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# HICAST RESEARCH ABSTRACTS

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**Himalayan College of Agricultural Sciences and Technology**  
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# **HICAST RESEARCH ABSTRACT S 2014, volume 4**

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## Foreword

Himalayan College of Agricultural Sciences and Technology (HICAST) has been conducting academic programmes in affiliation with Purbanchal University since 2000. Both the bachelor and master degree students must conduct field- and/or laboratory-based research, write and submit thesis based on research findings as partial requirement for obtaining the degree the student is enrolled to. Without being properly and timely published, these research findings cannot reach to wider readership, and continue to remain as decorative materials in the book shelves of the library. Realizing the importance of widely circulating at least the abstracts of those researches an attempt was initiated by us to publish the thesis research abstracts annually.

This publication is a collection of abstracts of thesis researches conducted in 2013. This is the fourth volume of this journal. Relevant thesis can be consulted at HICAST Library for more information.

This publication has four chapters, viz. horticulture, plant protection, agri-economics and business management, and veterinary sciences. This division is based on the departments the papers fall within.

It is hoped that the publication will be useful for the students, researchers, teachers, policy makers and development workers. It is the publication that each student of agriculture and veterinary science should possess and read.

Binayak P Rajbhandari, PhD  
Executive Chairperson

# Table of Contents

## 1. Horticulture (pp 9-19)

Impact of Off-Season Vegetable Production in Income and Employment Generation in Kathmandu Valley - Rinku Das

Riverbed Farming and its Role in Income Generation and Poverty Reduction in Kamala Riverbed (Siraha and Dhanusha District) - Kumar Mani Dahal

Effect of Black Plastic Mulch on Growth, Yield and Fruit Quality of Tomato (*Lycopersicon esculentum* L.) under Drip Irrigation System - Keshav Gaire

Vegetable Production Under Plastic Cover in Bhaktapur District of Nepal - Shambhu Chaudhary

Effect of Organic Nutrients Management on Growth and Yield of Cucumber (*Cucumis sativus*) and its Residual Effect on Soil - Bishnu Sapkota

Impact of Eco-village Approach on Socio-economic, Ecological and Technological Changes of Targeted Communities in Udayapur District - Seeta Paudel

Effect of Bio-intensive Vegetable Growing on Nutritional Status of Women and Children as well as on Soil Fertility in Dang District - Ranjana K.C.

Study on Post-Harvest Practices and Value Added Products of Banana in Kailali District - Rakesh Jung Shah

A Study on Large Cardamom Management Practices in Dhankuta District - Pemba Sherpa

Production Practices and Problems of Mango Cultivation in Three VDCs of Rupandehi District - Dipendra Chaudhary

Production Practices and Problems of Litchi Cultivation in Sarlahi District - Tejendra Chaudhary

Comparative Study on Vegetable Production under Organic and Conventional Farming System in Kathmandu Valley - Anup Bam

Evaluation of Yield Performance and Vase life Study of Gerbera (*Gerbera jamesonii*, Hook) - Ganesh Shiwakoti

Post Harvest Practices of Bael (*Aegle marmelos* L. Correa) and its role in income generation in Bardiya District - Eak Raj Oli

Postharvest Handling of Tomato (*Lycopersicon esculentum*) in Kapurkot and Mulpani Pocket Areas of Salyan District - Bharat Bikram Rawat

## **2. Plant Protection (pp 20-27)**

Efficacy of *Metarhizium anisopliae* to White Grubs and Comparative Study on the Effectiveness of Pest Management Practices between IPM and Non IPM Farmers Groups in Latikoili VDC, Surkhet District - Hem Raj K.C.

Effectiveness of *Trichoderma viride* against *Fusarium* Wilt in Tomato and Pest Management Practices in Mahadevsthan VDC in Kavre District - Himal Bhusal

Major Insect Pests of Cucurbits and their Management Practices under Bio-Intensive Farming System - Jyoti K.C.

Efficacy of *Bacillus thuringiensis* against *Spodoptera litura* under laboratory condition and study on vegetable pest management in Bhaktapur district - Susmita Thapa

Study on Efficacy of Locally Available Plant Materials against Maize Weevil *Sitophilus zeamais* (Motsch) and Grain Moth *Sitotorga cerealella* (Oliver) in Maize Storage - Madhu Sudan Acharya

Major Crop Pests and Diseases, and their Management Practices in Bhadrakali VDC, Sindhuli - Pabitra Bardewa

Knowledge and Practices of IPM Farmers in Summer Vegetable Crops at Kushadevi VDC of Kavrepalanchowk District - Subeksha Shrestha

Disease Management Methods Adopted by Commercial Organic and Conventional Vegetable Farmers in Kathmandu Valley - Sajish Prajapati

Evaluation of Wheat Varieties/Genotypes and Monitoring of Wheat Rust Diseases- Rajan Shrestha

Survey and Surveillance of Wheat and Barley Diseases in Kathmandu Valley - Prajwal Karkee

### **3. Agri-Economics and Business Management (pp 28-35)**

Economics of Riverbed Farming a Case Study at Bank of Rapti in Phatepur, Haliya and Kamali VDC of Banke District - Pashupati Singh

A Comparative Economics of Major Vegetable and Cereal Seed Production in Surkhet District - Tilak Pandey

Economics of Chiraito and its Problems in Sankhuwasava and Bhojpur District - Jwolant Bhattarai

An Analysis of Economic and Marketing Dynamics of Chiuri and Chiuri Products: A Case Study of Jajarkot District of Nepal - Krishna Bhatta

Comparative Economics of Organic and Conventional Vegetable Farming in Kathmandu Valley - Kamal Shrestha

Economics of Capsicum Production in Chitwan District - Suresh Gharti Magar

Analysis of Marketing and Potentiality of Chiury Honey in Jajarkot District of Nepal - Hari Prasad Sharma

Assessment of The Socio-Economic Status of Youth Engaged in Agro-Based Micro-Enterprises on Kavre District - Niranjana Pandey

Assessment of Small Holders Farming Towards Commercialization in Sindhupalchowk District - Jeevan Aryal

Impact of Micro Irrigation Technology on Socio-economic Status of Strawberry Growers in Nuwakot District - Neha Thapa

A Study on Production and Marketing of Strawberry (*Fragaria spp.*) in Nuwakot District - Ashmita Rijal

### **4. Veterinary Sciences (pp 36-49)**

Pig and Human Sero-Survey and Risk Factor Assessment for Japanese Encephalitis in Rupandehi and Kapilvastu Districts of Nepal - Shristi Ghimire

Animal Cruelty, Criminology and Prosecution: An Assessment on Animal Abuse and Animal Law in Nepal - Prabhakar Kumar Shah

Study on Quality Parameters of Semen and Artificial Insemination in Goat - Mukesh Panjiyar

Sero-prevalence Study of Brucellosis in Dairy Cattle of Kapilvastu and Bhaktapur Districts - Santosh Thapa Chhetri

Sero-prevalence of Leptospiral Infection in Canine Population of Kathmandu Valley - Mahesh Thakur

Prevalence of Gastrointestinal Parasites in Captive Carnivora and Artiodactyla in Central Zoo and Their Comparative Analysis - Roshika Shrestha

Comparison of Different Indirect Tests with Culture for the Detection of Subclinical Mastitis in Dairy Cows and Buffaloes - Navodita Malla

Prevalence of *Eimeria* in Kids of Dang District - Manoj Oli

Prevalence of Helminth Parasites in Goats of Rukum District - Rup Narayan Shrestha

Comparative Study On The Prevalence of Helminth Infestation in Wild Water Buffalo (*Bubalus bubalis arnee*) and Domestic Buffalo (*Bubalus bubalis*) in The Buffer Zone of Koshi Tappu Wildlife Reserve - Bhim Raj Karki

Prevalence of Gastro-intestinal Nematodal infection in Piglets of Kathmandu Valley - Bijaya Ghimire

Study on Prevalence of Gastro-intestinal Helminths of Equines in Kathmandu Valley - Rabin Ghimire

Survey on Stress Among Registered Veterinarians of Nepal - Suraj Dangi

Seroprevalence of Echinococcosis in Slaughtered Buffaloes of Kathmandu District - Bhupendra Khaniya

Impact of Climate Change on Livestock Production and Health and Adaptation Measures Adopted by Farmers of Lamjung Districts - Rakesh Kumar Thakur

Seroprevalence of *Toxoplasma gondii* in Slaughtered Pigs in Kathmandu Valley - Krishna Chandra Ojha

Prevalence of Gastro-Intestinal Nematodes in Calves of Chitwan District- Tulsi Pandey

Prevalence of Haemoprotozoan parasites in clinical cases of Dog - Indra Narayan Ray)

Study on Prevalence of Ectoparasitic Infestation in Skin Problematic Dogs of Lalitpur District - Ram Bahadur Bogati

Survey on Good Hygiene Practices in Retail Meat Shops in Butwal Municipality - Bivek Ghimire

Prevalence of *Neoascaris Vitulorum* in Cattle and Buffalo Calves of Kamalamai Municipality of Sindhuli District - Manoj Shrestha

An Investigation on Gastro-Intestinal Helminths of Pet Puppies in Kathmandu Valley and Knowledge, Attitude and Practice Survey of Pet Owners - Sandhya Bista

Comparative Study of *Cryptosporidium* Infestation in Wild Water Buffaloes (*Bubalus arnee*) and Domestic Buffaloes (*Bubalus bubalis*) of Koshi Tappu Wildlife Reserve -Pramesh Chalise



## **1.Horticulture**

### **Impact of Off-Season Vegetable Production in Income and Employment Generation in Kathmandu Valley**

**Rinku Das**

The study was conducted to see the impact of off-season vegetable production in income and employment generation in Kathmandu Valley. The off-season vegetable production started 6 years ago at the study area. Farmers produced different types of vegetables in their farms, where higher incomes were obtained from tomatoes and cauliflower. The main vegetables produced, as off-season was cauliflower and tomato. The farmers of three districts engaged in off-season vegetable production were 76 percent male and 24 percent were female. Female farmers were less as compare to male. The production of income from off-season vegetable was more than Rs.40000 per ropani. The employment of male in the study areas was 55 percent and female was found 45 percent. Home manpower was 42.90 percent and outsider manpower was found 57.09 percent. Off-season vegetable was inspired by NGOs. The literacy status of the farmers was high. 93 percent respondents were found literate and only 7 percent respondents were illiterate. The respondents in the study areas choose the off-season vegetable farming due to high income and employment from the off-season vegetables than the other cereals and normal season vegetables. The respondents in the study areas used mainly hybrid seed. Major problem faced by the farmers was irrigation.

