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Livestock technology transfer service in India: A review

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ABSTRACT

The Planning Commission, Government of India (GOI), in its document, "*Agriculture Strategy for Eleventh Plan: some critical issues*" has observed, 'unfortunately, extension advice is almost totally absent in animal husbandry, special efforts need to be made in this area". This motivated the authors, besides the experience they gained in detailed study of extension role of state departments of Animal husbandry, to write this review indicating a direction to livestock technology transfer service suitable to India. To cater to the diverse needs of livestock farmers, among others an efficient livestock extension services delivery system is required. Whereas, there is no exclusive livestock extension service in India to cater to the specific needs of livestock farmers, as also the general extensive services are oriented mainly for crops. The Government of India (GOI) spends below 10% on livestock extension activities. The State Departments of Animal Husbandry (SDAH) - the major stakeholders for the livestock development in India is mostly dominated by animal health concerns with negligible attention to production related advice to farmers. Moreover, their spending on livestock extension activities is only around 1–3% of their total budget. Consequently, the NSSO survey revealed that only 5.1% of the farmer households in India were able to access any information on animal husbandry against 40.4% of the Indian households accessing information on modern technology for crop farming. This situation was analysed towards improving the framework for livestock extension services delivery system suitable to India.

Key words: Animal health, Livestock extension services**,** Production, Productivity

The potential of India's huge livestock resources is grossly under utilized, necessitating more rapid progress towards boosting per unit productivity, quality of products and exports. Whereas, the demand for, and production of livestock and livestock products in less developed countries (LDCs) is expected to double over the next 20 years (Delgado *et al*. 1999). The overall growth rate in livestock sector is steady and is around 6% and this has been achieved despite the fact that investment in this sector was not substantial (Bhat and Das 2002). But in terms of productivity, India's huge livestock resources are one of the poorest in the world. For instance, the milk yield of a cow in India is 900 kg, which is about 20% of the world average (Birthal and Jha 2005). According to DAHDF, the milk productivity per lactation is only 987 kg in India as against world average of 2,038 kg. Thus, the poor productivity as well as the quality of production and products remains a cause of concern in Indian livestock sector.

For productivity improvement, technology generation (research), technology dissemination (extension), technology users (farmers) and support mechanisms (inputs supply, market credit etc) have to be geared up. The functioning of various livestock development agencies especially the State Departments of Animal Husbandry (SDAH) in relation to the extension education activities performed by them need to be analyzed so as to ascertain a paradigm for livestock extension service suitable to India. To this end, it would be pertinent to review various extension mechanisms currently in operation in India and their role in delivering livestock related information to the farmers and feedback from them.

The importance of productivity improvement in crops as well as livestock has been well recognized since long in India. Accordingly, Government of India (GOI) initiated programmes like IADP, ICDP, Lab-to-Land, National Demonstrations, 'Operation Flood' etc. since 1960s through 1980s. India owns a huge livestock population (485 million), attended by extensive network of the veterinary institutions (54 912), and lot many personnel (among others, over 50 000 professional veterinarians) looking after the task of

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livestock development, yet the productivity remains very low in comparison to the world average.

The Animal Husbandry Department (AHD) at the state level is the major stakeholder as far as livestock development is concerned. The AHD with its huge infrastructure, however, is primarily involved in treatment of animals for which it has a clear mandate. With more effective control of serious diseases such as rinderpest (now eradicated from India) and Newcastle disease and more easily available treatment for many other conditions, animal health constraints are gradually being overcome (Morton and Matthewman 1996). But the demand for information on different aspects of livestock production is growing; as also the great numbers of livestock are now kept by people without traditional background causes distinct pressure on AHD to educate the owners. It is expected that farmers' education and extension contacts enable them to acquire, receive and decode new information to evaluate benefits of alternative sources of economically useful information and to have earlier access to such information (Duraisamy 1992, Adeokun and Akinyemi 2003). This necessitates a system through which farmer can receive desired information. However, there is no organized system of providing extension messages to the farmers especially with regard to improved animal husbandry. The activities relating to livestock extension are sporadic and spread over time and space and do not meet the requirements of a vast majority of farmers (Lehmann *et al.* 1994). The problem is further compounded with the neglect of policy makers and by researchers towards livestock production extension (Morton and Matthewman 1996, Sen 2003, GOI 2002) since the animal health extension gets precedence over production extension in India.

Like many other developing countries, the general extension services in India have been traditionally funded through public funds. Until 1960's, agricultural extension was purely a function performed under the guidance of the State Department of Agriculture (DoA). But subsequently many other programmes like Training and Visits T&Vwere introduced to cater to the needs of farmers. However, it was recently realized that the inclusion of livestock component into Broad Based T & V system was unsuccessful for several reasons, such as plan to nominate the Department of Agriculture as the lead organization, increase in the work load on Village Extension Workers (VEWs), the staff were primarily trained in agriculture and that they would be unable to provide an adequate technical service, skeptism that livestock production was amenable to the provision of regular, standard messages of the kind suitable for crops, longer time-scale in animal production, slower speed of technical development and lack of synchronization of different animals and herds (Matthewman *et al.* 1997, Morton and Matthewman 1996 and Rao *et al*. 1992). Thus, the T&V system could not make much impact on animal production.

