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Annual Report

2071/72 (2014/15)

Government of Nepal
Nepal Agricultural Research Council
National Cattle Research Program
Rampur, Chitwan

2015

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National Cattle Research Program (NCRP)
Nepal Agricultural Research Council (NARC)
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Cover Page Photo:
Office Building of National Cattle Research Program at Rampur, Chitwan, Nepal

Foreword

This is yet an approach of National Cattle Research Program (NCRP) in the series of Annual Technical Report 2071/72 publication. This report presents a concise information and database on novel technology regarding Cattle rearing, management and health practices for economy, effectiveness and efficiency in the Nepalese farming scenario. Significant output has been achieved despite the compulsion to give more focus on settlement than research, crunch in human resources and financial resources as well.

The production level of crossbred dairy cows is below satisfactory level in both government and private farms of Nepal. Reason behind these sub-optimal production are; low genetic potential of native dairy animal, improper selection of the native herd to optimize their potentials basically due to lack of scientific data record management, lack of proper feeds and feeding technology to reduce the cost of production such as milk, lack of veterinary care to produce healthy animal, lack of management technique suitable to different agro ecological zone of the country. In the course of technology generation, program has achieved some outputs that can be extended in the field to promote the dairy industries in the Nepal, which were explained briefly inside this report. Sexed semen of Jersey and Holstein cattle received from the FAO/DCIP was helpful to produce the high quality female calves for the replacement in the NCRP farm.

The co-operation from line agencies like District Livestock Service and Agriculture and Forestry University was found to have significant role in designing and conducting the research programs. All NARC designators from different Directorate including Executive Board were very much helpful to accomplish the research program of this year. Support from the NASRI and all disciplinary divisions were helpful in reformulating the research agendas and activities.

Last but not least, I would like to thank all our staff from NCRP in accomplishing year round activities with their high level of sincerity, honesty and devotion.

Dr. Madhav Prasad Acharya
Coordinator
National Cattle Research Program,
Rampur, Chitwan
Date: 2072/09/28

Abbreviations

ADS	Agriculture Development Strategies
APP	Agriculture Perspective Plan
°C:	Degree Centigrade
CP:	Crude Protein
DCIP:	Dairy Cattle Improvement Program
DLS:	Department of Livestock Service
DLSC:	District Livestock Service Center
DM:	Dry matter
FMD:	Foot and Mouth Disease
FY:	Fiscal Year
GM:	Green matter
ha:	Hactare
IAEA:	International Atomic Energy Agency
Kg:	Kilogram
MoAD	Ministry of Agricultural Development
MT	Metric Ton
NARC:	Nepal Agricultural Research Council
NCRP:	National Cattle Research Program
NASRI	National Animal Science Research Institute

Table of Content

संक्षिप्तवार्षिक प्रतिवेदन

नेपाल कृषि अनुसन्धान परिषद् अर्न्तगतका विभिन्न बाली बस्तु अनुसन्धान कार्यक्रम मध्ये राष्ट्रिय गाई अनुसन्धान कार्यक्रम पनि एक हो । नेपालको सन्दर्भमा गाई दूध तथा जोत्नका लागि मुख्य श्रोत हुन् । नेपाल सरकारका विभिन्न अल्प, मध्य तथा दीर्घ कालिन आयोजनाहरु जस्तै : APP (हालसालै समाप्त), ADS (हालसालै लागु भएको) र विभिन्न आयोजनाहरुमा पनि गाई प्रवर्धनका लागि आवश्यक पर्ने प्रविधि विकासले प्राथमिकता पाएको छ । नेपाल सरकाको योजनाहरुले दूध उत्पादन, प्रशोधन तथा बजार व्यवस्थापन कार्यले प्राथमिकता पाएको छ । नेपाल कृषि अनुसन्धान परिषद् आफैले पनि यो बस्तुको प्रवर्धनका लागि आवश्यक प्रविधि विकास हुन अल्प, मध्य तथा दीर्घकालिन नीति लिएर नार्क स्थापनाकाल २०४८ देखि नै अनुसन्धान कार्यमा तल्लिन छ । लक्षित प्रतिफल प्राप्तीका लागि गत आ. व. २०७१/७२ मा पनि विभिन्न उत्पादन र प्रचार प्रसारका योजनाहरु तयार पारी कार्यहरु सम्पन्न भए र जसका उपलब्धीहरु यो वार्षिक प्रतिवेदनमा उल्लेख गरिएको छ । कार्यक्रममा खास गरी दुई प्रकारका (क) अनुसन्धान तथा (ख) उत्पादन गतिविधिहरु संचालनमा ल्याईको थियो । (क) अनुसन्धान कार्य (१) जसमा गाईको गर्विणी अवस्था चाडै पत्ता लगाउने, दुधको लागत मूल्य घटाउने रणनिति विकास गर्ने र खोरेत विरुद्धको खोपको titre मापनगर्ने (ख) उत्पादन गतिविधि अर्न्तगत १) DCIP मार्फत आयातितवीर्य प्रयोग गरी उन्नत नश्लका (जर्सी तथा होल्स्टीन फिजन) बहर तथा बाछी उत्पादन गरी बितरण गर्नु, परिषद् बाट सिफारिस भएका विभिन्न घाँसको बीउप्रयोग गरी घाँस उत्पादनमा बृद्धि ल्याउनु जस्ता गतिबिधि सम्पन्न गरिएका छन् । जस अनुरुप २५ बाछाबाछी उत्पादन, ४९५ मे. टन घाँस उत्पादन र ५२६२२ लि. दूध उत्पादन भएको छ । उत्पादित ५ वटा बहरहरु जिल्लापशु कार्यालयको सिफारिसमा ललितपुर काभ्रे र भक्तपुर जिल्लाका किसानलाई उनीहरुको माग अनुसार वितरण गरिएको थियो । उक्त वितरित बहरहरु स्थानीय गाईहरुको नश्ल सुधारका लागि निकै नै प्रभावकारी भईरहेको छ ।

गाई आनुसन्धानलाई अझ प्रभावकारी बनाउने हेतुले रामपुर चितवनमा वृहत संरचनाहरुको निमार्ण कार्य सुरु गरिएको छ जसमध्ये दुईवटा गाई गोठ निमार्ण भईसकेको छ र अन्य निमार्ण कार्यक्रममा छन् ।

EXECUTIVE SUMMARY

National Cattle Research Program (NCRP) is one among the various commodity program under the Nepal Agricultural Research Council (NARC). Cattle are the major source of milk and drought in Nepal. The commodity was prioritized by the Agricultural Prospective Plan (APP 1995) earlier, and now by Agriculture Development Strategies (ADS 2015) and other National Periodic Plans. Further these Government Plans have spell out the need of input generation to promote the milk and meat production, processing and marketing. NARC has prepared short, medium and long term research strategies to generate the improved technology to promote the commodity. In the line of implementation the plan and program, NCRP during FY 2071/72 has conducted the 1) research in the area of early pregnancy diagnosis, development of strategies for reducing cost of milk production, identification of sero-status of FMD vaccination 2) the production of improved genetic materials such as breeding bulls under the Dairy Cattle Improved Program (DCIP), forage seed production and conservation of fodder for round the year feeding to the cattle maintained at NCRP farm are also been of the work done during the FY 2071/72.

Sero-status of FMD vaccination and early pregnancy diagnosis in cattle by using EIA has been started in collaboration with Animal Health Research Division. As a regular program to support the cattle program 25 improved calves produced using the semen supplied by DCIP. Similarly, 495 MT pasture and forages and 52622 Liters. of milk produced in this FY. Five bulls were distributed to the farmers of Kavre and Lalitpur Districts. Farmers demand the NCRP bull because of their past experience in production of high quality semen from the bull of this farm. These bulls have started to provide the breeding services and become very useful tools to improve the dairy cattle in the district and they have achieved the success in cattle improvement.

Infrastructure to establish the National Cattle Research Program at Rampur has been already started. Two cattle shed has been constructed and other office building and other shed are under construction.

1. WORKING CONTEXT

National Cattle Research Program (NCRP) comprises Cattle and it is one among the various commodity program under the Nepal Agricultural Research council (NARC)Cattle are the main source of animal traction and manure in Nepal. In terms of animal mass units, it is the largest livestock in Nepal. This Commodity is prioritized by the government long term plan such as Agricultural Prospective Plan (APP) and Agriculture Development Strategies (ADS). Program is important for dairy commodity as among the total AGDP;livestock contribution is 29.4 percent out of which dairy contribute 63% (MoAC, Statistical Yearbook 2011).

Currently, the program owns a farm in Rampur, Chitwan which has generally upper tropical climate. Land occupancy of the program in Rampur is chiefly rainfed while a portion of the total occupancy being irrigated through deep tube wells. Location of the farms is surrounded by the prominent business area Narayangarh. This district in particular is marked as one of the leading area in dairy sector. The volume of the milk being collected and its contribution in terms of the supply of the fluid milk to the national milk grid is outstanding.

However, there are some challenges in terms of the diseases outbreak and productivity constraints. Infertility in cattle regardless the breed is perhaps the most limiting factors towards the dairy improvement and productivity. Likewise, the frequent occurrence of the mastitis contributes to low production as well as quality production.

2. INTRODUCTION

2.1 Background

National Cattle Research Program (NCRP) is one among the various commodity programs under the Nepal Agricultural Research Council (NARC). Administratively, it is under Director for Livestock and Fisheries Research. It has evolved from the Livestock Development Farm of the Department of Livestock Development and Animal Health after the establishment of Nepal Agricultural Research Council in 1991.

National Cattle Research Program is located at Rampur, Chitwan which lies in 27°65' North and 84°35'East with the elevation of 23m masl. It is about 11 km South-west from the city of Narayangarh.

As a component of NARC, it aims to contribute towards increasing the production and productivity of livestock sectors in general and research and development of cattle in particular. Therefore, generation of suitable technologies for various agro-ecological zones of the country, client oriented, problem based, participatory, holistic and systematic research on cattle is the approach undertaken by this program to maintain the dynamism in livestock production system and uplift the living standard of Nepalese people.

2.2 Goal

Livelihood of farming communities improved through increased livestock productivity.

2.3 Objectives

1. Generation, verification and recommendation of adaptable technologies in feeding, breeding, production / management (husbandry) & health of dairy cattle suitable for various agro-ecological zones of the country.
2. Determination, formulation and fixing priorities of cattle research in the country.
3. Documentation, maintenance and updating of information on Cattle research in Nepal.
4. Establishment,maintenance and strengthening of linkage with other National and International institutions / organizations for collaborative and participatory research.

2.4 Strategies

The strategy of NCRP is to generate the technology on Cattle promotion suitable for different agro ecological zone of the country. The strategies are a) short term b) medium term and c) long term research. The research strategies are

based on the cattle breeding, feeds and feeding, health, product processing and socioeconomic of the Nepalese farming.

2.5 Current thrust area for research

National Cattle Research Program research is focused to generate the dairy cattle related technology as per the national demand.

Some of the current thrust areas are:

(a) Genetic improvement of cattle and buffalo using the genetic material (semen) generated by DCIP,

(b) Develop forage based diets to reduce the cost of milk,

(c) Identify the effective drugs against mastitis,

(d) Evaluate the efficacies of the vaccines for the economically important diseases and

(e) Improve data management of the farms

2.6 Infrastructure and facilities

The program has been undergone administrative and technical changes significantly as decision made earlier by the NARC so as to give full fledge structure that can perform nationwide research and development in cattle.

Currently, the program have accesses to 25 ha land out of which about 10-15 ha is allocated for the farm structures, laboratory buildings, office buildings, residential quarters and rest for the pasture and fodder production as a feed stuffs required for daily consumption throughout the year. However, most of the constructions are yet to be planned and proposed while some are under constructions. Till now there is one already constructed office building, two cattle sheds and yards, tractor shed, two manure pits were recently constructed this year. Likewise, calves shed, open cattle house shed, chain link fence, other similar small structures are still under construction.