### **Riverbed Farming and its Role in Income Generation and Poverty Reduction in Kamala Riverbed (Siraha and Dhanusha District)**

**Kumar Mani Dahal**

Riverbed Farming and its Role in Income Generation and Poverty Reduction in Kamala Riverbed (Siraha and Dhanusha District)” was carried out at Raghunathpur VDC in Dhankuta, Bhokraha and Chikna VDCs in Siraha district in May 2013. The study includes 100 farmers involved in riverbed farming. Those families were landless and land poor, which came to know at the time of study. Majority of farmers grows vegetable in 2 kattha of land. Farmers grow cucurbit species on riverbed areas. The average vegetable production was found 25.87 t/h, 19.2 t/h and 15 t/h on the crop watermelon, cucumber and bitter gourd respectively. The average income per household from 2 kattha of riverbed vegetable farming was found NRs. 28666.67 with average net profit was found

NRs. 15660.0 The average cost of production per kg was found NRs. 8.78. Average benefit cost ratio of riverbed vegetable farming was found 1.21. The highest benefit cost ratio of 1.71 was found in cultivation of Watermelon. Riverbed farming provides the employment opportunity to the two members of each family in every season. After the involvement in riverbed farming farmers improved the livelihood status, mainly in the food security, health of the family, child education and saving. Crops damage by wild animals, pre-monsoon floods and insect pests are major constraints to riverbed vegetable farming. The profitability from riverbed farming is low due to low productivity and high cost of production of vegetables in comparison to conventional farming.

## **Effect of Black Plastic Mulch on Growth, Yield and Fruit Quality of Tomato (*Lycopersicon esculentum* L.) under Drip Irrigation System**

**Keshav Gaire**

The present investigation entitled “Effect of Black Plastic Mulch on Growth, Yield and Fruit Quality of Tomato (*Lycopersicon esculentum* L.) Under Drip Irrigation System” was undertaken in the Agriculture farm of MaHa Agriculture Pvt. Ltd. at Jitpur Phedi, Kathmandu, Nepal from March to July 2013. The experimental plants were subjected to two polyhouses managed with drip irrigation system, one covered with black plastic mulch and another without it. Relevant data on plant growth and yield were recorded each week. Higher plant height was observed in the field covered with black plastic mulch in every week (228.84 cm in 91 Days after transplanting (DAT)) and the increment in the height was in increasing trend. The plants subjected to black plastic mulch showed early flowering (25.04 DAT), fruiting (40.18 DAT) and ripening (59.22 DAT) the fruits. Total number of flowers and fruits per plant were also found higher in the black plastic mulched field resulting into higher yield. Total fruit yield per plant was found higher (2.24 kg) in the black plastic mulched field as compared to the un-mulched field (1.20 kg) till 91 DAT. The fruits collected from the black plastic mulched field had larger fruit diameter (4.65 cm), fruit weight (47.96 g) and TSS content (4.8<sup>0</sup>B) as compared to the un-mulched field. Soil moisture content of the mulched field was found higher (13.64 %) as compared to the un-mulched field. Weed population was observed higher (15.20/25cm<sup>2</sup>) in the un-mulched field where as it was almost negligible (1.50) in the mulched field.

# **Vegetable Production under Plastic Cover in Bhaktapur District of Nepal**

**Shambhu Chaudhary**

The main objective of this study was to assess the different aspects of the vegetable production under plastic cover in Bhaktapur District of Nepal. Household survey was carried out during 5<sup>th</sup> June to 7<sup>th</sup> July 2013 A.D. 100 farmers, randomly but purposively selected from Madhyapur Thimi Municipality, Duwakot and Bageshwori VDCs of the district were interviewed. Socio-demographic studies revealed that of male farmers (80%) were involved more in vegetable production under plastic cover as compared to female (20%). Average family size was found 5.24 ( $\approx 5$ ). Agriculture was found as major occupation (90%) of the people. Land holding size was 0.09 vs. 0.80 ha. Vegetable farming under plastic cover has been started from 11.12 years with the influence of neighbors (55%). Tomato, cauliflower, cucumber and capsicum were major vegetable crops but area under tomato (13.35 ropani per year) was higher than that of other crops. The average size of the plastic cover was 180 m<sup>3</sup> (15.73 m  $\times$  4.81 m  $\times$  2.38 m). Along with cultural practices, reconstruction of structure and replacement of plastics were the major activities performed by farmers in about every 2 years. Only 2 % farmers measured temperature inside of plastic cover regularly. The impact on yield (73%), easier weed management (73%) and easy to perform intercultural operations (66%), were perceived by farmers as positive impact of plastic cover. However, most of the farmers reported difficulties in insect pest management (59 %) and soil fertility maintenance (47%) under plastic cover. Major advantages were easy technique for off season vegetable production and increase in production, etc. while major disadvantages reported were difficult to manage soil fertility, higher occurrence of disease, etc. under plastic cover.

## **Effect of Organic Nutrients Management on Growth and Yield of Cucumber (*Cucumis sativus*) and its Residual Effect on Soil**

**Bishnu Sapkota**

The present investigation “Effect of Organic Nutrients Management on Growth and Yield of Cucumber (*Cucumis Sativus*) and its Residual Effect on Soil” was undertaken in the Farmers field of Setidevi-VDC, Pharping during the month of May- August 2013. The study consists of 6 treatments viz. T<sub>1</sub> (12 ton/ha FYM), T<sub>2</sub> (5ton/ha Poultry Manure), T<sub>3</sub> (4 ton/ha Vermi-compost), T<sub>4</sub> (½ Vermi-compost + ½ Vermi-compost), T<sub>5</sub> (1/2 vermi-compost + ½ FYM) and T<sub>6</sub> (Control). The experiment was laid out on Randomized Complete Block Design (RCBD) with

three replications. All the treatments were applied in the month of May. In this study, Growth parameter such as maximum number of female flower, days to first flowering, number of branches observed with treatment T<sub>5</sub>. Application of T<sub>1</sub> treatment is effective in improving number of male flower, male and female flower ratio. Yield parameter such as number of fruits per plant, number of fruits per plot, number of fruits per hectare, average fruits weight, yield per plant, yield per plot and yield per hectare were observed with the treatment T<sub>5</sub>. The pH value was near to neutral in treatment T<sub>2</sub>. Similarly, the maximum organic matter percentage and soil available nitrogen were observed with treatment T<sub>3</sub>. The highest available phosphorus and potassium were found in treatment T<sub>2</sub>.

## **Impact of Eco-village Approach on Socio-economic, Ecological and Technological Changes of Targeted Communities in Udayapur District**

**Seeta Paudel**

Eco-villages are social groups residing in the settlements with sustainable living approaches. This group promotes realistic solutions and management of natural resources in a sustainable way. The study was conducted in Udayapur district during June to August 2013 to assess the situation of targeted communities before and after implementation of eco-village approach. Targeted communities in the study areas included Danuwar, Chaudhari, Brahmin and Chhetri therefore to examine the relationship between eco-villages and sustainability. A total of 100 households were selected for the study from four eco-villages namely: Hadiya, Baireni, Uttraitole and Chaukibari. Random sampling method was followed for selecting samples from the study areas. The households depending on agriculture were found doing seasonal vegetable farming as major occupation. Only about 49 percent of the households were found to be food secure throughout the year. The major social changes were VAW, sanitation and hygiene, women's decision-making power and involvement in-group meeting. About 42 percent of the household had no access over irrigation. The major technological changes were soil fertility maintenance, pest\disease management technique, alternative energy sources (Bio-gas, solar energy), as eco-village is based on participatory approach, the study revealed drastic change in leadership after involvement in meeting, decreased discrimination against male and female children. The study revealed that, there was positive impact of such program and people of study areas were found aware about ecology protection, soil fertility maintenance and use of alternative energy sources. The study shows that there is an improvement in socio-economic, ecological and technological aspects of targeted communities.

## **Effect of Bio-intensive Vegetable Growing on Nutritional Status of Women and Children as well as on Soil Fertility in Dang District**

**Ranjana K.C.**

The study on “Effect of bio-intensive vegetable growing on nutritional status of women and children as well as soil fertility in Dang district” Was conducted to analyze and document the changes to assess the extent of social and economic changes as an impact of bio-intensive farming system (BIFS). A study was conducted from May 6 to September 16; 2013. The study was conducted in 5 VDCs namely Tarigaun, Manpur, Urahari, Hekuli, and Shreegaun of dang district were selected for study. The Stratified random sampling technique was used for selecting respondents. The total sample size was 100 households. The study exposed that large numbers of respondents were applying BIFS. Trend of vegetable cultivation, use of compost and farmyard manure, use of botanical pesticides and attractants for pest /disease management are the changes. The positive role being played by BIFS related support program in the dang district and also positive role played by BIFS in the nutritional status of women and children as well as soil fertility and raise the household income from BIFS. It helps to identification of various indigenous and botanical materials for the integrated pest management. BIFS can be taken as one of the important alternatives to solve the problems of food insecurity and help to improve on the livelihoods reducing negative impacts of chemical inputs on environment, simultaneously maintaining soil fertility as well as. BIFS were mostly trusting on organic manure/ compost. They were seen to be much more benefit in terms yield, health, income and other livelihoods concerns. Most of the respondents was gained sufficient food because they have sufficient cultivated land for production vegetable and cereals and met the consumption rate of cereal, vegetable, and pulses standard of WFP. In the study site majority of the soil were acidic in nature, high level of organic matter because respondents were adopting bio-intensive farming system.

