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Annual Report

2070/71 (2013/14)

Government of Nepal
Nepal Agricultural Research Council

NATIONAL CATTLE RESEARCH PROGRAM

Rampur, Chitwan

2014

Twin calves borne in NCRP, Khumaltar farm

Newly Established Fodder Block in Rampur

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National Cattle Research Program (NCRP)

Nepal Agricultural Research Council (NARC)
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Office Building of National Cattle Research Program at Rampur, Chitwan Nepal

FOREWORD

The team of National Cattle Research Program (NCRP) feels proud to present you with the book in your hand that briefly highlights the progress it has made in technical and financial terms over the last fiscal year i.e. 2070/71. Efforts have been made to present a concise form of information and database on research and development related activities related to cattle feeding and nutrition, management and health practices. Some noteworthy achievements have been bagged over the year, that the team believes, can be of significant resource for the farmers to improve the production and productivity of dairy cattle in different agro-eco zones of the country.

The production level in terms of lactation yield of cattle across government and private farms is very low in Nepal. Major factors attributing to such sub-optimal production level are; low genetic potentiality of native cows, lack of proper selection of the native herd to optimize their potentials, lack of proper feeds and feeding technology to reduce the cost of production of milk, lack of veterinary care to produce healthy animal, lack of management technique suitable to different agro ecological zones 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 Nepal. Through the special project operation engagement of NARC in partnership with Michigan State University (MSU), U.S.A., Agriculture and Forestry University (AFU) and Department of Livestock Services (DLS), continuation and expansion of some promising technology e.g. Urea-Molasses-Mineral-Block (UMMB) technology in the dairy farm has also been accomplished. The genetic materials (semen of Jersey and Holstein cattle) received from FAO/DCIP was helpful to produce the high quality calf to retain for the farm and for distribution through the district livestock service office (DLSO). DLSOs are being benefited by getting the high quality male calves from the program. Jersey and Holstein males were mainly distributed to the central hill districts of Nepal. Still there is great demand of these improved male calves from these districts.

The line agencies such as DLS and AFU in articulating the research and providing co-operation and coordination to NCRP have been tremendous throughout the reporting year. Support from NASRI in reformulating the research agenda and activities with the help from its disciplinary divisions

have always been meritorious. The program has undergone massive administrative changes for the planned shift of its campus from Khumaltar to Rampur. The support from NARC senior management especially Dr. Dil Bahadur Gurung, Executive Director, Dr. Yajna Gajadhar Khadka, Director, Crops and Horticulture Research and Dr. Min Nath Paudel, Director, Administration have been instrumental to whatever success the program has achieved in the year reported.

I would like to thank Dr. Rupa Bastola for the robust work she has accomplished in putting things together to bring this report in this shape and form. Likewise, the constant support from Mr. Purna Bhadra Chapagain, Dr. Anjay Kumar Shah, Mr. Narayan Hamal and Mr. Buddhi Ram Acharya for research has always fuelled my enthusiasm to move ahead in cattle research and regular office management. Finally, I would like to acknowledge the encouragement the entire team received from Dr. Tek Bahadur Gurung, Director Livestock and Fisheries Research.

Any comments or feedback from the readers will be our asset and are dealt with great importance. Therefore, such comments and feedback are welcomed and will be duly acknowledged.

Tulasi Prasad Paudel
Coordinator
National Cattle Research Program,
Rampur, Chitwan

Date: 2071/06/14

ABBREVIATIONS

AFU:	Agriculture and Forestry University
C:	Centigrade
CP:	Crude Protein
DCIP:	Dairy Cattle Improvement Project
DLS:	Department of Livestock Services
DLSO:	District Livestock Service Office
DM:	Dry matter
FMD:	Foot and Mouth Disease
GM:	Green matter
IAEA:	International Atomic Energy Agency
Kg:	Kilogram
MoAD	Ministry of Agricultural Development
NARC:	Nepal Agricultural Research Council
NASRI:	National Animal Science Research Institute
NCRP:	National Cattle Research Program

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नेपाल कृषि अनुसन्धान परिषद अर्न्तगतका बिभिन्न बाली बस्तु अनुसन्धान कार्यक्रम मध्ये राष्ट्रिय गाई अनुसन्धान कार्यक्रम पनि एक हो । नेपालको सन्दर्भमा गाई तथा गोरुहरु दूध तथा जोत्नका लागि प्रयोगमा आउने मुख्य आर्थिक श्रोत हुन् । नेपाल सरकारका बिभिन्न अल्प, मध्य तथा दीर्घ कालिन आयोजनाहरु जस्तै :APP, प्रस्तावित ADS र बिभिन्न आयोजनाहरुमा पनि गाई प्रबर्धनका लागि आवश्यक पर्ने प्रबिधि विकासले प्राथमिकता पाएको छ । नेपाल सरकाको योजनाहरुले दूध उत्पादन, प्रशोधन तथा बजार ब्यवस्थापन कार्यले प्राथमिकता पाएको छ । नेपाल कृषि अनुसन्धान परिषद आफै पनि गाई प्रबर्धनका लागि आवश्यक प्रबिधि बिकास हुन अल्प, मध्य तथा दीर्घकालिन नीति लिएर नार्क स्थापना काल २०४८ देखि नै अनुसन्धान कार्यका तल्लिन छ । लक्षित प्रतिफल प्राप्तिका लागि गत आ. ब. २०७०/७१ मा पनि बिभिन्न उत्पादन र प्रचार प्रसारको कार्यको योजना तयार पारी कार्यहरु सम्पन्न भए र जसको उपलब्धी यो बार्षिक प्रतिबेदनमा उल्लेख गरिएको छ । कार्यक्रममा खास गरी दुई प्रकारका क) अनुसन्धानमूलक तथा ख) उत्पादनमूलक गतिबिधिहरु संचालनमा ल्याईको थियो ।