Similarly, the dairy processing unit with the facility to store the fluid milk and to produce yoghurt, ghee, fluid milk, paneer and khoa which hasbeen established. Likewise, mini laboratory to support the study of animal health parameters having the facilities of autoclave, incubator, laminar flow, microscopes etc and there is facility of artificial insemination under Artificial Insemination unit where frozen semen straw can be stored, and inseminated with appropriate handling and processing. For the farm operation facilities there are milking machines to milk the animal, weighing balances to record the daily milk production, and to measure the birth weight of the new born and lacto scan machine for routine milk analysis, chaff cutter to process the forages and straw in desired size. However, the program lacks totally the equipments needed to set up the Animal Nutrition

Laboratory and still there are lots of equipments required to sophisticate the different unit laboratory. Irrigation facility has also to be improved to produce the substantial amount of the forages and pastures.

2.7 Organization structure and human resources

The program is basically coordinated by Principal Scientist(S5) but in this FY it was coordinated by the Senior Scientist (S3) and supported by other scientists, technical officers, technician and administration staffs as shown in Annex 1.

3. RESEARCH HIGHLIGHTS

3.1 Cattle

As a cattle commodity program all the researcher was involved in the carrying out the cattle related projects. The highlights of the research projects carried out by the scientists and technical officers of the NCRP are as below; Number of project implemented in FY 2071/72 is given in annex 3.1.

3.1.1 Early Pregnancy Diagnosis in Cattle and buffalo by using Radio Immunoassay /ELISA technology

The diagnosis of pregnancy (*cyesiognosis*) has been sought since long by farmers for curiosity however, it is essential for profitable animal husbandry especially in the productive animal species. For an economical dairy farm, cattle and buffalo must calve every year, and to maintain this sequence, identifying pregnant animals at an early date seems imperative. It therefore, appears that early diagnosis of pregnancy is essential in animal management for economic reasons. In many developing countries, farmers often present their animals for pregnancy diagnosis very late when much of their time is lost in maintaining non pregnant cows. There is a need to educate farmers to get their animals checked for pregnancy at an early date as it has been shown that earlier the pregnancy diagnosis performed, the more profitable is the return for dairy cows and buffaloes (Oltenacu, 1990; Duggal et al., 2001a; Youngquist, 1997).

To implement this project, International Atomic Energy Agency (IAEA) supported the laboratory equipments of Radio Immunoassay and Enzyme Immunoassay (EIA) at Animal Health Research Division. But Kit of Radio Immunoassay was not send by IAEA because our country have no law related to atomic energy and until and unless the country have no law for atomic energy IAEA does not support the radio- ionized kit so the Proposal Review Panel suggested to follow EIA methodology for early pregnancy diagnosis for this FY. Laboratory set up is completed at Animal Health Research Division, Khumaltar.

Progesterone is a steroid hormone produced by the corpus luteum (CL) on the ovary which forms after ovulation. Progesterone targets uterine epithelium, mammary tissue, myometrium and hypothalmus causing endometrial secretion, inhibition of GnRH release and promotes maintenance of pregnancy. The level of progesterone in the serum and milk reflects the activity of the CL on the ovary. The level of progesterone increases for the first 4 to 6 days following ovulation. Maximum levels are reached between days 10-17.

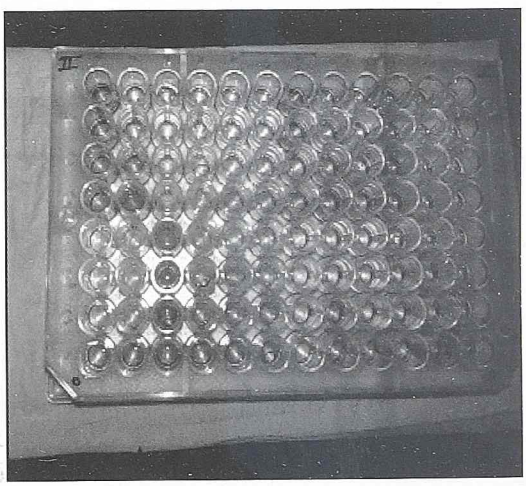
If the cows are pregnant, the CL is maintained and high level of progesterone are produced which helps to maintain pregnancy. If the cows are not pregnant, the CL begins to regress and the level of progesterone sharply decreases on days 18 or 19 and allowing the cow to return to estrus on day 21-23. Hence tracking the P4 levels in milk or serum, to diagnose the pregnancy within a month, becomes an important method to improve the reproductive management both in dairy cattle farms

A total 26 serum samples were collected from the post Artificial inseminated cattle from Cattle farm of National Cattle Research Program. Collected serum samples were of different days of post AI ranges from 30 to 190 days. The samples were tested at the laboratories at Animal Health Division (NARC) by using a progesterone measurement kit supplied by International Atomic Energy Agency.

Out of 26 samples, 14 samples showed positive whose P4 concentration ranges from 4- 16ng/ml. The females having the P4 levels under this value were considered non-pregnant; the ones having the above mentioned values higher than 3ng/ml were considered pregnant. The positive and negative cases were verified by rectal palpation after 80 days post AI which matched with the kit result.

The P4 determining in serum by means of the immune enzymatic method is a good indicator of the cow's reproductive status. The results obtained after the experiment was performed, recommend the method described in this paper as a proper one to improve the reproductive management in the dairy cattle farms by means of the early diagnosis of pregnancy or non-pregnancy.

Training on Cattle reproductive health management

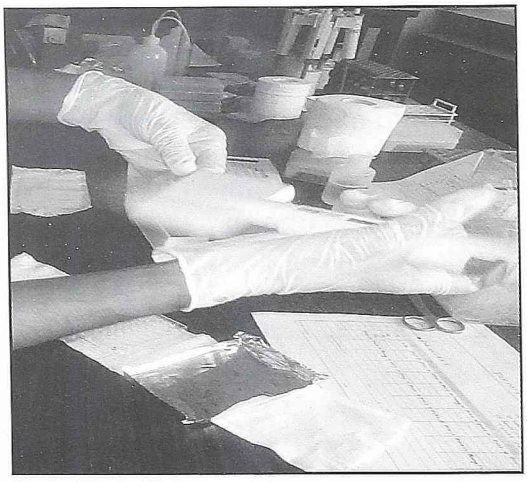


ELISA to detect the progesterone for early pregnancy

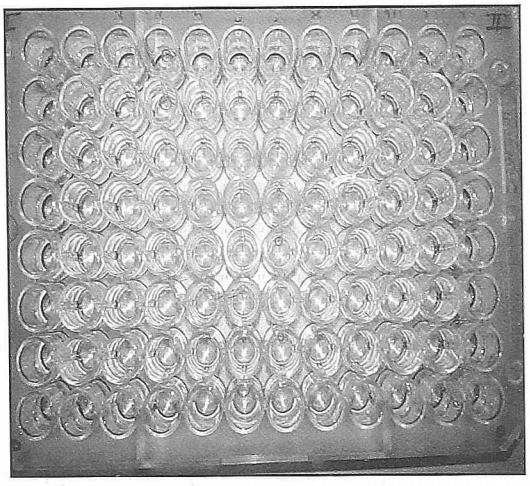
Finally, one day training on Cattle reproductive health management was carried out in Lele with the help of District Livestock Service Center (DLSC). Thirty three farmers including both male and female were benefitted with training on heat management and early pregnancy diagnosis on cattle after insemination.

3.1.2 Study on sero-status of FMD vaccine in cattle of Chitwan, Lumle and Khumaltar farm

Foot and Mouth disease (FMD), a global epidemic of Livestock is an endemic disease of Nepal that pose a serious threat to the livestock economy and the national economy in general. There are seven serotypes in which only O, A, C and Asia-1 occur in Nepal where serotype C has not been seen since 1996. The challenging issue is that there is no cross- immunity of the different strain. Emergence of novel strain like Pan-Asia strain and IND 2001 has necessitated for a detailed laboratory based investigation thereby developing a vaccine from the local strain. As FMD vaccine is not produced at national level we rely on the imported vaccine. The condition is further aggravated by the low immunity it confers as in the field condition the six month immunity has failed time and again. Hence correct assessment of the sero-status after vaccination is needed to confer the right immunity and protect the animal from FMD.



Laboratory workout for SPC ELISA for FMDV antibodies



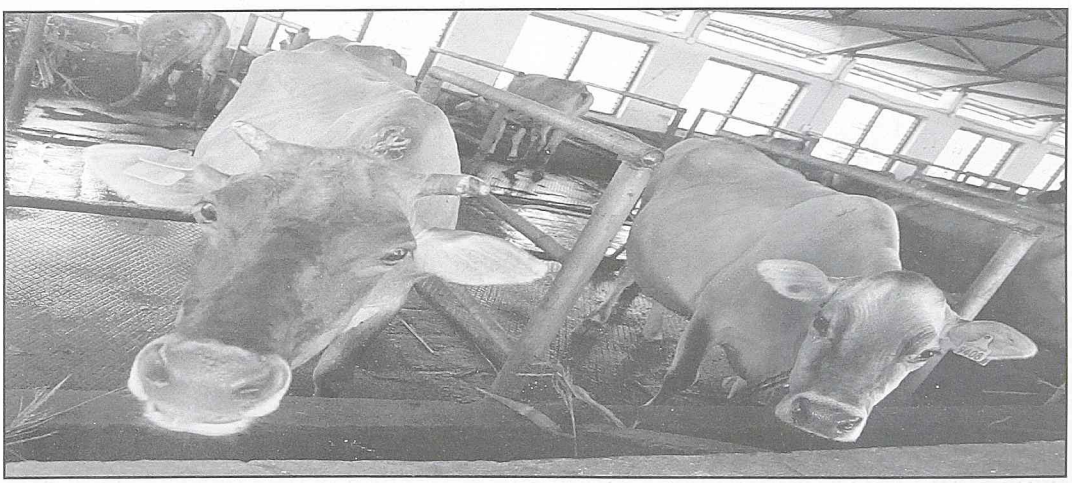
Colour results after SPCE for FMDV antibodies concentration

A total 20 of blood serum sample were collected from livestock farm of Regional Agriculture Research Station, Lumle, Kaski and National Cattle Research Program, Rampur before and after the vaccination against Foot and Mouth disease virus of the strain O, A, Asia1. But anti- body titer of only 8 samples from Lumle and 7 samples from Rampur was measured because of limited number of FMDV antibody titer kits available. Antibody titer measurement was done after each 21 days of post vaccination till three months and then after 30

days for the next three months. Vaccine was supposed to produce and maintain the antibody titer at least up to six months post vaccination, but result was contradicted and rather was found antibody titer below the protection level at the fourth dilution. Like titer against O strain was found to be giving protection level upto six months at first dilution. However the detailed calculation and statistical analysis is yet to be done.

3.1.3 Clean Milk production in relation to dairy Management and Animal Health

On insanitary practices, the animal sheds are fertile breeding grounds for flies and mosquitoes, which are vectors for various kinds of infectious diseases. The metabolic gases like methane, moisture and carbon dioxide produced by the cow and ammonia gas produced by the micro organisms acting on the dung will not find easy exit if the shed construction is faulty. This shall have a very negative repercussion in the health of the cow. We have also witnessed a common phenomenon in rural areas where human and animal share common room/shed. This is deleterious to the animal as well as to the human. Insufficient quantity of the oxygen in the environment will accelerate the growth of microaerophilic kinds of bacteria. The methane produced by the animal during belching and rumination is also dangerous if it doesn't find sufficient exit. The air compounded with the moisture and heat forms ideal milieu for microbial growth which will naturally find their way to milk during milking. Similarly, the arthropod vector shall also find their way to the milk, directly from the environment and also when the animals flip while milking. An assessment of the quality of milk in terms of physical, chemical and microbiological agents will provide an overview of the status of the current situation. Likewise, the study shall provide, based on the current base of knowledge, the ways forward to mitigate the hygienic issue that would arise.



