

## Importance of Livestock Farming for Livelihood Security in India

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### Abstract+

Livestock and poultry sector very important segment of Indian agriculture supporting not only the livelihood of more than seventy five percent population of the rural area especially marginal, small & landless farmers of India, but it is also the important source of income generation. Animals and poultry provide nutrient-rich food products viz. milk, wool, egg, meat etc) draft power, dung & droppings as organic manure for improving the soil fertility and domestic fuel, hides & skin as well as their byproducts also as a regular source of income generation for rural households. The share of livestock in agricultural GDP is about 25 percent while the growth of livestock sector is very fast and it increases continuously in every year. The annual growth rate of livestock population in terms of livestock wealth is approximate six percent per annum, while the growth of poultry sector is about 10-12% per annum. Livestock keeping and poultry farming are the best insurance for the farmers against the various natural calamities like drought, famine, flood and other natural disaster or calamities. The scientific and economical interventions initiated by our livestock owner get maximum benefit in terms of valuable income as well as livestock and poultry products. The animal's products like milk, wool, egg, meat etc and their various slaughter by products (ABPs), such as processed animal proteins, fats, whey, buttermilk, and egg shell, feather meal, bone meal etc represent a potentially valuable resource for feeding livestock and poultry as well as the additional source of income generation for sustaining the life. Proper and judicious utilization of animal products as well as its various slaughter by-product has direct impact on the national economy and hygienic & sanitary of country as well as for enhancement of farmer income, good health and improving socio economic condition of the farmers leads to livelihood security of farming community. Utilization of crop residues, non conventional feed resources adopting crop sequencing, crop rotation and integrated farming systems with availability of lush green pastures or fodders throughout the year leads to reduce the feeding cost of animal rearing and environmental safety. The Veterinarians plays a very key role to maintain global health, economics of nation with the help of livestock wealth and their valuable various animal products and its byproducts. In last one decades there has been tremendous work for creating awareness and increasing interest among the people for proper and judicious utilization of the various milk products with value addition and animal byproduct of the dairy, meat and skin industry along with dung & urine for preparation of valuable product such as Panchgavya, Jeevamrit and Gaumutra ark etc for betterment of

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**Introduction**

Livestock farming is an economic enterprise & considered as "Survival enterprise" for millions of people in India, especially in the Arid & Semi-Arid regions (Singh et al., 2017; Yadav et al., 2018). In India, 85% livestock and poultry keepers are small & marginal farmers (<2 hectare of land), operating 44% of land for crop cultivation & contributing more than 69% in country milk production (Singh et al., 2018). Future of sustainable agriculture growth & food security in India depends on the performance of small & marginal farmers (Bharti et al., 2019).

Hence, Animal Husbandry act as a major source of social strengthening since it provides livelihood to about more than 70 percent of rural people providing employment opportunity as well as skilled and unskilled villagers (Islam et al., 2009) Not only this, livestock sector provides employment to 8.8 per cent of population which largely comprises of landless and unskilled population (Shukla et al., 1999). The dairy sub sector plays a major role among livestock sector in terms of growth and income and employment opportunity (Census, 2019). The words of Shri Nanda Kumar, Chairman of National Dairy Development Board (NDDB) stated that "Doubling farmers' income by 2022 is impossible without dairy farming which has a CAGR of 19.6 per cent. This clearly indicates that strength and importance of livestock or dairy farming in the building of nation.

Veterinarians play a very significant role in maintaining the health of people throughout the world by contributing in production of good quality animal proteins in terms of milk, meat, fish and egg. Veterinarians not only restricted to global health and welfare of animals but also actively involved in prevention, treatment, management and control of infectious as well as zoonotic diseases. Now days, Veterinarians of whole worlds are actively engaged in conducting various research trials to understand the basic ethology, ecology of emerging zoonotic and infectious diseases that may be transmitted between animals, humans and vice versa. Veterinarian also contributed in animal welfare either in Veterinary dispensary or hospitals or at the door step of the farmers to diagnose the diseases, treatment and vaccination. He is also responsible for creating awareness programme among the rural youth,

villagers and women to promote livestock keeping and animal welfare issues.

