

Research Article

STUDY OF RESEARCH AND EDUCATION ON ANIMAL SCIENCE IN NEPAL

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ABSTRACT

Nepal Agricultural Research Council (NARC) is an apex body to coordinate overall research activities in the country through its five regional headquarters and several research stations throughout the country. Government of Nepal (Department of Livestock Services) provides extension services through its district offices in its all 75 districts. Five regional directorates supervise and monitor the entire program conducted by the respective district within the region. After the establishment of Tribhuvan University's (T.U.) Institute of Agriculture and Animal Sciences (IAAS) in Rampur, Chitwan in 1972, then only higher education in Agriculture science formally began. As Nepal remains a predominantly agrarian economy, only one technical university called "Agriculture and Forestry University" (AFU) was established in Rampur, Chitwan, Nepal in 2010. Similarly, Himalayan College of Agriculture Sciences and Technology (HICAST), under Purbanchal University (P.U.) and other several agricultural colleges and polytechnic institute collectively focus for the development of agriculture, livestock, aquaculture and forestry which would raise the socio-economic conditions of rural people through quality teaching, research and extension.

Keywords: Livestock research, Education, Extension and Technology transfer.

INTRODUCTION

Nepal is situated in South Asia. It is also known as the land of Mt. Everest, the highest peak of the world and the birth place of Lord Buddha, Lumbini. Nepal is a land locked country, which occupies 0.03 % and 0.3% land area of the World and the Asia respectively. It has diverse topography and climate. It stretches from east to west with an average length of 885 kilometers and widens from north to south with an average breadth of 193 kilometers. Geographically, Nepal has three east-to-west elongated ecological belts. The northern mountain belt is naturally decorated by an unbroken range of Himalayas, which contains eight peaks higher than 8,000 meters, including the world's highest peak Mt. Everest (8848 meters). Middle hilly belt is enriched by gorgeous hills, valleys and lakes. Kathmandu, the capital city of Nepal is situated in this region. Terai belt is the plain area situated in southern part of Nepal, which is usually known as the grain house of the country since most of the crops produced in Nepal are farmed in this region.

The Constitution of Nepal (2015) has declared the country a Federal Democratic Republic with seven states. It is further divided into 744 local levels including 481 Village Municipalities, 246 Municipalities, 13 Sub-metropolises and 4 Metropolises. There are 75 districts in Nepal. According to the National Population Census 2011, the annual growth rate of population is 1.35 percent and the total population has recorded about 26.5 millions with sex ratio 94.2. Nepal has the rank 41 of the most populated countries in the world. The preliminary estimate of GDP per capita at current price stands at NRs. 90521 (US\$ 853) for the fiscal year 2015/16. Growth rate of GDP at basic price is estimated 6.94% for the same fiscal year. About one fourth of the population (25.16%) lives below poverty line as per the Nepal Living Standards Survey 2010/11 and Gini coefficient, which indicates inequality in consumption expenditure stands at 0.328.

Livestock population and production in Nepal

Nepal remains a predominantly agrarian economy. About 66 percent of its population is involved in agriculture, which accounts for 35 percent of the gross domestic product or GDP (MOA, 2014). The livestock subsector of agriculture contributes 24 percent of the total agricultural GDP (ADS, 2012), and also plays important roles in human food and nutritional security, livelihood, regional balance, gender mainstreaming, and rural poverty alleviation (ILO, 2004). Nepal's livestock numbers are estimated to be 7.27 million cattle, 5.24 million buffaloes, 10.17 million goats, 0.8 million sheep, 48 million poultry, and 0.37 million ducks (MoLD, 2016). The percentage of improved livestock accounts for only 13% in cattle, 25.9% in buffalo, 4.6% in sheep, 6.1% in goats, 34.2% in pigs, and 54.2% in poultry (MoAD, 2012). The remaining livestock populations are local indigenous breeds, which are low in productivity and performance.