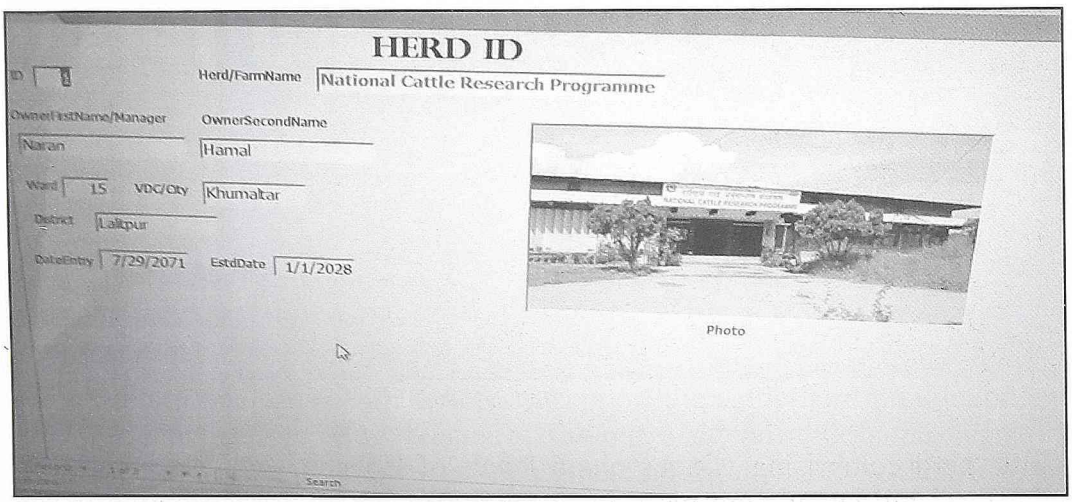
Clean house floor with mat/pad for clean milk production

Milk sample were collected from Illam and Chitwan District (milk cooperative) for bacterial analysis. The bacteria analyses were total count done in Nutrient agar to calculate CFU/ml and Coliform count done in Eosin Methylene blue. The sample was diluted in 10 centrifuging tube with phosphate buffer saline. From the so diluted sample, 10^{-3},10^{-5} and 10^{-7} were taken and poured in the agar. In this way a single samples were poured in 3 petri-dishes for total count and 3 petri-dishes for Coliform count.

3.1.4 Implementation of data recording system in cattle management software to assess reproductive and milk production performances at NCRP farm

Commercial cattle dairy farming is increasing day by day as a charming business with the advancement and availability of the improved farming technology generated by government body and different non government organization as well. But the technology on the improved

Data management system yet has neither emphasized nor developed in Nepal. Hence, cattle management information system technology or improved record information system is need for the large size commercial dairy farm and as well as research farm to analyze the situation of the farm related production, marketing and reproductive performances which enables farm manger to take appropriate husbandry decisions. Once the software program is developed it can store and process the large number of data quickly enabling monthly, half yearly or yearly assessment of the reproductive and productive performances of the dairy cattle. Hence to assess the reproductive and productive performances efficiently cattle management software program implementation is necessary. Although the objective of this study is not to demonstrate an effect of the system of recording and report generation with respect to manual recording and reporting system



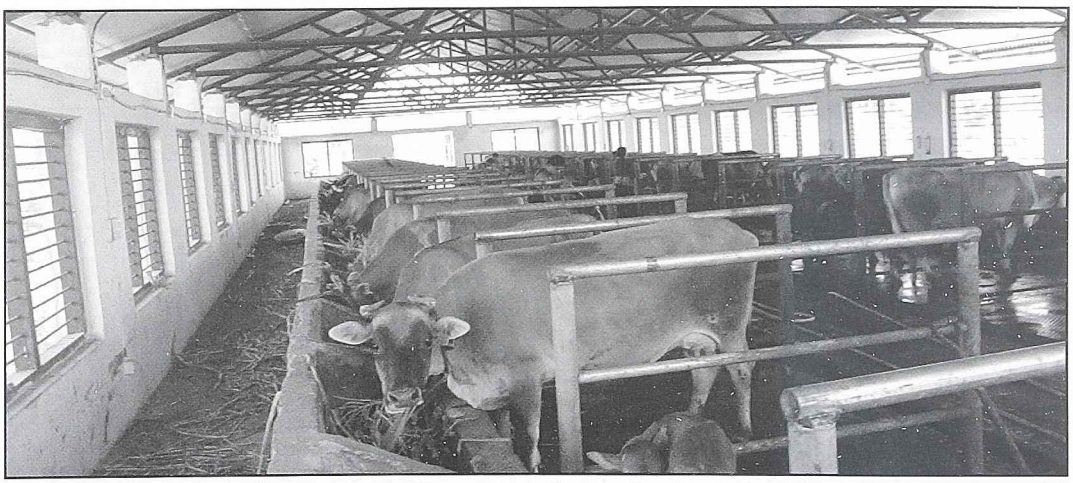
Cattle herd management software

as there is no control herd. Hence this research/project will be a new which will try to established improve recording system at NCRP farm and will develop the program which can be marketed to other commercial farm later on. Moreover success of this project will help in further researches on reproduction and genetic improvement as software program can provide the data of any past year.

This year little effort to develop the software was done but couldn't give the final shape. However, overall parameters to be covered in the herd management have been developed for the software design. Now, in the next year information technology organization will be hired to remodel the same software and make it final for its use in the farm.

3.1.5 Cattle Herd Management and Production Program

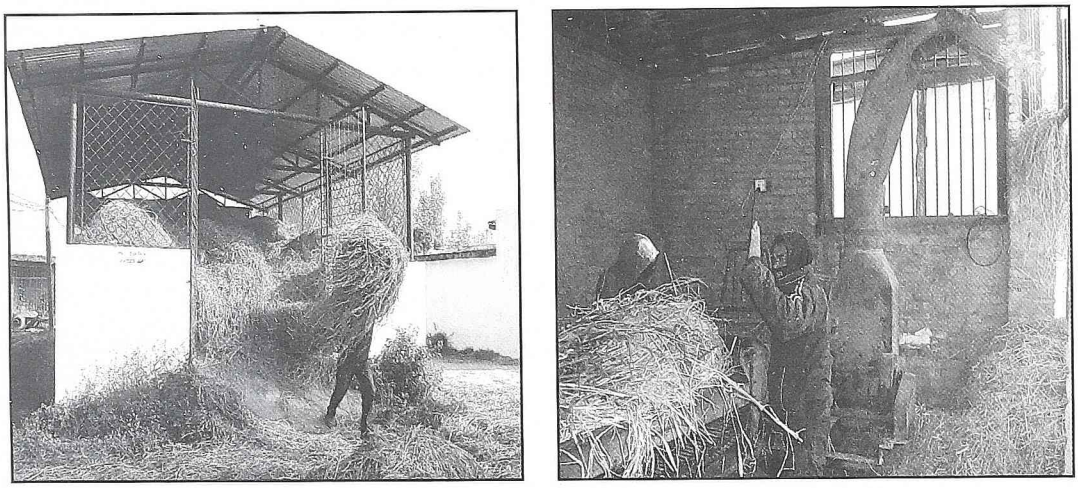
To promote the cattle species in Nepal there is demands of suitable breeds for different agro ecological zone of the country. The review of past work revealed that 62.5 % blood level of jersey, Holstein Friesian (HF) are better in existing feeding and management system.Therefore, cattle raisers are suggested and maintain their cattle herd into 62.5 % blood level of above mentioned breeds. However, there are not any recognised and officially recommended improved cattle breeds in the country. Even there is no any dairy farm where the elite herd of such breed is available for research and distribution. The livestock farm under National Cattle Research program, Rampur has been functioning as a centre for elite cattle herd in the country. This project has been designed, as ongoing management project and implemented for cattle breed development, their improvement and distribution to the farmers and research support.



Tail to Tail housing system of cattle at NCRP, Rampur

Cattle herd comprising various blood levels of Holstein and Jersey together with local hill cattle were maintained for improvement & distribution to the

farmers and research support. Concentrate feed, seasonal green grasses, straw, silage and fodder were made available to them as per their feeding requirement. Animals were vaccinated against HS, BQ and FMD as per the recommended schedule. Regular drenching against flukes and worms was made together with treatment of diseased animals as and when required. Maize, Teosinte and Bajara were grown for summer while Oat, Vetch, Berseem for winter forages to feed the animals. Milk produced from the lactating animals was either sold as whole milk or utilized for dairy product processing in the dairy laboratory. Farmyard manure produced at the farm was used for manuring the forage blocks and surplus amount was sold as well. Seeds of seasonal forage were produced for next year planting and distribution if required.



Use of Chaff-cutter: Part of mechanization in the farm; chaffing the straw mixed with oat

A total of 25 crossbred calves and 52622liters of milk were produced during the reporting period. Similarly 495 MT of green grass and 30MT silage was produced and was used for animal feeding. Estimating the dry matter requirement of animal as 3 percent of their live weight, almost half of the DM required for whole year was obtained from green grass and remaining was fulfilled from straw and concentrate.

Major source of revenues was sells of milk and milk products. However, sell of bull, manure, contributed considerably in the revenue generation.

3.1.6 Genetic improvement, maintain, production, selection and utilization of cattle germplasms at NCRP, Rampur, Chitwan

This project was basically intended to support the cattle herd production and management that is to be established at Rampur, Chitwan while at the mean time all the herds of this program was still at the Khumaltar, Lalitpur. This projects aims to improve and maintain the farm at Rampur by selection, utilization and

genetic improvement. Project collected the 24 outstanding germplasm of Jersey crossbreed from the Lumle farm under RARS, Lumle in Poush 2071 and 10 Jersey crossbreed from the Khumaltar farm in Baisakh 2072 to Rampur farm and started maintainig the herd by its regular activities. All the animals were recorded for its reproductive and productive performances. Three births were given by the breeds of the Lumle which were already pregnant at Lumle while others were inseminated upon the heat detection. Similarly the cows brought from the Khumaltar were recently calved and was on peak lactation with their average 13 ltrs of milk production per day. There was routine milk analysis which helped to monitor the milk composition and on average the fat percentage was around 4.5 and SNF around 10. Similarly to maintain the germplasm there was regular heat detection and insemination by the use of the genetic material (semen) from the DCIP to improve the offspring. In the same way to fulfill the feeds there was year round forages production of different variety like oat, teosinte, bajara, sorgham, maize and others fodders like Rye Khanyu, Bakaino, etc. Small scale nursery was also established so as to propagate the forages and pasture for the next year as well as to distribute to the interested farmers basically at outreach sites. To maintain the health status regular drenching, dipping and vaccination was carried out in the farm. All the farm records were maintained in the production and breeding record book. However in next year most of its activities will be merged in the cattle herd production and management project with its continuation ahead by the basic activities required for the germplasm maintenance.

3.1.7 Upscaling and Verification of some Livestock Technologies in Outreach sites

Several promising technology have been generated for improvement of livestock productivity by Nepal Agriculture Research Council during the period of its establishment to date but the technology has not adopted by the farmers may be due to lack of proper extension work. By following the extension process "seeing is believing" for adaptation it is felt need to conduct some research activities for verification and dissemination of generated technology through or sites at Chitwan and Nawalparasi Districts. Farmers will be aware from generated proven livestock technology and village will be developed as a resource centre of livestock species and forage source.

Livestock technologies developed and verified in the previous year at the research command area have not been fully adopted by the targeted farmers. The reason behind it might be either due to the weakness in technology verification or in transfer of verified technologies in the past. In such circumstances, the same technology being popular among the farmers of one village of particular ecological domain has not been practiced in another village of the similar eco-domain. The universally accepted principle behind it is due to lack of

technological packaging and demonstrating mechanisms in close collaboration of the ultimate end-users. Enhancing the risk bearing capacity and confidence among the farmers is the basic requisite for the adoption of any innovative technologies and knowledge systems.

Out- reach sites were selectedwith the help of DLSOstaff at Sitalpur of Madi in Chitwan and Razahar in Nawalparasi District. Most of the farmers of these places are interested to raise improved cattle. Hence these are places where proven technologies were introduced touplift the farmers' economic condition.

In Razahar of Nawalparasi, it is a semi urban area and most of the farmers are commercial farmers and few are the small scale farmers. We can easily demonstrate and let them to adopt our very promising technologies in this area. These are the activities tested in farmer's field condition as described below.

Evaluation of teat dipping in farmers management conditions

Newly lactated high milk yielders cattle's teats were dipped in povidine iodine (90%) and glycerine (10%) mixture after milking which was found effective in both places.