अनुसन्धानमूलक कार्यक्रम अन्तरगत क्षेत्रिय तथा राष्ट्रिय स्तरका कृषि प्राबिधिक समूहहरुको सिफारिसका आधारमा परियोजनाहरुको सञ्चालन गरिएको थियो । त्यस मध्ये गाईलाई कृत्रिम गर्भाधान वा साँढे लगाईसके पश्चात छिटै गर्भिणि अवस्थाको पहिचान गर्न नसक्दा समय र श्रोतको खेर जाने हुँदा गाईको गर्भिणी अवस्था चाडै पत्ता लगाउने प्रविधिको विकास गर्न एक परियोजना सञ्चालन गरिएको थियो । रगत र दूधमा गर्भावस्था सँगै हुने परिवर्तनहरुको भिन्नता अध्ययन गरी गर्भावस्थाको निदान गर्ने प्रविधिको परीक्षण यस परियोजना अन्तरगत गरिदै छ । त्यस्तै उल्लेखित छलफल तथा गोष्ठी, सेमीनार आदिमा किसानहरुले आफ्नो दूधको लागत बढी पर्ने गरेको तर उक्त लागतको तुलनामा पाउने मूल्य अत्यन्त न्यून हुने गरेको गुनासोहरु प्राप्त हुन आएकाले यस कार्यक्रमद्धारा दूधको लागत मूल्य घटाउने रणनिति विकास गर्ने आयोजनाको सुरुवात गरियो । विभिन्न भौगोलिक र व्यवसायिक स्तरमा भएका गाई फार्महरुको अध्ययन गरी ती स्थान र स्तर विशेषमा दूधको उत्पादन लागत पत्ता लगाउने र बढी उत्पादन लागत भएका स्थानहरुमा बढी उत्पादन लागत हुनका कारक तत्वहरु पत्ता लगाई त्यसलाई घटाउन सकिने रणनिती अवलम्बन गर्ने उद्देश्यका साथ यो अध्ययन भईरहेको छ । त्यसका अलावा हालसालै देशका विभिन्न स्थानमा फैलिएको खोरेत रोगको महामारीलाई मध्यनजर गरी संक्षिप्त अध्ययन गर्दा फार्म केन्द्रहरुमा प्रयोगमा रहेका खोपहरु प्रभावकारी हुन नसकेका हुन कि भन्ने अनुभव गरिएकाले उक्त खोपको प्रभावकारीता अध्ययन गरी नयाँ खोप तालिका आवश्यक देखिए सो सिफारिस गर्न एक अनुसन्धान परियोजनाको शुरुवात गरिएको थियो । त्यस अन्तरगत खोरेत बिरुद्धको खोप ब्यवस्थापनका लागि उपयुक्त समयको् मापन गर्ने लुम्ले र खुमलटार फार्म र ती फार्मका वरपरका किसानका फार्महरुमा समेत गई रक्त नमूनाहरु संकलन गरी अध्ययन भई रहेको छ । अन्तमा बजारमा उपलब्ध दूधको गुणस्तर र

त्यस्ले निम्त्याउन सक्ने जनस्वास्थ्यको खतराका कारणले किसानको क्षमता अभिवृद्धि गर्न आवश्यक भएकाले सफा दूध उत्पादनको सहभागितात्मक रुपमा प्रबिधि विकास गर्ने आदि परियोजनाहरु सञ्चालन गरिएको छ । चितवन र नवलपरासीका किसानहरुलाई तालिम तथा सहभागितात्मक प्रबिधि विकासका माध्यमबाट कार्यक्रमहरु सञ्चालन भईरहेका छन ।

अर्को तर्फ, उत्पादन गतिबिधि अर्न्तगत बहर तथा बाछी उत्पादने आयातित वीर्य प्रयोग गरी उन्नत नश्लका (जर्सी तथा होल्स्टीन फ्रिजन) वहर उत्पादन गरी बितरण गर्ने कार्यक्रम निरन्तर सञ्चालन गरिएको छ । त्यसै गरी परिषदबाट सिफारिस भएका बिभिन्न घाँसको बीउ प्रयोग गरी घाँस उत्पादनमा बृद्धि ल्याउनु जस्ता गतिबिधि सम्पन्न गरिएका छन् । जस अनुरुप जम्मा जम्मी ४७० मे. टन घाँस उत्पादन गरिएको छ भने ५५,३६६ लि. दूध उत्पादन भएको छ । उत्पादित ६ बटा बहरहरु जिल्ला पशु कार्यालयको सिफारिसमा ललितपुर काभ्रे र भक्तपुर जिल्लाका किसानलाई उनीहरुको माग अनुसार बितरण गरिएको थियो । यसरी बितरित बहरहरु स्थानीय गाईहरुको नश्ल सुधारका लागि निकै नै प्रभावकारी भईरहेको छ । त्यसैगरी गाईको दूधको प्रति लिटर लागत मूल्य कम गरी किसानहरुलाई अधिकतम नाफा दिलाउने उद्देश्यले दूधको उत्पादन लागत घटाउन महत्वपूर्ण भूमिका खेल्ने कारक तत्वहरुको विश्लेषण गरी प्राबिधिक दृष्टिकोणले दीगो रणनिती तय गर्न एक परियोजनाको शुरुवात गरिएको छ । तनहुँ र ईलाममा गरिएको संक्षिप्त सर्वेक्षण पश्चात चितवनमा ती कारक तत्वहरुको बारेमा छलफल गर्न सरोकारवालाहरुसँग अन्तरकृया कार्यक्रमको आयोजना गरिएको थियो जसले आगामी दिनमा उक्त कार्यक्रमले तय गर्न पर्ने कृयाकलापहरुको बारेमा दिशानिर्देश गरेको थियो ।

