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Prospects of animal husbandry in doubling farmer's income by 2022: A review

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Abstract

Doubling the farmer's income by 2022 is a very challenging task, because the land holding size of farmer is decreasing continuously and at the same time, human population increasing very rapidly, which necessitates the situation to look forward to the animal husbandry sector. The income of farmer's can be doubled by adopting the recent technology in livestock sectors like increasing the coverage of artificial insemination, improving animal productivity through grading up and crossbreeding, betterment of health care services, feeds and fodders bank development, climate resilient housing and feeding practices and value addition of milk and meat products. Apart from this various schemes viz. ARYA, READY, National Livestock Mission, Rashtriya Gokul Mission, Kisan credit cards, farmer's federation, NGOs, and women SHG are also useful in doubling the farmer's income. Animal husbandry department also plays an important role in the dissemination of technical knowledge about farming practices, protecting animals from the most economically important diseases like FMD, H.S, B.Q, PPR and anthrax and creating awareness among the farming community regarding benefit of diversified farming.

Keywords: Animal husbandary, doubling farmer income, ARYA, Kisan credit card and SHG

1. Introduction

In India, agriculture and livestock sector related intrinsically from the very beginning and about 70% of the rural farmer's livelihood depends on it. The Agriculture and allied sector contributed significantly in Indian economy. The income of farmer's depends upon the resources available with them and it varies from state to state. According to the report of NSSO (2012-13) monthly income of farmers were Rs. 6,426^[1] but Dinani *et al.*^[2] reported that the average monthly income of farmers was less i.e. Rs. 3,844. The income reported by various researchers, is not sufficient to fulfill the basic needs of one family in the 21st century. Due to Green Revolution, India's food production has increased by 3.7 times, whereas population multiplied by 2.55 times^[3]. The food production has been increased from 51 million Ton in 1950-51 to 273 million tons in 2016-17. Due to this per person food production has been increased by 45%, which made the India not only food self-sufficient at the aggregate level, but also a food exporting country^[3]. Hence, this situation compels the government to focus on double the farmer's income. So, our Prime Minister, Sri Narendra Modi has given the narrative that Double Farmers' Income by 2022' marking the country's 75th year of independence is a welcome directive, which would aim to benefit the Indian Farmer through interventions from FARM to FORK^[4]. To double the income of farmers would require 15% compounded income growth rate by 2022. This is not possible through agriculture alone. Therefore, in order to achieve the target of doubling farmer's income would require much greater effort and focused attention on various livestock sub-sectors.

2. Role of livestock sector

Crop and livestock are complementary to each other in the agricultural systems of India. Livestock alone provide livelihood security to 2/3rd population of landless and marginal farmer, who kept 70-75% of livestock population. Livestock provides employment to unemployed educated rural youth, nutritional supplements in terms of milk, meat and eggs to family members and critical input to crop sectors. Apart from these, animals are natural capital to the livestock keeper and acts as mobile banks at the hour of needs. Livestock sub-sector plays a vital role in the Indian economy and also in the socioeconomic development of millions of rural households.

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As per the annual report [5], livestock sector contributed 28.4% to agricultural GVA (Gross value added) and 4.9% to national GVA (At current price). The status of livestock

population in world scenario and animal productivity and per capita availability of different livestock commodities are depicted in table 1.

Table 1: Current status of livestock population and its products (Livestock census, 2019)

S.N.	Species	Population (million)	Rank in world	Percentage distribution of livestock to total population (%)
1.	Cattle	193.46	2 nd	36.04
2.	Buffalo	109.85	1 st	20.47
3.	Goat	148.88	2 nd	27.74
4.	Sheep	74.26	3 rd	13.83
6.	Pig	9.06	-	1.69
7.	Others (Donkey, Yak, Mules)	0.26	-	0.23
8.	Chicken	851.81	5 th	96.07
9.	Duck	33.51	5 th	3.93
Production and availability of livestock products [6]				
S.N.	Animal products	Production	Per capita availability	ICMR Recommendation
1.	Milk	187.75 MT	394 grams/day	280 grams/day
2.	Meat	8.11 MT	2.96 kg/year	11 kg/year
3.	Eggs	103.32 billion	79 eggs/annum	182 eggs/year
4.	Wool	40.42 m kg	-	-

3. Contribution of livestock sector in Indian economy

Livestock and poultry sectors contribute 4.0 and 0.9%, respectively, to the national economy in terms of Gross Domestic Product (GDP). The agriculture and allied sector collectively contributed about 17.2% to the total GDP of the country. According to estimates of the Central Statistical organization [8], GoI, the value of output from livestock sector was about Rs. 10,43,656 crore at current prices during 2017-

18 which is about 39.67% of the value of the output from total agriculture and allied sector. The total export earnings from livestock products and agriculture are approx. 1% and 6%, respectively [7]. Meat and meat products contributed 90% to total export earnings from livestock sector. The contribution of agriculture and allied sectors to the national economy is given in table 2.