Management of animals at different stages of life plays a significant role in improving the lactation efficiency of dairy animals because good animals are always raised not purchased. So, Management plays a very crucial role in terms of livestock health, growth, production and reproduction. Management is technical cum scientific and practical skill or knowledge by which it can improve the efficiency of labours as well as production & reproduction performance of animals maintained at organized or un-organized farm to produce very good quality products. Hence, Livestock management in form of scientific interventions to reduce feeding cost, mortality, morbidity, age of sexual maturity (ASM), age of first calving (AFC), generation interval (GI) etc, by which it improves milk, meat, wool, egg, skin production, peak yield, growth rate, fertility rate, prolificacy. So, it will be very useful & beneficial for the farming community to adopt the scientific and technical interventions for strengthening the socio-economic status of the farmers.

The growth of a country is directly related with energy, renewable as well as non renewable resources. The livestock products and its byproducts represent a economical and quality resource for feeding to the livestock. So, mainly there are basically only two ways by which we can improves the income generations of our livestock owners.

**A. Managerial Interventions**

For sustainability of livelihood, livestock security and welfare, livestock management plays a very important and crucial role. So, interventions in management should be strictly adopted by our livestock farmers for positive outcome. For livestock improvements, we should strengthen the pillars of management viz.

- i. **Breeding:** We should give emphasis on breed conservation, establishment of elite herd and allow for mating with their superior individual.
- ii. **Feeding:** Provides growth, maintenance, production and reproduction ration with plenty of greens.

- iii. **Weeding:** Culling of unwanted & unproductive animals.
- iv. **Heeding:** It includes scientific and technical interventions at different stages of life viz. calf management, heifer management, care and management before & after breeding season, care during pregnancy, care & management during peri parturient period, care & management during & after parturition, milking management & clean milk production etc with daily farm visit to check health status, hygienic & Sanitary condition of farm animals (Banergee, 2011).

For attaining maximum benefit to our livestock owners they should focus on scientific management of livestock during their different stages of life.

#### **A. Housing Management**

The livestock owners should give due importance on construction of cheaper, durable, well lighted and ventilated house to protect their animals from bad weather condition, theft, proper feeding and rearing etc. The alleviation of house should also take in consideration to reduce the water logging and dampness condition nearby house. There should also be provision of light, fan, curtain etc to protect the animal from inclement weather as well as for protection from direct exposure to wind and sun light.

#### **B. Care and management of calves:**

The calves are just like the foundational stone required for the success of any organized dairy farm. The intensive care of calf before and after birth will responsible for the future of its productive & reproductive performance as well as the it's protects the future of farmers. So, it is a quote that "good animals are always raised. not purchased". There is very high calf mortality among calves in India is due to poor management of calf during early stage of life (Thomas et al., 2005).

The raising of neonates begins even before it is born. The cows which are not fed proper will give birth to under nourished and weak calves. So, the livestock owner should be very conscious on feeding of advanced pregnant cows with its proper management under close observation. Intensive care will be also required for neonates during and after the birth. Immediately after birth, remove the mucous from mouth & nostrils, allows mothers to lick her calf. Provides colostrum 10% of their body weight of calves in 4-5 times in a day within 30-50 minutes after birth. Provides artificial colostrum in case of any casualty with mother. Provides milk replacer and calf starter for early growth of calf. Feeding of antibiotics, pro-

biotic and pre biotic should also practice. Timely vaccination, de worming, dipping, bathing should also be taken in consideration.

#### **C. Care and management of heifers**

The good growing heifers are the best foundational stock for any successful dairy enterprises. Heifers can be raised by two methods viz. outdoor and indoor system. Provides maintenance ration, in case of breeding season and pregnancy period the livestock owner's should provides additional concentrates for conception and successful parturition. The additional concentrates should be provided at least 0.5-1.0 kg during early pregnancy while during early & mid pregnancy also provides 0.5-1.0 kg and 1.0-1.5 kg additional concentrates respectively. In case of advanced pregnancy special feeding practices must be practiced in form of challenge feeding and steaming up for successful parturition as well as to obtain healthy calves with maximum milk production (Singh et al., 2017).

#### **D. Care and management of lactating animals:**

The care of lactating animals should be performed in very kind manner. There should be provision of adequate nutritional support in form of high quality concentrates with mineral mixtures. The concentrates should be enriched with bypass fat and protein technology. The farmers should also provide adlib quantity of lush green fodder to the lactating animals throughout the year. The lactating animal should be groomed and exercised daily for better production. The milking of dairy animals should be practiced with full hand milking or fisting methods to reduce the incidence of teat injury (Jones, 2006).

