Diversification in agriculture through animal husbandry

Introduction

Agricultural diversification is an important mechanism for economic growth. It depends, however, on there being opportunities for diversification and on farmers' responsiveness to those opportunities. Agricultural diversification can be facilitated by technological breaks-through, by changes in consumer demand or in government policy or in trade arrangements, and by development of irrigation, roads, and other infrastructures. Conversely, it can be impeded by risks in markets and prices and in crop-management practices, by degradation of natural resources, and by conflicting socio-economic requirements - perhaps for employment generation, or for self-sufficiency or foreign-exchange-earning capacity in particular crops or livestock or fishery or forest products. Diversification of agriculture refers to the shift from the regional dominance of one crop to regional production of a number of crops, to meet ever increasing demand for cereals, pulses, vegetables, fruits, oilseeds, fibres, fodder and grasses, fuel, etc. It aims to improve soil health and a dynamic equilibrium of the agro-ecosystem. In view of shrinkage of agricultural land and operational holdings due to expansion of urban centers, changes in consumer food habits, exponential population growth rate, farmers are pressured to include or substitute additional crops in to the cropping system.

India is a country of about one billion people. More than 70 percent of India's population lives in rural areas where the main occupation is agriculture. Indian agriculture is characterized by small farm holdings. The average farm size is only 1.57 hectares. Around 93 percent of farmers have land holdings smaller than 4 ha and they cultivate nearly 55 percent of the arable land. On the other hand, only 1.6 of the farmers have operational land holdings above 10 ha and they utilize 17.4 percent of the total cultivated land. Due to diverse agro-climatic conditions in the country, a large number of agricultural items are produced.

Broadly, these can be classified into two groups – food grains crops and commercial crops. Due to the challenge of feeding our vast population and the experience of food shortages in the pre-independence era, 'self reliance' in food grains has been the cornerstone of our policies in the last 50 years. Around 66 percent of the total cultivated area is under food grain crops (cereals and pulses). Concurrently, commercial agriculture developed for whatever reasons in the pre-independent phase also kept flourishing during the post independent period. Commercial agriculture not only catered to the domestic market but has also been one of the major earners of foreign exchange for the country.

Livestock sector plays an important role in Indian economy and is an important subsector of Indian Agriculture. The contribution of livestock to Gross Domestic Product was 4.70 percent in 2004-05 at 1999-2000 prices. This is the sector where the poor contribute to growth directly instead of getting benefit from growth generated elsewhere. The overall growth rate in livestock sector is steady and is around 4-5% and this has been achieved despite the fact that investment in this sector was not substantial. The ownership of the livestock is more evenly distributed with landless labourers and marginal farmers owning bulk of livestock. The progress in the sector results in balanced development of the rural economy particularly in reducing the poverty amongst the weaker sections. The rural women play a significant role in Animal Husbandry and are directly involved in most of the operations relating to feeding, breeding, management and health-care of the livestock. According to CSO estimates, gross domestic product from livestock sector at 1993-94 prices was about Rs.642 billion during 1999-2000 (accounting for 24% of agriculture and allied GDP). This rose to Rs.772 billion during 2003-04 with 27% share in the agriculture and allied sector. Livestock provides stability to family income especially in the arid and semi-arid regions of the country. Livestock are the best insurance against the vagaries of nature due to drought, famine and other natural calamities. Major part of the livestock population is concentrated in the

marginal and small size of holdings. Livestock plays an important and vital role in providing nutritive food to families both in rural and urban areas. Bullock power continues to be the main source of draught power for agricultural operations and transport of agricultural products to nearby markets and is likely to remain so for a long time to come. Further, agricultural productions get valuable organic manure provided by the livestock. From the dawn of civilization, mankind has been utilizing different animal species for a variety of purposes viz. production of milk, meat, wool, egg and leather, draught power, companionship, entertainment, research experimentation, sports, security etc. Livestock wealth is deemed as the oldest wealth resource for mankind and was once a symbol of economic status in the society. Livestock sector plays a crucial role in rural economy and livelihood. This is one sector where poor contributes to the growth directly instead of getting benefit from growth generated elsewhere.