## **Study on Post-Harvest Practices and Value Added Products of Banana in Kailali District**

**Rakesh Jung Shah**

This study entitled “Study on Post-Harvest Practices and Value Added Products of Banana in Kailali District” was carried out in Narayanpur, Dhansingpur VDC’s and Tikapur Municipality of Kailali district of Nepal to study about the post-harvest practices of banana and its various products from April to September

2013 using a set of pre-tested questionnaire. Agriculture was the main occupation in study area where literacy rate was 71 %. William Hybrid was the dominant variety. Majority of the banana farmers did not clean the banana after harvesting. The main reason behind was the additional cost and the return of the cleaned bananas and the unclean bananas was same in local market and even in outside of the district. Due to the high cost of cushion, 59 % farmers preferred banana leaves to other materials because of its leaves easily available without added cost for the cushion materials. All farmers harvested their banana at mature green stage. Most farmers (i.e. 68 %) graded their banana fruits based on size, color, shape and others (ridge become round). The means of transportation used were vehicle, cycle and backload of human beings in a bamboo basket. 72 % respondent farmers reported no losses during storage but other had losses during storage. All respondents realized that banana growing increased their living standards. Majority of the farmers (66 %) made value added product (alcohol, wine, banana shake, vegetable, chips, banana lassi, pakoda, finger chips etc.) from banana fruits while one farmer made banana products (mat, hat, tea mat, pickle, vegetable, paper, slipper, plate etc.) from banana plant which could be observed in 'Banana Resort', altogether, there were 25 varieties of value added banana products from banana fruits and banana plants.

## **A Study on Large Cardamom Management Practices in Dhankuta District**

**Pemba Sherpa**

Cardamom (*Amomum subulatum*) is one of the important high value crops of the country. Cardamom is considered as major cash crop of Nepal contributing directly in poverty alleviation. The main objective of the study entitled "A Study on Large Cardamom Management Practices in Dhankuta District" was to know about management practices of large cardamom specially in two VDCs of Dhankuta district, Pakhribas and Hattikharka. The household survey was conducted from Jestha to Asar 2070. Randomly selected 100 respondents from two VDCs were interviewed during the survey. The study found that 74 percent of the respondents were male, maximum respondent belongs to age range from 40-60 years and 50 percent of respondents were found literate through formal and informal education. 30 percent respondents have land between 11-20 ropani and cardamom cultivated area by farmers was 40 percent i.e. 11-15 ropani. Most of the farmers use sapling separated from mother plant as planting materials. No visits of technical officer were found from the history of cardamom cultivation in the area. Ramshahi variety was found popular in the area 40 percent respondents had cultivated it. 76 percent farmers have irrigation facility whereas rest percent don not have well access of irrigation in dry and winter seasons. None of the farmers were found using fertilizer. Cultural practices were followed according to the economic situation of farmers from 2-4 times per year. Every management in

the cardamom field was followed manually and traditionally. Mostly farmer dry cardamom in 'Bhatti' by fire. In the context of two VDCs no farmer grade cardamom. Generally it was found that they store cardamom in normal room putting it in jute sack from 4 months to 2 years. The main problem during the cardamom cultivation was technical problem faced by farmers. Providing diseases and insect pest management technology, information and encouragement from government effort would be effective in large cardamom cultivation.

## **Production Practices and Problems of Mango Cultivation in Three VDCs of Rupandehi District**

**Dipendra Chaudhary**

The main objective of this study was to assess the production practices and problems of mango production in Rupandehi district. Randomly selected 45 respondents from Parroha, Pathkhauli and Taraini VDC were interviewed and a Focus Group Discussion was conducted. Out of 45 respondents 65.66 % were male and 35.33 % were female with average age of 45.59 years and agriculture was the primary occupation of 67.88 % respondents. 62.22 % respondents have history of mango cultivation of more than 20 years. Mango farming was perceived as source of income by 67.66 %. 66.66 % respondents obtained planting materials from private nursery while only about 11.11% produced themselves. Grafting method was popular among most of the farmers (48.88%) and veneer grafting was preferred by most of them (68.18 %) for propagation. 96.45 percent farmers were aware about site selection while only about 27 % were performed soil test. Most of the farmers (49%) were dug 1m \* 1m \* 1 m size of pit and 64.5 % were dug pit before one month of mango plantation. Almost all farmers were applied compost and wood ash in mango pit and 93 percent were adopted square system of mango plantation. Most of the farmers (48%) were maintained 10 \* 10 m of spacing. Malda and Kalkatiya were the most common varieties of mango and 66 percent farmers did planting before monsoon. On an average 54 percent were irrigating and only about 32 percent-applied fertilizers in their mango field regularly. Most of the farmers (67 %) were observed floral malformation as major disorder. 56 % farmers was used Malathion to control insect pests and 62 percent applied Bordeaux mixture to control fungus. Disorder in mango, attack of insect pests and lack of timely input availability were major production problems while lack of post harvest technology and domination of buyer in price fixation were major marketing problems of mango across the study sites. Except few constraints and problems mango farming has great role in income generation and rural employment in rural areas thus it should be promoted for commercialization.

## **Production Practices and Problems of Litchi Cultivation in Sarlahi District**

**Tejendra Chaudhary**

The main objective of this study was to assess the production practices and problems of litchi cultivation in Sarlahi district of Nepal. Randomly selected 100 respondents from Babargunj, Chhauhattanna and Jutpani VDC were interviewed and a Focus Group Discussion (FGD) was conducted. Out of 100 respondents 36 percent were female and 64 % were male. Average age of the respondent was 48.73 years and agriculture was primary occupation of 65 % of the respondents. The commercial production of litchi in Sarlahi district has been started since 10 years. Litchi farming was perceived as a rural employment by 49.45 % farmers and as source of income by 19.78 %. Tropical Region Horticulture Center, Nawalpur, Sarlahi led for planting materials of most of the farmers (45%). Almost all farmers propagated litchi through air layering. 43.44 % farmers performed soil testing. Size of pits was variable but most of the farmers (52.5 %) made 1 m \* 1 m \*1 m size. 76.77% dug pits before one month of planting. All farmers applied manure (FYM) and fertilizers (Urea, DAP, MOP and Lime) in pits and adopted square system of planting. Rose Scented and Muzzfarpur were most popular varieties among farmers. 96 % farmers were fertilizing and 49% were irrigating litchi field regularly. Mulching in young plant and training/pruning was done by 42 % and 33.37% respectively. Litchi mite was common insect in litchi. 60% farmers applied Malathion to control insect pests. Mostly farmers (43%) sold fruit in local market and co-operative was emerging organization for marketing of litchi. Along with lack of trainings facilities attack of insect pests and lack of year round irrigation were major production problem. Domination of buyer in price fixation was the major marketing problem. This reflects the lack of bargaining power of the litchi growers for price determination. Lack of market information and lack of post harvest technology were also found as marketing problems. Although there were some problems in litchi enterprise the farmers should be encouraged for litchi farming for the commercialization of agriculture through fruit farming.

## **Comparative Study on Vegetable Production under Organic and Conventional Farming System in Kathmandu Valley**

**Anup Bam**

Organic agriculture is becoming popular, and there have been growing concerns on its importance and promotion in number of areas in Nepal. A study entitled



“Comparative Study on vegetable production under organic and conventional farming system” was conducted from (May 15-July 15)2013 in Kathmandu valley. The major objective of the study is to assess the production status, to identifying the opportunities and constraints of organic and conventional farming farmers' field of Kathmandu valley. *The study was conducted in 60 households who were practicing organic(30) as well as conventional (30) farming in their cultivated land.* Primary data were gathered using semi-structured questionnaire and the secondary information was collected from different sources like books, booklets, reports, research paper and testimonials by visiting different organizations. Crops like cucurbits, solanaceous, crucifers and legumes were found grown organically and conventionally by farmers. It was found that percentage of female respondents was very low in both farming. In organic farming 78% of farmers were farming on leased land in 8 ropani and 22% on own land of area 2 ropani. In conventional 93% of farmers were farming on leased land in 16 ropani and 7% farming on own land of area 1 ropani and they were engaged on organic farming from four to five year and in conventional farming from two to three year. Tractor was highly used as a ploughing implement in organic farming where as spade is more used in conventional farming. Since 27% of farmers were lacking training on organic farming and in conventional 37% were lacking training. In conventional farm chemical fertilizer are applied by farmers in crop species for egg. Urea, DAP, Potash and the fertilizer used in organic farms are chicken manure, FYM, urban compost, mustard cake, bone meal etc. The high productivity was seen in conventional than organic farming in initial but later it was found that productivity was decreased due to soil degradation. The study revealed that most of the farmer had future plan towards organic farming because of economic viability, sustainability and health consciousness

## **Evaluation of Yield Performance and Vase life Study of Gerbera (*Gerbera jamesonii*, Hook)**

**Ganesh Shiwakoti**

The present investigations “Evaluation of yield performance and vase life study of gerbera (*Gerbera jamesonii* Hook)” was under taken in the laboratory of Himalayan College of Agricultural Sciences and Technology, Kathmandu and Agriculture farm of Sasita’s Agric firm Pvt. Ltd. at Kamalvinayak, Bhaktapur, Nepal from 1<sup>st</sup> May, 2013 to 2<sup>nd</sup> June 2013. Vase life study was carried out with different vase solutions viz. Water, Sodium hypochlorite 40 ppm, Calcium Chloride 2percent, Sucrose 2percent and Glycerol 2percent on cut flowers. The laboratory experiments were carried out in the randomized complete block design in the general room having 25±2°C temperature and humidity of 61 percent on an average. Ten varieties were selected to study yield performance and vase life of gerbera. The longest vase life (17.12 days) was observed in Aqua variety and the

shortest vase life (10 days) in Ruble. Among the ten varieties of gerbera maximum numbers of leaves were observed in Pirineo variety and minimum in Bayadere variety. The maximum days taken from bud initiation to harvest (45.8 days) was observed in Aqua variety and the minimum days taken (31 days) in Essandre.