#### **E. Care and management of dry animals**

Dry period is starts from the day of the cows stops the giving milk up to the day of next calving is called. The dry period starts from the termination of lactation period till next calving. This period is necessary for regeneration & repair of udder tissues, to give rest to the cow's udder to recoup its normal condition. There are three methods of drying in lactating animals.

- Sudden cessation of milk
- Incomplete milking
- ntermittent milking

#### **B. Breeding of Livestock**

Purity of germplasm and detailed records about pedigree and sire Dam records should be maintained properly by livestock owner with the help of breeder.

Hence we should avoid the uncontrolled breeding with low quality stray bulls. It will be very helpful to maintain the production and reproduction of dairy animals.

The faulty detection of heat is major concerned in lengthen the generation interval as well as reduce the production level. So, proper heat detection with teasure bull is very helpful for Artificial Insemination (A.I.) or natural service by good quality semen or proven sire.

### C. Feeding of livestock

Feeding of good quality concentrates, roughages and green fodder in form of balanced ration to our livestock, improves their productive and reproductive performances. The concentrates should be enriched with high quality proteins and bypass fat & protein, 25-30 kg good lush green fodder and 4-5 kg dry fodder in form of stover or bhusa along with chelated mineral mixtures. Provide at least 30-50 gm of chelated mineral mixture daily in addition in the ration of dairy animal, if concentrates are not having mineral mixture (Prashad, 1997). The feed supplements in form of probiotics, prebiotics, antibiotics, anti-oxidants nutraceuticals and immunomodulatory herbal preparations also have the beneficial effect over the performance of dairy animals.

It will be better to improve the digestibility and nutritional value, poor quality roughages or straw or stover or tуди should be treated with urea or Non-Protein Nitrogenous (NPN) substances for improving the performances of dairy animals. Feeding of Urea Molasses Mineral Block (UMMB) and salt lick also plays a very important role in terms of improving the palatability, appetite and digestibility.

### D. Green fodder availability

By using suitable crop rotation, increasing cropping intensity (more than 300%), sowing of annual & perennial legumes along with cereal fodder to make availability of good quality lush green fodder for their livestock throughout the year.

To make fodder availability during scarcity season, fodder preservation is important step. So during lush season the fodder must be preserved in form of hay or silage. There is also urgent need to establishment of fodder bank in fodder surplus area.

### E. Use of Non-conventional feed resources

The cost of feeding can be reduced by use of non-

conventional feed (NCF) resources viz. sugarcane baggase, splint wash, sugarcane tops, tree leaves, industrial byproducts like molasses. It is essential for survival of livestock during disaster and natural calamities. The use of non-conventional feed resources or scarcity fodder plays a very important role during calamities after removing the toxic alkaloids.

### F. Hygiene & Sanitization

The animal shelter should be well cleaned, hygienic and sanitary condition so that we can minimize the occurrence of diseases and mortality in the farm. There is also urgent adoption of bio-security measure to control transmission of infectious diseases. The premises of milking barn and other shed and loafing are should be neat & clean to improve hygienic and sanitary quality of milk and its byproducts (Barbuddhe et al., 2008)

### G. Regular health monitoring, Vaccination of Livestock and the working staff

Routine visit to every shed with close observation, health check-up, disease diagnosis and treatment should be strictly followed by the livestock owner. The diseased animal should be isolated in a isolation ward as early as possible, while those animal which are being purchased or coming from competition should be put under quarantine. The vaccination of all farm animal is compulsory as per recommendation by the Veterinarian.

### H. Marketing channel

Establishment of well organized market of livestock and livestock products in India is very urgent requirement without the involvement of middleman. There is also the urgent need of road facilities along with good transportation facilities with chiller. Since, the Milk and milk products as well as meat, egg and animal byproducts are perishable in nature so availability of deep freeze and transportation facility is required for improving the shelf life of livestock products.

### I. Culling and Replacement of Animals

Culling or removal of less or un-productive animals from the farm should be in regular practice, because the un-productive or less productive animals severely affect the rearing cost and profit ratio of the livestock owners. So, regular culling and replacement of older animal is essential for making the livestock enterprises more profitable.