Major Driving Forces for Agriculture Diversification

The major driving forces for Agriculture diversification are:

1. Increasing income on small farm holdings.
2. Withstanding price fluctuation.
3. Mitigating ill-effects of aberrant weather.
4. Balancing food demand.
5. Improving fodder for livestock animals.
6. Conservation of natural resources (soil, water, etc.).
7. Minimizing environmental pollution.
8. Reducing dependence on off-farm inputs.
9. Decreasing insect pests, diseases and weed problems.
10. Increasing community Food security

Milk production in India remained stagnant during the period 1950 to 1970, when the production grew at the rate of about 1% per annum. Thereafter, India's milk production showed rapid growth of between 4 and 5 percent, reaching a level of 91 million tones in 2004- 05. The per capita availability of the milk increased from 112 gm per day in 1970-71 to 229 gm per day in 2004-05. An estimated 70 million rural milch animal households are engaged in milk production. Poultry, which was considered as a backyard venture in the early 60s, has now been transformed into a major farming activity. The egg production in the country has reached 45.2 billion (2004-05). India now occupies number one position in the world in respect of milk production and fourth position in egg production. However, wool production has remained almost constant during the last one and half decade. In India, the livestock continues to be raised on crop residues and agricultural bi-products. The area under cultivated fodder production is limited only to 4.60% of the total cultivable land. The schemes and programmes relating to feed, fodder and pasture development in the country are quite limited. The efforts made during the 10th five-year plan in raising the feed and fodder resources for the livestock were not very successful. The performance of central fodder development organization of Government of India was evaluated by The Centre for Management Development, Thiruvanthapuram and found to be unsatisfactory.

The National Project on Cattle and Buffalo Breeding (NPCBB) was initiated in Octobner, 2000 for a period of 10 years. The project envisages genetic up gradation of indigenous cattle and buffaloes, development and conservation of important indigenous breeds and to evolve sustainable breeding policy. The project is being implemented by State Implementing Agencies (SIA's). Presently, 26 states and 1 UTs are participating in the project. The livestock projects have a long gestation and therefore it is too early to pass any judgement on the performance of NPCBB.

With the completion of ‘Operation Flood’ Project by NDDB, the pace of investment in dairy sector has slowed down. The allocation for dairy development by the Central and State Governments has also diminished over the last two plans. The assistance from Government of India under Centrally Sponsored Scheme ‘Intensive Dairy Development Programme’ has gone to non-viable areas without conducting proper feasibility studies and implemented without proper technical supervision. While delicensing and the subsequent decision to do away with the concept of milk sheds were expected to boost private sector investment in dairying, it has not happened. Furthermore, there appears to have no concentrated efforts been made in investing on technology for development of value added and innovative milk products.

Consequently, in the first four years of10th five-year plan, the growth rate of milk has been less than 3 per cent per annum. Further, no policy measures were undertaken so far to develop and organize the un-organized sector involved in the production of Indian dairy products, which otherwise have tremendous demand in the domestic market as well potential for export overseas. Since first five year plan, efforts were made to control diseases of the livestock especially Rinderpest, Black quarter, Hemorrhagic Septicemia, Anthrax and Food and Mouth Disease. The Rinderpest has been eradicated from the country and India declared free from Rinderpest infection on 25th May 2006 by the International Committee of the World Organization for Animal Health (OIE), Paris. While, Rinderpest has been eradicated, other diseases still continue to pose a major threat to animal production programme. Some of the emerging diseases like Peste des Petitis Ruminants (PPR), Bluetongue, Sheep pox and Goat Pox, Swine Fever, Contagious Bovine Pleuropneumonia, New Castle-Disease (Ranikhet Disease) are causing substantial economic losses. The Department of Animal Husbandry and Dairying is not well equipped with necessary infrastructure and adequate technical manpower to execute various programmes on animal health and bio-security.

Diversification

Goat

Goat population in India during the last four decades has increased at the fastest rate amongst various livestock species, in spite of the fact that nearly 41% of goats are slaughtered annually. The current goat population is estimated to be around 124.4 million (Livestock Census 2003). The increase in goat population from 47.2 million in 1951-52 to the current level of 124.4 million show that it offers great potential in terms of population growth making it most important species of animal for meat production. Hardly any serious development programmes for improving meat production have so far been undertaken in the country. Experiments on cross breeding Indian goats with exotic breeds like Alpine and Anglo-Neubian were not very encouraging. There was however, little improvement in body weight, efficiency of feed conversion for meat and dressing percentage. No exotic germplasm is available for increasing the yield of meat since superior goat breeds found in foreign countries are essentially dairy breeds. Consequently the approach for raising the meat production from goats should be selective breeding along with proper management, fattening, rationing and better health cover.