## **Post Harvest Practices of Bael (*Aegle marmelos* L. Correa) and its role in income generation in Bardiya District**

**Eak Raj Oli**

Study was conducted under the title "Post Harvest Practices of Bael (*Aegle marmelos* L. Correa) and its role in income generation in Bardiya District." In four VDCs; (Suryapatuwa, Dodhari, Sanoshree and Dhadawar). 100 sample was taken from 25 farmers groups across the study site. Random sampling method was done to selected 4 farmers from each farmers group. The main objectives of the study was Post harvest practices of Bael and its role in income generation in local level farmer in selected VDCs of Bardiya districts. 62 percent respondents were male while 38 percent were female. Literacy rate was 72 percent and remaining 28 percent were illiterate in survey area. Regarding the gender involvement 52.5 percent male and 47.50 percent female workers was directly involved in harvesting activity. But 50.55 percent of female and 49.46 percent of male works are directly involved in processing activity of Bael industry in selected area. Squash, frooty, powder, and Murabba are the major Bael products. But among them Bael squash and Bael frooty are major products in Bardiya. According to survey, 700 kg per season by male and 500 kg per person per season female respondent are collected of the Bael in Bael industry. Rs 4200 by male and Rs 3000 rupees by female respondent were generated income through Bael collection per season. Total income generated by male is Rs 34200 and Rs 33000 by female responding and generate his income by processing working in Bael industry.

## **Postharvest Handing of Tomato (*Lycopersicon esculentum*) in Kapurkot and Mulpani Pocket Areas of Salyan District**

**Bharat Bikram Rawat**

This study was conducted in ward number 7 (Kapurkot) and ward number 2 (Mulpani) of Dhanawang VDC, Salyan District of Nepal to know about the post harvest handling of tomato (*Lycopersicon esculentum*). Site survey was conducted during 24<sup>th</sup> June to 20<sup>th</sup> July (2013) employing household survey and focus-group discussions (FGD). For household survey, two wards 7(Kapurkot) and 2 (Mulpani) of Dhanawang VDC were purposively selected. 83 households

were selected by using simple random sampling technique from the two wards of Dhanawang VDC. The study revealed that 85.54 percent of the farmers were male, maximum farmers belonged to age group of 21 to 40 years and 71.08 percent of farmers were found literate. The main occupation of the respondents was agriculture (69.88 percent); few respondents had small business and young generation found to go abroad. Out of total respondents, 43.37 percent had taken general training about agriculture. 49.40 percent of the total respondents harvested tomato at pink stage, 38.55 percent at both pink and mature green stage and 12.05 percent at soft ripe stage. Out of total respondents, 28.92 percent used cloth, 48.19 percent used clean water for cleaning tomato but. All the respondents simply separated the damaged and rotten pieces of tomato but did not apply any grading technique. About 89.15 percent of total respondents used woven bamboo basket for packaging materials. But only 10.84 percent of respondents used plastic crate. The total loss of tomato during post harvest handling was to be 12.89 percent. The main problem on the basis of priority was found to be transportation and storage. Although there are many challenges, farmers were satisfied with tomato cultivation as it contributed significantly to raise their living standards.

## **2. Plant Protection**

### **Efficacy of *Metarhizium anisopliae* to White Grubs and Comparative Study on the Effectiveness of Pest Management Practices between IPM and Non IPM Farmers Groups in Latikoili VDC, Surkhet District**

**Hem Raj K.C.**

Survey research was conducted with a semi structured questionnaire interview with 40-sample population to assess the comparative effectiveness of pest management practices under before IPM adopting and after IPM adopting. The survey was conducted in commercial vegetable growing area of Latikoili VDC, of Surkhet district during May to June 2013. A household survey was conducted with random sampling method taken from four study areas: Deutibajai, Raharpur, Manikapur and Dipnagar in which both kinds of respondents IPM adopted and non adopted respondents were included. There was found increased trend of pesticides use in vegetable crops before IPM adopting. Overuse and misuse of pesticides has developed resistance of pest which had lead lower yield in before IPM, while after IPM adopting farmer had more yields, which was due to lower pest attack or lower incidence of pest. The severity of pest damage was also increasing in case of Before IPM than that of after IPM. Similarly a simple laboratory experiment was conducted on efficacy test of *Metarhizium anisopliae* against 48 larvae of white grub under 3 treatments, each treatment has 12 larvae and treatments were 5g/100ml(T1), 10g/100ml(T2),20g/100ml water(T3)and last was control (T4), the experiment duration was 21 days. From the experiment found that 20 g applied treatment has kill the larvae in 10.714 days and in 5 g treatment kills the larvae in 15.25 days and in average killed by starvation is 6.30 days. From the experiment founds that higher the doses of *Metarhizium anisopliae* 20 g/100ml was effective in killing larvae so found that higher the doses higher the efficacy and shorter was the mortality period under normal room temperature. In case of after IPM adopting, majority of farmer were found minimizing the use of chemical fertilizer as well chemical pesticide. Those farmers had positive attitude and were aware about environmental degradation and their health problems and ecological disturbances caused by the high use or misuse of chemical so, these farmers were using various indigenous materials that don't harm to their health and environment.

# **Effectiveness of *Trichoderma viride* against *Fusarium* Wilt in Tomato and Pest Management Practices in Mahadevsthan VDC in Kavre District**

**Himal Bhusal**

A field survey was conducted during June 3<sup>rd</sup> to 13<sup>th</sup> of July 2013 A.D. for studying the disease management practices of commercial vegetable farming area of Mahadevsthan V.D.C. ward no. 4, 7, and 8 of Kavre district. Samples of 68 households were selected randomly from three wards of Mahadevsthan V.D.C., Kavre district. The three wards were Naubise, Ranitar and Kuntabesi. Among all 68 respondents, 50 percent respondents were suffered from major disease i.e. fungal wilt, followed by 30 percent of respondents were facing the problem of blight and viral mosaic at about 20 percent each. They were largely unaware about the major disease/pests of the summer vegetable crops resulting into their poor management practices. Majority of them lacked the knowledge about the alternate eco-friendly methods of management of *Fusarium* wilt in general and biological techniques in particular. Farmers are inadequately supported from the service providers that, they lack on the selection of appropriate varieties, time of planting, method of planting and tactic about cultural practices a field study using different doses of *Trichoderma Viride* against *Fusarium* wilt in tomato was conducted in Mahadevsthan, Kavre district. Five treatments with 45 replications were used in the experiment. The treatments were (a) *T. viride* (5g/lit each) (b) *T. viride* (7g/lit each) (c) *T. viride* (10 g/lit each) (d) *T. viride* (15 g/lit each) and last one was distilled water treated Control. All the treatment was replicated five times. Among all treatments, *T. viride* (10 g/lit each) treatment reduced the maximum number of *Fusarium* incident compared to other treatments resulting less infestation of disease. Similarly about 6.1 kg/plant more fruit yield was obtained from the plot treated with *Trichoderma* as compared to untreated control plot. Therefore in comparison to other treatments, *T. viride* (10 g/lit) treatment was more effective in *Fusarium* management with higher fruit yield in the study area.

## **Major Insect Pests of Cucurbits and their Management Practices under Bio-Intensive Farming System**

**Jyoti K.C.**

The study was carried-out from May to August 2013 on the topic major insect pests and diseases of cucurbits and their management practices under BIFs. Samples of 60 households were taken randomly from Triyuga municipality (Chaukibari, 16 and Utraitle, 14) and Hadiya VDC, 6 with general objective of

the study was to identify the crop pest and its management practices in cucurbits adopted by farmers. Fruit fly and Red Pumpkin beetle was the most important insect of cucurbits except in bitter gourd. Epilachna beetle was found most in the bitter gourd to be attracted mostly by mealy bug. Similarly on the disease Powdery mildew and the Downey mildew, Cucurbit Mosaic Virus was the most common disease. For the management, they were largely aware about the major insect pest of the cucurbitaceous crops resulting in their management practices adopted. It was found that farmers were aware of the botanical pesticides and its preparation method. Application of the botanical pesticides and other indigenous materials like cattle urine and wood ash were the most common pest management tool adopted by the farmers. A field study using the different traps against fruit flies in pumpkin was conducted in Hadiya, 6. Four treatments with four replications were used in the experiment. The treatments were: a) Cue lure with Malathion (1ml), b) Molasses with Malathion (1ml), c) Pumpkin with Malathion (1ml), and last one was untreated control. All the treatments replicated for 4 times. Among the all treatments Cue-lure treatment trapped the maximum number of fruit flies as compared to other treatments, which were more effective in fruit flies management found in the study area.