गाई आनुसन्धानलाई अझ प्रभावकारी बनाउने हेतुले रामपुर चितवनमा निमार्ण कार्य सुरु गरिएको छ जसमध्ये दुईवटा गाई गोठ निमार्ण सम्पन्न प्राय भईसकेको छ भने अनुसन्धान प्रयोजनका लागि प्रयोगशाला भवन, अधिकृत स्तरका कर्मचारीका लागि आवास गृह, ट«याक्टर राख्ने घर, जेनेरेटर घर, गाई गोठका लागि यार्डको निमार्ण भइरहेको छ ।

EXECUTIVE SUMMARY

National Cattle Research Program (NCRP) is one among the various commodity programs under the Nepal Agricultural Research Council (NARC). Cattle are the major source of milk and draught power in Nepal. The commodity is prioritized by the Agricultural Prospective Plan (APP), Proposed Agriculture Development strategies (ADS) and other National Periodic Plans. Further, these Government Plans have spelled 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 2070/71 has conducted the 1) research in the area of early pregnancy diagnosis, development of strategies for reducing cost of milk production, identification serostatus 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 2070/71.

The feedback and inputs provided by different Regional Agriculture Technical Working Groups and National Agriculture Technical Working Groups have adequately indicated that significant resource in terms of finance and time are being wasted due to the lack of technology to diagnose the pregnancy in cows in time. Therefore a study to develop the technology for early pregnancy diagnosis using serum and milk as test media is underway. Likewise, similar fora and interactions with the stakeholders have indicated that farmers are in plight due to what they report is the cost of their unit milk and the price they get in the market. To address this ambiguity and to develop a strategy to reduce the cost of milk production has been initiated. The study studies factors associated with the cost of milk production across three agro-ecological zones and two production systems. Individual factors across these sections will be studied in detail and an amicable solution towards the development of strategy to reduce the cost of cow milk in these circumstances will be suggested. In addition, recent outbreak of FMD in different parts of the country has put experts in dilemma finally suspecting the efficacy of the FMD vaccine. A study is, therefore, initiated to monitor

the sero-status of FMD vaccination in order to explore the antibody titre of the vaccine with the aim to precisely workout the effective duration between two FMD vaccinations across RARS, Lumle farm, NCRP, Kumaltar farm and local farms around these farms.

As a regular program to support the dairy extension program 9 improved bulls have produced using the semen supplied by DCIP. Six bull were distributed to the farmers of Kavre, Lalitpur and Bhaktapur district. Farmers of these districts 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 have become very useful tool 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) is a national level research institution mandated to conduct research in cattle across the entire geological and political divisions of the country. Currently, the program owns a farm in Rampur, Chitwan which is market generally by the 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. However, the climatic and irrigation systems are different in Khumaltar, Lalitpur. The climate of Khumaltar is warm temperate to subtropical. Mostly the atmosphere is humid and the land occupancy of NCRP in Khumaltar is entirely rainfed. The irrigation system in the forage and pasture fields is yet to be developed.

The location of the farms both in Rampur and Khumaltar are market by their proximity to the prominent business areas namely Narayangarh and Kathmandu respectively. However, a greater extent of diversity exists between the local households of the vicinity. Rampur and Chitwan in general is chiefly marked by the dwellings of the farmers and a high level of agricultural activities are evident in the area. Chitwan in particular is marked in many instances the capital of poultry industry as well as the dairy industry. The volume of milk being collected and its contribution in terms of the supply of fluid milk to the national milk grid outstanding. Likewise, the establishment of, perhaps, the largest dairy processing unit (Chitawon Milk Pvt. Ltd) is a breakthrough in establishing the district as the leading dairy production and supplier to the national food security scenario.

In contrast, the neighborhood of Khumaltar farm is market by high economic activities but of industrial origin. The livelihood of the populations nearby Khumaltar is dominated by the income originated from the industrial and service sector. The contribution originating from the agriculture sector of the neighborhood and the entire Kathmandu valley is very less. Therefore, the impact of the program in the neighborhood is less than that outside the valley. However, the opportunity provided by the Khumaltar farm in investigating different facets of dairy cattle improvement in the hill condition is immense and can never be ignored.

Both locations have been marked by a number of common issues and challenges in terms of diseases and productivity limiting factors. The incidence of infertility in cattle regardless of the breed is perhaps the most limiting factors towards the improvement of the dairy cattle productivity. Likewise, the sporadic incidence of mastitis is yet another factor that has contributed to the low production from the lactating cows or the production of inferior quality of milk from them.

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 administratively located at Rampur of Chitwan district. Currently, it has amenities and farm facilities both at Rampur, Chitwan and Khumaltar, Lalitpur. The geospatial location of the program in Rampur Chitwan is 27°65' North and 84°35' East and in Khumaltar is between 27°40' North latitude and 85°20' East longitude with the elevation of 1360 masl. The facilities in Rampur is about 11 km from the city centre of Narayangarh. Likewise, the facilities in Khumaltar are about 7 km. South of Kathmandu and within a walking distance of 2 km. from the historical city of Patan.

As a component of NARC, it aims to contribute towards increasing the production and productivity of dairy sector 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, management, health, product processing and socioeconomic of the farming.

2.5 Current thrust area for research

National Cattle Research Program research is guided by the national need to meet the internal demand for the fluid milk and dairy derivatives. Similar approach will be followed to cater the similar needs outside the country with focus on the value addition to the raw milk produced within the country.

The current thrust are:

(a) Genetic improvement of cattle using the technology generated by DCIP

(b) Develop feeding strategies to reduce the cost of milk

(c) Identify the strategies to reduce the cost of milk production and

(d) Evaluate the efficacies of the vaccines for the effective management of economically important diseases of dairy cattle.