Effectiveness of double vaccination for major economic diseases and drenching against major internal/external parasites

Strategic drenching and vaccination will be performed as required in 100-200 cattle. Effectiveness of double vaccination for major economic diseases and drenching against major internal/external parasites were found effective than single at Chitwan and Nawalparasi district. Vaccine against FMD and HS/BQ was implemented to adopt and similarly drenching against flukes and tapeworms was demonstrated.

Use of UMMB

20 cattle were selected for UMMB trial in each district. Supplementation of UMMB was found effective to increase the milk production in both districts.

Demonstration of silage making

Silage making demonstration was demonstrated in Madi,Chitwan District and farmers were found interested to adopt the silage making and feeding.

Training/s

A training on 'Cattle farming Management' covering the breeding, health, fodder and pasture, nutrition managementwas organized in Madi, Chitwan, and Rajahar of Nawalparasi, District with the coordination of respected DLSO's staffs. Thirty eight farmers were trained in Madi and twenty five farmers were trained in Razahar.

Distributation offorage seed

Fifteen kg different improved fodder seeds were distributed to nineteen farmers in Madi and Twenty kg of seeds were distributed to twenty two farmers inRazahar. Seeds distributed were Bajara, Sorghum and Teosinte.

All the below mentioned technologies were tested in farmers field when these were identified. All the activities found important to uplift the animal production. Dipping and drenching is one of the important activities for livestock health and production. Cattle rearing farmers were facing clinical mastitis problem in about 25% milch cattle. Dipping teats after milking with 90% povodine iodine and 10 % glycerine were found effective to prevent the mastitis problem. Silage is also the feed for cattle in dry season (Magh to Chaitra) which increases up to 25 % milk production in cattle. Use of UMMB also increases the milk production and maintains good health. Vaccination is also the important activities which prevent cattle from different diseases like Foot and Mouth Disease, Haemorrhagic Septicemia and Black Quarter.

3.1.8 Development of Strategies for Reducing Cost of milk production

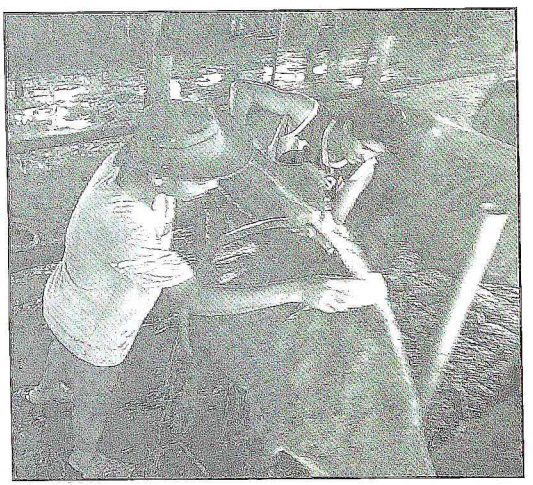
Dairy farmers throughout the country have been complaining since long time regarding the price they get for the milk when sold in the formal sector is low compared to the cost of production. In every formal and informal forum, the issue of reducing cost of milk production has been raised. In contrast, we have been flatly recommending the forage based milk production to reduce the cost. This is only the part truth; however, a need to comprehensively evaluate the cost of milk production under different production system representing dairy pockets in different eco-zones of the country has been realized at NARC so that complete recommendation can be made in a more holistic approach. In this connection, a survey to evaluate the cost of milk production in Illam and Tanahu has been carried out. A total of 90 farmers in two districts were interviewed and one Focus Group Discussion involving 15 Technical officers of different Districts Livestock Service Center of Illam were conducted and information related to the feeding, health, breeding, was recorded. Most of the activities were missed to conduct due the transition phase of the program from the Khumaltar to Rampur having massive change in administration and technical manpower. However project will give the concrete outputs conclusion in coming years.

3.2 Collaborative/Support Research highlights

Such project researches are jointly conducted in collaboration with other divisions and regional stations or as multi-location project or in support to the students from bachelor or Master Degree. Here are some of the projects works carried out last year:

3.2.1 Effects of frequency of normal water bathing during summer on the performance of lactating cross bred cattle in Chitwan

The study was conducted including sixteen lactating Jersey crossbred cattle between May 2015 and August 2015, to study the effects of frequency of normal water bathing during summer on the performance of lactating crossbred cattle in National Cattle Research Program, Rampur, Chitwan. The experimental animals were divided into four blocksand four treatment groups in RCBD. The respiration rate of different treatment groups in different period were found statistically significant ($P<0.05$) at 9.00am. The lowest respiration rates per minute in T_3 group were 71.75±5.78, 54±9.31, 61±1.91, 56±4.89, 53±5.51, 56±4.32, and 57±3.42 in 0, 15, 30, 45, 60, 75 and 90 days respectively.



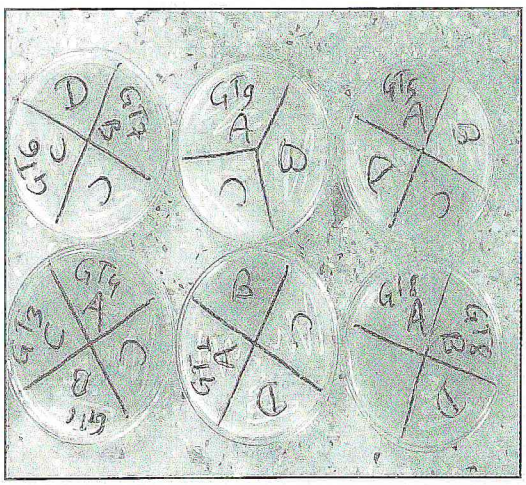
Bathing of the cows during hot summer to minimize heat stress

Likewise, at 12.00Noon also were found statistically significant ($P<0.05$).At that time, panting was observed in T_4groups (Control) which were recorded 96±9.93, 109±4.43, 105±5.74, 98±8.08, 108±5.16, 108±6.93 and 106±8.72 per minute in 0, 15, 30, 45, 60, 75 and 90 days respectively. But, the observation at 3.00PM showed mixed results however values of control group had invariably highest respiration rates and were recorded as 105.50±7.72, 120±8.16, 105±3.42, 89.03±7.74, 117±5.97, 109±8.54 and 97±11.82 per minute in 0, 15, 30, 45, 60, 75 and 90 days respectively. Regarding pulse rate the values did not show any significant difference between bathed and control groups. Similarly, rectal temperature at 9.00AM and 12.00Noon did not vary significantly, however observations taken at 3.00PM were significantly different (<0.05) in 15, 30, 60 days and non-significant in rest of the fortnight. During the periods the control group has higher rectal temperature than other groups reading 102.35±0.33, 105.18±0.22, 105.15±0.32, 103.60±0.61, 105.00±0.37, 104.75±0.66 and 103.75±0.66 °F on 0, 15, 30, 45, 60, 75 and 90 days respectively. Correlation study among physiological parameters indicated highly positive correlation between respiration rate and rectal temperature at 9.00 am, 12.00 Noon and 3.00 pm respectively. The results of milk production performance were found statistically non-significant. Similarly, milk compositions were also statistically non-significant. From the study, it can be inferred that at least once (12.00 Noon) normal water bathing is beneficial in reducing summer stress resulting into positive impact in milk production as well.

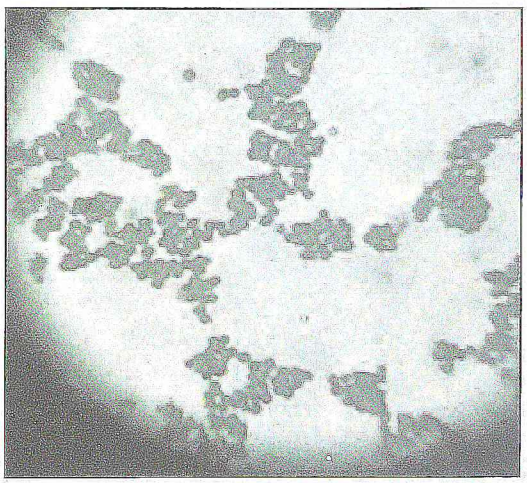
3.2.2 Prevalence, antibiogram and risk factor associated with *Sthapylococcus aureus* in cow milk of Chitwan, District

The majority of economic losses to the cattle farmers were due to mastitis and most devastating feature of subclinical mastitis is to remain in latent form. There were lots of evidences of *Stapphylococcus aureus* to cause subclinical mastitis in cattle. Our research found that *S. aureus* was isolated from the number of milk samples that were collected from clinically apparent animal. The quarter-wise prevalence estimate was 34.2% (95% CI: 29.7-0.39). Among 100 animals, 39 showed positive result at least in one quarter. Even in 23 CMT negative samples, there was growth of this organism. The MRSA prevalence was found to be 15.75%.

From antibiotic sensitivity test, the most of the isolates showed resistance against β-lactam antibiotic. Aminoglycosides, Quinolones and Tetracyline group drugs were significantly effective for *Staphylococcus aureus*. There was place wise variation of mean antibiotic resistance and isolates from Mangalpur showed higher resistance than that of other places (Narayanpur, Gitanagar and Chanauli) but there was no significant differences in resistance pattern ($p<0.05$). There was high MAR indices (>0.2) in more than 2/3rd of the isolates that reflects the serious threat to the efficacy and susceptibility of an antibiotic.



Mannitol salt agar, Yellow background is due to mannitol fermentation (suspected S. aureus)



Gram's staining showing Staphylococcus spp

The risk factors associated with the occurrence of *Staphylococus aureus* were floor type, farming system, breed, parity, stage of lactation, udder conformation. Wet bedding or wet floor were harboring the pathogen and increased the prevalence rate. There was high incidence of *Staphylococcus aureus* in commercial farming system and exotic breed with higher milk yield were

suffered more. The increase in the parity of cow increased the prevalence of this organism but limited up to 3rd to 4th parity. The cow of prolonged lactation and pendulous udder conformation created the favorable environment for *S. aureus*.

Proper hygiene, prudent use of an antibiotic, regular screening of mastitis and minimization of animal risk factors by proper selection method are the goldstones to save from the multidrug resistant zoonotic pathogen *S. aureus*. "Once a Staph cows always a staph cow" (Anonymous). So, better way to control this pathogen is to prevent the entry of unscreened animal, strict animal hygiene, and proper health management.

If the farming system is commercial, there should be to be very strict measure on herd and shed hygiene. There may be chance of rapid spread of this organism and establishment of this bacteria incur heavy losses without detecting any clinical intra-mammary infection. So, even small amount of investment for the maintenance will be advantageous for farmer. The more caution should be given to the high yielding exotic breed as these species are more prone to the *Staphylococcus aureus*. The floor of the farm should be maintained dry as this reduces the bacterial load in the environment which acts as a potential source for harboring these bacteria.

The sample size of this research was quiet insufficient to draw conclusion for the overall prevalence of the bovine *Staphylococcus aureus*. That's why further research should be done with the greater sample size. This organism is highly adaptable to the multiple hosts including human. So, upcoming research should cover *S. aureus* fromother livestock as well as human.

3.2.3 Use of live yeast extract (*Saccaromyces cerevisiae*) on cattle feed to enhance the performance of milk in crossbred cattle

Study was carried out to observe the effects of live yeast culture (*Saccharomyces cerevisiae*) inclusion in the feed upon the milk yield, milk composition and the economy change from the milk production. It was carried at the Khumaltar farm of National Cattle research Program, Rampur Chitwan from 2071/12/05 to 2072/01/02 in 20 crossbred cattle of equal lactating status selected at random. There were 5 treatments as T_1, T_2, T_3, T_4 and T_5 providing the different level 0.5 kg/metric ton, 1 kg/metric ton, 1.5 kg/metric ton, 2 kg/metric ton live yeast inclusion feed respectively. Each treatment included four animals having one each of first, second, third and fourth or above parity. There was significant change in the milk yield between treatments, within treatments and across different time points. Treatment T_4 having 2 kg/ton live yeast inclusion was found to be significantly different with the control T_5 without yeast inclusion with the highest milk production in T_4. Fat was found to be significantly different in between 1st day and the 28th day as there was increased milk production in

28th day which cause decreased fat proportionally. Rest of the milk composition factor was insignificant. However, economically T_3 was found to be reliable for the farmers although T_4 had more milk production.