Table 2: Value of output from Agriculture and allied sectors in Indian economy [8].

Items	Total GVA (in crores) in 2017-18 at current price	Percent (%) of total value
Crops	1546808	10.0
Livestock	758417	4.9
Forestry and logging	189348	1.2
Fishing and aquaculture	175373	1.1

Table 3: Value of output from livestock products and by-products to national economy

Items	Value (in crores) in 2016-17 at current price	Value (in crores) in 2017-18 at current price	Percent share in national economy at current price (2017-18)
Milk and milk products	629157	701530	67.22
Meat and meat Industry by-products	207245	218540	20.94
Eggs	29756	32844	3.14
Wool and Hair	628	599	0.06
Dung	53690	56424	5.41
Silk worm coccons and honey	8825	9096	0.87
Increment in stock	21590	24623	2.36
Total	950891	1043656	100

4. Why to double the farmer income?

4.1 To promote farmer's welfare

Various schemes are developed by the Department of Animal Husbandry, Dairying & Fisheries for the promotion of farmer's welfare viz.- ENAM (Electronic: -National agriculture market) [7]. Pradhan Mantri Fasal Bima Yojna (PMFBY), Dairy Entrepreneurship Development program, National Livestock Mission (NLM) etc., which help to increase the productions level and socio-economic growth of farmers [6].

4.2 Agrarian distress

India rank 2nd largest agricultural producer in the world. In spite of that, agriculture farming in India is very risky business due to irregularity of weather, crop and market. That

unpredictability for small farmers led many farmers into agrarian distress [3].

4.3 Increased number of farmer suicide

Farmer's committing suicide is a very multifarious phenomenon and that is related with farmer's economic, social and psychological distress. The main cause of farmer's suicides includes: - Increase cost of production, globalization and exploitation from money lending sources, shrinkage of water table, repeated crop failure, natural calamities and lack of alternative source of income [3].

4.4 Lack of interest in Rural youth in farming

Now a day, the youth of India are not interested to continue the agricultural farming as a livelihood because of under-

investment in agricultural research, poor infrastructure (electricity, markets and roads), under-development of institutions (credit, extension, insurance) less profit and marginalized income. So, Ministry of Agriculture and farmer welfare of India started two projects in 2018, to attract the rural youth for farming like, Attracting and Retaining Youth in Agriculture (ARYA) & Rural Entrepreneurship Awareness Development Yojna (READY).

5. Prospects of Animal husbandry to increase the farmer's income

5.1 Widening the coverage of A. I

According to report of Niti Ayog Paper (2017), the coverage of A.I in cattle and buffalo is approx. 35%. This situation is prevailed due to inadequate supply of quality semen doses and liquid nitrogen. To achieve the required target of A. I, we require 160 million doses of semen, but currently we are producing 81 million doses, which widen the gap between demand and supply.

5.2 Improving the productive efficiency of dairy animal

The productivity of our Indigenous animals in India is very low (2-4 kg/day) as compared to other developed countries. Farmer's income can only be double if productivity of these low producing animals enhanced^[9]. There is ample scope in the improvement of production efficiency of dairy animals by improving the housing, feeding, health and reproductive management like anestrous, delayed puberty and delayed heat. Also, there is a need to improve genetic material and breeding methods which is helpful in enhancing the productivity of dairy animal^[10].

5.3 Technology generation and dissemination

In livestock, information technology used for dissemination of livestock related information such as; vaccination alert can be delivered through mobile service and various social media before Monsoon^[9].

5.4 Diversification

Crop-livestock diversification is the best livelihood strategies for farm household. This system provides increased stability in income, food security and nutrition to the farmers. Livestock sector alone provides alternative livelihood option to over 70 millions small and marginal farmers. Meat, egg, wool and their by- products are also emerging as important productive sector for diversification^[10].

5.5 Value addition

Value addition is a process of changing and transforming a product from its original state to a more valuable state. Product development is a way that enhances the value of milk and meat byproducts. Local farmers also get the benefit if they engage in value addition activities which enhance the value of livestock commodities^[10].

5.6 Ensure availability of feed and fodders

India is a deficit of 10% of dry fodders, 33% concentrate feeds and 35% of green fodders. So, the availability of feeds and fodders can only be improved through dietary manipulation, microbial manipulation and increased production of fodder crop. Inter cropping and mix cropping are widely used to minimize the risk of failure, low water requiring and short duration forage such as; cow pea, cluster bean can be intercropped with long duration crop such as

sorghum, pearl millet. Fodder production can be increased by raising fodder crop as a catch crop between the main cropping seasons^[11]. The animal should be fed with balanced ration including mineral mixture and vitamins.