Matthewman and Ashely (1996) further argued that farmers see village extension workers as crop specialists and do not go to them for livestock information. Thus, introducing poor livestock keepers to new technologies without securing access to support services like training and advice does not succeed (Chipeta 2002). These features substantiate the claim that State Department of Animal Husbandry (SDAH) has to relook its policy to provide adequate livestock production extension service, since, agricultural extension is the primary responsibility of DoA in any given state and livestock extension *per se* is under the domain of the SDAH. Despite the rise of the private sector, public extension will continue to play a central role in technological dissemination. This implies the continuation of extension service by the government departments to cater to the needs of livestock owners. Moreover, the agriculture including the animal husbandry is state subject; the government departments like SDAH remain the primary stakeholder as far as the dissemination of information relating to livestock development is concerned.

The investments of the GOI including share of states in animal husbandry and dairying sector is extremely low and varied between 0.4% and 1.0% . The investment in animal husbandry and dairying as percentage to total investment of GOI in 9th Plan was 0.4% only (Bhat 2003). This is compounded by the investment of National Department of Animal Husbandry, Dairying and Fisheries, i.e. DAHDF, which commits less than 10% of its budget to information delivery (Chipeta 2002). The DAHDF pays inadequate attention to extension activities which is evident from its spending, for instance during 1996–97, it spent only Rs 78.6 million on extension and training activities (9.7% of total expenditure on animal husbandry). The low investment by the DAHD in information delivery including livestock extension activities is also likely to be followed by state departments, which often face budgetary constraints. Besides, the last decade witnessed an accelerated decline in credibility of public sector extension provided by State Departments of Animal Husbandry. This calls for a thorough review of the situation with respect to provision of livestock extension especially by the SDAH. An insight into these issues is essential towards augmenting and efficient use of extension in livestock development. A first step towards this end would be to undertake detailed institutional analysis (Sulaiman and Hall 2002). This makes it imperative that the SDAH has to effect structural arrangement so as to accommodate livestock extension component in its scheme of things just like the animal treatment aspects.

Apart from structural inadequacy, livestock extension service in India suffers from services generally being provided by men for men while women play key role in animal husbandry particularly in goat keeping and backyard poultry. Large ruminants, large / progressive farmers, well developed areas receive better attention while neglecting the smaller livestock species and small and landless livestock

keepers, focus on intensive systems particularly on milk, to the neglect of other roles of livestock (Matthewman and Ashley 1996).

Indian agricultural extension system

The importance of frequency of extension contact and closeness with the extension agent in adopting various technologies have been realized since long (Rao and Kherde 1985, Gill 1991). Thus, the GOI had laid special emphasis on extension in implementing various rural development programmes like Community Development Programme (CDP), National Extension Service (NES) and Intensive Area Development Programme (IADP). As the agriculture and allied activities are under the state list, the State Department of Agriculture (SoA) was given the prime responsibility in implementing various extension programmes and activities until 1960's (Sulaiman and Hall 2002). Subsequently, with the establishment of Indian Council of Agricultural Research (ICAR) as well as the State Agricultural Universities (SAUs), Departments/ Directorates of Extension were established. Their basic objective is to conduct extension research, demonstrate latest technologies, provide feedback to scientists, and training support to State Departments of Agriculture (Pal and Singh 1997). To extend the support to the farmers, village level functionaries were assigned the task of spending 75% of their time on functions related to the promotion of improved agricultural practices (Bajaj 1989). Soon it was realized that extension worker serving the farming community must be a full time trained staff and there should be two-way flow of information between research, extension and farmers. This led to the introduction of T & V system in mid 1970s (Hayward 1989). However, the sectorial approaches introduced through the T & V system meant that in practice the form of extension was oriented for crop production and livestock was neglected (Matthewman *et al*. 1997). The Agricultural extension system in India, as such, is not oriented and focused on the needs of livestock farmers, since its primary concern remains crops.

Need for a specialized livestock extension service

With the livestock sector assuming the important role in the national economy, there is further requirement to improve the present state of livestock sector. Livestock production has been steadily growing, faster than any other agricultural sub-sector, and it is foreseen by 2020, livestock sector will account for more than half of total agricultural output in economic terms. Further, to reach the growth rate of 4% in the agriculture sector as envisaged in the 11th Plan, the growth in livestock sector becomes more essential for which role of extension service especially the information input becomes vital. The livestock farmers need relevant and reliable information timely. Although considerable resources have been directed towards disseminating information on basic crops, little attention has been given for disseminating information related to livestock.

The National Sample Survey Organization (GOI 2005) in its survey of 51770 farmer households across the country conducted in 2003 revealed that only 5.1% of the households were able to access information on animal husbandry against 40.4% households accessing information on modern technology for crop farming. The survey also revealed that the public sector extension services are not the preferred option for accessing information related with livestock production, because, in the livestock sector the concept of extension service delivery was very weak. Moreover, just 5.7% farmers had access to information from extension workers. This showed that the number of extension workers is inadequate to meet the needs of the livestock farmers. This situation underscores the need for paying attention to the livestock extension activities in the country.