2.6 Infrastructure and facilities

The program has been recently undergone massive administrative changes following the decision made by the NARC council meeting for the appropriate relocation and establishment of the program that suits its growth other than the Kathmandu valley. Rampur of Chitwan has been deemed better in terms of the land that can be made available for the cattle research and the agro-ecological region of Chitwan. In addition, the impact the program can potentially have while scaling up the technologies generated on-station in Chitwan would have better coverage than anywhere else in the country. Therefore the amenities in Khumaltar are in the process of being relocated to Rampur. However, the current facilities and weather conditions in Khumaltar furnish NARC with the opportunity to research cattle in hill conditions. The unique climatic pattern and land utilization scheme is an avenue on which NARC should still research on especially the dairy sector.

The Rampur campus is being developed to function as a complete entity that can perform research and development in cattle nationwide. Currently, the dairy

processing unit with the facility to produce yoghurt, ghee, fluid milk, paneer and khoa are in the process of installation. Likewise, a mini laboratory to basic animal health parameters is also in operations. However, the facilities needed to equip the program with the laboratory to analyse feed and fodders is seriously lacking. Therefore, efforts have been made to allocate substantial financial resources to have a laboratory established in Rampur so that research for animal nutrition can be carried out without little or no hassle.

The research farm in Khumaltar, in contrast, is equipped with the basic infrastructures for cattle production and management. Two sheds to house dry and milking cows with the capacity to house around 100 cows. In addition, there exists the facility to house newly borne calves, weaned calves, heifers and pregnant cows.

The structure required to post-production of milk is in its primitive stage. A chilling vat with only paneer making facility has been established in Khumaltar. Large proportion of NCRP's revenue is still furnished by the sale of fluid milk. This has indicated towards the need of a state-of-the art dairy processing unit.

In support of the cattle farm, hay barn, feed store and dispensary have been established. The dispensary currently harbors the AI unit where frozen semen is processed before it is inseminated to the cow e.g. thawing, evaluation etc. Likewise, the farm also owns some land for fodder cultivation (both for winter and summer). Chiefly, Oat, Bajra, Sorghum, Berseem, Vetch and Maize are being cultivated for the purpose. Though the farm lacks irrigation networks across the farm, the deep tube well established couples of years ago and a pond serves the irrigation purpose whenever the farm is in the need of the water especially for forage cultivation. In addition, the program also owns some officer and shepherd quarters that helps out of office hours monitoring of the farm.

2.7 Organization structure and human resources

The program is coordinated by the National Program Coordinator. The coordinator is supported by other scientists, technical officers, technicians administrative staff as shown in Annex Table 1.

3. RESEARCH HIGHLIGHTS

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 2070/71 is given in annex.

3.1 Early Pregnancy Diagnosis in Cattle and buffalo by using Radio Immuno Assay /EIA 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., 2001; Youngquist, 1997).

International Atomic Energy Agency (IAEA) supported the project with the laboratory equipment of Radio Immuno Assay and Enzyme Immuno assay (EIA) at Animal Health Research Division (AHRD). However, the legal provisions that help the use of RIA is currently absent in the country. Therefore, the RIA kit was not sent by IAEA. Such support to continue to be received from IAEA as soon as the Nepal recognizes with required law the use of radioactive materials for the use in animal health.

So the proposal review panel suggested to follow EIA methodology for early pregnancy diagnosis in following year. Laboratory set up is completed at Animal Health Research. A one-day training on cattle health and management was carried out in Lele with the help of District Livestock Sub Service Center (DLSSC). Altogether 30 farmers both male and female were benefitted with training on heat management and AI services in cattle.

3.2 Study on Sero-status of FMD vaccine in cattle of Chitwan, Kaski and Lalitpur 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 current knowledge on management of FMD has been challenged by the lack of cross-immunity of these different strains. Emergence of novel strain like pan-asia 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 entirely on the imported vaccines. 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.

A total 20 blood serum samples were collected from livestock farm Jiri after the post vaccination of Foot and Mouth disease. Antibody titre of sample could not be measured because of change of protocol by the Proposal Review Panel to adopt an entirely different protocol for the study. Antibody titre measurement was supposed to be done after each month of post vaccination till six month but panel of proposal review suggested to measure the antibody of FMD each fifteen days after post vaccination till two month and in every month for up to six months.

3.3 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 microorganisms 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 micro aerophilic 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.

Milk samples were collected from Ilam and Chitwan District (milk cooperative) for bacterial analysis. The observation made during the analyses were Total Count (TC) done in Nutrient agar to calculate CFU/ml and Coliform count done in Eosin

Methylene Blue (EMB). The sample was diluted in 10 centrifuging tube with phosphate buffer saline. From the so diluted sample, 10^{-3},10^{-5} and 10^{-7} aliquots were taken and poured in the agar. In this way a single samples were poured in 3 petri dish for TC and 3 petri dish for Coliform count.

3.4 Development of Strategies for reducing cost of milk production

Dairy farmers throughout the country have been complaining since long time that the price they get for fluid milk when sold in formal sector is low compared to the cost of production. In every formal and informal platform, the issue of reducing cost of milk production has been raised. In contrast, we have been flatly recommending for adopting forage based production system to reduce cost of milk production. 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 in Ilam and Tanahu has been carried out. A total of 90 farmers in two districts were interviewed and information and observation relating to feeding, management and health operations were recorded. As much information as possible that incur some cost in terms of both cash and kind were attempted to be recorded in the questionnaire. There are more districts to be covered for this to make a comprehensive and meaningful conclusion from the study. A total of four other districts would be covered in the next round of survey surveying five farmers in each of the subsistence, commercial and non-commercial farmers in each representing districts.