Poultry Development

The Indian Poultry industry has transformed from meager backyard farming to a well organized scientific techno commercial industry. Majority of Poultry industry is in organized sector contributing nearly 70% of the total output while rest 30% is coming from unorganized sector. The Status of poultry sector during 10th Plan was significant by contributing about 11,000 crores to national GDP, ranking 4th in egg production and 19th in broiler production in the world. The production was 45.2 billion eggs and about 2.0 million tons of chicken meat. Poultry utilizes substantial quantities of non-edible agricultural and industrial biproducts and converts into high quality nutritious protein rich food. It helps to bridge the

gapbetween requirement and availability of high quality protein for the human population in the country. Eggs and poultry meat are the cheapest source of animal protein. Further, Poultry manure is one of the best alternatives for chemical fertilizers. It is estimated that 1 ton of poultry manure provides 40 kgs of nitrogen, 28 kgs of phosphorus and 23 kgs of potash. The total availability of nitrogen from poultry manure is equal to more than 3 lakhs tons of urea. The sector provides a great employment opportunity. It is estimated that more than 2 million people are employed directly or indirectly in this sector. It is further estimated that an increase of one egg and 50 gms of meat per capita consumption would create an employment opportunity for about 25,000 and 20,000 persons, respectively. It is important to note that this sector provides employment to even unskilled labourers and women thereby providing income generation for the vulnerable group. The other organized farming activity is breeder industry. There are about 700 to 800 hatcheries operating in the country. Many of them having both pure line and grandparent operations to supply majority of the broiler and layer known breeds in the country. The productivity in both broilers and layers has improved tremendously due to implementation of good management practices, optimum nutrition and scientific breeding. Today, a broiler is able to achieve a body weight gain of 2 kgs and more within 42 days with a Food Conversion Ratio (FCR) of 1.8 to 1.9 and a layer is capable of producing on average about315 to 320 eggs in 52 weeks of production.

Piggery Development

The pig husbandry is the most important activity in the north eastern region especially in the tribal areas. Pork is an important item in the daily food habits of these people with little exception in the state of Assam. A very high consumption in the rate of pork has been reported in the region. The region has also a substantial pig population, which constitutes around 25% of the country's pig population. The bulk of the population is, however, indigenous type whose growth and productivity is very low. The region however, has a type

of pig called “Pigmy Hog”, the meat of which is highly preferred. The unique feature of this pig is that it is smaller in size (around 15 kgs at furrowing) and produces its first litter around 9 months of age. In spite of sizeable population, the local pigs are not able to meet the demands of North-Eastern regions. The region therefore imports large number of pigs from other parts of the country including Andhra Pradesh, Uttar Pradesh, Bihar and West Bengal. No serious attempts have been made to take up pig production on a commercial basis by developing financially viable production units in the Northeastern region.

Meat and Abattoirs

The meat production in India has been estimated as 6.4 Million Tonnes (FAO 2005 estimates). The value of meat produced accounts for Rs.21, 900 crores and meat products for Rs.828 crores. Meat production has increased at the rate of 4.1% annually during the last five years. Meat Industry in India is a by-product of livestock production in bovines by utilising spent animals at the end of their productive life whereas in other species like sheep, goat and pig the animals are primarily raised for meat production. Livestock population, slaughter rate and meat production data indicate that buffalo population of 96 million produce an equal quantity of meat, namely, 1.2 million tonnes as that of cattle. This is due to effective culling practiced in buffaloes for both domestic and international markets.

Animal Health Services and Bio-security

With the improvement in the quality of livestock through launching of extensive developmental programmes, especially cross breeding of cattle the susceptibility of the stocks to various diseases has increased. In order to reduce morbidity and mortality amongst livestock, efforts are being made to provide better health care. The country has a network of 26,717 Polyclinics / Hospitals / Dispensaries and 28,195 Veterinary aid centers (including Stockmen Centres), which are supported by about 250 disease diagnostic laboratories, for reliable diagnosis of diseases. Further, for control of major livestock and poultry diseases by

way of prophylactic vaccination, the required quantity of vaccines are produced in the country at 26 veterinary vaccine production units. Of these, 19 are in the public sector and 7 in the private sector. Import of vaccines by private agencies is also permitted as and when required.