## J. Value Addition of Milk and Milk Products

The value addition of milk and meat products improve the profit so, it can be done by making several types of sweets, chhana, curd, flavoured milk, kheer, cheese, paneer, butter milk, pavsam etc from surplus milk as well as value addition of meat by making kabab, pickles, sausage etc to increase the shelf life of livestock products. Lack of cooling facilities to keep milk fresh in warm climate resulted in the diversion on milk for the preparation of various milk products with comparatively longer shelf life.

## K. Utilization of Animal byproducts

The processed animal proteins, animal fats, milk and egg products and former food products represent a potentially valuable resource for feeding livestock, which is called as animal byproducts. It is very useful in reducing the feed cost as well as encouraging income generation by making various useful items. It is very essential to take initiative by Government of India to organizing regular awareness and training program for the farmers to know the utilities of animal byproducts as well as to gain more income.

Animal wastes are either in-expensive or cheaper than propane, electricity and most natural gas. In fact, there are costs associated with disposing of manure which can be minimized through use as a fuel. In addition, using manure as a fuel minimizes odor, run off (non-point source pollution) and other nuisances. Using animal manure as fuel can improve the financial bottom line of the farm operation. Generally, anaerobic digestion is the most flexible biomass conversion option for a farm operation. It produces biogas which has a heating value of approximately 600-800 Btu/cubic foot, 60 to 80% of the energy value of natural gas. The gas can be used to generate electricity, as a boiler or furnace fuel or to run refrigeration equipment. Biogas is one of the more important sources of energy in terms of cooking, electricity generation & mechanical energy generation, made from dung and animal waste materials. Biogas is a clean and efficient fuel.

## A. Dairy Industry Byproduct

Paneer, cheese, chhana, butter milk and ghee is a chief dairy by product and having a much more demand among the human beings. Skim milk, butter milk, ghee residue and whey are the major dairy industry byproducts. Judicious and proper utilization of dairy by-products leads to improvement in income generation, availability of nutrients for humans being and helps in minimizing the environmental pollution. In India, low per capita availability of milk, higher

proportion of buffalo milk, poor quality of raw milk, lack of organized manufacture of products, lack of adequate technology, high cost of new technologies, lack of in-house R & D, lack of proper infrastructure, lack of indigenous equipments and plants etc. Before setting up a by-product factory, it is important to consider the economical aspects of the plant, because sometimes the cost of manufacture of the by-product may be more as compared to the by-product and, therefore, the setting up of the by-product plant is not economically feasible. But with advancement in science and technology as also the automation of plants, the economic feasibility of these can be improved.

In India, skim milk is mostly utilized either for standardization purposes or preserved in spray dried form. Only a very small quantity of skim milk, mostly of substandard quality, has to be used as byproduct. Whey and Its by-products In India, there has been a tremendous increase in the production of cheese and coagulated milk products resulting in a proportionate increase in whey. Butter milk is the by-product obtained during the manufacture of butter. The exact amount of butte rmilk production in India is not estimated. In addition, a substantial amount of lassi (sour butter milk) is also produced during the manufacture of makkhan directly from fermented milk (curd). Total annual production of butter milk in India is estimated at 35 million tonnes. Sweet cream butter milk resembles skim milk in gross chemical composition and is usually admixed with bulk of skim milk for further spray drying or even product manufacture in dairy plants. Desi butter milk, on the other hand, has long been an important domestic beverage in India. It has high nutritive and therapeutic value. It also finds its way in the preparation of a host of items such as kadhi, dhokla and idli. Also a number of state dairy federations and private plants sell salted and spiced butter milk in 200 ml pouches. Surat-based Sumul does business out of selling butter milk (chhach) in and around the city."Sumul chhach" in 500ml packs reaches practically every nook and corner of Surat, covering over 850 retail outlets.

## B. Dung & Urine

Fecal matters (dung) & urine of livestock is a most important source of bio-fertilizer, Dung brick preparation & pest repellent but at the same time cow's urine, cow's horn and a dead body of a cow can be used for preparing effective bio-fertilizer. In our country, farming and agricultural cultivation, as per the traditional age-old system, used to be done, with cow dung amongst others serving as manure.