In addition, the project team conducted a one-day interaction workshop in Rampur, Chitwan to discuss among the stakeholders the strategies to be adopted to reduce the cost of milk production in the context of Chitwan. Stakeholders and researchers from DLSO, Chitwan, Institute of Agriculture and Animal Sciences (TU), Agriculture and Forestry University, Rampur, Chitwan and representatives from leading cooperatives of Chitwan participated in the workshop. The workshops discussed and concluded working out factors attributing the cost of milk production in various production systems and agro-ecological regions of the country.

3.5 Cattle Herd Management and production Program

To promote cattle species in Nepal there is demands of suitable breeds for different agro ecological zone of the country. the review of past work reviled 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, Khumaltar 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.

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 Napier were grown for summer forage and Oat, Vetch, Clover for winter forage and fed to 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.

4. PRODUCTION

A total of 9 crossbred calves and 55,366 liters of milk were produced during the reporting period. Similarly 495 metric tons of green grass and 30 metric tons silage was produced and was used for animal feeding. Additionally, Oat seed were produced 1000. 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. A brief Production of Farm at the end of 2071/2072 is presented below:

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

SN	Description	GM Production (Mt)	Available GM (Mt)	Dry Matter (NDM%)	Total DM (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 = 350×3 = 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 =$945 \times 30 \times 6$=170100Kg = 170.1 Mt.DM

Therefore, almost half DM required for the year is obtained from green grass production and remaining requirement is fulfilled from straw and concentrate.

Table : Monthly Milk Production

Month (Shrawan 070-Asad 71)	Total Milk Production (kg)
Shrawan , 2070	7025
Bhadra, 2070	6086
Aswin, 2070	5704
kartik, 2070	4513
Marg, 2070	3404
Paush, 2070	3008
Magh, 2070	3041
Falgun, ,2070	4334
Chaitra, 2070	4641
Baisakh ,2071	4417
Jestha, 2071	4666
Ashad, 2071	4527
Total	**55366**

Table : Calf Production and distribution

Calves	Male	Female	Total
Produced	5	4	9
Distributed	8		8

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 2070/71 two training on cattle health management and clean milk production was conducted at Lele of Lalitpur district and Chitwan. Thirty participant farmer of Lele and twenty participant farmer were benefitted with this one day training. District Livestock Service centre helped to conduct the training by selecting the farmers and facilitating in the training. Similarly one day workshop/meeting on development of strategies for reducing cost of milk production was done at Chitwan.

5.2 Service

Technical Briefing to the farmers students, extension officials co-operatives farmers group, NGOs were done on cattle and buffalo husbandry practices. At least 2000 people were benefitted through our counselling and farm observation

5.3 Publications

Revised book on improved cattle and buffalo husbandry technology was published and this book is on sale at NRs 200. It is also one of the source of revenue collection for NCRP. Similarly Annual report of 2069/70 was also published.

5.4 Information through media:

(1) Newspaper: Abhiyan: Dairy cattle (The Himalayan times) (2) FM: Ujyalo 90 Network.

5.5 Visit:

At least 2000 people (including farmers, students INGO and NGO Cooperatives) consulted to learn improved technology on cattle and buffalo husbandry. Dr. Anjay Sah, Dr. Rupa Bastola and Dr. Binay Shrestha were directly involved in consultation.

5.6 Fair and Exhibitions

NCRP actively participated on the exhibition on NARC day. A stall of NCRP was maintained on Khumaltar premises with the provision for observation and briefing of different technologies available. During exhibition milking machine was highly admired by a large number. of observer.

6. OTHER ACHIEVEMENTS

6.1 Seminar, workshop, scientific visit:

Visit to Michigan State University on Short term course on Animal Agriculture Best Practice Dairy value Chain for 2 week by Dr. Rupa Bastola (Technical officer, NCRP) organized by Michigan State University and Dr. Binay Shrestha (Technical Officer T6) and Dr. Anjay Sah (Scientist S1) participated in two weeks Meat Inspection Training organized by Directorate of Livestock Services Training Extension and communication Hariharbhawan, Lalitpur

7. BUDGET AND EXPENDITURE

Compared to the previous year's budget made available to NCRP, this year's resources were relatively satisfactory. However, the resource when compared to the thrust of the council to relocate the program in full fledged national level program is far below its expectations. The financial resources required to complete a variety of sheds in Rampur requires a substantial amount of financial resources for construction under the capital heading. Likewise, similar resources are required to build up the laboratories and other structures in Rampur. In Khumaltar, the research work related to feeding/nutrition, breeding and health were supported by the respective disciplinary divisions. However, such facilities are not available in Rampur and should be internally managed.

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 career development opportunities and encouragement for the staff.
10. Insufficient land for operating the Cattle research program at Rampur, Chitwan.

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 dairy cattle 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 Upgrade the native 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 dairy cattle 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, Black Quarter etc.