The Indian livestock production system operates on low input - low output basis. Therefore, curative measures as the option for control of diseases in livestock and poultry are not feasible. Hence the control and prevention of diseases through immuno- prophylaxis along with other systematic measures is the most suitable method in Indian context. However, over the years, it has been experienced that the state governments are finding it difficult to provide adequate funds for implementing the schemes even though they have all the manpower needed to implement the same.

Dairy Development

India is the world largest milk producer since 1998-99. According to estimates of the Central Statistical Organisation (CSO), milk accounted for 68% of the total value of output from livestock. In terms of value of output, milk is now the single largest agricultural commodity in India.

Dairying is a secondary occupation for about 69 percent of India's farming community. It contributes close to a third of the gross income of rural households and in the case of those without land, nearly half of their gross income. Women constitute about 70 percent of the labour force in livestock farming. Based on the small holder milk production system, domestic per capita availability of milk was around 229 grams per day in 2004-05. An estimated 70 million rural milch animal households - of which about 75 percent are landless, marginal or small farmers. Most of the rural milch owning households own only one to three animals and it is estimated that only around 15 percent households own more than 4 milch animals. Even after trade was liberalised under the WTO framework, India's imports and

exports of milk products have remained at less than 0.2 percent of domestic milk production. The entire requirement of the country is met essentially from domestic production. India's cost of milk production is competitive with the world's advanced dairying nations. Milk as an item of livestock product is steadily gaining importance in the basket of products produced from the livestock sector. At current prices, the relative share of milk grew from 64.8% in 1993-94 to 67% in 2003-04, while contribution of meat dipped from 18.7% to 17.8%.

Impact of WTO on Wool

Following the WTO agreement, the import of wool in India has been allowed under OGL. Traditionally, India has been importing fine quality wool for the woolen industry at an import duty of 20- 30%. Under new dispensation the duty was abolished. This has adversely effected the domestic wool production resulting in sharp fall in the domestic crises. At present almost all the requirement of wool by the industry is met through imports from Australia and New Zealand. Indian Sheep breeders finding no market for the fine and medium quality wool have crossed their animals with mutton breeds. Consequently, all programmes relating to improvement of wool quality in the country except in J & K and upper reaches of Himachal Pradesh and Uttranchal States have been closed.

Goals and Strategy of National plans

The goals for the eleventh five year plan for the livestock sector would be i) to achieve an overall growth between 6% to 7% per annum for the sector as a whole with milk group achieving a growth of 5.0% per annum and meat and poultry group achieving a growth of 10% per annum, ii) the benefit of growth should be equitable, benefiting mainly the small and marginal farmers and landless labourers and should benefit poorly endowed areas like draught prone, arid and semi-arid areas iii) the sector should generate additional employment opportunity to people in the rural areas especially to the female population, iv) livestock should provide major source of income in the selected areas having potential for mixed crop-

livestock farming system, and v) the growth in the sector should result in the improvement of environment specially in the rural areas.

Need for animal husbandry

Market opportunities have opened up for the livestock sector following the economic liberalization. There are expectations of faster growth in demand for livestock products due to expected increase in income combined with the high income elasticity of demand for livestock products. But the sector's ability to capitalize on new market opportunity is constrained by the availability and quality of support services. At present, Government is the main provider of these services. The quality of the services is however not satisfactory and these services are not available at the doorsteps of the producers. The present structure of livestock improvement is based on fixed model of a Veterinary Hospital/Dispensary being the key nodal structure at the ground level from where services and goods are currently distributed. There is a need to restructure service delivery mechanism to become conducive to the requirement of the rural livestock producers. Lack of credit for livestock production has been a major problem. Public sector lending is abysmally very low. The commercial banks are not favourably disposed to providing credit to livestock farmers and the cooperative credit system is very weak resulting in excessive dependent of livestock farmers on informal sources usually at exorbitant interest rates. The strategy should be to correct these distortions and ensure timely availability of inputs and services including credit to livestock farmers. The Department of Animal Husbandry and Dairying is managing large infrastructure of livestock farms and fodder production stations. Many of the infrastructures are out dated and have not kept pace with the development of science and technology. An exercise on restructuring the existing infrastructure needs to be taken up on priority basis. An institution like Delhi Milk Scheme, which is suffering huge losses, has lost relevance and should be closed and sold out. An authority to supervise quality control on production and marketing of breeding material,

vaccine and other biological should be set up. To advise the Department of Animal Husbandry and Dairying on policy matters, establishment of a National Institute for Livestock Information and Policy Studies is recommended. Similarly the large number of livestock farms managed by the State Governments should be reorganized and the production of vaccine and other biological materials should be privatized.