Cow dung is a very good source for maintaining the production capacity of soil and enhances the microbial population. Cow dung has been considered as a Gold Mine due its wide applications in the field of agriculture, energy resource, environmental protection and therapeutic applications. It is also used as a co-product in agriculture, such as manure, bio-fertilizer, bio-pesticides and pest-repellent. Several Products has been launched by the manufacturing companies such as soap, toothpaste, floor cleaners, hair oil, incense, shaving cream and face wash from the cow dung to earn money. The soap contains dried and pulverised cow dung, orange peel, lavender powder, and gooseberries, the company says. The toothpaste is made of dung, ghee, and urine. It is now readying a line of cosmetic products and medicines as well.

### *Panchgavya*

It was thought that the a divine cow named as “Kamdhenu” was famous for milk production. Maharshi Vasishtha and Maharshi Dhanvantari offered to mankind a wonder medicine “Panchgavya” (a combination of cow urine, milk, dung, ghee and curd) from the divine cow’s milk, ghee, curd, dung and urine Kamdhenu. All these five products (cow urine, milk, dung, ghee and curd) are individually called “Gavya” and collectively they are called as “Panchgavya”. The importance of Panchgavya is also discussed in various ancient scriptures like Bhel Sanhita, Kashyap Sanhita, Charak Sanhita, Sushrut Sanhita and yog ratnakar granth. Panchgavya providing positivity, longevity and magnetic charisma with improvement in mental health. It is also useful to safeguards the plants, shrubs and herbs as well as Due to such benefits of Panchgavya, it is often called as a divine elixir by Ayurvedacharyas in India.

The preparation of panchgavya is a traditional method, used to safeguard plants and soil micro-organisms and to increase plant production. Panchgavya application is found to be more profitable than recommended fertilizer application and chemical spray in case agriculture also.

### *Biogas and Composting*

Cow or buffalo dung can also used for production of Biogas. Methane is chief component of biogas. It is a type of bio-fuel because it is naturally produced from the decomposition of organic matter and debris. On an average biogas contains 50-70% methane, 30-40% carbon dioxide and traces of other gases. Biogas can be used in cooking, for lighting in homes and streets or for mechanical utility purposes like chaffing

of green or dry fodder for feeding to the livestock in an organized dairy farm. Slurry is a waste material of biogas unit can be used for production of quality manure, to improve the crop yield by improving the soil fertility (Singh, 2019).

Proper manure disposal at a dairy farm has always been a concern for hygienic, sanitary and health point of view. Small, integrated farming operations generally use the manures as fertilizers and apply the collected manure on soil surface of a crop land. There are limits to how much manure can be spread. Putting too much manure on fields can reduce yields. Additionally, spreading more manure than the requirement of crops can result in groundwater and surface water pollution.

### *Therapeutic uses of cow dung*

- i. Skin tonic: Mixed with crushed neem leaves and smeared on skin - good for boils and heat rashes.
- ii. Tooth polish: Toothaches gets removed, so instead of toothpaste which is made of chemicals & dead bones of animals it is a good alternative. Several experiments have been proved that fresh cow dung kills the germs of Malaria and Tuberculosis disease.
- iii. Bio-enhancer: Bio-enhancers are those substances, which do not having any drug activity but it can promote and augment the bioactivity or bio-availability of drugs. Generally the bio-enhancers are being isolated from plant and herb extracts. It has also noted that fresh urine of healthy cow also act as a bio-enhancer and improves the efficacy of the antibiotics against infectious micro-organisms with anti-cancerous property.

### **C. Livestock slaughter by product**

Meat sector in India plays an important role in providing livelihood to rural people, sustaining livestock production and contributes a valuable foreign exchange to the country (Singh et al., 2018). All parts of a live animal that are not part of the dressed carcass, is termed as livestock slaughter by-products (Mohammad et al., 2016). The raw materials used to make various products for human and animal welfare can be prepared from livestock slaughter by-products (Sharma, 2003). Good quality leather for making of shoes, purses, clothing, car seats can be prepared from animals hides and skin. The intestines of slaughtered animals’ can be used for making casings or sausage and food containers. There is various pharmaceutical, cosmetic, household, and

industrial products can also prepared from slaughter animal by-products. Hide or skin, hair, horns, hooves, teeth, fats, bones, ligaments and cartilage, feet, glands, blood, and lungs are called as in-edible animal slaughter byproducts (Sharma, 2011). These are also very useful for making various pharmaceutical preparations and quality animal feed.