5.7 Fodder and Feed development-

Since, feed and fodders contribute 60-70% of the total variable cost in livestock rearing, thus, economic feeding will increase the profitability. Fodder Development program along with fodder bank should be designed in every district. Establishment of fodder banks in a fodder scarcity region through dairy federation and organizations can help small farmers to feed their livestock^[4]. At the same time, the number of low productive animal need to be decreased to provide the adequate feed and quality feed instead of keeping large number of animal with underfed.

5.8 Improvement of nutritional value-

Majority of feed and fodders for animals are paddy straw, wheat straw, maize stalk, sugarcane, bagasse which have poor in nutritional value due to high fiber content. Nutritional value of these fodders can be improved through urea treatment, water irrigation and heat treatment methods^[11].

5.9 Increasing funding, subsidy and bank loan

Majority of livestock development policy has been implemented by State government and only 10% governed by central governments. There is very less private sector investment in animal husbandry. Investment linked tax incentives and attractive credit facility to private investors are missing in this sector, which need to be addressed.

5.10 Improve breeding practices

It is necessary to provide updated knowledge regarding artificial insemination and problem associated with it to the Paravet and AI technician on regular basis to improve the breeding efficiency and thereby loss of farmers. Also new technology like MOET and IVF need to be implemented to increase the breeding potential of superior Dam. It is further strengthened by providing a timely supply of liquid nitrogen, frozen semen, vaccine, first aid kit, concentrate feed, mineral mixture and forage seed to paravets for onward supply to dairy animals through local dairy federation or NGOs engaged in livestock husbandry^[11].

5.11 Shelter management

Farmers should ensure the welfare and comfort of animals by providing sufficient space requirement of individual animal, proper ventilation, water management, feeding management, proper hygiene in animal shelter^[12]. With a changing climate, the housing design of animals needs to be modified to make the micro-climate conducive for health and production by adopting a free stall design, fogger, sprinklers and mist cooling system^[11].

5.12 Improvement of health care services

Creation of awareness among farmers regarding animal diseases and preventive measures by organizing regular camp in villages and vaccination of animals for most common diseases. Also need to be established disease investigation laboratory for early disease diagnosis, dairy federation for milk procurement, private agencies and farmer's federation for effective treatment of animals.

5.13 Contract Farming

Now a days various co-operatives and agribusiness organizations promoting contract livestock and poultry farming, including risk coverage, which help in the improving of the socio-economic status of rural farmer.

5.14 Livestock Insurance

Livestock insurance provided by the public sector insurance companies could cover only about 6% of the animal heads. Therefore, innovative and acceptable insurance models may be designed to evolve a suitable scheme for various livestock species.

5.15 Kisan credit card

Government of India started KISAN CREDIT CARD in the year 1998 to provide timely and adequate credit support to the farmers from the banking system in a fixable, hassle free and without cost. The benefit of this system is also still underutilized.

5.16 Women SHGs

Now a day, Woman SHGs is emerging as a most credible institution to provide cash support to small enterprises and also they have a very good track record on credit supply and timely recovery. So there is need to invest more and more by the government to provide the credit benefit to these women SHG for the establishment of any new venture for their livelihood.

5.17 National dairy development programme

This programme is focused on production of quality milk, procurement, processing and marketing of milk and milk by-product by creating /strengthening of infrastructure.

5.18 Dairy entrepreneurship development scheme

This scheme is being implemented through NABARD which provide financial assistance to farmers to become a entrepreneur.

5.19 National dairy plan phase 1

NDP-1 is a central government scheme, implemented by the National Dairy Development Board to increase productivity of milch animals through scientific breeding and feeding to meet the rapidly growing demand for milk. By 2022 the demand of milk would be 254 million tonnes, which is possible only through crossbreeding and upgrading of non-descript breed and low producing animals.

5.20 Strengthening Livestock extension services

Livestock extension services remain in dormant stage and majority of livestock keepers are very poor and uneducated, that's why they do not able to access information given on various platforms. So there is need to aware the farmers through building up an exclusive cadre of livestock extension workers, establishment of KVKs exclusively for livestock activities and strengthening ATMA with AH experts^[9]. ICT based agricultural extension services also brings extremely good response among the farming community.

5.21 Fixing the minimum support price (MSP) for livestock products

The farmer is mainly concerned with the profit he gets from a particular commodity. Further, better price, may be fetched by diversification of livestock products with practical options. It

also needs to fix the minimum price of each livestock commodity, which provides financial security among the livestock keepers.

5.22 Strengthen organic livestock farming

In recent days, everybody is looking for organic products and even interested to pay a higher price in comparison to inorganic product. In our country, various places like, NER, HP, J&K, Uttarakhand, MP, Chhatisgarh, and Jharkhand is organic by default, must be made Organic by Process for the producers to get advantage of market value.