Schemes

The venture capital fund created by NABARD should be expanded for establishment of infrastructure by private entrepreneurs like veterinary dispensaries, vaccine production units, feed plants, fodder seed production facilities, processing plant for western and indigenous diary, meat and egg product, semen production units and network for delivery of inputs to the farmers. These activities should also get credit under the scheme of Priority Sector Lending from commercial and cooperative banks. Introduction of Livestock Farmers Credit Card (Like Kisan Credit Card) would solve the problem of working capital by providing short-term credit. NABARD should ensure that at least 20 per cent of the total agricultural credit becomes available to Animal Husbandry Sector.

Livestock sector and rural employment

In India, 70% of the rural households own livestock. They are an important source of employment in rural India, especially for women. In spite of the fact that the average holding of livestock is small, the livestock sector has considerable potential for generating additional employment through milk, meat, wool and eggs production. Milk production alone involves more than 30 million small producers. Gender equity is more pronounced in livestock sector, as women participation is 71% of the labour force while it is only 33% in crop farming. As many as 75 million women are engaged in the livestock sector as against 15 million men. Women play a major role in livestock production and most of them have good knowledge about livestock behavior and local feeds. Extent and nature of their involvement varies within

and between regions. Despite variations, women mostly handle aspects like milking, care of young and sick animals, cleaning and feeding. In the poultry sector, women mostly look after rural poultry. Similarly, women play a prominent role in rearing of sheep, goat and small ruminants. Animal Husbandry increases the earning capacity of women and ultimately leads to their economic empowerment. There is an increasing trend towards participation of women in livestock rearing activities. One reason for this phenomenon is the migration of men from rural areas to towns and cities in search of paid employment. This has resulted in an increase in the proportion of households headed by women. Viewed from an economic dimension, the day-to-day activities performed by women are crucial inputs for economic returns/benefits that a household earns through livestock production either directly through sale of livestock and livestock products or the use of livestock in various livelihood activities.

Structure of livestock farming in India

India is rich in agro-ecological diversity, and concurrently one finds a range of unique livestock production systems that have evolved in each region in tune with the naturally available resources and needs of the people. This diversity begins with the choice of species reared, breeds that have evolved, management and feeding practices, healthcare systems that are closely linked to the natural flora and fauna, and local marketing systems. Mixed crop-livestock farming and pastoralism are the two common production systems found across rain fed agriculture zones. In the former, farmers derive their livelihood somewhat equally from agriculture and livestock; in the latter, people's livelihoods depend primarily upon their livestock, which are exclusively maintained on grazing. Dryland regions also traditionally harbour the 'grasslands' of India, providing pasture/grass for some parts of the year. In these harsh climates with minimal precipitation, sustained agriculture through the year is extremely difficult and it is livestock, which has historically played an important role in people's livelihoods. The livestock rearing in India is highly segmented. A vast majority of livestock

producers come from under-privileged section of rural community and need a Livestock development and research paradigm to achieve sustainable livestock development. This section represents a sizeable population of rural families and contributes substantial livestock produce. Livestock are important in their livelihood culture and they have limited alternative opportunities for employment. Studies have shown that development of small holders' mixed crop - livestock production is one of the most effective methods of poverty alleviation.

On-going Schemes

The schemes and programmes relating to feed, fodder and pasture development in the country are quite limited. There are several public departments and institutions directly or indirectly connected to the formulation and implementation of these schemes and programmes. The Department of Animal Husbandry and Dairying, Govt. of India, is the principal governmental agency in this regard. In addition, the Departments of Animal Husbandry, Agriculture, Forestry, Environment, Rural Development, State and Central Agricultural Universities, ICAR Institutions, National Seed Corporation and various local bodies such as panchayats, municipalities and corporations are engaged in the task.