10. ANNEXES

Annex 1.1. : Map of Command Area

Annex 2.1 : Map of the Office/Station

Annex 2.2 : List of Laboratory Facilities

SN	Name of laboratory	Major instruments	Manpower in laboratory	Testing facilities
1	Dairy Laboratory	Lacto-scanner	Technical Assistant	Milk Quality
2	AI Laboratory	AI Gun, Refree	Technical Assistant	Pregnancy test

Annex 2.3: Human Resource in 2071/72 (2013/14)

S.N.	Name	Designation	Qualification	Specialization/Working area
1	Mr. Tulasi P. Paudel	Coordinator (S3)	MSc	LPPM
2	Mr. Purna B. Chapagain	Senior Scientist (S3)	MSc	LPPM
3	Dr. Anjay K. Sah	Scientist (S1)	MVSc	Animal Breeding
4	Mr. Narayan Hamal	Technical Officer (T6)	I. Sc. Ag.	Pasture
5	Dr. Rupa Bastola	Tech .Officer (T6)	B.V. Sc & AH	LPPM
6	Dr. Binay Shrestha	Tech .Officer (T6)	B.V. Sc & AH	LPPM
7	Mr Shree R. Shrestha	Account Officer (A6)	I Com.	
8	Mr. Buddhi R. Acharya	Technical Officer	BSc.Ag	LPPM
9	Ms. Susma Devi Subedi	Tech (T5)		
10	Mr Bharat B. Kharti	Tech. (T5)	V	
11	Mr Shanu Kaji Raut	Tech. (T5)	VIII	
12	Mr. Madav P. Chalise	Tech. (T5)		
13	Mr. Lila R. Pathak	Tech. (T5)		
14	Mr Ram B. Khatri	Tech. (T4)		
15	Mr. Jib Raj Bhusal	Tech. (T4)		
16	Mr. Buddhi R. Chaudhary	Tech. (T4)		
17	Mr. Shyam P. Lamichhane	Tech. (T5)		
18	Mr. Ram B. Maharjan	Tech. (T5)		
19	Mr.Sanu Babu Mahat	Tech. (T5)		
20	Mr. Bhim B. Deula	Tech. (T5)	Literate	
21	Mr. Prakash Maharjan	Tech. (T4)		
22	Mr. Krishna B. Thapa	Tech. (T4)		
23	Mr. Thala B. Shilwal	Tech. (T4)		
24	Mr. Krishna B. Pandey	Tech. (T4)		
25	Mr. Chhiring Tamang	Tech. (T4)		
26	Mr. Maite Tamang	Tech. (T3)	Literate	
27	Ms. Parbati Khatri	Tech. (T3)	Literate	

Annex 3.1: Summary of NARC Research Projects and Activities in 2070/71 (2013/14)

Project code number	Name of project/activity	Project/Activity leader	End year	Budget allocated for this year
41670007	**Early Pregnancy diagnosis in Cattle and Buffalo by using Radio Immuno Essay (RIA) and EIA technology**	**Dr. Rupa Bastola**	**2073**	**220**
Activity 1	Site Visits: Site selection and Farmer selection (1)			50
Activity 2	Baseline data collection on participating farmers (2)			55
Activity 3	Follow up of the results (2)			50
Activity 4	Training to farmers for heat detection / pregnancy diagnosis (2)			65
41670005	**Clean milk production in relation to dairy**	**Dr. Binay Shrestha**	**2073**	**395**
Activity 1 .	Site and experimental animal identification(2)			80
Activity 2	Training to the dairy farmer (2)			85
Activity 3	Evaluation of milk sample for bacterial count(3)			230
41670004	**Development of strategies for reducing cost of milk production**	**Tulasi P Paudel**		**485**
Activity 1	Site and farm selection (IFCN Methodology) (2)			10
Activity 2	In depth study on cost of milk production on selected sites farms (3)			205
Activity 3	Interaction with stakeholders (3)			45
Activity 4	Publication of technical on dairy animal (3)			225
41670003	**Study on sero status of FMD vaccinating in cattle of Jiri and Khumaltar farmers**	**Dr. Binay Shrestha**	**2074**	**530**
Activity 1	Selection of farms and tagging of animals (1)			30

Activity 2	Vaccination of the selected animals (3)			370
Activity 3	Assay of serum from vaccinated animals every 30 days for 6 months (3)			130
41644001	**Cattle herd management and production program**	**Tulasi P Paudel**	**Core**	**7150**
Activity 1	Milk Production, Handling and Selling			4075
Activity 2	Calf Production			3075

Annex 4.2 : Distribution of (commodity/product) in FY 2068/69

SN	Commodity/ product	Type (Breeder/Foundation, Blood level)	Quantity	Major stakeholder(s)	Distributed districts
1	Male Calf	Jersey Cross, Holstein cross		Farmers NGOs	Bhaktapur, Lalitpur Kavre

Annex 5.1 : Training/Workshop/Seminar Organized in FY 2068/69 (2011/12)

SN	Name of Training/ Workshop/ Seminar	Duration	Target group	Location	No. of participants
1	Cattle Management Training	1 day	Farmers	Lele, Lalitpur	30
2	Clean Milk Production	1 day	Farmers	Chitwan	25

Annex 5.2 : Services Provided in FY 2068/69 (2011/12)

SN	Laboratory/field test/ counseling services provided	Numbers	Major clients
1	Farm Observation and technical briefing to farmers	More than 2000	Farmers, students, Entrepreneurs, Extension officials, NGOs

Annex 5.3 : Publications in FY 2068/69 (2011/12)

SN	Name of publications	Type *	Language	Authors	No. of copies
1	Cattle and Buffalo Husbandry Technology	Book (Revised)	Nepali	NCRP	200
2	Annual Report	Book	English	NCRP	200

**Books, leaflet, brochure, manuals, pamphlets, audio visual etc*

Annex 5.4 : Information Disseminated Through Media

SN	Information disseminated/ Media coverage	Type*	Name/ Type of media
1	Cattle Management	Interview	TV (Nepal Television)
2	Current trends in Cattle Research and Development	Interview	Himalayan TV

**news, interview, feature article, feature story, case story etc.*

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	few	Kathmandu, Lalitpur	Cattle husbandry practices
4	NGOs officials	few	Kathmandu, Lalitpur	Cattle husbandry practices
5	Student	more than 500	HICAST , IAAS, Technical school	Farm visit, Cattle husbandry practices

Annex 6.1: Training/Workshop/Seminar Attended by Staff in FY 2070/71 (2013/2014)