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Table 1. Number of Livestock Population in Nepal

S.No.	Livestock	2013/2014	2014/2015	2015/2016
1	Cattle	74,18,894	72,41,743	73,02,808
2	Buffalo	51,42,910	51,67,737	51,68,809
3	Sheep	7,89,180	7,89,292	8,00,658
4	Goat	1,01,79,321	1,02,51,569	1,09,86,114
5	Swine	12,25,065	12,03,230	12,91,308
6	Poultry	4,57,19,377	5,01,95,285	6,86,30,638
7	Duck	3,90,209	3,90,287	3,92,255
8	Rabbit	25,437	25,872	32,213
9	Horse	49,426	52,655	55,808
10	Yak/Chauri	61,045	70,978	68,831

Nepal's dairy subsector shares more than 60% of the livestock sector's contribution to the GDP. The annual production of milk is 1.35 million metric tons (MT) per year. Buffaloes contribute more than two thirds of the total milk production and the remainder is from cows. Only about 13% of the total cattle population and 26% of the buffaloes (1.19 million) in the country are in milking condition. The Nepal dairy industry is dominated by a smallholder milk production system. Nearly 125,000 farm families are engaged in milk production and are organized in about 1,500 primary cooperatives throughout the country (FAO, 2010). The average annual per capita consumption of milk in Nepal is 64 liters, which is lower than the FAO recommendation of 92 liters (MoLD, 2016). Regarding the meat production, the highest share in total meat production is from buffaloes (64 %), followed by goats and sheep (21%), pigs (7%), and poultry (8 %) (MoAD, 2012). The average per capita consumption of meat in Nepal is 11.15 kg/year, which is lower than the global average of 42.5 kg/year (FAO, 2010).

Table 2. Livestock production in Nepal

S.No.	Particulars	2013/2014	2014/2015	2015/2016
1	Milk (Metric ton)	17,00,073	17,24,823	18,54,247
2	Meat (Metric ton)	2,98,244	3,03,401	3,22,059
3	Egg (Thousand)	8,82,918	8,79,501	13,08,072
4	Wool (Kilogram)	5,86,848	5,68,729	5,88,348

Nepal's supply of animal products is not sufficient to meet the increasing demand for these products. Nepal annually spends more than US\$40 million to meet the increasing demand for animal products (Economic Survey, 2014). The import rate of livestock and livestock products is significantly higher than their export rate and this is one of the main reasons of trade imbalance in the country (Economic Survey, 2014). In Nepal, the livestock subsector is declining. The Nepal Agricultural Development Strategy (ADS, 2014) has identified the core reason for the decline as low productivity of animals, mainly due to poor husbandry practices by farmers, the genetic inferiority of local breeds, and the poor condition of animal health. Lack of adequate marketing systems and channels for animal products is another major hindrance to the development of the livestock sector.

Institutional Development for Agricultural Research

Agricultural research in Nepal began in 1937 during the Rana regime when the Agriculture Council and several agriculture research stations were created. The Council was dissolved in 1951 and agriculture research was entrusted to the departments under MOAC. In 1987, a separate organization called the National Agriculture Research and Service Centre (NARSC) was created under the Ministry of Agriculture to undertake all agricultural research works, and all central divisions located at Khumaltar, research centers, and government farms came under its management. In 1991, NARSC was dissolved and Nepal Agricultural Research Council (NARC) was

formed as an autonomous organization to conduct all agricultural research needed for the country. Since then, NARC has been the apex body of Nepal's national agricultural research system (NARS). However, not all of the research assets such as, central laboratories, research farms, and human resources that were enjoyed by NARSC were handed over to NARC. Comparatively better equipped horticulture, livestock and fisheries sector research facilities were kept under the Department of Agriculture and the Department of Livestock Services, whose mandate is extension. This set back some horticulture, livestock, and fisheries research. In 2001, a separate institution National Agricultural Research and Development Fund (NARDF)—was established under the Ministry of Agriculture and Cooperatives to implement a competitive grant system for agricultural research and development. This institution does not implement research projects, but it provides grants to government and non-government organizations on a competitive basis. There is no formal coordination mechanism between NARC and NARDF. This has resulted to a continuing risk of duplication of work. The Institute of Agriculture and Animal Science (IAAS) and Agriculture and Forestry University (AFU) and Himalayan College of Agriculture Science and Technology (HICAST) also conducts research on agriculture. While most universities research work fulfills the academic requirement of post-graduate students, they also do research to solve farmers' problem with research grants from national and international donors. Agricultural research in Nepal has been and remains a public sector activity; however, the government institutions involved have been subject to frequent organizational changes leading to instability and uncertainty. This has contributed to the Nepal's lagging agriculture sector compared to neighboring countries. The nature and reasons of the institutional changes driven less by demands of the system or its end users, the farmers have also contributed to a disjointed system that is not working optimally. Despite difficulties in the operating environment, NARC has made a tremendous contribution to agricultural research and development and is moving to build an efficient NARS as envisaged by ADS.