## ***Efficacy of *Bacillus thuringiensis* against *Spodoptera litura* under laboratory condition and study on vegetable pest management in Bhaktapur district***

**Susmita Thapa**

The study was conducted in the commercial vegetable growing areas of Bhaktapur district to know the occurrences of several insect pest and diseases and their on farm pest management practices adopted by both kind of farmers like IPM trained and untrained. A household survey was conducted with sample size 60 through purposive random sampling method taken from five study areas: Sanothimi, Tathali, Bramahini, Dadhikot and Biruwa, in which both kinds of respondents IPM trained and untrained respondents were included. The major insect pest were leaf eating caterpillar, aphids, fruit fly, borers, spotted beetle, white fly, etc. while the major diseases were blight , club root, cucurbits mosaic, wilting , damping off ,etc. The general pest management practices included chemical method, botanical, biorational, pheromone trap, cultural and mechanical methods. The use of IPM tool like pheromone trap was just only by 15% of the trained respondents and 8% of the untrained respondents. The microbial-based biopesticides use was very rudimentary, used by only 7% of the respondents. The discouraging factors in the use of botanicals or biopesticides was found to be maximally tedious job of homemade botanicals, poor knock down effect, slow acting, costly, poor availability, easy and convenient trend of chemicals or due to no idea also. Regarding the chemical pesticides perception and use pattern, most

of the untrained respondents were poorly aware of all these than the trained respondents. The achievement of the IPM FFS, from the overall study, was found to be reduction of the chemical pesticides use, identification of natural enemies, and increases in the production status up to 20 %. A simple laboratory experiment was conducted regarding the efficacy of bacterial based biopesticide *Bacillus thuringiensis* var. *Kurstaki* against *Spodoptera litura* with 3 doses-5g/100ml (T1), 10g/100ml (T2), 20g/100ml (T3) and control (T4). The average days of mortality under T1, T2 and T3 was  $10.5 \pm 0.94$ ,  $9.41 \pm 1.13$  and  $7.5 \pm 0.33$  days respectively. It was found that the higher dose of Bt 20 g/100ml was effective in killing all of them in 10 days followed by 10 g and 5 g/100ml implying that higher the dose higher was the efficacy and shorter was the mortality period provided that the reapplication was necessary at 1 week interval under normal room temperature of 24-28 °C.

## **Study on Efficacy of Locally Available Plant Materials against Maize Weevil *Sitophilus zeamais* (Motsch) and Grain Moth *Sitotorga cerealella* (Oliver) in Maize Storage**

**Madhusudan Acharya**

The experiment was conducted under laboratory condition using bamboo made BHAKARI as a storage container and ten treatments and three replications at the Division of Entomology khumaltar Lalitpur Nepal. The study aimed to determine which among the botanical insecticides are effective against maize weevil and grain moth, the effective rate of the plant test materials, and the duration of efficacy of different plant test materials under BHAKARI storage condition. All the tested botanicals were effective some degree to controlling moth and weevil infestation on the storage maize grains. However, they vary in efficacy depending on the duration of the storage. The findings revealed that the magnitude of grains damaged by weevils was higher than that of damage caused by grain moths in the maize storage, about 70 % of grains were found damaged by storage insect pests including weevils and grain moths in untreated control treatment, of which, 49 % and 21% grains were bored by weevils and grain moths respectively. The mean percentages of grains bored by weevils were low (26 - 28%) in the grains treated with botanical treatments as compared to that with untreated control (49%). Similarly, mean percentage of grains bored by moths was the low (9%) in the grains treated with ginger. Among the botanical materials, the treatment with ginger produced better results (37% damage) in reducing weevil and moth damages as compared to that of control (70% damage) and other treatments during seventh month of storage period.

## **Major Crop Pests and Diseases, and their Management Practices in Bhadrakali VDC, Sindhuli**

**Pabitra Bardewa**

The survey indicated that Insect pest and diseases are considered to be the major constraints in agriculture after the irrigation in Bhadrakali VDC, Sindhuli. The major insect pests, were rice leaf folder, gundhy bug, rice stem borers, soybean hairy caterpillar and pod borer in pulses crop, diamondback moth, cutworm and aphids in cole crops, fruit fly in cucurbit crops and fruit crops, spotted beetle, aphid in leafy vegetables and cucurbit crops, white grub in potato. While the major plant diseases were blight in potato, cucurbits mosaic virus in cucurbit crops, damping off in cole crop. The uses of chemical pesticides were general pest management practices followed by botanical, cultural and mechanical methods. About 87% of the farmers used to apply chemical pesticides in their crop. About 40% of the respondents used to apply mechanical methods. And 20 % respondents had used homemade pesticides. Because of lack of knowledge of biological control methods there is increasing trend of chemical pesticide used day by day. Dithane M 45 (Mancozeb), Bloom and Dom (dichlorovos), Indocile were the major pesticides used by the farmers. Misuse and over use of chemical pesticides by farmers has developed pest resistance to chemical insecticides. The severity of pest damage was also increasing in farmers' fields. It was found that the number of farmers known about integrated pest management (IPM) and IPM program was limited in the study area. Majority of the farmers were unaware about methods of pest and disease management other than chemical pesticide.

## **Knowledge and Practices of IPM Farmers in Summer Vegetable Crops at Kushadevi VDC of Kavrepalanchowk District**

**Subeksha Shrestha**

The study was carried out at Kushadevi VDC of Kavrepalanchowk district with the objective of assessing the knowledge and practices of the farmers on IPM in summer vegetable crops. This site was selected mainly because Kavrepalanchowk is one of the progressive districts with great potential for vegetable growing and farmers have been growing vegetables since long time for their livelihood. A total of 100 households were selected for this study. The respondents replied that their vegetables were heavily infested with pests and they



lost a bulk of the produce each year. To reduce the pest problem, farmers used synthetic pesticides, which are expensive and cause negative environmental and health consequences, which encouraged them towards the adoption of IPM where farmers used chemical pesticides as the last resort for pest control as the part of IPM techniques. Based on their own analysis of the agro-ecosystem and their knowledge generated by conducting IPM practices in their own field through FFS. However, a minority of the farmers was less aware of such alternatives and modest number of them felt such practices as tedious ones in application and less effective. IPM approach in the study area was intervening since 2066 and farmers were adopting alternative means over chemical control. Through IPM activities, they also developed good linkage among the government and other farmers in promoting IPM approach in the study area. Now, those farmers have become better managers, they have increased their crop yields, ensured their health safety and contributed to environmental balance. Farmer's knowledge and participation are key elements of achieving this approach.

## **Disease Management Methods Adopted by Commercial Organic and Conventional Vegetable Farmers in Kathmandu Valley**

**Sajish Prajapati**

Identification of important diseases of crops can be useful to determine research priority in one hand and identification of strategy for developing disease management techniques on the other. As a high value crops, vegetable cultivation is an income generating source for the farmers. Diseases are one of the constraints of vegetable cultivation. Based on the surveys, field visits and disease samples received from farmers, various diseases have been found to be affecting vegetable crop production. Blight, wilt, mosaic in tomato, clubroot and black rot in cruciferous vegetables, mosaic and mildews in cucurbits have been causing considerable losses in both the organic and conventional farms in Kathmandu valley. Presently, important diseases of economic importance are early blight (*Alternaria solani*), late blight (*Phytophthora infestans*) and mosaic in tomato, clubroot (*Plasmodiophora brassicae*) and black rot (*Xanthomonas campestris*) in brassica vegetables, mosaic and downy mildew (*Pseudoperonospora cubensis*) in cucurbits. Applications of botanical/chemical pesticides are the most common disease management tools adopted by the organic and inorganic commercial farmers followed by cultural and mechanical methods of disease management. Cattle urine, cow milk, neem, persian lilac, stinging nettle, garlic, calamus, Malabar nut, crofton weed, marigold flower, etc were basic raw materials used for the preparation of botanical pesticides. Dithane M-45, Cabrio Top, Krinoxyl, Curex, Bavistin, Safaya were most common chemical pesticides used by the farmers. Because of inadequate disease resistant varieties of vegetable crops and

lack of other sustainable control measures, integrated disease management approach along with crop management and farmers' awareness program should be emphasized. Both the farmers (organic and conventional) require streamlining their knowledge and ideas for proper and sustainable management of disease and reduce pesticide dependence.

## **Evaluation of Wheat Varieties/Genotypes and Monitoring of Wheat Rust Diseases**

**Rajan Shrestha**

Evaluation of 45 different released and promising pipeline wheat varieties/genotypes to know their rust disease response at Khumaltar revealed that 36 entries were susceptible to yellow rust (YR) with 18 of them with high severity, 7 with moderate severities, 6 with low severities, 5 with traces and 9 entries free to all three rusts. Most of the old varieties (Lerma-52, Kalayansona, RR 21, NL 30, HD 1982, UP 262, Lumbini, Vinayak, Vaskar, Nepal 297, Nepal 251, BL 1135, Annapurna-4, Achyut, Rohini and BL 1473) were observed with high severity of YR while recently released ones had medium severity to YR. YR was highest in the cultivars like HD 1982, Vaskar, Vijay and Rohini (100S) followed by RR 21, NL 30, UP 262, Nepal 297, BL 1135 and Annapurna-4 (90S). The promising pipeline varieties viz., Aditya (10MR), NL 971 (10MR), BL 3503 (20MR,MS), BL 3623 (TR, TMR), NL 1008 (10R, MR), NL 1064 (20MR), Becard#1 (10MR) and Chyakhura-1 (TMR) exhibited low severity and trace to moderate resistance to YR at Khumaltar, Lalitpur. But the varieties like Vijay and NL 1055 showed high severity of YR with 100S and 80S scores respectively. Leaf rust was minor in the trial while stem rust was sporadic at late/maturity stage during April/May. Monitoring of wheat rust diseases in Bhaktapur district to know the rust status in the farmer's field revealed two of the three rust diseases viz., yellow rust (YR) and leaf rust (LR) occurrence in quiet significant level. The incidence of LR was greater than YR. Only 36.36% of monitored sites were recorded with YR while for LR it was higher (48.48%). Craws more threat to wheat cultivation with the high impact as 62.5% and 54.16% of samples were recorded in high severity and incidence levels respectively. LR was observed with moderate severities and lower incidence levels. Severity of YR was recorded highest (100S) in Dadhikot and Balkot areas while LR was recorded at most 70-80S. Majority of the farmers don't know about wheat/rust diseases. Also, farmers were unknown and unconcerned about wheat varieties. Hence, awareness program may be useful and information on wheat diseases and resistant varieties should be disseminated as soon as possible.