SN	Name of staff	Position	Name of Training/ seminar/ workshop	Duration	Place/ Country	Organizer
1	Dr. Rupa Bastola	Technical officer	Dairy Value Chain	2 weeks	Michigan , USA	Michigan State University
2	Dr. Binay Shrestha	Technical officer	Meat Inspection training	2 weeks	Hariharb hawan	Directorate of Livestock Training and Extension
3	Dr. Anjay Sah	Scientist	Meat Inspection Training	2 weeks	Hariharb hawan	Directorate of Livestock Training and Extension

Annex 7.1: Regular Annual Budget and Expenditure Record of FY 2070/71(2013/14)

(in 000 Nepalese Rupees)

Code	Budget Heads	Annual budget	Budget released	Expenses	Balance
40*	**Staff expenses**	**7180000.0**	**7050000.0**	**7046855.77**	**3144.23**
4000	Staff Basic Salary	5600000.0	5555000.0	5554017.17	982.83
4010	Staff Allowance	300000.0	286000.0	286000.0	0.0
4020	Staff Provident Fund	560000.0	534000.0	533683.60	316.40
4030	Staff Medical Expenses				
4040	Staff Uniform Expenses	200000.0	202500.0	202500.0	0.0
4050	Staff Dashain Expenses	450000.0	414500.0	413455.0	1045.0
4060	Staff Overtime Expenses				
4070	Staff Pension & gratuity				
4080	Insurance Fund	70000.0	58000.0	57200.0	800.0
41**	**Operational expenses**	**10755000.0**	**1135500.0**	**11323993.39**	**31006.61**
4100	Travel Expenses	435000.0	510000.0	492913.0	17087.0
4110	Vehicle Fuel & Lubricants Cost	355000.0	400000.0	399586.63	413.37
4120	Wages to Labour Cost	3025000.0	3005000.0	2999941.0	5059.0
4130	Laboratory and Research Supplies Cost	570000.0	525000.0	522381.05	2618.95
4140	Farm Supplies Cost	5030000.0	5608000.0	55607962.06	37.94
4150	Books, Journal & Publications	305000.0	315500.0	315221.0	279.0
4160	Training & Seminar Cost	85000.0	85000.0	79726.0	5274.0
4170	Contract & Collaborative Research				
4180	Farm Management Project Cost	950000.0	906500.0	906262.65	237.37
42**	**Administrative expenses**	**2025000.0**	**2025000.0**	**1914378.95**	**110621.05**
4200	Rent, Utilities & Other Expenses	800000.0	788750.0	771149.30	17600.70
4210	Communication Expenses	120000.0	100500.0	83905.68	16594.32
4220	Repairs & Maintenance Cost	900000.0	900000.0	823732.97	76267.03
4230	Stationary, Printing & Office Supplies	130000.0	149500.0	149441.0	59.0
4240	Board and Panel Meeting Cost				
4250	Recruitment Expenses				
4260	Contingency Expenses	75000.0	86250.0	86150.0	100.0
4270	Office Furnishing Cost				

4280	Other Administrative Expenditure				
43	**Capital expenses**	**15470000.0**	**17065000.0**	**16548712.25**	**516287.75**
4300	Freehold Land Cost				
4310	Land and Land Development Cost				
4320	Building & Other Construction Cost	15000000.0	15000000.0	14485169.25	514830.75
4330	Furniture & Fixture Cost				
4340	Machinery Tools & Equipment Cost	300000.0	1680000.0	1679505.0	495.0
4350	Vehicles Cost				
4360	Computer & Computer Accessories Cost	120000.0	310000.0	309048.0	952.0
4370	Other Fixed Assets	50000.0	75000.0	74990.0	10.0
	Grand Total	**35430000.0**	**37495000.0**	**36833940.40**	**661059.60**

Annex 7.2 : Revenue Status of FY 2070/71(2013/14)

(in Nepalese Rupees)

SN	Sources	Total	Remark
1	Milk Sale	2770662	
2	Male calf Sale	20000	
3	Manure sale	103766	
4	Administrative	119600	
	Total	3014028	

Annex 7.3 : Beruju Status of FY 2070/71(2013/14)

Beruju	Amount	Remarks
Beruju till last year	**9636398.43**	
Beruju cleared this FY	**21373.92**	
Remaining Beruju	**9615024.51**	
Document processed for clearance of Beruju	**7437850**	

Annex 7.4 : Annual Budget and Expenditure (NRs 000) of FY 2070/71(2013/14)

S.N.	Budget heads	Annual Budget	Annual Expenditure	Percentage Expenses
1	Salary Expenses	7050.000	746.855	99.96
2	Program Expenses	11355	11322.993	99.73
3	Office Expenses	2025	1914.375	94.54
4	Capital Expenses	17065.000	96548.712	96.97
	Total	37495.000	36833.940	98.24

Human Resources at NCRP

SN	Post	Group	Number of post	Post fulfilled	In	Out	Vacant Post
1	Principal Scientist	Livestock Product Production & Management	1				
2.	Senior scientist	Livestock Product Production Management	1	2			
3.	Scientist	Livestock Product Production Management	3	1			2
4	Senior Technical Officer	Livestock Product Production Management	2				2
5	Technical officer	Livestock Product Production Management	2	3			
6	Account officer	Admin & Finance	1	1			
7	Admin officer	Admin	1	1			
8	Technician	Technical	15				
9	Technical Assistant	Technical	1				
10	Admin Asst	Admin	2				
11	Driver Heavy	Admin	1	1			
12	Driver light	Admin	1	1			
	Total						

Note: Some Personnel were in on deputation and in and out during the 2070/71

सूचना

मिति २०७०/०७/१०

Real Time basis मा रसायनिक मलको मौज्दात र तरकारीहरुको थोक तथा खुद्रा मुल्यको जानकारी लिन सकिने बारे ।