Central Fodder Development Organisation was formed in IX Plan, merging the regional stations for forage productions in the country, a Central Fodder Seed Production Farm and a **Central Minikit programme.** The objectives include introduction of fodder crops, establishment of fodder calendars, organization of farmers' field days, production of forage crop foundation seeds, conduct of training programmes and distribution of fodder seed mini kits and testing their performance in the field.

Livestock Health

Animal wealth in India has increased manifold and the animal husbandry practices have changed to a great extent following the introduction of newer technologies particularly for crossbreeding and upgradation of indigenous breeds. More recently, with the liberalization of

trade after the advent of WTO's SPS agreement, the chances of ingress of exotic diseases in to the country have increased. For ensuring the maintenance of disease free status and to be compatible with the standards laid by the Office International des Epizooties (OIE) - World Animal Health Organization, major health schemes have been initiated to support the animal health programmes in the states. Further, in order to control the economically important livestock diseases and to undertake the obligatory functions related to animal health in the country, Central Government is implementing the following Schemes.

Intensive Dairy Development Programme

Intensive Dairy Development Programme(IDDP) – A Centrally Sponsored Plan Scheme.

Objectives/Aims of Scheme

(a) Development of milch cattle

(b) Increase milk production by providing Technical Inputs services

(c) Procurement, Processing and Marketing of milk in a cost effective manner

(d) Ensure remunerative prices to milk producers

(e) Generate additional employment opportunities

(f) Improve social, nutritional and economic status of residents of comparatively more disadvantaged areas.

Kamdhenu Dairy Scheme

<u>Background</u>:

- Uttar Pradesh is the largest milk producing State in the country.
- Though Uttar Pradesh, with the production 241.939 lacs M.T. of milk during the year 2013-14is the largest milk producing State in the country, yet average

productivity of animals is low in comparison to other states of the country mainly due to less availability of high yielding germ plasm animals in the State.

- In order to over come the low availability of high yielding germ plasm animals, the Government of Uttar Pradesh has launched interest free Kamdhenu Dairy Scheme, which envisage establishment of dairy units of 100 high yielding animals procured from outside the State.
- The number of dairy units to be established under this scheme by 31 of March 2015 is 425.
- **U.P. POULTRY DEVELOPMENT SCHEMES**
- · Development of Animal Husbandry and Dairying in the form of small industries is among one of the priorities of the present government. It is very important to give priority to poultry development in the Animal husbandry sector because the egg production of the State at present is 108 crore while the consumption is 473 crore per year. Similarly requirement of chicken meat is met by procuring and rearing about 10 crore one day old broiler chicks annually.
- · This clearly reflects the huge gap in requirement & availability. Though the State have enormous potential and conducive environment for poultry development yet only Backyard Poultry is developing steadily in the State. Inspite of rich resources like availability of maize grain, other poultry feed ingredients, plenty of man power, huge market, steep rise in poultry product consumption; development of entrepreneurship in poultry sector is not taking required pace in the State.
- · Therefore, for the development of entrepreneurship and making state self sufficient by providing incentives and creating investor friendly environment, the State Govt. has proposed bankable schemes for establishment of 123 lac commercial layer and 6 lac parent broiler birds in next five years.

- · In the schemes measures have been taken for financial support through required poultry policy initiatives.

Restructuring of policies for animal husbandry

A role restructuring is indicated below:-

Government: (Central and State Governments) should concentrate on following:-

1. Policy formulation and implementation.

2. Provision of public goods including physical infrastructure.

3. Regulation of private activity and promotion of competition.

4. Technology development

5. Overall governance and promotion of credible and secure legal environment.

6. International interfacing.

Private Sector: should concentrate on following:

1. Production, marketing, input supply and service support.

2. Technology development.

3. Compliance with regulatory structure.

Producers Institutions: should focus on following:

1. Representation of producer interests in policy making and resource allocation decisions.

2. Promotion of producer interests in emerging markets.

Autonomous Bodies: should focus on following:

1. Information generation and dissemination.

2. Policy analysis and promotion of stakeholder dialogue.

3. Technology development.

4. Capacity building.

NGOs: should keep their focus on following:

1. Information generation and dissemination.

2. Complimenting government’s development role.

3. Equitable participation.

4. Capacity building.

5. Watchdog function.