Most models try to integrate livestock into general extension systems by providing cross training of crop specialists in the areas of livestock production and vice-versa. But in practice, its availability has been patchy and the course work too short and too classroom based (Morton and Matthewman 1996). This obviously affected the quality of the extension service to livestock owners, which had inhibited them in adoption of modern livestock technology (Rao *et al*. 1992). Moreover, the highly specialized livestock extension service has different requirements since it has distinct features from crop extension due to longer time-scale of animal production, slower speed of technology development, lack of synchronous of different animals, difficulty in demonstrating merits because of their poor observability, frequently dispersed and non-uniform needs of livestock owners (Matthewman *et al*. 1997, Rao and Kherde 1985). There is ample proof in this regard, for instance, Indian government initiated various livestock programmes like Key Village Scheme, Intensive Cattle Development Project, Operation Flood etc., which could not improve the productivity of the milch animals substantially for the want of a specialized extension service for livestock farmers (Rao and Kherde 1985). Many of the animal husbandry practices followed by farmers are still not in tune with the scientific rearing. Misconceptions and ignorance coupled with poor extension interventions are some of the reasons for such state of affairs in respect of the poor popularization status of improved animal husbandry practices (Sen and Venkatadri 1997).

There is sufficient evidence that frequency of extension contact and closeness with extension agent are positively related to the knowledge and adoption of dairy technologies (Rao *et al*. 1993). A case can be made in this regard with respect to adoption of AI where in spite of huge infrastructure and budgetary provisions over the years, a meager (10%) bovine population in India is covered through AI (Gandhi *et al*. 1998). It still continues to be below 15% with huge

regional imbalances like in some states it is even less than 5% . This can be attributed largely to poor extension work though there are other factors responsible too for poor coverage and conception through AI. The importance of livestock extension and its hitherto neglect have generated an interest towards looking for the options to improve the scenario with respect to information delivery to the livestock farmers. This leads to the importance of understanding the role of State Departments of Animal Husbandry (SDAH) in extending livestock extension service for obvious reasons. The SDAH have the widest mandate for Livestock development and are best placed to deliver livestock production information (Morton and Matthewman 1996). It is the only institution available throughout the country for livestock owners to consult for information on livestock related issues as the SDAH are compulsorily staffed with the technical persons, viz. veterinarians/stockmen. The services of SDAH can be effectively utilized for livestock extension education activities, if required, with suitable changes and interventions in terms of budget, staff and infrastructural requirements towards delivery of information. Therefore, it is imperative to carry out the detailed review and investigation on these aspects by SDAH, especially when (i) there is no specialized or separate livestock extension service in operation in India, (ii) the possibility of creating a separate/independent agency for livestock extension under the government is very remote given the budgetary constraints with the government.

Livestock extension services to the farmers have the potential to play the key role in improving livestock productivity and making the livestock sector competitive in the liberalized economy. Livestock extension service includes transfer of technology and also strengthening of locally relevant innovation systems; advisory service; the provision of access to a range of services that include input and output markets; and the strengthening and support of farmers' organizations. Livestock extension service assists livestock farmers through educational process, to improve livestock farming methods and techniques, increase production efficiency and income, better levels of living, and lift the social and educational standards of rural life through livestock enterprise. As such, livestock extension is assistance to farmers to enable them identify and analyse their production problems and to increase their awareness of the opportunities for improvements. Clearly, it is an extremely important process, which can accelerate technological, social and economic development through improvements in livestock production. Despite its crucial role, livestock extension has been treated somewhat casually as is evident from the organizational structure, budget and staffing for extension activities both at central and state levels.

Agencies dealing with livestock extension service: Livestock development implies the shift from traditional to new scientific methods of production. Therefore, the technology generated at the research stations is required to be adequately presented to the livestock owners in appreciable form for its effective implementation. This advocated the role of qualified Livestock Extension Agency to tide over the inadequacies in relation to livestock in the general extension system. In absence of a specialized livestock extension agency, many departments are performing some livestock extension activities one way or other at different levels.

Livestock extension activities carried by central agencies

Department of Animal Husbandry, Dairying and Fisheries (DAHDF): As the apex body for livestock development in India, the DAHDF invested only ₹ 10.41 crore during IX Five-Year Plan against the allocation of ₹ 20 crore under the Animal Husbandry Extension Programme, which was started in 1992–93. Under this scheme, financial assistance is provided to State Governments, Agricultural and Veterinary Universities and Veterinary Colleges for establishment and development of an information network to promote and propagate latest animal husbandry practices among farmers. The scheme has the components like establishment of National Demonstration Unit, organization of seminar/ workshop/training for field staff on Animal Husbandry Extension, and conducting training programme for breeders, farmers including women. It also has provision for the organization of various competitions, livestock shows at various levels and evaluation of Animal Husbandry Extension programmes. The general allocation pattern of funds (Fig. 1) during 1996–97 by the Department of Animal Husbandry and Dairying (GOI 1998), showed only 10% of total budget was earmarked for extension activities.

The central agencies are mainly responsible for the policy formation and to ensure adequate guidelines for the state agencies. Report of the *Working Group on Animal Husbandry and Dairying for the Tenth Five-Year Plan (2002–2007)* for the first time treated livestock extension differently from crop

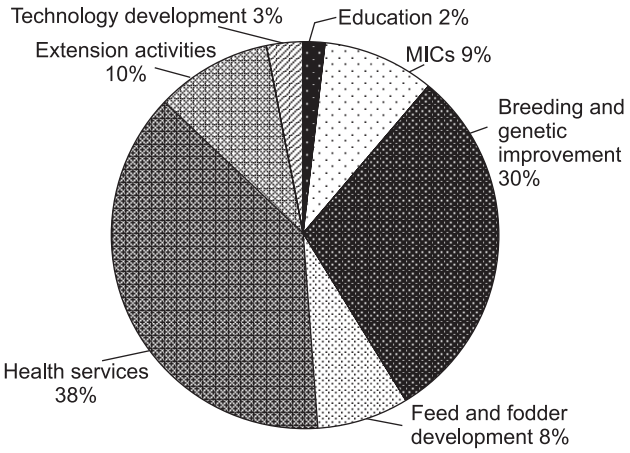

Fig. 1. Allocation pattern of funds at DAHDF, GOI (1998).