Hence it is concluded that live yeast inclusion makes significant changes in the milk production with the 2 kg/MT inclusion but economically T_3 with 1.5 kg/ metric ton live yeast (*Saccharomyces cerevisiae*) inclusion is better. So it would be economically better to use yeast extract (*Saccharomyces cerevisiae*) in cattle feed.

4. PRODUCTION

A brief Production of Farm at the end of 2071/2072 is presented below:

Table 1. Production of green grasses for livestock units maintained at the farm.

S.N.	Description	GM Production (Mt)	Available GM (Mt)	Dry Matter (NDM%)	Total DM Available (Mt)
1.	Local Grass	170	170	20	34
2.	Paspalum	55	55	20	11
3.	Teosinte	40	40	20	8
4.	Oat	85	85	20	17
5.	Rye & Clover	35	35	20	7
6	Maize	110	110	20	22
	Total	495	492	20	99

Maize Silage Production=50 MT.

Average total livestock units at farm = 90

Average body weight of each livestock unit=350 kg

Required DM/day/LU = $\frac{350 \times 3}{100}$ = 10.5 kg

Required DM/day for total livestock unit =10.5×90 =945 kg/day.

Required DM for 6 months for total livestock unit =945×30×6=170100 kg = 170.1 MT Dry matter. Therefore, almost half dry matter required for the year is obtained from green grass production and remaining requirement is fulfilled from straw and concentrate.

Table 2. Monthly Milk Production 2071/072

Month (Shrawan 071-Asad 72)	Total Milk Production(kg)
Shrawan , 2071	4123
Bhadra, 2071	3639
Aswin, 2071	3057
kartik, 2071	2328
Marg, 2071	1636
Paush, 2071	1515
Magh, 2071	1563
Falgun, ,2071	3835
Chaitra, 2071	6749

Month (Shrawan 071-Asad 72)	Total Milk Production(kg)
Baisakh ,2072	8492
Jestha, 2072	8748
Ashad, 2072	6937
Total	52622

Table 3. Calf Production and distribution 2071/072

Calf Production	unit	Total
Male	No.	18
Female	No.	7
Total	No.	25
Calf distribution	5	5

5. TECHNOLOGY TRANSFER AND SERVICES

Technology generated by the research has no meaning unless it has been extended to the farmers. Over the year, several outputs has been obtained by research but not adequately extended to the farmers. Therefore National Cattle Research program had a project to do the extension of technology generated by the program.

5.1 Training/ workshops:

In the year 2071/72two different trainings on cattle farming management and clean milk production was conducted at Madi, Chitwan and Razahar, Nawalparasi with thirty eight participants in Madi and 25 in Razahar in each of the training. Farmers were demonstrated with the various proven technology with objective to adopt those technology in their farm house for the improved management and finally production. Similarly, one day training on the 'Cattle reproductive health management was conducted at the District Livestock Service Center, Chapagaon, Lalitpur covering 33 participants. Objective of the training was to transfer the latest technology in the early pregnancy diagnosis methods together with the other reproductive management.

5.2 Service/s

Technical briefing to the farmers students, extension officials co-operatives farmers group, NGOs were done on cattle and buffalo husbandry practices. At least 1000 people were benefited through our counseling and farm observation. Besides, program distributes the high quality bulls as a seed animal to the farmers of the hills for the further multiplication of the superior quality progeny. Moreover, program also generously supply the clean and fresh whole milk continuously to at least 150 household for daily consumption and also some of the milk products like Khoa, Paneer and Ghee to some of the households dwelling nearby its vicinity.

5.3 Publications

Publication in this FY year was found to be very poor may be due the hindrance created on transfer phases of the technical staffs from the Khumaltar to the Rampur and responsibility was burden with extra workload at both the places. Hence, only annual report of 2071/72 was published with 100 copies.

6. OTHER ACHIEVEMENTS

Seminar, workshop, scientific visit: Seminar on "Farm animal genetic resources" organized by the NASRI and presented by the Professor from the Bangladesh Agriculture University was attended by the Dr. Anjay Kumar Sah which was really important in terms of the maintenance of the cattle germ plasm as a source of the genetic resources. This year capacity building parts for the Technical officers and the Scientist was found to be appreciative. Altogether 10 trainings as mentioned in the Annex 6.1 have been conducted by different organizers and were actively involved in those trainings by the different and related personnel of NCRP. Trainings on the Infertility management for dairy cows, Statistics application for the veterinary and animal science, Proposal and technical paper writing However, no any scientific visit neither on national level nor on international has been entertained.

7. BUDGET AND EXPENDITURE

Budget approval and released for this FY 2071/072 was relatively satisfactory than previous FY 2070/071. However, the resources when compared to the thrust of the council to relocate the program in full fledged national level program are still below its expectations. Huge financial resources required to complete the construction and laboratory set up. Details of the budget and expenditure of this FY is briefly accounted in the Annex/s 7.1, 7.2, and 7.5 along with Revenue and Beruju status in 7.3 and 7.4 respectively.

8. KEY PROBLEMS

1. Inadequate scientific manpower and competent technicians as per the approved posts.
2. Lack of Experimental trial sheds for quality research.
3. Poor drainage system of the program surroundings.
4. Unavailability and quantity of water for animal's use and irrigation purpose.
5. Easy accessibility of unwanted invader due to lack of permanent fencing or compound wall.
6. Insufficient staff quarters, Laboratory, working rooms and other physical facilities.
7. Tendency of encroachment of its land holdings for other purposes.
8. Poor mechanism for the dissemination of generated technologies.
9. Lack of carrier development opportunities and encouragement for the staff.

9. WAY FORWARD

1. Conduct various research programs either in sole authority or in collaboration with other institution on production & management, nutrition, feeding, breeding and health care of bovine to enhance their production & productivity.
2. Identify the existing production & management system of livestock in different agro-ecological zones of Nepal for proper technological intervention.
3. Conduct farmer's field trial or on-farm research to demonstrate and disseminate the technologies for their wider adoption and adaptation. Up-grade the native *zebu* cattle by strengthening AI facilities and distribution of upgraded breeding bulls to the farmers.
4. Conduct research to mitigate the methane level to make dairy farming more environmental friendly.
5. Study on the cost of milk production to make dairy farming more economic.
6. Establish, maintain and run a livestock farm for conservation, utilization and exploitation of bovine genetic resources together with providing animals for research support and distribution.
7. Maintenance and production of improved grasses for animal feeding, silage production and forage seed distribution to the farmers.
8. Conduct research on Vaccine failure for different disease like Foot and Mouth disease, Hemorrhagic septicemia etc.

Annexes

Annex 1.1 Map of Command Area

Annex 2.2

List of Laboratory Facilities

SN	Name of laboratory	Major instruments	Manpower in laboratory	Testing facilities
1	Dairy Laboratory	Lacto-scanner, Khoa maker machine, Paneer Vat, Sealing and filling Machine	J.T., Technical Officer	Milk Quality
2	AI Laboratory	AI Gun, Refree with liquid nitrogen	J.T.	Pregnancy test
3	Health Laboratory	Microscopes, Incubator, Laminar flow, Autoclave	J.T, Technical Officer	AST, Bacterial culture

Annex 2.3 Human Resource in 2071/72 (2014/15)

S.N.	Name	Designation	Qualification	Specialization/ Working area
1	Mr. Tulsi Prasad Poudel	Coordinator (S3)	MSc	LPM
2	Mr. Purna Bhadra Chapagain	Senior Scientist (S3)	MSc	LPM
3	Dr. Anjay Kumar Sah	Scientist (S1)	MVSc	Animal Breeding and Genetics
4	Mr. Narayan Hamal	Technical Officer (T6)	I. Sc. Ag.	LPM
5	Dr. Rupa Bastola	Tech .Officer (T6)	B.V. Sc.& A.H.	LPM
6	Dr. Binay Shrestha (resigned)	Technical Officer (T6)	B.V.Sc & A.H.	LPM
7	MrsLaxami Devi Parajuli	Account assistant (A6)		
8	Mr. Buddhi Ram Acharya	Technical Officer	B.Sc.Ag.	LPM
9	Susma Devi Subedi	Tech (T5)		
10	Mr.Bharat Bahadur Kharti	Tech. (T5)		
11	Mr.Shanu Kaji Raut	Tech. (T5)	VIII	
12	Mr. Madhav Chalise	Tech. (T5)		
13	Mr. Lila Ram Pathak	Tech. (T5)		
14	Mr.Ram Bahadur Khatri	Tech. (T4)		
15	Mr. Jib Lal Bhusal	Tech. (T4)		
16	Mr. Buddhi Ram Chaudhary	Tech. (T4)		
17	Mr. Shyam PrasadLamichhane	Tech. (T5)		
18	Mr.Ram Bahadur Maharjan	Tech. (T5)		
19	Mr.Shanu Babu Mahat	Tech. (T5)		

S.N.	Name	Designation	Qualification	Specialization/ Working area
20	Mr. Bhim Bahadur Deula	Tech. (T5)		
21	Mr. Parakash Maharjan	Tech. (T4)		
22	Mr. Krishna Bahadur Thapa	Tech. (T4)		
23	Mr.Thal Bahadur Shilwal	Tech. (T4)		
24	Mr. Krishna Bahadur Pandey	Tech. (T4)		
25	Mr.Chiring Tamang	Tech. (T4)		
26	Mr.Maite Tamang	Tech. (T3)	Literate	
27	Miss. Parbati Khatri	Tech. (T3)	Literate	
28	Dr. Parbesh Sharma	T6	B.V.Sc.&A.H.	Veterinary

Annex 3.1 Summary Progress of NARC Research Projects and Activities in 2071/72 (2014/15)

Project code number	Name of project/activity	Project/Activity leader	End year	Budget allocated for this year	Major progress/ achievements
41670007	Early Pregnancy diagnosis in Cattle and Buffalo by using Radio Immuno Essay (RIA) and EIA technology	Dr. Rupa Bastola	2073	240	
Activity 1	Site Visits: Site selection and Farmer selection (1)	Dr. R Bastola		20	
Activity 2	Baseline data collection on participating farmers (1)	Dr. R Bastola		60	
Activity 3	Follow up of the results (2)	Dr. D R Khanal		80	
Activity 4	Training to farmers for heat detection / pregnancy diagnosis (3)	Dr R Bastola		80	
41670005	Clean milk production in relation to dairy	T P Paudel		390	
Activity 1	Site and experimental animal identification(2)	T P Paudel		58	
Activity 2	Training to the dairy farmer (2)	T P Paudel		124	
Activity 3	Evaluation of milk sample for bacterial count(3)	T P Paudel		208	

Project code number	Name of project/activity	Project/Activity leader	End year	Budget allocated for this year	Major progress/ achievements
41670004	Development of strategies for reducing cost of milk production	T P Paudel		415	
Activity 1	Site and farm selection (IFCN Methodology) (3)	T P Paudel		10	
Activity 2	In depth study on cost of milk production on selected sites farms (3)	T P Paudel		325	
Activity 3	Interaction with stakeholders (3)	T P Paudel		80	
41670003	Study on sero status of FMD vaccing in cattle of jiri and khumaltar farmers	Dr. Anjay Kumar Sah		556	Terminated
Activity 1	Selection of farms and tagging of animals (1)	Dr. Anjay K Sah		46	
Activity 2	Vaccination of the selected animals (2)	Dr. Prabesh Sharma		375	
Activity 3	Collection of serum after vaccination (3)	Dr. Prabesh Sharma		85	
Activity 4	Assay of serum from vaccing ted animals every 30 days for 6 months (3)	Dr. Anjay K Sah and Dr. Prabesh Sharma		50	
41671006	Implementation of data recording system in cattle management software to assess reproductive and milk production performances at NCRP	Dr Anjay K. Sah	2073	205	
Activity 1	Site allocation, Record card design and software development (1)	Dr Anjay K sah		23	
Activity 2	Data recording into software and software remodelling (1)	Dr Anjay K Sah		73	
Activity 3	Assesment of the reproductive and productive performances (3)	Dr Anjay K Sah		66	