# **Survey and Surveillance of Wheat and Barley Diseases in Kathmandu Valley**

**Prajwal Karkee**

Survey and surveillance of wheat and barley diseases was conducted during April-may 2013 to record the incidence and severity of wheat as well as barley diseases in Kathmandu valley. As introduce new wheat varieties diseases are emerging and incidence and severity of established diseases are increasing more and more. The reason behind the new wheat diseases incidence and increasing severity of established diseases is due to change in race/pathotypes, climate change, varietal diversification, which needs further continued investigation. The wheat diseases, which like moderate temperature, are in hills in the state of increasing severity, like powdery mildew, leaf rust, and stem rust. The incidence of wheat diseases was higher in Kathmandu valley. Leaf rust was observed in Balkot, Duwakot and Kharipati areas of Bhaktapur while foliar blight were observed too and several other wheat diseases were observed with higher severity, which ultimately resulted higher yield loss and high threat to wheat cultivation. From this survey information and knowledge would be obtained. Climate change which result into low erratic and untimely rainfall, high temperature has significant impact on wheat diseases and largely on production. Unavailability of improve seeds, fertilizer, irrigation also contribute price rise in wheat production costly. Farmers are not fully aware with new technology and reluctance to grow wheat need to be further study and investigate and ultimately increase the production of wheat by encouraging farmers. Wheat has been playing important role for food security. Wheat is the most grown and cultivated crop and it has significant role in reducing food insecurity and poverty alleviation in third country and it has been doing so for the long time. Cultivation of new cultivars of wheat is one of the means to produce food security and to generate income. Farmers are liable to change their cultivation choices as they switch from wheat cultivation to vegetable cultivation due to higher profit and quick return.

### **3. Agri-Economics and Business Management**

#### **Economics of Riverbed Farming a Case Study at Bank of Rapti in Phatepur, Haliya and Kamali VDC of Banke District**

**Pashupati Singh**

Fighting extreme poverty and hunger is at the heart of Millennium Development Goals and progress has been made particularly in Asia. However, the incidence of poverty and hunger is still grave in Nepal and the landless and land-poor population in Nepal's lowlands, the Terai, is particularly affected. The number of landless and land poor in the Terai is high and rising. The main objective of this study was to assess the economics of Riverbed farming in Banke District of Nepal. Site survey was conducted during 15th May to 7th June 2013. Randomly selected 65 respondents from Kamdi, Holiya and Phatepur VDCs of Banke District were interviewed. Comparative economic analysis study between riverbed vegetable production and conventional non riverbed vegetable production revealed that the B: C ratio, of Watermelon, Bottle gourd, Cucumber, Bitter gourd, Pumpkin and Muskmelon were 1.850, 1.115, 1.043, 1.038, 1.112 and 1.480 respectively of riverbed vegetable production whereas 1.109, 1.245, 1.085 and 1.087 were the B: C ratio of Bottle gourd, Cucumber, Bitter gourd and Pumpkin respectively of conventional non riverbed vegetable production. Other economic measures analysis was also done. The watermelon and muskmelon were not grown in conventional but had highest B: C ratio even compared with conventional vegetable production, fetched good output market and high production. The study revealed that the B: C ratio of conventional non riverbed vegetable production was more because of high production as compared to the riverbed vegetable production but landless and land poor people who do not hold even 1 kattha (333 m<sup>2</sup> area) are converting the unfertile waste land into productive by utilizing available of own resources and family hired labor. Helping in improving the economic status of landless and land poor people, food sufficiency and food security of hungry people and finally GDP contribution to the country Constraints of irrigation, diseases, insects, pests, natural calamities, suitable agriculture technology, and buyer's monopoly were found.

#### **A Comparative Economics of Major Vegetable and Cereal Seed Production in Surkhet District**

**Tilak Pandey**

To assure food security and reduce poverty increasing agricultural productivity using modern agricultural input plays a vital role. Among the important agricultural inputs, seed takes the first place. Seeds being considered high value and low volume nature; it is often recommended as one of the opportunities for commercial agriculture in remote areas. This study was conducted in Surkhet district of Nepal to assess the comparative economics of major vegetable and cereal seed production. Site survey was conducted during 2<sup>nd</sup> Jun to 15<sup>th</sup> July 2013 employing household survey and focus-group discussions (FGD). For household survey, two village development committees (VDC) Mahelkuna and Maintada were purposively selected. A total of 60 households were selected randomly (thirty household from each VDC). Village level FGDs were conducted in both VDCs. Average area under seed production in Mahelkuna and Maintada were found to be 4.4 ropani and 3.76 ropani respectively and total 60 % of farmers received training related to seed production. Comparative economic analysis study between vegetable seed and cereal seed production revealed that the B: C ratio, of Radish seed, Rayo seed, okra seed and pea seed were 1.535, 1.80, 1.526 and 1.551 respectively of vegetable seed whereas 0.847 and 0.585 were the B: C ratio of Maize and Wheat respectively of cereal seed production. Other economic measures analysis was also done. The most preferred marketing channel was found to be producer (farmers) – Seed assembler (cooperatives) – seed processor (Seed Company) – Consumer. Technical knowledge related to seed production, delay payments by collectors, monopoly by single contractor and high marketing margin were the major problems faced by the sample farmers. It is hoped that this information will be useful for the policy makers and farmers for the selection of profitable enterprises.

## **Economics of Chiraito and its Problems in Sankhuwasava and Bhojpur District**

**Jwolant Bhattarai**

In this research each VDC from Sankhuwasava and Bhojpur district namely Siddhapokhari and Kimalung, respectively were selected as research site. The secondary data was reviewed then FGD was conducted and household survey was done. Data were analyzed by different techniques. The result revealed that in research area agriculture was main source of income. There were only 33% of illiterate respondents. In average 32% of total land respondent have, were used in Chiraito cultivation. The farmers of Kimalung were found high, doing commercial cultivation of Chiraito. Access to finance was very weak. Marketing analysis shows that 65% of Chiraito was collected by local collectors. The trend of price is increasing 10% annually. Production cost was calculated by adding establishment cost of first year, second year cost of management and third year cost of management till harvesting and marketing. The total cost of production was Rs 2286 per ropani. In average, farmers per ropani produce 29.15 Kg of

Chiraito. Average price of Chiraito was Rs 393.5. From here, the B: C ratio in Nrs is 5.01. There were five main marketing channels used in Chiraito marketing. In production problems lack of knowledge on intercultural operation, lack of training related to Chiraito production and lack of post harvest technologies were major problems. Likewise buyer's monopoly, high cost of transportation, lack of price information and lack of cooperative marketing were the major problem in marketing of Chiraito. If the problems could be minimized, there is good benefit of Chiraito cultivation. So, it is suggested to cultivate Chiraito commercially in the research area.

## **An Analysis of Economic and Marketing Dynamics of Chiuri and Chiuri Products: A Case Study of Jajarkot District of Nepal**

**Krishna Bhatta**

Chiuri is one of the important multi-purpose non-timber forest products having socio-economic importance to the rural people of Nepal. The main objective of this study was to assess the economic and marketing dynamics of Chiuri and Chiuri products in Jajarkot district of Nepal. Randomly selected 100 respondents from Khalanga VDC of Jajarkot district were interviewed and a Focus Group Discussion (FGD) was conducted to document local knowledge. There was a tradition of collecting Chiuri fruits and seeds from forest area since their ancient. Mostly farmers were used community forest (400 ropani) for Chiuri harvesting and very lower area of their own land (1.82 ropani) was found under Chiuri cultivation. Chiuri fruit, seed, ghee, honey, juice, soap and wine were found major economic commodities. Economic analysis showed that Chiuri business adds significantly higher return per unit of investment. On an average benefit cost ratio was found 4.77. The higher B: C may be due to lower cost of production as Chiuri can grow naturally without more investment. The cost of production per Kilogram of fruit and seed was found Rs 3.54 and Rs. 14.18 per Kg respectively. The higher cost per unit of seed as compared to fruit may be due to additional cost for processing to produce seeds. The gross margin of fruit and seed was Rs. 10.86 and Rs. 13.76 per Kg respectively. The study revealed that marketing margin of Chiuri fruit and seed was found Rs. 10.85 and Rs. 8.82 per Kg respectively. Gross return from the fruit and seed production of Chiuri was found Rs. 10051.88 per ropani. Producers, collector/middle man, processors, traders, retailers and consumers were found as major actors involved in marketing channel. Altogether 51 % farmers were attracted towards this business due to higher price of its products. Along with benefits of Chiuri cultivation some vital problems like; lack of transportation, processing facilities, and lack of modern equipments for harvesting and collection of Chiuri were found. It has been suggested that Chiuri has comparative advantages to the people of remote rural

area of Nepal; and therefore government should harmonize their policy for the promotion of Chiuri business by providing processing and technical facilities to the farmers.