related extension activities, so a separate sub-group was created to address the issues concerning livestock extension activities. The *Plan Document* indicated that livestock extension will be driven by technology transfer rather than transfer of knowledge (Bhat and Das 2002). Definitions of extension are often based on the operation of particular national extension system. These definitions reflect the organizational choices made due to the functions the extension system is asked to perform. Thus, assumptions about how extension functions shape our definition of it. The organizational structure of an extension service plays a large role in what types of extension activities are to be carried out, how they are carried out, and the recipient target groups and beneficiaries of extension. The various dimensions include delivering of technology, education, problem solving, feedback, adaptive research and also provide institutional technology, by helping farmers to organize into associations and other forms of co operative activity (Rivera 1989). This urges various agencies providing extension service in India for delineating the role clearly and to sensitize the policy makers about diverse nature of extension service. The overall objective of livestock extension is to educate the livestock owners for producing products economically through the application of scientific livestock farming technology and thereby increasing their living standards.

Also, during the 11th plan (2007-12), against the proposal of ₹ 150 crores for livestock extension activities, only a sum of ₹ 15 crore was allocated for livestock extension component (Fig 2). Further, out of this allocation, major share was for establishment of private veterinary clinics, which is not a typical livestock extension activity. By the end of 2009, only ₹ 1 lakh was utilized under the head, livestock extension. This speaks about the status of livestock extension especially under the centrally sponsored schemes.

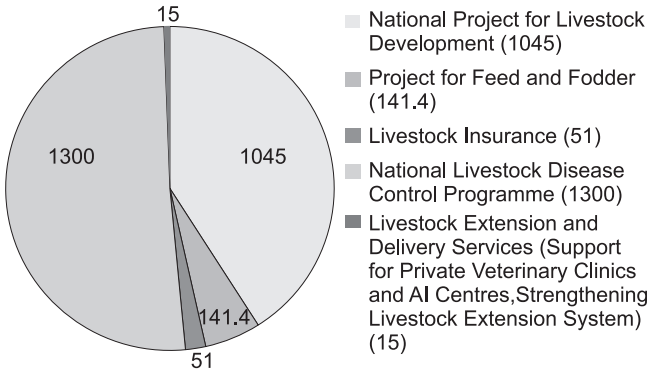

Fig 2. Allocation for livestock extension during 11th plan under centrally sponsored schemes, GOI

Indian Council of Agricultural Research/Department of Agriculture and Co-operation: The ICAR under Ministry of Agriculture has a vast network of the National Research Institutes, Project Directorates, National Research Centres and Deemed Universities which are basically mandated for research or academic programmes in the areas of their respective mandates yet perform some extension activities as well. The animal sciences institutes under the ICAR like IVRI, NDRI, CIRG, CSWRI, CARI and other species research centers have division of extension /directorates of extension or extension section in case of smaller institute which are manned by extension scientists and technical officers. The basic focus of these extension units under the ICAR system remain to conduct research, nevertheless, some field extension activities like farmers' fairs, animal health camps, farmers' visits, demonstrations, *kisan gosthis*, exhibitions etc. are organized by these units but their area of operation and influence remains the periphery of the institute concern. As such, the extension efforts by these ICAR institutes have very limited reach, scope and influence over farmers leading to very limited implications for livestock development. Besides, to formulate various research and development issues under the ICAR- DAC interface, joint meetings of the senior officers of the ICAR and Department of Agriculture and Co-operation are organized twice a year. These meetings apparently have very little to discuss about livestock extension, whatever be its importance to livestock development. The ICAR has also established 44 Agricultural Technology Information Centres (ATICs) in ICAR Institutes and SAUs. These centres provide a 'Single Window' delivery system for technology products, services and information available in the institutions to the farmers. The impact of these centres specifically on livestock production is yet not visible.

Krishi Vigyan Kendra: It is one more agency 100% financed by the ICAR, responsible for extension activities at district level, primarily mandated for skill oriented training to farmers. KVKs since the establishment of first KVK in Puducherry in 1974 have grown to about 576 moving towards the goal of at least 1 KVK in each district of the country. Now, even 2 KVKs have been envisaged in larger districts. The Annual Reports of these KVKs clearly reveal a crop bias, with very little contribution towards livestock extension. The KVKs including those under the animal sciences institutes of the ICAR and Veterinary Universities as also with a few NGOs have largely ignored animal husbandry component as these have taken only a bit of care for livestock. These KVKs maintain demonstration sights for crops but rarely have demonstration units on livestock. As such, livestock extension is poorly represented within the KVK set up.