Project code number	Name of project/activity	Project/Activity leader	End year	Budget allocated for this year	Major progress/ achievements
Activity 4	Monitoring, Evaluation and Report writing	Dr Anjay K Sah		43	
41671001	Genetic Improvement, maintain, production, selection and utilization of cattle germplasms at NCRP, Rampur, Chitwan	PB Chapagain		1897	
Activity 1	Collection of the outstanding species through purchasing (3)	P B Chapagain		45	
Activity 2	Maintenance of different cattle breeds (3)	P B Chapagain		1030	
Activity 3	Production of the calves and milk	B R Acharya		140	
Activity 4	Productive and reproductive performances recording of different breeds of cattle (3)	B R Acharya		96	
Activity 5	Selection of the Cattle (3)	P B Chapagain		10	
Activity 6	Improvement of cattle through breeding (3)	P B Chapagain		80	
Activity 7	Routine milk anaysis (3)	B R Acharya		37	
Activity 8	Dipping, drenching, vaccination for the farm animal (3)	Dr. Prabesh Sharma		62	
Activity 9	Development of the fodder and pasture block	P B Chapagain		77	
Activity 10	Year round fodder production	P B Chapagain		75	
Activity 11	Establishment of the small scale fodder nursery at NCRP, rampur	P B Chapagain		165	
Activity 12	Transfer of the cattle from NCRP, Khumaltar, and RARS, Lumle	P B Chapagain		80	
41671002	Upscaling and Verification of the Livestock Technologies at outreach sites	PB Chapagain		235	
Activity 1	Site selection and survey (1)	P B Chapagain		35	

Project code number	Name of project/activity	Project/Activity leader	End year	Budget allocated for this year	Major progress/ achievements
Activity 2	Upscaling of the teat dipping in farmers management conditions (1)	P B Chapagain		60	
Activity 3	Effective for double vaccination for major economic diseases and drenching against major internal/external parasites (3)	P B Chapagain		50	
Activity 4	Fortification of UMMB using sustained release urea (SRU) and probiotic cultures (3)	Dr C R Upreti		55	
Activity 5	Evaluation of the silage making techniques (3)	P B Chapagain		35	
41644001	Cattle herd Management and production program	T P Paudel		4143	
Activity 1	Feeding of animals in required quantity (3)			2789	
Activity 2	Health care of animals (3)			150	
Activity 3	Breeding of Animals (3)			215	
Activity 4	Green grass production (3)			505	
Activity 5	Milk production handling and selling and product diversification (3)			264	
Activity 6	Manure handling and spreading in the field (3)			40	
Activity 7	Oat seed production (3)			30	
Activity 8	Calf production (3)			150	
Activity 9	Selection of productive cattle for breeding (3)			0	

Annex 4.2 Distribution of (commodity/product) in FY 2071/72

SN	Commodity/ product	Type (Breeder/ Foundation, Blood level…)	Quantity	Major stakeholder(s)	Distributed districts
1	Male Calf	Jersey and Holstein crossbreds	5	Farmers NGOs	Kavre, Chitwan
2	Seeds	Bajara, Teosinte etc	35 kg	Farmers	Chitwan and Nawalparasi

Annex 5.1 Training/Workshop/Seminar Organized in FY 2071/72 (2014/15)

SN	Name of Training/ Workshop/ Seminar	Duration	Target group	Location	No. of participants
1	Training on Cattle Reproductive Health Management	1 day	Farmers	Lele, Lalitpur	33
2	Training on Clean Milk Production	2 days	Farmers	Madi, Chitwan	38
3	Training on Clean Milk Production	1 Days	Farmers	Razahar, Nawalparasi	25
4	Training on Cattle farming management	2 Days	Farmers	Madi, Chitwan	38
5	Training on Cattle farming management	1 Days	Farmers	Razahar, Nawalparasi	25

Annex 5.2 Services Provided in FY 2071/72 (2014/15)

SN	Laboratory/field test/ counseling services provided	Numbers	Major clients
1	Farm Observation and technical briefing to farmers	More than 1000	Farmers, students, Entrepreneurs, Extension officials, NGOs

Annex 5.3 Publications in FY 2071/72 (2014/15)

SN	Name of publications	Type	Language	Authors	No. of copies
1	Annual Report 2070/071	Book (Revised)	English	NCRP	100

Annex 5.4 Information Disseminated Through Media

SN	Information disseminated/ Media coverage	Type	Name/ Type of media	Date/Time
1	Cattle Management at NCRP	Interview	Himalaya TV	--------
2	Clean Milk Production	News	FM	

Annex 5.5 Visits of the Office/Station by Farmers, Extension Officials/Technicians, Entrepreneurs, Cooperatives, Farmer Groups, NGO/CBO Officials etc.

SN	Category	Number	Districts	Area of major interest
1	Farmers	More than 1500	Various District of all over the country	Cattle raising and farm visit
2	Entrepreneurs		Kathmandu, Lalitpur ,Bhaktapur and other neighboring district	Cattle husbandry practices
3	Extension officials	very few	Kathmandu , Lalitpur	Cattle husbandry practices
4	NGOs officials	very few	Kathmandu , Lalitpur	Cattle husbandry practices
5	Student	more than 500	HICAST, AFU, Technical schools	Farm visit, Cattle husbandry practices

Annex 6.1 Training/Workshop/Seminar Attended by Staff in FY 2071/72 (2014/2015)

S N	Name of staff	Position	Name of Training / seminar/ workshop	Duration	Place/ Country	Organizer
1	Dr. Rupa Bastola and Dr. Parwesh Sharma	Technical officer, T6	Bio-Pyrn Pregnancy Diagnosis	5 days	AHRD, NARC Nepal	MSU, DLS, NARC and AFU
2	Purna Bhadra Chapagain, Dr. Anjay K Sahand Buddhi Ram Acharya	Scientist S3, Scientist S1 and Technical Officer T6	Infertility Management for Dairy Cows	2 weeks	AFU, Rampur, Chitwan	AFU
3	Dr. Anjay K Sah	Scientist S1	Statistics for Research Application in Animal/Veterinary Science	4 days	NASRI, Khumaltar	NASRI, NARC
4	Lila Ram Pathak	JT	Artificial Insemination	7 days	Pokhara	NLBC and LCC project, MSU
5	Dr. Anjay Kumar Sah	Scientist S1	Advanced Dairy Cattle Nutrition and Management	1 day	NASRI, Khumaltar	MSU, DLS, NARC and AFU
6	Mr Tulasi P. Paudel, Mrs Laxami Parajuli and Dr. Parwesh Sharma	Coordinator, NCRP; Accountant and Technical officer	LMBIS	1 days	RARS, Parwanipur	NARC
7	Mr Tulasi P Paudel	Coordinator	Managerial Skills	7 Days	Staff College, Jawalakhel	NASRI, NARC
8	Mrs. Susma Devi Subedi	Assistant Admin, A5	Electronic Attendence management	-	-	NARC
9	Mr Tulasi P Paudel and Mr Narayan Hamal	coordinator and Technical Officer T6	Psn vftf n]vf k|0ffnL	2 days	RARS, Lumle, Kaski	NARC

SN	Name of staff	Position	Name of Training / seminar/ workshop	Duration	Place/ Country	Organizer
10	Dr. Anjay Kumar Sah	Scientist S1	Project Concept Note, Project Proposal, Technical Paper Writing and Statistical Analysis	6 Days	NASRI	NASRI, NARC

Annex 7.1 Regular Annual Budget and Expenditure Record of FY 2071/72(2014/15)

Code	Budget Heads	Annual budget (NRs.)	Budget released (NRs.)	Expenses (NRs.)	Balance (NRs.)
40*	Staff expenses	9003070.3	8980570.3	8980570.3	22500
4000	Staff Basic Salary	7,201,983.0	7,201,983.0	7,201,983.0	0
4010	Staff Allowance	321,134.0	321,134.0	321,134.0	0
4020	Staff Provident Fund	647,766.3	647,766.3	647,766.3	0
4030	Staff Medical Expenses				
4040	Staff Uniform Expenses	210,000.0	187,500.0	187,500.0	22500
4050	Staff Dasai Expenses	560,160.0	560,160.0	560,160.0	0
4060	Staff Overtime Expenses				
4070	Staff Pension & gratuity				
4080	Insurance Fund	62027.0	62027.0	62027.0	0
41**	Operational expenses	17600000.0	17329415.70	17329415.0	120584.3
4100	Travel Expenses	1191000.0	1186300.0	1186300.0	4700.0
4110	Vehicle Fuel & Lubricants Cost	555000.0	534258.50	534258.50	20741.5
4120	Wages to Labor Cost	4595000.0	4593150.0	4593150.0	1850.0
4130	Laboratory and Research Supplies Cost	980000.0	979885.00	979885.00	115.0
4140	Farm Supplies Cost	9699000.0	9690394.30	9690394.30	8605.7
4150	Books, Journal & Publications	205000.0	173514.0	173514.0	31486.0
4160	Training & Seminar Cost	125000.0	72000	72000	53000

Code	Budget Heads	Annual budget (NRs.)	Budget released (NRs.)	Expenses (NRs.)	Balance (NRs.)
4170	Contract & Collaborative Research				
4180	Farm Management Project Cost	100000	99913.9	99913.9	86.1
42**	Administrative expenses	2495000.0	2444947.66	2444947.66	12552.34
4200	Rent, Utilities & Other Expenses	1300000	1298412.57	1298412.57	1587.43
4210	Communication Expenses	120000	111532.64	111532.64	8467.36
4220	Repairs & Maintenance Cost	880000	877544.0	8775440.0	2456.0
4230	Stationary, Printing & Office Supplies	120000	119960.5	119960.45	39.55
4240	Board and Panel Meeting Cost				
4250	Recruitment Expenses				
4260	Contingency Expenses	37500	37498.0	37498.0	2.0
4270	Office Furnishing Cost				
4280	Other Administrative Expenditure				
43**	Capital expenses	21592000.0	12691585.0	12691585.0	8900415.0
4300	Freehold Land Cost				
4310	Land and Land Development Cost	650000.0	4933260.0	493326.0	156674.0
4320	Building & Other Construction Cost	18200000.0	9495076.0	9495076.0	8704924.0
4330	Furniture & Fixture Cost	300000.0	299892.0	299892.0	108.0
4340	Machinery Tools & Equipment Cost	1542000.0	1541614.0	1541614.0	386.0
4350	Vehicles Cost				
4360	Computer & Computer Accessories Cost	200000.0	199774.0	199774.0	226.0
4370	Other Fixed Assets	200000.0	199923.0	199923.0	77.0
4321	Renovation	500000.0	461980.0	461980.0	38020.0
	Grand Total	50690070.3	41446518.6	41446518.6	9056051.64

Annex 7.3 Revenue Status of FY 2071/72(2014/15)

SN	Sources of Revenue	Revenue Collected (NRs)
1	Milk, Calf, manure, Sale	3125160.75
2	Administrative Sell and others	1597455.67
	Total	4722616.42

Annex 7.4 Beruju Status of FY 2071/72(2014/15)

Beruju	Amount (NRs 000)	Remarks
Beruju till last year 2071	11695.5	
Beruju cleared this FY	1378.78	
Remaining Beruju	10316.37	
Document processed for clearance of Beruju	7437.85	