## **Comparative Economics of Organic and Conventional Vegetable Farming in Kathmandu Valley**

**Kamal Shrestha**

The present study was conducted to compare the economics of organic and conventional vegetable farming in Kathmandu valley. A sample of 30 farmers practicing organic and 30 farmers practicing conventional vegetable farming system were selected randomly for the study. Data were collected through survey method using semi-structured questionnaire. The estimated per ropani cost of vegetable production in organic farms (NRs 69170.05) was less than in conventional farms (NRs 100562.41). The gross return per ropani from vegetable farming in organic farms was NRs 101536.09 and NRs 135747.79 in conventional farms. Although higher cost and revenue per ropani was found in conventional farms but higher Benefit Cost Ratio (BCR) was found in organic farms (i.e. 1.47 in organic farms compared to 1.35 in conventional farms). The estimated per ropani cost of tomato production in organic farms was NRs 91838.90 and NRs 94486.17 in conventional farms. The gross return from tomato production per ropani in organic farms NRs 194071.53 was higher than NRs 177127.34 in conventional farms. The BCR was also higher in organic farms (2.11) compared to conventional farms (1.87) for tomato production. The cost of cauliflower production in organic farms was NRs 27055.44 and NRs 25541.12 in conventional farms. Per ropani gross return from cauliflower production in organic farms NRs 44913.00 was higher than NRs 31340.50 in conventional farms. BCR was also higher in organic farms (1.66) compared to conventional farms (1.23). This study revealed that organic vegetable farming is more economically profitable than conventional vegetable farming.

## **Economics of Capsicum Production in Chitwan District**

**Suresh Gharti Magar**

Vegetable is the most promising and profitable agriculture enterprises to improve rural livelihood through income generation and self-employment. Among several vegetables capsicum is one of the important vegetable popular among farmers in the nation. The main objective of this study was to assess the economic and marketing aspects of capsicum production in Chitwan district of Nepal. Household survey was conducted during 11<sup>th</sup> June 2013 to 21<sup>st</sup> July 2013. Randomly selected 90 respondents from Birendranagar, Chainpur and Bhandara

VDCs of Chitwan District were interviewed. The average area under capsicum was 17.74 percent of total used area and 29.12 percent of vegetable area. The average cost and return of capsicum production was found NRs. 6409.50 per and NRs. 11901.60 per kattha respectively. On an average B: C of capsicum enterprise was found 1.87. Similarly, on an average gross margin of capsicum was found NRs. 11.24 per kg and NRs. 5492.10 per kattha. The marketing margin and producers' share was found NRs. 7.32 per kg and 74.04 percent respectively. The presence of newly established collection center and transportation facility to the major markets of vegetable (Kathmandu, Pokhara, Narayangard, Butwal, Hetaunda and Birgunj) has facilitated the marketing of capsicum. Producers, collection centers/cooperatives, middleman, traders, wholesalers, retailer and consumers were found as major actors involved in marketing channel. Along with several socioeconomic and commercial benefits of capsicum enterprise farmers were also perceived some vital problems. Among several problems, disease and insect pest were the major problems. Similarly, lack of packaging material and processing facility was the major marketing problems. Therefore, benefit can be optimized through commercialization of capsicum production for this government should harmonize their policy to develop appropriate production technologies and extension facilities as well as marketing infrastructure.

## **Analysis of Marketing and Potentiality of Chiuri Honey in Jajarkot District of Nepal**

**Hari Prasad Sharma**

This study was initiated to analyze the marketing and potentiality of the Chiuri honey in Jajarkot district of Nepal in the different villages of the Khalanga VDCs of the Jajarkot district like Pipe, Maide, Daurikanda, Jyamire and Aual. The focus of the study was, to analyze the marketing system, effective marketing channels, marketing problems and potentialities of Chiuri honey. The data were generated by individual interview and group discussions using pre-tested semi structured questionnaires and checklists. This was supplemented by secondary data collected from different published and unpublished sources. The sample size included 100 Chiuri honey producers along with 2 collectors, 8 traders, 2 wholesalers and 1 processor were selected purposively. According to the study, the average production of Chiuri honey in Jajarkot district per year was found to be 42.5 Mt. It was found that the business of honey is quite profitable in the district. The cost of production per kg of Chiuri honey was Rs.51.6, whereas income per kg honey was Rs. 354 and net profit per kg was Rs 302.40. The benefit-cost ratio was found out to be 6.8. However, the total share of the household income from honey was estimated to be 14.36 percent. The potential market of the Chiuri honey of the district is Khalanga, Kalimati and Radijeula; and outside the district mainly are Dolpa, Chaurajahari, Sallibazaar, Chinchu, Nepalgunj and Kathmandu. The problem of the marketing of the Chiuri honey are



identified as lack of packaging materials, low production, lack of storage facility, buyers monopoly, lack of knowledge about marketing, lack of price information, lack of quality control measures in production level, lack of support from the government, lack of training, high cost of transportation and so on. The most prioritized problems in export of Chiuri honey was lack of organic certification followed by lack of lab testing, no minimum standard of Nepalese Chiuri honey, lack of grading and packaging material. Therefore, benefit can be optimized through commercialization and potential for growth in sales will be exponential in near future.

## **Assessment of the Socio-Economic Status of Youth Engaged in Agro-Based Micro-Enterprises on Kavre District**

**Niranjan Pandey**

The future of any productive country lies in the hands of youth whose contribution to national economy is immense. Majority of youth in developing country are not getting any sort of shape, direction and motivation and this trend is up hilling in youth. The major option for solution is by directing and motivating youths towards agro based microenterprise and letting them to feel the impact in agro based microenterprises of country like Nepal. This mini thesis deals with 65 youth entrepreneurs of age 16-40 years from seven agro based micro-enterprises representing the Kavre district on the basis of purposive and multistage sampling, which was conducted during 10<sup>th</sup> to 20<sup>th</sup> of May. The findings from the statistical analysis showed that involvement on microenterprises have positive association with economics and social welfare of youth. Nonetheless, descriptive findings showed the high degree of involvement of youth on agro-based microenterprise, which has restored their self-respect and advancement. The finding also shows respondents were motivated towards agro based enterprises because of influence from MEDEP, family culture, role entrepreneurs, choice to become the own owner, failure from previous job, training received in those field ,as per market demand and availability of raw materials within the village.

## **Assessment of Small Holders Farming Towards Commercialization in Sindhupalchowk District**

**Jeevan Aryal**

The future of any productive country lies in the hands of youth whose contribution to national economy is immense. Majority of youth in developing

country are not getting any sort of shape, direction and motivation and this trend is up hill in youth. The major option for solution is by directing and motivating youths towards agro based microenterprise and letting them to feel the impact in agro based microenterprises of country like Nepal. This mini thesis deals with 65 youth entrepreneurs of age 16-40 years from seven agro based micro-enterprises representing the Kavre district on the basis of purposive and multistage sampling, which was conducted during 10<sup>th</sup> to 20<sup>th</sup> of May. The findings from the statistical analysis showed that involvement on microenterprises have positive association with economics and social welfare of youth. Nonetheless, descriptive findings showed the high degree of involvement of youth on agro-based microenterprise, which has restored their self-respect and advancement. The finding also shows respondents were motivated towards agro based enterprises because of influence from MEDEP, family culture, role entrepreneurs, choice to become the own owner, failure from previous job, training received in those field, as per market demand and availability of raw materials within the village.

## **Impact of Micro Irrigation Technology on Socio-economic Status of Strawberry Growers in Nuwakot District**

**Neha Thapa**

A survey was conducted in Okharpauwa and Kakani VDCs of Nuwakot District during May 2013, to study the socio-economic impact of micro-irrigation technology adopted by micro-entrepreneurs of MEDEP in 60 strawberry farms. Sixty households with micro-irrigation installed in their farms were randomly selected and compared the household's income before and after the installation of micro-irrigation. Respondents were interviewed with structured questionnaire and Focus Group Discussion (FGD) was conducted. The study showed that total irrigated land increased from 0.38 ha (65.52 percent) to 0.46 ha (75.41 percent) after the installation of the sprinkler irrigation systems. When sprinklers were introduced, Total cultivated land of the households increased from 0.58 ha to 0.61 hecter. Prior to the sprinklers, farmers were mostly cultivating cereals in rotation with pulses and some vegetables. Radish was very popular in Nuwakot district prior to the introduction of Strawberry irrigated with sprinkler system. Strawberry cultivation became the first choice of the farmers dominating the other traditional cropping patterns when sprinkler was the used for irrigation. Other crops included tomato, cauliflower, cabbage and pea as the major vegetables irrigated with sprinklers. The productivity of strawberry, tomato, cabbage, cauliflower and pea increased up to 15.82 %, 24.22 to 32.34, 5.32 to 8.73, 7.72 to 11.56 and 2,25 to 4.25 t/h respectively. The cropping intensity increased from 181 to 216 percent after the use of sprinklers. Gross farm income

per household, after the installation of micro-irrigation, drastically increased from Rs. 3230.3 to Rs. 44514.2 per year. Similarly, Rs. 6100.57 to Rs. 17291.67 increased off-farm income before and after micro-irrigation installation respectively. The household income before and after micro-irrigation installation was Rs. 9330.87 and Rs. 61805.87, respectively. The problems in the installation and operation of micro-irrigation were ranked by scaling technique and it was found that high initial cost of installation, difficulty in first operation, difficulty in management, daily time requirement and difficulty in accessibility were the major problems with scores of 0.74, 0.69, 0.52, 0.49 and 0.47 respectively. The study concluded that there was positive impact of micro-irrigation on strawberry and vegetable production and increased in the farm incomes of the households resulting an improved the socio-economic status of the farmers.

## **A Study on Production and Marketing of Strawberry (*Fragaria spp.*) in Nuwakot District**

**Ashmita Rijal**

In view of suitable climatic condition in mid-hill of Nepal, strawberry farming is very popularly adopted activity in Nuwakot district; it is emerging as a new enterprise for the farmers. As to highlight the fact, a survey research was carried out in two VDCs namely Okharpauwa and Kakani VDCs of Nuwakot district to analyze the economics of production and marketing of strawberry from May 2013 to June 2013. Altogether 87 entrepreneurs were interviewed; among them 80 were strawberry producers, 2 collectors and 5 retailers. The result of the study shows that the strawberry cultivation is profitable in the study area. The cost of production of 1 kg strawberry was estimated to be Rs. 100, whereas the farm gate price was Rs. 120. The average Benefit-Cost (B/C) ratio was found out to be 1:1.751. The average cost of strawberry production per ropani was estimated to be Rs. 78,868.34 whereas return was Rs. 2, 53,730. Along the strawberry flow chain; the margins of the traders, wholesaler/collectors and retailers were Rs. 20, Rs. 50 and Rs. 15/kg of strawberry, respectively. The total price spread of strawberry was estimated to be Rs. 65/kg and total producer's share was estimated to be 54.05%. Strawberry producers, collectors/wholesalers and retailers were the major actors of strawberry marketing in Nuwakot. Farmers started strawberry cultivation due to good market and high price, whereas disease/pests were the major problem in production. Unavailability of processing plants and proper storage facility were the major weaknesses in the strawberry farming area.