Directorate of Extension: This is one important agency under Ministry of Agriculture and is responsible for organizing extension activities and trainings of extension functionaries through sponsoring these activities to be carried out by various organizations including the NGOs. The Extension Education Institutes (EEIs) under this directorate too organize extension and training in their respective zones. The Directorate of extension organizes a National level

workshop to decide on the training to be entrusted to various agencies. A cursory look at the proceedings of the 21st National workshop on Planning and Management of Agriculture Extension training (GOI 2002) revealed that there is a little scope on livestock extension under the Directorate of Extension, GOI. Out of the 63 national training courses on extension sponsored by the directorate during 2001–02, only 2, viz. Transfer of Technology in clean milk production, and Extension strategies for Animal health and production were approved in Animal Husbandry by the Directorate of Extension. This might be due to the poor response given by the various states with respect to livestock extension. Only 2 states (Uttar Pradesh and Himachal Pradesh) were represented in this workshop. As a result, there was very poor representation of Animal Husbandry extension programmes under the central scheme of the directorate during the year. The directorate could be a very good source for augmenting extension training for the livestock functionaries, viz. veterinary officers and auxiliaries of the SDAH but the facility is very poorly utilized by the states for livestock development, whatever may be the reasons. Some animal science institutes of the ICAR like IVRI do organize extension training sponsored by the directorate for the state level functionaries but the scope remains very limited and only occasional.

Extension Education Institutes (EEIs): With the 100% financial and technical sponsorship of central government through the Directorate of Extension, GOI, 4 EEIs are in position at Hyderabad, Anand, Nilokheri and Jorhat. These institutes cater to the training needs of the trainers, besides, research and extension work in their respective areas of operation. As such, their activity profile as also the mandate does not reflect any direct and significant bearing for livestock development.

Agricultural Technology Management Agency (ATMA): It is recent evolution tried on pilot basis with the World Bank funding initially in selected districts of 7 states, now in place in 262 districts. It is further going to be expanded in more districts with additional funding (up to ₹ 230 crore), since the ATMA is being seen as a major instrument to revitalize agricultural extension system in India. In the 11th Plan document, the sub-group on Livestock Technology Transfer Service too has stressed the role of ATMA in improving the livestock sector performance. It remains to be seen, how much impact it will have on livestock sector. As per the project reports of various ATMAs, the activities in the area of animal husbandry extension have been very negligible so far.

National Dairy Development Board (NDDB): This too has a very elaborate mechanism for transfer of technologies especially for dairying activities. NDDB has played a very vital role in augmenting milk production through countrywide network of dairy cooperatives. The Anand Pattern of Dairy Cooperatives has become world famous through its brand name AMUL. Among various interventions, the extension education efforts of NDDB through a range of initiatives have paid rich dividends in the form of improved productivity, production and improved supply of milk to cities. Many reports indicated that India is number one in milk production in the world largely due to the efforts under cooperative movement launched by NDDB. But the extension activities of NDDB has remained restricted to bovines, and limited only to the members of the dairy cooperatives. It caters to the needs of only 10 million households among 70 million households who depend on dairy animals (Patel 2004). The dairy cooperatives in various states use business criteria to determine their areas of operation, which results in less well-developed areas being explicitly excluded from involvement in their activities. As such, the livestock extension by NDDB as also by dairy cooperatives in different states has been exclusive, confined to dairy animals and members only, thus, excluding many other livestock species and majority of Indian farmers.

The role played by the central agencies as explained above indicated that either these are not mandated exclusively for livestock extension or these are restrictive/exclusive, inadequate, and poorly equipped to deal with the diverse requirements of the Indian livestock owners.

Role of states in extending livestock extension service: Agriculture including the animal husbandry is a state subject, thus, primary responsibility of agricultural development rests with the states. To carry out the agricultural development work, states have various agencies and institutions like State Agricultural Universities (SAUs) and Department of Agriculture (DoA), which is the major department looking after agricultural development within the state.

The SAUs and Veterinary Universities have Departments/ Directorates of Extension on the pattern similar to the ICAR institutes. There are about 45 SAUs, 1 Central Agricultural University and 7 Veterinary Universities spread over different states. These universities with primary mandate for teaching, like ICAR institutes have very limited scope for livestock extension, lacking in focus, intensity and reach. The wider community of livestock farmers remains untouched by the limited and sporadic extension efforts by these SAUs and veterinary universities since these are neither mandated for nor equipped to cater to the specific needs of livestock farmers directly. There is now trend to establish more Veterinary Universities by making veterinary colleges independent from SAUs so as to pay more focused attention to teaching, research and extension in livestock sector. However, little can be expected from these veterinary universities since their working is likely to be oriented on the pattern of SAUs which have very limited role in matters of field extension because of their mandate and limitations of staff and funds.

Livestock extension activities by SDAH: The SDAH are a subdivision of the DoA responsible for animal husbandry

and veterinary issues being mainly staffed by veterinarians and veterinary auxiliaries with few if any animal productionists. They provide an animal health service through a network of veterinary hospitals and village dispensaries. Various activities undertaken by the SDAH and having bearing on extension are: (i) Veterinary staff engaged in informal extension when interacting with livestock keepers but there are no guidelines on the messages to be transmitted (Matthewman *et al*. 1997 and Lehmann *et al*. 1994), (ii) camps are organized to provide clinical veterinary treatment, and these opportunities may be used to pass on information, (iii) livestock fairs, shows and competitions are occasionally run at district and village locations, where livestock keepers are able to meet, discus, receive advice and shown demonstrations of technical importance, (iv) programmes for cattle, poultry, small ruminants and pig production have extension components directed at their target species/ systems/clients, and (v) departments receive annual funds from state governments for which proposals are submitted in advance. The shortage of funds for transport and travel allowances limits the ability of staff to travel, which especially affects extension activities.