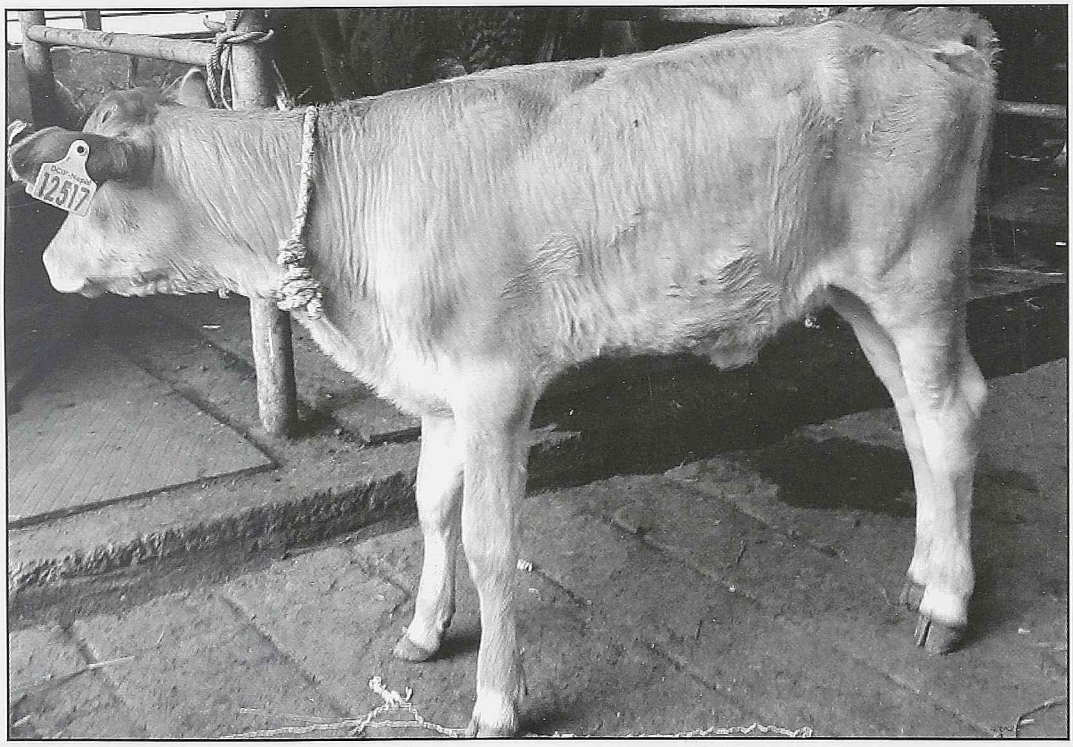
Annex 7.5 Annual Budget and Expenditure of FY 2071/72(2014/15)

SN	Budget heads	Annual Budget (NRs.)	Annual Expenditure (NRs.)	Percentage Expenses (NRs.)
1	Salary Expenses	9003070.3	8980570.3	99.75
2	Program Expenses	17600000.0	17329415.70	98.46
3	Office Expenses	2495000.0	2444947.66	97.99
4	Capital Expenses	21592000.0	12691585.0	58.77
	Total	50690070.3	41446518.66	81.76

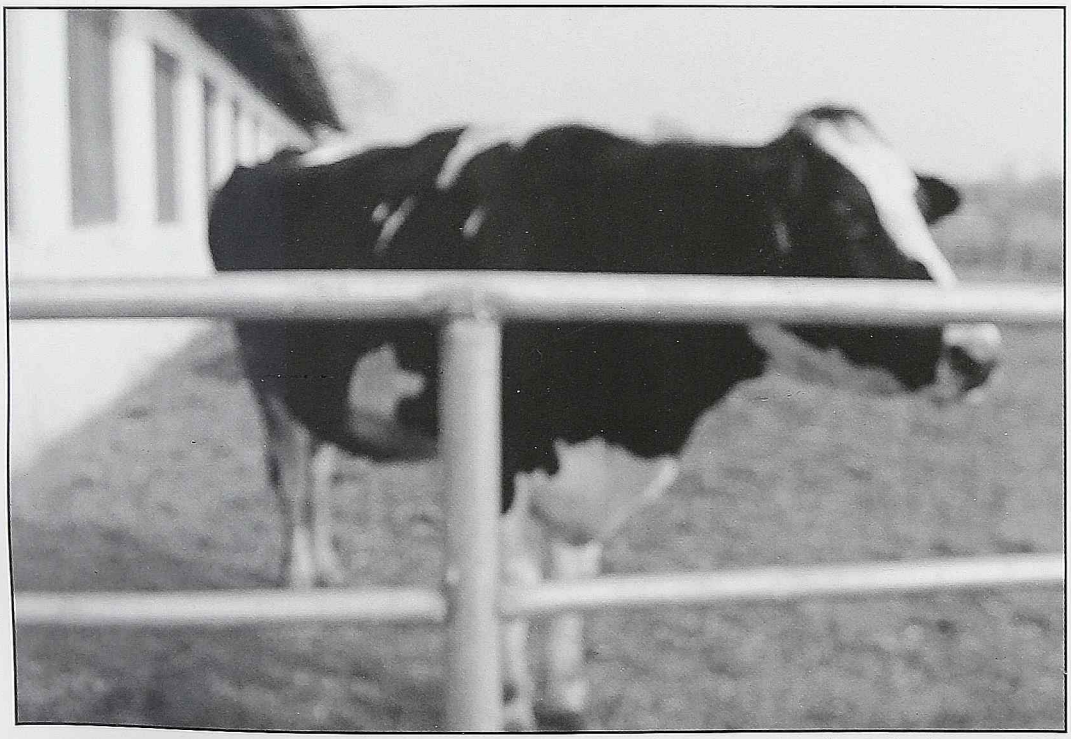
Human Resources Chart at NCRP

SN	Post	Group	Number of post	Post fulfilled	In	Out	Vacant Post
1	Principal Scientist	Livestock Production & Management	1	1	0	1	0
2.	Senior Scientist	Livestock Production Management	1	1	0	1	0
3.	Scientist	Livestock Production Management-2 and Animal Breeding-1	3	3	1	2	0
4	Senior Technical Officer	Livestock Production Management	1	0	0	0	1
5	Technical officer	Livestock Production Management & Veterinary	4	3	3	0	1
6	Account officer	Admin & Finance	1	1	1	0	0
7	Admin officer	Admin	1	1	0	1	0
8	J. Technician		4	3	3	0	1
9	Technical Asst	Admin	5	3	3	0	2
10	Typist	Admin	1	1	0	1	0
11	Technical Helper	-	12	8	6	2	4
12	Computer Asst.	-	1	0	0	0	1
10	Admin helper	Admin	1	1	1	0	0
11	Driver Heavy	Admin	1	1	0	1	0
12	Driver light	Admin	1	1	0	1	0
	Total		38	28	18	10	10

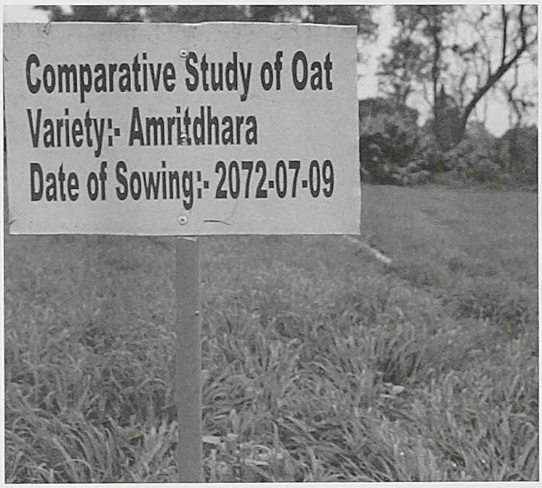
Note: Some Personnel were in on deputation and in and out during the 2071/72



A female calf born with 39 kg birth weight from the frozen sexed semen insemination at NCRP, Rampur



A cow born by Embryo Transfer Technology at NCRP



Study trial on the oat variety-Amritdhara

Study trial on the oat varitey-Kamdhenu

वर्षै भरी हरियो घाँस उत्पादन प्रविधि तालिका

पशुपालक कृषकहरुले मौसम अनुसार बाह्रै महिना उपलब्ध हुने घाँस लगाउने प्रविधिको अभावले पशु उत्पादन र उत्पादकत्व वृद्धि हुन सकेको छैन । यस प्रविधिबाट वर्षै भरी हरियो घाँस खेती गरी आहरा पूर्ति गराई पशुहरुको उत्पादकत्वमा बृद्धि ल्याउनुको साथै उत्पादन लागत पनि कम भई पशुपालनबाट धेरै मुनाफा प्राप्त गर्न सकिन्छ । हरियो घाँस उत्पादनको लागि कृषकहरु सचेत भई पशुपालन व्यवसाय तर्फ उन्मुख हुन जरुरी देखिन्छ । अनुसन्धानबाट प्राप्त नतिजा अनुसार भित्री मधेशदेखि मध्यपहाडसम्मको क्षेत्रको लागि निम्न तालिका अनुसार घाँस खेती गर्न सकिन्छ । विशष गरेर वर्षायाम अर्थात असाढदेखि आश्विनसम्म स्थानीय स्तरमा उपलब्ध स्थानीय घाँसहरुका साथै वर्षै भरी निम्न उन्नत एक वर्षे तथा बहुवर्षे घाँसहरुको खेती गर्न सकिन्छ ।

घाँसका नाम, उपलब्ध हुने महिना र तिनको संक्षिप्त विवरण तालिका :

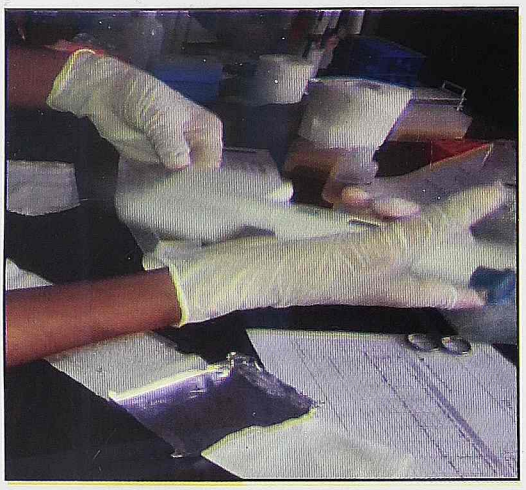
जेठ	आषाढ	श्रावण	भाद्र	आश्विन	कार्तिक	मार्ग	पौष	माघ	फाल्गुण	चैत्र	बैशाख

टिओसिन्टी : छर्ने समय : फाल्गुण- बैशाख, बीउ दर : २.५ किलो प्रति रोपनी, हरियो घाँस उत्पादन १७५०-२५०० किलो प्रति रोपनी ।

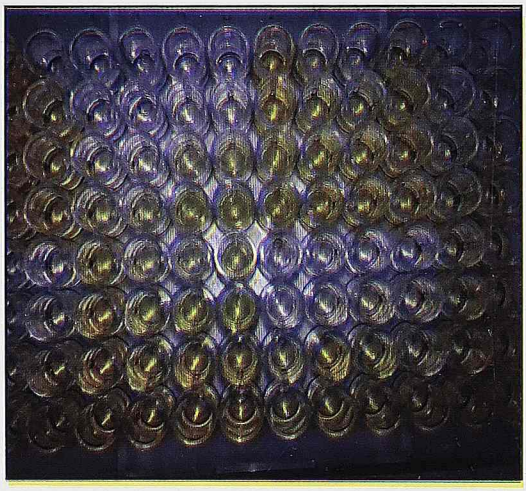
बोडी: छर्ने समय : श्रावण- भाद्र, बीउ दर : १-२ किलो प्रति रोपनी, हरियो घाँस उत्पादन १०००-१२५० किलो प्रति रोपनी

जै : छर्ने समय : आश्विन- कार्तिक, बीउ दर : ५-६ किलो प्रति रोपनी, हरियो घाँस उत्पादन २०००-२५०० किलो प्रति रोपनी