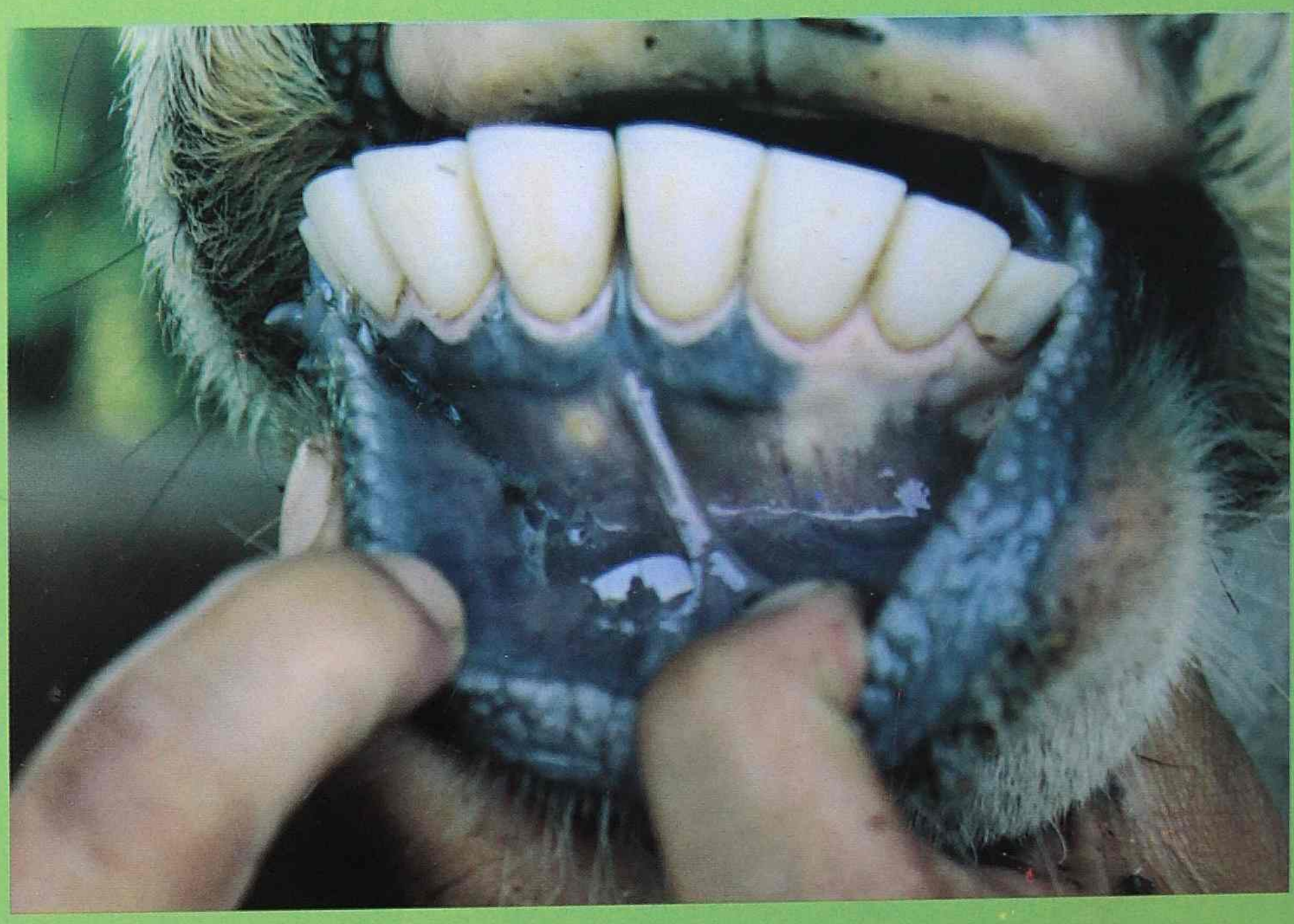
कृषि विकास मन्त्रालयले आधुनिक सूचना प्रविधिको उपयोग गरी देशभर कृषि सामग्री कम्पनी अन्तर्गत डिपोहरुमा भएका मल बिक्री तथा मौज्दात विवरण र विभिन्न कृषि थोक बजारहरुमा कायम भएका तरकारीहरुको थोक तथा खुद्रा मूल्य Real Time basis मा On line मार्फत सम्बन्धित सबैले जानकारी लिन सकिने गरी व्यवस्था मिलाएको छ । मल बिक्रि तथा मौज्दात विवरण हेर्न सर्वसाधरणले aicl.f1soft.com.np मा log on गरी Fertilizer Sale and Stock मा Click गर्नु पर्ने छ भने तरकारीहरुको विभिन्न थोक बजारहरुको तुलनात्मक थोक तथा खुद्रा मुल्य हेर्न agribiz.gov.np नामको Web site मा गई market information of selected whole sale market मा Click गरी आएको डाइलग बक्समा All market-Price को Button मा Click गरे पछि सम्पूर्ण मुल्यहरु हेर्न सकिने छ ।

यस सूचना प्रविधिबाट सम्बन्धित सबैले Real Time basis मा महत्वपूर्ण जानकारी हासिल गर्न सक्ने छन् । मन्त्रालयले अझ यस प्रविधिलाई कृषक मैत्री बनाउन SMS मार्फत पनि जानकारी लिन सकिने गरी व्यवस्था मिलाउन लागिएको व्यहोरा समेत अनुरोध गर्दछु ।

Participants of Clean Milk Production Training in Chitwan

NARC team monitoring the progress in cattle shed in Rampur

NARC team assessing the land requirement for NCRP in Rampur



Veterinarian Monitoring the Incidence of FMD in NCRP, Rampur