Ministry of Livestock Development

As a realization of the importance of the livestock subsector in country's economy, the Government of Nepal (GoN) has formed a separate Ministry of Livestock and Poultry Development (MLPD) in December 2015 and now named as Ministry of Livestock Development (MOLD) to prioritize the activities of the livestock subsector. The vision of the newly formed (2015) Ministry of Livestock Development (MoLD) is "Food Sovereign and Prosperous Nepal through Sustainable Livestock Development." Its mission is stated as "Food and Nutrition Security through Sustainable Livestock Production for Higher Economic Growth". The Ministry Initiate realistic and fact-based programs in year 2016/17 in order to make Nepal independent in milk, meat, and eggs within one year, two years and three years, respectively. Its brief objectives are stated as;

- To make the country self-sufficient in animal products by transforming traditional and subsistence livestock farming into a commercial and competitive one.
- To provide technical services, improved breed and feeds, and veterinary services to livestock farmers, community, co-operatives, and livestock entrepreneurs through a well-coordinated integrated channel.
- To reduce child malnutrition and improve food and nutrition security by making Nepal independent in milk, meat, eggs, and other animal source foods.
- To contribute to the national economy by encouraging women and youth to become involved in livestock production, processing, management, and marketing.

- To contribute to increases in hygienic and wholesome livestock and livestock products by preventing, controlling, and eradicating diseases that create economic and public health challenges.

Under the MOLD, the Department of Livestock Services (DLS) is responsible for promotion, administration and coordination of the livestock activities throughout the country. DLS executes its plans and programs through four directorates: Directorate of Animal Health, Directorate of Livestock Production, Directorate of Livestock Market Promotion and Directorate of Livestock Training and Extension, through five Regional Directorates; and through the 75 District Livestock Services offices (DLSOs), which include 359 livestock service centers and 640 livestock sub-service in each sub-district level (DLS, 2016).

Nepal Agricultural Research Council

NARC has organized its research program into five broad thematic areas of intervention: crops and horticulture; livestock and fisheries; natural resource management and climate change; biotechnology; and technology dissemination, extension, and outreach.

Livestock and Fisheries Thematic Area

Livestock and fisheries play a strategic role of insuring rural farming communities from shocks to farming and other livelihoods. The challenge is to increase livestock productivity, improve the quality of livestock products, and increase market access. The strategy for livestock and fisheries development is to improve the living standard of the rural communities by:

- Increasing nutrition, incomes, and employment through improved livestock productivity in a sustainable and equitable manner; and
- Enhancing the capacity of people to manage the process of livestock development.

NARC is already engaged in various research efforts towards this end, which will continue to be strengthened. In addition, NARC will promote the following activities

Theme 1: Breed improvement and management

- Germplasm collection, conservation, maintenance and utilization of dairy, meat, eggs and wool and fiber animal, fish commodity, forage and range land species
- Sustainable conservation and utilization of domestic AnGR of Nepal.
- Enhancing productivity of dairy animals through selection and cross breeding
- Developing meat type buffalo.
- Enhancing productivity of sheep and goat through selection and cross breeding for meat, fiber and milk (goat cheese) production
- Development of suitable cross breed pig and poultry for value addition.
- Enhancing fish productivity through increasing fish species diversity and integrated fish farming in ponds, lakes, running water and rice fields.
- Development of suitable meat and wool type rabbits for different agro-ecological zones of Nepal.