Source: ARS, Lumle

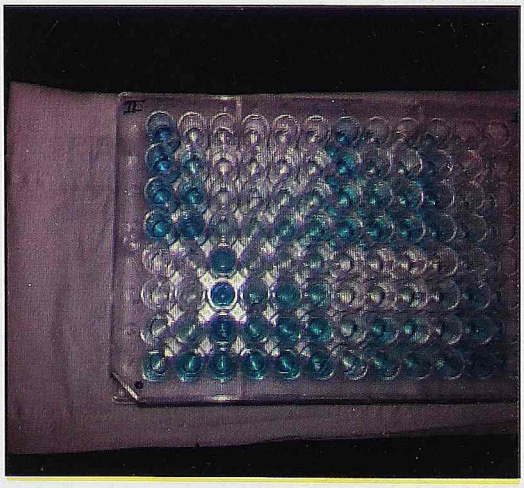


Laboratory workout for SPC ELISA for FMDV antibodies



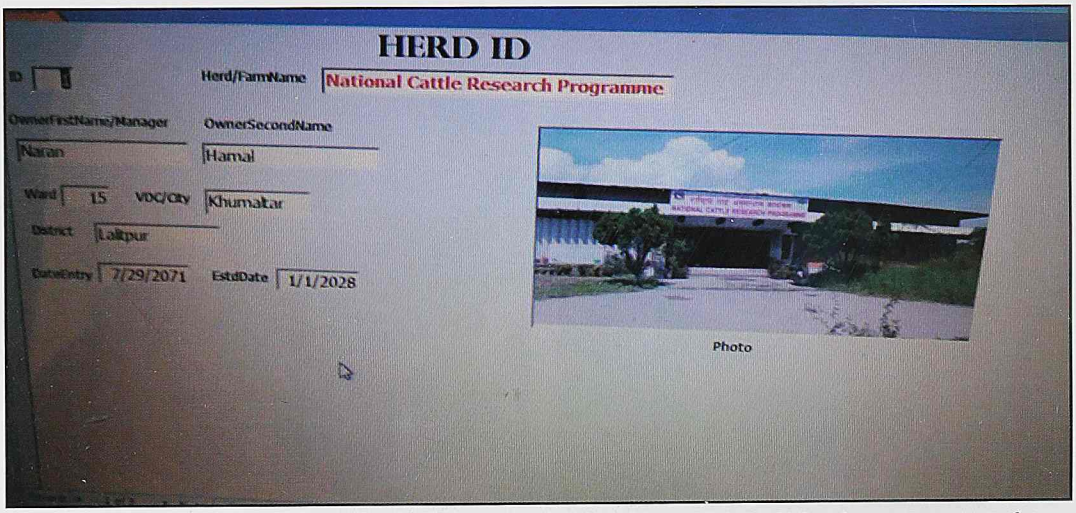
Colour results after SPCE for FMDV antibodies concentration

Training on Cattle reproductive health management

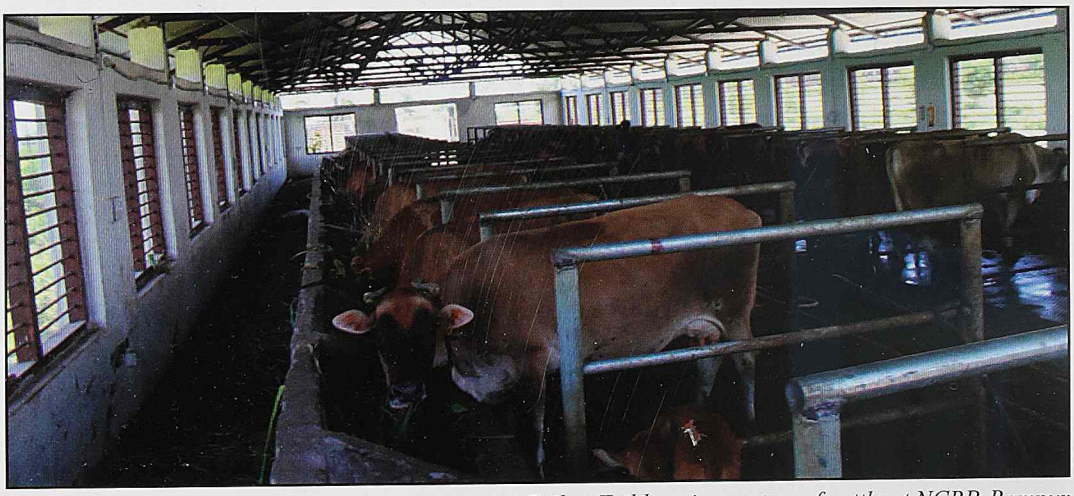


ELISA to detect the progesterone for early pregnancy

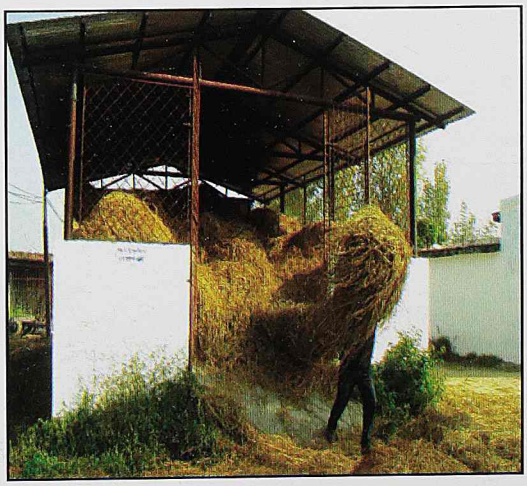
Clean house floor with mat/pad for clean milk production

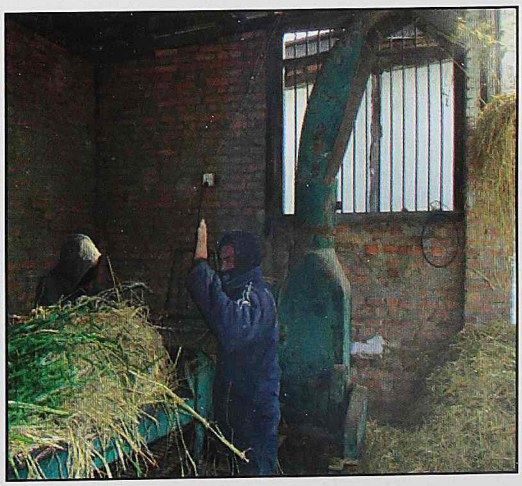


Cattle herd management software

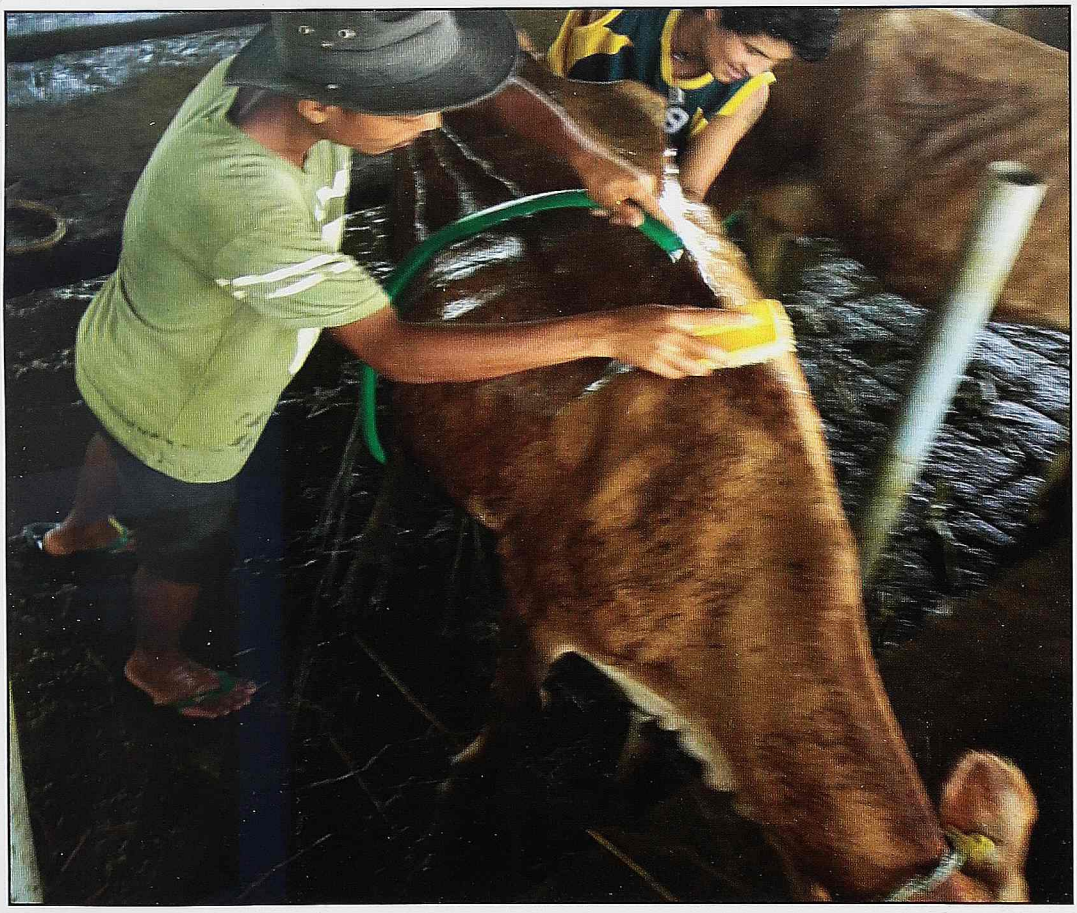


Tail to Tail housing system of cattle at NCRP, Rampur

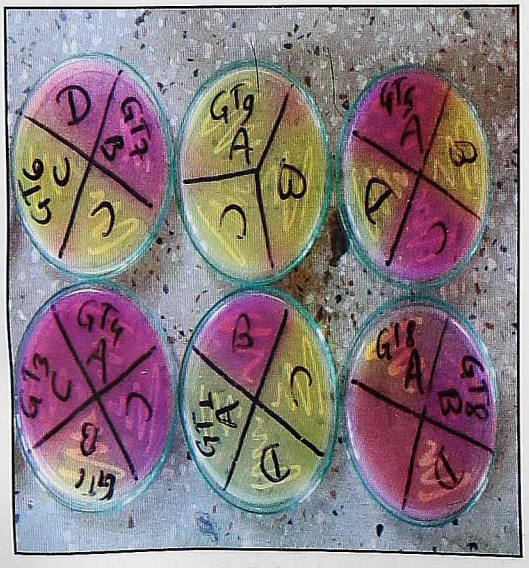




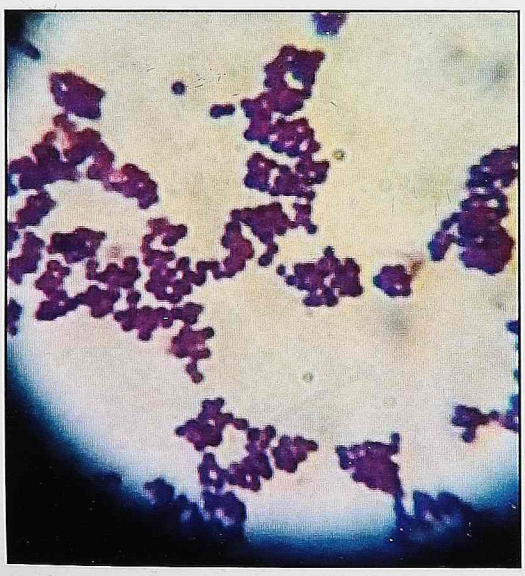
Use of Chaff-cutter: Part of mechanization in the farm; chaffing the straw mixed with oat



Bathing of the cows during hot summer to minimize heat stress



Mannitol salt agar, Yellow background is due to mannitol fermentation (suspected S. aureus)

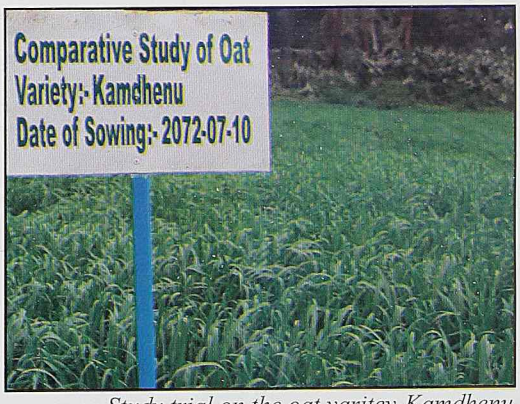


Gram's staining showing Staphylococcus spp

A female calf born with 39 kg birth weight from the frozen sexed semen insemination at NCRP, Rampur

A cow born by Embryo Transfer Technology at NCRP

Study trial on the oat variety-Amritdhara



Study trial on the oat varitey-Kamdhenu

Source: ARS, Lumle

Panner production technology demonstration at Out-reach site, Chitwan

Culture media preparation at Animal Health Laboratory Unit of NCRP, Rampur

Crossbred cows of Holstein Friesian and Jersey in the yard (Khumaltar farm)

Briefing NCRP progress to Monitoring team of NARC