In 1993–94, the Department of Animal Husbandry in Gujarat, for instance, delivered 53 technical broadcasts, 50

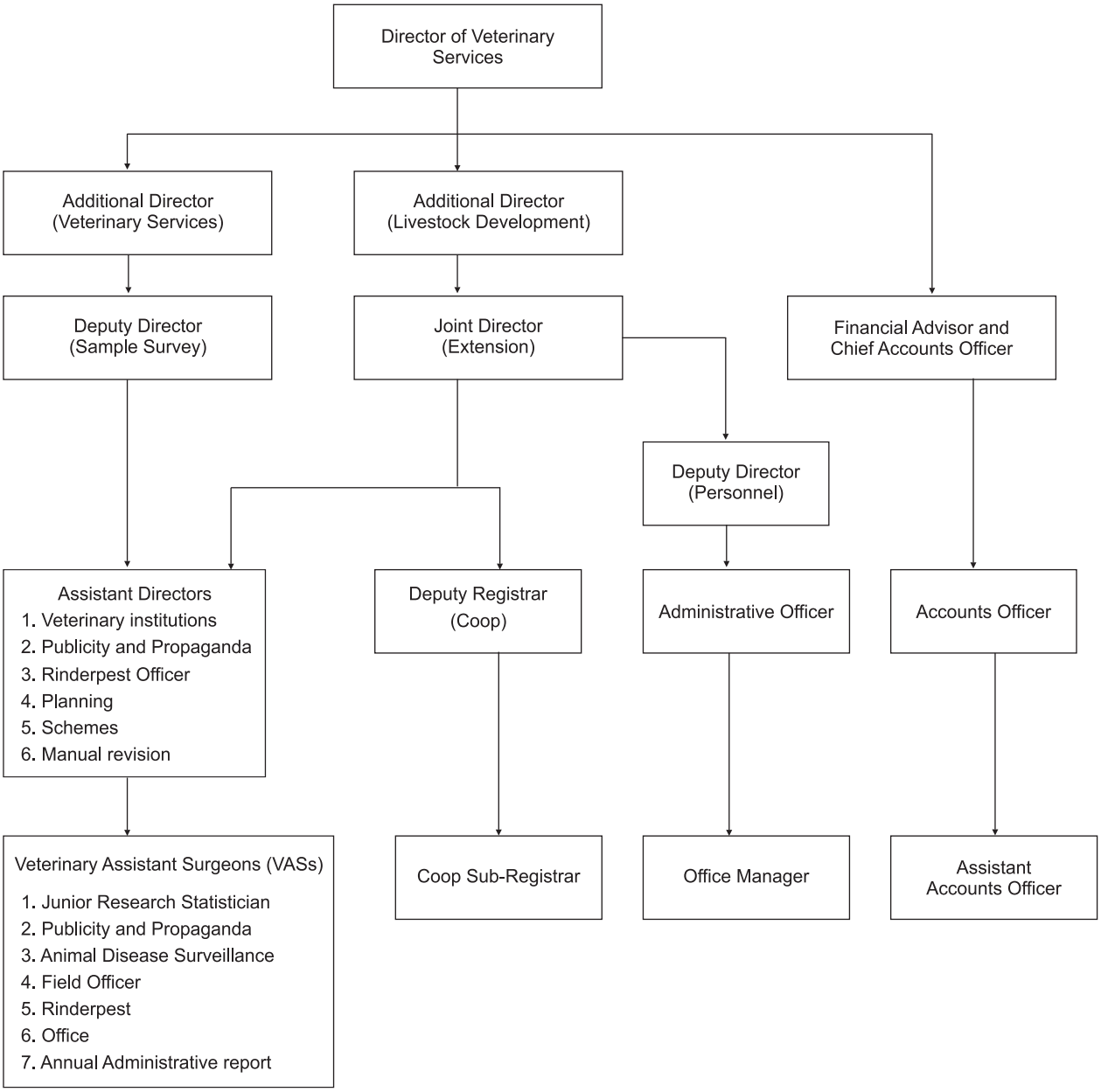

Fig. 2. Administrative set up: Directorate of Veterinary Services, Tamil Nadu.

television programmes, 47 exhibitions, 195 film shows and 54 video shows (Matthewman and Ashley 1996). It was also pointed out that SDAH of Gujarat was providing a good service given its resources and manpower. It does not have a clear mandate to carry out extension work, but meant only to diagnose, treat and offer advice on health issues. Veterinary staff gives some advice on other matters, such as fodder production and feeding, but there is no allocation of funds and time to specifically do this. No evidence was found that veterinary officers go out of their way to investigate livestock owners' opinion or needs other than those specifically within their own area of expertise. Similarly, there were no arrangements to assess the spread of extension messages, or to feed-back findings from the field to planners or researchers. Information requirements are thus, based on the assessment of departmental officers, using their field experiences and aggregate targets for numbers of crossbreds or inseminations and productive figures (Matthewman *et al*. 1997). There is no official extension agenda/recommendations on messages to be transferred. Hence, although farmers may face undifferentiated and unsolved problems, neither the problems nor the mechanisms for determining them have been investigated by veterinary staff for the obvious reason that they are neither clearly mandated for nor trained on livestock extension methodologies. Moreover, the SDAH tend to have higher densities of veterinary institutions and activity in areas where production is highest, leaving farmers in low production areas excluded from extension education benefits, if any.

The annual reports of various states indicated a few schemes and activities listed as extension work, even if listed; there is no physical target and achievement details. The general livestock extension service provision of various states is in haywire, there may be a few exceptions where some states possess such detail and have separate extension wing within the Department as reflected in the organogram of Tamil Nadu State Department of Animal Husbandry (Fig. 2).