Theme 2: Fodder and feed management

- Development of round the year fodder production system for reducing the production cost of dairy animals.
- Rangeland resource management through exploration of indigenous and scientific knowledge.

- Improvement of locally available non-conventional feed resources.
- Improving productivity of fish through developing appropriate feeds and feeding management.
- Nutrients fortification in mechanically compressed feed block.
- Promotion of integrated crop, forest, livestock and fisheries development.

Theme 3: Animal health management

- Enhancing animal productivity through prevention and control of economically important diseases.
- Surveillance and control of zoonotic diseases in strategically important locations.
- Identification and exploitation of adaptive and disease resisting traits of indigenous animals.
- Proper utilization of poisonous plant and ethno veterinary medicines.

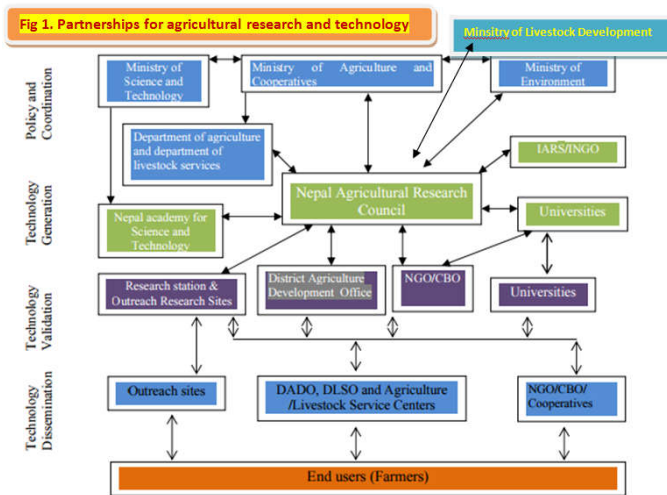
Theme 4: Marketing and value addition

- Development and promotion of value adding technologies for import substitution and export promotion of dairy, meat, eggs, fish and wool.
- Development of suitable fiber, meat & skin processing techniques for product

Technology Dissemination

While NARC is responsible for generating technologies, the Departments of Agriculture and Department of Livestock Services and their district offices (including service centers) are responsible for technology dissemination. Several other organizations such as Poverty Alleviation Fund, Women Development Program, Irrigation Program, Watershed Management Program, and NGOs also do agriculture technology dissemination and development activities. Agriculture Technical Working Group (ATWG) at the district and regional levels are tasked with identifying field level problems and distributing technologies that address them. The National Agriculture Technical Working Group (NATWG) coordinates the overall performance of this process. People from research, extension, NGOs, and private sector take part in ATWG meetings, but there is no mandatory system of working together in the field. Several other organizations—including NARDF, NGOs and INGOs and development projects, disseminate agriculture technology as do agro-vets and seed traders, but coordination among these institutions is lacking. The majority of NARC's research stations, especially R/ARS, have outreach research sites on farmers' fields. Potential technologies are tested at these sites and farmers' preferences are considered in their development.

The action and adaptive researches conducted at these outreach sites also help disseminate technologies in short period of time. NARC communicates about its research and development activities through many channels— including, technical reports, workshops (and proceedings), NARC research highlights, annual reports, and newsletters. In addition, NARC scientists publish their findings in the form of brochures, booklets, workshop proceedings and journal articles. It also uses mass communication—website, radio, television, and daily newspapers for disseminating its latest innovations and knowledge. NARC operates the National Agriculture Library where a significant amount of print and electronic documents are placed for the use of scientists, academics, students, development workers, and others.