5.23 Adoption of Integrated Farming system (IFS)

Development and adoption of IFS model in various farming system according to the need of people will fulfill the target of Doubling farmer's income by utilizing output of one enterprise as input of other enterprise viz. Fish cum duck farming, Livestock and crop, Fish-duck- goatery, Fish-duck-fruit plant etc.

5.24 Profit enhancement through effective livestock waste management

Cow dung having multifarious uses. If anyone having 5- 10 units of cow and buffalo can easily utilize the livestock waste into valuable products, likes vermicomposting, which is rich in humus and provide better nutrient to the soil. Similarly, biogas technology, bioethanol and biodiesel, which is used as a renewable source of energy which can be used as a substitute for other non-renewable fuel in rural area^[13].

5.25 Promoting small ruminants

Livelihood security of landless and marginal farmers can be secured by promoting goat and sheep farming because it requires less space and least cost on feeding. In our country, population of goat is 148.88 million and sheep is 74.26 million and holds 1st and 3rd rank respectively, in the world.

5.26 Role of government

State government should organize Kisan Mela through KVK situated in that particular area to provide information regarding adoption of new technology related to livestock, and also organize training programme to educate farmers for preparation of value added livestock products. Government should facilitate the farmers to provide loan at low interest and provide insurance facilities in natural calamities.

6. Various Government Schemes have been launched to strengthen the Animal Husbandry Practices^[5]**6.1 Livestock health and disease control scheme**

Department of Animal Husbandry, Dairying and Fisheries (2010) launched a centrally sponsored programme for the prevention of economically important diseases of livestock such as Foot and Mouth Disease, Hemorrhagic Septicemia, Black quarter in large animals, PPR in Small ruminants and New Castle disease in poultry.

6.2 National Animal Disease Prevention Programme and National Artificial Insemination Programme

This programme was launched by our Prime Minister Shri Narendra Modi from Mathura on 11 Septemeber, 2019 to control the most endemic diseases in India i.e, Foot and mouth diseases through mass vaccination and Artificial insemination programme to increase the productivity of low producing animals through graded bull semen.

6.3 Dairy entrepreneurship development scheme

This scheme is run by NABARD to provide financial support to small and marginal farmers for the entrepreneurship development in the dairy sector.

6.4 Feed and Fodder development Scheme

This programme has been started to secure the availability of feed and fodder throughout the year, because in India only 2.2% of fodder land is available to support, 10.71% of animal population of the world. Therefore, this scheme has been focused on crop rotation, superior use of land and water resources, fertilizer and improvement of fodder crops.

6.5 Rashtriya Gokul Mission

This scheme is constituted for the conservation and productivity enhancement of low producing Indigenous animals, which more resistant to disease and climatic variation.

7. National mission on Bovine Production

- **Pashu Sanjiwani:** Started for the welfare of animals through effective treatment of sick animals by veterinary graduate.
- **Advanced reproductive technology:** Production of female calf only through use of sex sorted semen, which are disease free and also reducing the cost of rearing male calf.
- **E- Pashu Haat:** E- market Portal has been started for availability of high quality germplasm and selling along with identification, traceability of germplasm sold through e -market connecting breeder's agencies and stakeholders ^[15].

8. National bovine genomic center

This has been started with the aim of identification of disease free high genetic merit bull of indigenous breeds through highly precise gene breeding technology. Sexing of semen is now being taken up to regulate the sex ratio and produce a large number of progenies with one sex to increase milk production and profitability. The sex sorted semen technology will be standardized for indigenous breed's like Sahiwal, Gir, Red Sindhi and Haryana, which need to be further extended ^[14].

9. Role of veterinarian in increasing farmers' income

Role of veterinarian is much more important in creating awareness about major livestock diseases and their prevention and control. Apart from this, they help farmers in various ways- like giving information about various livestock policies and schemes, encouragement of farmers for making value added livestock products and benefit of diversification in animal husbandry ^[15].

10. Conclusions

In the era of globalization and industrialization, doubling farmer's income is very tough task due to continuous decreasing arable land for cultivation and excessive population growth. This can only be achieved through proper implementation of appropriate strategies. Basically, income of farmers may be enhanced by three ways, such as increasing the gross income, reducing the costs of production and stabilizing the income. Gross income of farmers can be increased by improving productivity of milch animals, integrated and diversified farming system, better market price

realization and special policy measures. Livestock policy should be based on the principles of social acceptability, economic feasibility, technical viability and resource conservation ability. Policy support system like Kisan credit card, SHG and NGO provide financial support to the farmers to become entrepreneurs. Large scale awareness and skill programme need to be organized to educate the farmers to adopt the diversification in the livestock sector.

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