It was also noted that SDAH field staff consider treating of sick animals and AI work as the two most important activities they are responsible for. Lehmann *et al.* (1994) found that treating of sick animals was listed by 83% of the veterinarians as the first or second most important activity and AI work by 74% . Vaccination was ranked third on an average. For 10% , the maintenance of records was the most time consuming activity. Further, the most important difficulty mentioned was inadequate mobility. This, in turn, definitely hampers extension activity, if any. Discussion activities with farmers was only ranked seventh, as per time allocation of the working hours, and only 1% felt it as most important. The veterinary service personnel act more as doctors rather than extension functionaries. While treatments of the animal, vaccination or AI are performed in veterinary clinics, reaching out to the farmers through extension activities receive much less priority as compared to clinical services. This is due to the fact that veterinary functionaries are requested to perform 25 multifarious activities in which extension is one calling for rationalizing in their job chart (Venkatadri 2002). Education of the dairy farmers, which is crucial in livestock development work, was given low preference in a study (Rao and Kherede 1985). The extension management in Animal Husbandry is the weakest link in the whole process of technology transfer (Sen 2002). The weaknesses in animal husbandry extension performed by the SDAH is also reported, Sen (2003). As such, the SDAH though considered to be the major agency to cater to the needs of the livestock farmers, their role is limited to treatment services, vaccinations and artificial insemination (AI) services. Their contribution in providing educational (extension) support for farmer capacity building is limited in practice.

The veterinary officers and para-vets of the SDAH are the only functionaries who can effectively deliver livestock related information to the farmers but their main focus is on health care (Sulaiman and Van Den Ban 2003). Moreover, the expenditure incurred over the years by various SDAH in India on livestock extension activities was found only around 1–3% of their total budget (Ravikumar 2005). Most of the states do not possess staff devoted specifically to livestock extension and in most cases this was restricted to 1 or 2 relatively junior staff members looking after livestock extension work for whole state, while located at headquarters (Matthewman and Ashley 1996, Kurup 2003, Ahuja *et al*. 2000). However, appreciably, some states in recent times have identified veterinarians specifically to look after animal husbandry extension activities at district level.

The livestock extension worker may be understood as one who has specialized skills in changing the behavior complex of the livestock farmers and actively involved in livestock development work. Unfortunately, there are only few persons who could be considered as livestock extension personnel. Many people who have not acquired any professional qualifications in livestock extension are also engaged in livestock extension work, for instance the veterinary surgeons, livestock assistants/ stockman who are considered grassroots animal husbandry extension workers (Rao and Kherede 1985).

General investment climate

The SDAH received their funds directly from state government in annual budgets for which proposals are submitted in advance. In general, SDAH consider them to be under funded with a high proportion (over 80%) of their budget being spent on staff salaries. The shortage of funds for transport and personnel travel allowance is a frequent complaint and limits the ability of staff to travel, which especially affects extension activities. For example, during the financial year 1995–96, SDAH in Haryana spent only 0.63% of total plan expenditure for various extension

activities. In Gujarat, it was 0.5% of the total budget. This was drastically reduced during the financial year 1996 – 97, when it was only 0.08% (Matthewman and Ashley 1996). Whenever, these state departments are asked to reduce their spending, extension activities become the first casualty though the extension budgets in general are already very meager.

Staffing pattern

The SDAH are staffed by a broad range of specialists mainly veterinarians and veterinary auxiliaries with few if any animal productionists. Gujarat, Haryana, Orissa, Andhra Pradesh, Karnataka, and Rajasthan do not possess staff devoted specifically to extension and in most cases this was restricted to 1 or 2 relatively junior staff members looking after livestock extension work for whole state, while located at headquarters (Matthewman and Ashley 1996, Kurup 2003, Ahuja *et al*. 2000).

Information seeking behavior of livestock owners

In general, the veterinary service is well used by all categories of livestock owners – men and women, wealthier and poorer practising all systems with all livestock species. However, there were greater variations in the use made of veterinary staff for services other than those related to health. Poorer households were generally less well informed and had frequently not heard of or could not clearly explain the messages presented by SDAH (Matthewman *et al*. 1997). In the present climate of retrenchment, governments are unlikely to start creating new institutions, or funding new services, to deliver extension on livestock production. So, this growing need must be met by reforms in the existing institutions and services (Morton and Matthewman 1996). It has important implication that the SDAH have to make adequate room for extension activities directed to livestock development in the respective states.

Studies and field experiences showed that there is need for great care in selecting messages/recommendations and package them in many spoken languages for extension. The role of SDAH has to cater to the livestock production services like information about market, fodder production and low cost technologies and development of husbandry and management skills, which are identified as major needs by poor livestock keepers in almost all developing countries (Chipeta 2002). Over the last decade, there has been increasing realization of the importance of tasks such as community mobilization, conflict management, problem solving, education and Human development and need for extension staff to acquire social skills to perform these tasks (Sulaiman and Hall 2002). It has also been realized that there is a lack of awareness on the part of researchers and extension agents regarding the farmers' priorities. Hence, there is now a growing concern among the researchers, extension staff and policy makers to better understand the farmers' perception with reference to technology generation and adoption (Rao *et al*. 1995).