## Conclusion

The contribution of livestock sector in supporting the Indian agriculture, livelihood of more than two-thirds of the rural population especially marginal, small & landless farmers of our country by providing valuable products and byproducts. The Livestock provides various nutrient rich products for human welfare viz. milk, wool, hair and meat etc. The livestock are also provides a regular source of cash income in form of animal draft power, dung as organic manure and domestic fuel, hides & skin for rural households. The adoption of scientific and technical intervention about advancements of livestock farming by our livestock owner they will definitely get maximum benefit by selling of valuable animal products viz. milk, wool, egg, meat etc and their by-products such as processed animal proteins, animal fats, milk and egg products, and former food products represent a potentially valuable resource for feeding livestock as well as the additional source of income generation for the farmers. Proper utilization of animal products as well as by-product has direct impact on the economy and environmental pollution of country. So, livestock plays a very significant role improving health and livelihood security.

## References

1. 20th Livestock Census (2019). All India Report, Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India, Krishi Bhawan, New Delhi. Mishra, R. and Singh, S. (2013) Sustainable energy plan for a village in Punjab for self-energy generation. *International Journal of Renewable Energy Research*, 3(3): 640-646.
2. Banerjee, G.C. (2011). A text book of Animal husbandry. Oxford & IBH publishing co. PVT. Ltd. Pp: 766-767.
3. Barbuddhe SB, Swain BK. (2008). Hygienic production of milk. Indian Council of Agricultural Research (ICAR).
4. Bharti, S.K., Basak, G., Pathak, V., Arya, A., Singh, D.N., Malakar, R. (2019). Organic Food Production: A potential Discretion towards sustainability for food and Livelihood Security.
5. Islam MA, Islam MN, Khan AS, Rashid MH, Obaidullah SM. (2009). Effect of different hygienic condition during milking on bacterial count of cow's milk. *Bang. J. Anim. Sci.*:109-114.
6. Jones, GM. (2006). Milking Practices Recommended to Assure Milk Quality and Prevent Mastitis. The Cattle Site.com.
7. Mohammad Rais and Sherin Kuruvilla (2016). Meat Processing in India: Science, Technology, Policy and Skill Development. *Journal of meat science and technology* : 4 (2): 53-61.
8. Prasad, J. (1997). A text book on Principles & Practices of dairy farm management. Kalyani publishers. 3rd edn. Pp 341-343.
9. Sharma BD (2003). Modern abattoir practices and animal byproducts technology, Jaypee Brothers Med. Publ., (P) Ltd.
10. Sharma BD and Sharma K (2011). Outlines of Meat Science and Technology, Jaypee Brothers Med. Publ., (p) Ltd. pp. 360.
11. Shukla R K and Brahmankar S D. 1999. Impact evaluation of operation flood on rural dairy sector. A report of National Council of Applied Economic Research, New Delhi, India.
12. Singh, D.N., Kumar Ajay, Singh, Y., Mamta and Sirohi, R. (2017). Nutritional Management of the transition dairy cow for optimal health and Production. *Journal of Animal Feed Science*. 5(1):25-29.
13. Singh, D.N., Singh, Y., Sirohi, R., Ajay, Bhattacharyya, A. and Shukla, P.K. (2016). Bioterrorism: Significance in livestock Production and Bio-Security Measures. *Indian Journal of Agriculture business*. 2(1):51-55.
14. Singh, D.N., Sirohi, R., Singh, Y., Kumar Ajay, Shukla, P.K. (2018). Role of Animal By-Products Utilization in doubling the farmers Income. *Indian Journal of Agriculture business*. 4(1):23-27.
15. Singh, M.P. (2019) Organic waste creates power and fertilizer. *Journal of the International Association on Electricity Generation, Transmission and Distribution*, 19-20(1):18.
16. Thomas, C.K. and Sastry, N.S.R. and Ravikiran, G. (2005). A text book on dairy bovine production & hygiene. Kalyani publishers. 2nd revised edn. pp 4486-488.
17. Yadav Sarvajeet, Singh Amit, Singh Deep Narayan and Singh Jai (2018). Factors influencing Adoption behavior of the dairy farmers in semi-arid region of Uttar Pradesh. *Ruminant Science* 7(2):301-303.

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Sd/-  
(Dinesh Kumar Kashyap)