move forward for the betterment of human welfare.

REFERENCES

Rao, S.V.N & Natchimuthu.K (2012). Challenges in the path way of poverty alleviation through improved strains of backyard poultry In Souvenir of XXIX Annual Conference and National Symposium of Indian Poultry Science Association (IPSACON), 5 - 7 December, 2012.pp 193-202.

Athilakshmy. S & Rao, S.V.N (2012). Adoption of improved strain of backyard poultry in Karaikal region of Puducherry in Proceedings of Kerala Veterinary Science Congress 2012, 10th &11th November, 2012.

Rao, S.V.N., Venkatasubramanian, V & John De Vit (1995). Consequences of crossbreeding in India, *Economic and Political Weekly*, Vol 30, No.39, A 112 - 116.

Dr S V N Rao and Dr K Natchimuthu are working as Professor & Head and Associate Professor respectively in the department of Veterinary and AH Extension Education, Rajiv Gandhi Institute of Veterinary Education and Research, Puducherry. Authors can be contacted at svnrao1953@gmail.com and natchimuthuka@gmail.com respectively.