Suggestion to improve livestock extension service

Overhauling of institutional set up: To improve the livelihood of livestock owners, institution must have 3 vibrant systems, viz. knowledge generating system, knowledge disseminating system, and knowledge consuming system. There is thick evidence that the knowledge disseminating system is the weakest of all among them in context of livestock development. The responsibility for the transfer of information to livestock owners fall with the extension services, but these are largely focused on the extension of crop messages, and the livestock services under the SDAH are geared to mainly animal health concerns. There is also growing concern about the lack of clear understanding of livestock owners' needs. The SDAH are in better position for delivering livestock related information to the farmers when compared with any other agencies because of the availability of huge infrastructure and technical persons. Therefore, it is pertinent to study the livestock extension services rendered by the SDAH especially to know, (i) what type of extension activities the SDAH is conducting for information delivery and through what mechanisms and facilities? (ii) how much importance they attach to livestock extension service? (iii) how far and in what ways the livestock owners seek advice from the SDAH? and (iv) in what way the livestock extension service can be improved upon?

Revitalization of operational mechanism: The concentration of government services on livestock health has been justified by the immediacy of animal diseases. As farmers gain confidence that diseases are under control, they are prepared to invest more in animal production. New constraints particularly in genetic potential, nutrition and husbandry are now becoming limiting. Moreover, the livestock extension faces additional institutional problem of being marginal to both agricultural extension and animal health services (Morton and Matthewman 1996). Chipeta (2002) argued that for efficient production system, the institutional structure must possess a qualified advisory service with the task to supply best knowledge available to farmers, guidance, processing of economic data, to analyze farm conditions, training projects and to constitute an effective link between practical farmers and the research institutes and *vice-versa*. She concluded that creation and dissemination of knowledge was the tool that paved the way for increased productivity. Sen (2003) discussed that by way of replacing the predominantly clinical approach, even if partially, extension orientation among the field functionaries can attain supreme importance.

These functionaries through such orientation need to be equipped with appropriate tools like Farming System Research and Extension (FSRE), Participatory Rural Appraisal (PRA) etc., to enable them to know the farmers'

practices, problems and priorities in respect of livestock management. Sen (2002) emphasized the importance of analyzing the existing strength and resources on this count and to build on the same for further improvement so that improved technologies reach the grassroots level for integration with the production system. At present, there is no formal extension service in many states and extension activities account for very small proportions of SDAH budgets (Matthewman *et al*. 1997, Lehmann *et al*. 1994). It is also mentioned that SDAH generally are not designated as learning organizations, where it deals primarily in treatment of animals. This, however, is fundamentally important for providing adequate extension service (Van Den Ban 1997).

The various stakeholders need to understand the role played by the SDAH in providing livestock extension service and ways for improving the existing pattern so as to develop an institutional context for livestock extension service within the states under the SDAH. This calls for a detailed institutional analysis of the SDAH in context of the livestock extension services to be delivered by this important institution. The need for creating a separate unit within the SDAH for livestock extension activities and provision of enhanced budget, staff, vehicles and other infrastructure required for delivery of extension messages is clearly felt by the key stakeholders (Ravikumar 2005). In coming years, some of the burden of government agencies is likely to be reduced by private sector, wherein; contract farming for milk, meat and egg production may improve delivery of extension messages to contract farmers. The role of NGOs like BAIF, J K Trust or even the private agencies like Nestle may increasingly be visible in extension efforts. This will change the dynamics of livestock extension a bit but the responsibility of the SDAH will continue to deliver extension services albeit more efficiency through appropriate need based delivery mechanisms.

Policy implications

There is obvious need to stimulate discussion and analysis of livestock extension systems in different states in the search for effective and efficient technology transfer mechanisms for livestock development in the country. Identification of information seeking behaviour and sources of information among the livestock owners is also important as it will help the concerned authorities to fine tune their services according to the perceived needs of the livestock farmers.

It is imperative to work on policy for livestock extension service suitable to the needs of Indian livestock farmers. This in turn would be guided by the National Livestock Policy indicating the goals and objectives set for the livestock development. The livestock policy for India *inter-alia* emphasized the increasing productivity alongside ensuring quality. The livestock extension policy, therefore, has to take into account both these goals of the National Livestock Policy. It has to orient its activities to the goals of the national policy through suitable staffing, budgeting, creation of facilities and functioning. These issues need urgent attention so as to harness the potential of livestock which can substantially reduce the incidence of poverty in India as elsewhere. The XI Plan working sub- group on livestock technology transfer service observed that while there is an agriculture extension policy in-built into the national agriculture policy as well as in several state agriculture policies, the livestock extension policy has not received its due importance. It appears to have fallen between 2 stools namely, agriculture extension and livestock veterinary services. There is a need to articulate within the overall national agriculture and livestock policy the importance and vital role of livestock extension. Since a large number of schemes emanating as a result of this will then be able to factor in the livestock extension component in their main-body.

In recent times, the extension reforms Programme specifically the ATMA has been a major intervention in addressing the constraints as observed in T &V and post T & V extension programmes by making the extension system farmer driven and farmer accountable through process and institutional reforms mechanism. The livestock sector too should benefit from such extension reforms initiated by the Government of India. It would depend to the great extent on the ability of the SDAH to associate with such efforts by the central government. Moreover, the XI Plan document of Planning Commission has highlighted the importance of livestock extension, while addressing the various issues concerning livestock technology transfer services in India. If implemented as envisaged, it may positively impact livestock sector in terms of productivity and quality of animal production in India. Therefore, it is important that the states should take into consideration the XI Plan recommendations concerning the livestock technology transfer in the country and implement them to exploit full potential of livestock sector.

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