Agriculture and Livestock education in Nepal

Higher education in agricultural sciences in Nepal formally began in 1972 with the establishment of Tribhuvan University's (TU) Institute of Agriculture and Animal Sciences (IAAS) in Rampur, Chitwan. Today, Nepal has three agricultural universities (TU Institute of Agriculture and Animal Sciences, Purbanchal University's (PU) Himalayan College of Agriculture Science and Technology (HICAST) in Kathmandu, and Agriculture and Forestry University (AFU) in Chitwan) and several agricultural colleges and polytechnic institutes throughout the country. While these institutions focus primarily on training agricultural scientists, specialists and technicians. The Agriculture and Forestry University (AFU) was established in Rampur, Chitwan, Nepal in 2010 which is the first technical university in the country. The university aims at producing highly skilled human resources required to work on quality research and development in agriculture. It aims at all round development of agriculture, livestock, aquaculture and forestry which would raise the socio-economic conditions of rural people through quality teaching, research and extension. The mission of Agriculture and Forestry University is to produce competent manpower to promote education, research and development in agriculture, veterinary, fisheries, forestry and allied disciplines. The university has 107 faculty members and 255 support staffs at this moment. The current student strength consists of 1883 including 1471 undergraduate students, 367 M.Sc. students and 45 Ph.D. scholars in different disciplines. Nearly 35 % students are girl students. The faculty members of the university are involved in different research and developmental activities with the support of national and international institutions and agencies. They focus their research works on increasing production and productivity of agricultural commodities, post-harvest technology, improving self-life of food products, biodiversity conservation, and local innovation adopting participatory approaches to enhance sustainable livelihood systems of farming communities. The postgraduate students are contributing thesis researches to generate knowledge and technologies to address the issues of agriculture, livestock and forestry in the nation.

Institute of Agriculture and Animal Science (IAAS) was established in 1972 in Rampur, Chitwan as a constituent institute of Tribhuvan University (TU), Nepal. The mission of the institute is to promote agricultural science and to train manpower for agricultural development focusing on teaching, research and dissemination of agricultural technologies. At present, the institute is running Master of Science in Agriculture (M.Sc.Ag.) in three departments, Master of Science in Animal Science (M.Sc.An.Sc.) in two departments, Master of Veterinary Science (M.V.Sc.) in two departments and also the Ph. D. program in some departments. Likewise, Himalayan College of Agriculture Sciences and Technology (HICAST), under Purbanchal University has been offering Bachelor's programme since 2000, and in 2005 this college started its Master's programme. Besides academic programmes, HICAST has been conducting research, training and out-reach activities and services like mobile veterinary camps as well as awareness campaigns in different parts of the country. Similarly, the Council for Technical Education and Vocational Training (CTEVT), constituted in 1989 is a national autonomous apex body of Technical and Vocational Education and Training (TVET) sector committed for the production of technical and skillful human resources required to the nation. It mainly involves in policy formulation, quality control, preparation of competency based curriculum, developing skill standards of various occupations and testing the skills of the people, conduct various research studies and training needs assessment etc.

REFERENCES

- ADS, 2012. Ads Assessment Report, Agricultural Development Strategy Assessment; Government of Nepal, ADB, IFAD, EU, FAO, SDC, JICA, WFP, USAID, DANIDA, DfID and World Bank: Kathmandu, Nepal, 2012.
- Economic Survey, 2014. Government of Nepal, Ministry of Finance. Annual Technical Report. <http://www.grs.com.np/uploads/2014/07/Economic-survey-FY-2070-71.pdf> (Accessed 15 February 2016.)
- FAO, 2010. Food and Agriculture Organization of the United States. Dairy Sector Study of Nepal. (Accessed 27 February 2016.)
- ILO, 2004. A Fair Globalization: Creating Opportunities for All; Report of the World Commission on the Social Dimension of Globalization: Geneva, Switzerland, 2004; p. 143.
- MoAD, 2012. Ministry of Agricultural Development, Agribusiness Promotion and Statistics Division, Agri Statistics Section, Singh durbar, Kathmandu Nepal. Statistical Information on Nepalese Agriculture. (Accessed 10 February 2016.) MoLD. 2016. Ministry of Livestock Development. Commitment paper (Nepali). <http://www.mold.gov.np/uploads/files/pratibaddata.pdf> (Accessed 10 April 2016.)
- MOAD, 2014. Department of Agriculture, Ministry of Agricultural Development, Government of Nepal. Available online: <http://www.doanepal.gov.np/> (accessed on 20 June 2014).
- NARC, 2010. NARC's Strategic Vision for Agricultural Research (2011-2030). Nepal Agricultural Research Council. Available on; www.narc.gov.np/narc_vision/NARC_vision.pdf