## **4. Veterinary Sciences**

### **Pig and Human Sero-Survey and Risk Factor Assessment for Japanese Encephalitis in Rupandehi and Kapilvastu Districts of Nepal**

**Shristi Ghimire**

A cross-sectional study was carried out from March to September 2013 in Rupandehi and Kapilbastu districts of Nepal to determine the JEV infection status in pig and suspected human cases, to find out awareness, exposure to risk factors and prevention measures used by pig farmers and to explore the role of probable risk factors to JEV infection at farm level. This study showed that sero-positivity in pigs was 11.04%. There was no significant difference of JEV infection in pigs with districts and with age, sex and breed of pigs ( $p>0.05$ ). 2.54% suspected human cases also turned out to be JE positive further supporting virus spill over in the environment. The awareness level was low among pig farmers regarding JE. Illiteracy and significantly low level female awareness were noted. They were exposed to multiple JE risk factors like closeness to pig shed, rice field, water bodies, mosquito bite, wild birds etc. But there was no vaccination practice in pigs as well as human against JEV. Though most of them were using mosquito-avoiding practices the adequacy, frequency of use and availability to all could be varying. This study showed the farm level infection is significantly associated with closeness to rice fields ( $p<0.05$ ), standing water sources ( $p<0.05$ ), wild bird exposure ( $p<0.05$ ) and mosquito bite to pigs ( $p<0.05$ ). In future awareness generation program is needed targeting illiterate farmer and media source can be the good means. Strategic vaccination to human and pig together with adequate use of mosquito avoiding practices are necessary to control JE. Further studies to explore much about the complex etiopathogenesis and transmission of JEV are necessary to be able to get full control over this disease.

### **Animal Cruelty, Criminology and Prosecution: An Assessment on Animal Abuse and Animal Law in Nepal**

**Prabhakar Kumar Shah**

A study was carried out to assess the current status of animal cruelty, criminology and prosecution in Nepal. A questionnaire survey was carried out among the veterinarians of Nepal. Collection of reported data and observation of cruelty cases was done in various sites of Nepal and a search of international data about animal cruelty, criminology and prosecution was also carried out. Multiple cases of animal cruelty/abuse were found. The present study showed that human violence against animal was found in increasing trend. Most cases of animal cruelty included beating (8.46%), run over with vehicle (10.65%),

emaciated (8.46%) and malnourished (9.41%) animals, kicking (7.52%), poisoning (7.52%) while fewer cases were of animal sexual abuse (0.62%), hanging the animals (2.51%), dragging (3.13%) and shooting (3.13%). Other types of cruelty included pouring of boiling water in the body of animals, religious sacrifices, brutal slaughtering of animals, leaving animals in the streets etc. Hunting of wild animals, animal trafficking and living condition of farm animals were other sort of cruelty issues highly prevalent in our society. In this study, male represented the higher number of animal abuser than female and the respondents designated as a government officer represented the higher number of abuser. Numbers of animal welfarists are high in comparison to animal rightists. Reported cases of animal cruelty and prosecution are few. Appropriate recommendations were made targeting the remodeling of animal protection law, public education and awareness to all concerned step holders.

## **Study on Quality Parameters of Semen and Artificial Insemination in Goat**

**Mukesh Panjiyar**

A study was carried out in National Livestock Breeding Center, Pokhara to determine the effects of processing techniques on the quality of semen from Jamunapari, Barbari and Boer bucks. The volume of the semen obtained from Jamunapari, Barberi and Boer were 1.5ml, 2ml and 1.2 ml respectively and the color varying from milky white to creamy white. The semen motility percentage almost similar for Jamunapari and Barbari but lower for Boer. The morphological defects of tail curved of Jamunapari, Barbari and Boer 100% were 64%, 66% and 60% respectively; tail straight were 36%, 34% and 40% respectively; the live spermatozoa were 72%, 70% and 67% respectively; dead spermatozoa were 28%, 30% and 33% respectively; morphology were 16%, 18% and 24% respectively and concentration were 40, 34 and 38 in term of million spermatozoa per dose respectively. For artificial insemination; Out of 129, 87.6% of Boer 100%, 4 (3.1%) of Barbari and 12 (9.3%) of Jamunapari buck semen straw was used for AI purpose. Total 129 goats of Khari (32.6%), Khari x Jamunapari (64.4%), Sannen cross (0.8%) and Terai (1.6%) were artificially inseminated in terai and mid hills districts of Nepal under this study. Among them, 5.4%, 14.7%, 38%, 25.6%, 7.8%, 6.2%, 1.6% and 0.8% were found to be the female of 0 lactation, 1<sup>st</sup> lactation, 2<sup>nd</sup> lactation, 3<sup>rd</sup> lactation, 4<sup>th</sup> lactation, 5<sup>th</sup> lactation, 6<sup>th</sup> lactation and 7<sup>th</sup> lactation respectively. The percentage of not repeated cases was 71.3% and repeated case was 28.7%.

## **Sero-prevalence Study of Brucellosis in Dairy Cattle of Kapilvastu and Bhaktapur Districts**

**Santosh Thapa Chhetri**

Brucellosis is one of the zoonotic diseases that cause abortion in dairy cattle. To find out its status, a sero-prevalence study was conducted during June-July 2013 in aborted dairy cattle of Kapilvastu and Bhaktapur districts. A total of 48 sera samples (23 from Kapilvastu and 25 from Bhaktapur districts) were collected from dairy cattle with the recent history of abortion. Out of 48 samples 6 (12.5%) were positive on Rose Bengal Plate Test. Among 6 positive samples, 2 (8.69%) were from Kapilvastu and 4 (16%) from Bhaktapur. Considering the prevalence of the brucellosis in the dairy pocket areas and its threat for transmission to other animals and human, a suitable preventive and control measures including the regular test and segregation of sero positive animals, effective quarantine, legislative measure and awareness programs for farmers, veterinarian, technicians and stakeholders at all level are warranted.

## **Sero-prevalence of Leptospiral Infection in Canine Population of Kathmandu Valley**

**Mahesh Thakur**

To determine the status of Leptospiral infection in a canine population of Kathmandu valley, a rapid diagnostic test kit was used to detect IgM antibodies in sera samples. Altogether a total of 150 sera samples were collected from the pet and stray dogs brought to the Veterinary Hospitals and Clinics with the history of fever and jaundice. Screening of all sera samples by the rapid diagnostic test kit (SD Bio Line) showed 2.7 % (4/150) sera samples positive for Leptospiral antibodies. The present result suggests that Leptospiral (organism) pathogens continue to circulate in canine population of Kathmandu valley.

## **Prevalence of Gastrointestinal Parasites in Captive Carnivora and Artiodactyla in Central Zoo and Their Comparative Analysis**

**Roshika Shrestha**

A study was conducted to find out the prevalence of different gastro-intestinal parasite in the captive Zoo animals of Central Zoo, Jawlakhel from June to August 2013. A total of 102 fecal samples were tested, 43 from the order Carnivora and 59 from Artiodactyla, 7 families and 21 species from the two

orders were evaluated for the study. The prevalence of the parasite within the order, family and species and their comparative analysis was done. Only the qualitative examination using direct smear, floatation and sedimentation methods were executed to know the prevalence. Out of the total sample, prevalence of Strongyloides spp (22.55%), Toxocara spp (20%), Coccidia spp (6.86%), Entamoeba spp (2.94%), Taenia spp (1.96%), Strongylus spp (19.61%), Paragonium spp (3.92%), Hookworm (7.84%), Trichostrongylus spp (17.65%), Trichuris spp (11.76%), Giardia spp (4.90%), Capillaria spp (1.96%), Ascaris spp (2.94%), Fasciola spp (6.86%) and Paramphistomum spp. (7.84%). Out of these 15 parasites 12 species of parasites had been identified in Artiodactyla and 8 species of parasites were identified in the order Carnivora. Of the common parasites like Toxocara spp, Ascaris spp, Entamoeba spp, Coccidia spp, Giardia spp, Paragonium spp and Hookworm which are present in both the order had been found to be significantly higher in Carnivora than in Artiodactyla by Chi-square test ( $p < 0.05$ ). There has been no significant difference in the prevalence of Strongylus and Strongyloides between the two order ( $p > 0.05$ ). Family Bovidae and Cervidae exhibited no significant differences ( $p > 0.05$ ) in the presence of parasites. Species Spotted Deer and barking Deer exhibited no significant differences ( $p > 0.05$ ) in the presence of parasites,

## **Comparison of Different Indirect Tests with Culture for the Detection of Subclinical Mastitis in Dairy Cows and Buffaloes**

**Navodita Malla**

All together 52 animals were selected for the research; 45 cattle and 7 buffaloes. Overall quarterwise prevalence of SCM in total 207 quarters was 71.99, 31.88, 29.95 and 23.18%, whereas animalwise prevalence in total 52 animals was 86.54, 59.62, 57.69 and 46.15% respectively was found by culture, CMT, SFMT and MWT. Overall quarterwise prevalence of SCM in buffaloes on the basis of culture, CMT, SFMT and MWT was 64.3, 21.43, 25.0 and 3.57% and animalwise prevalence was, 85.71, 57.14, 57.14 and 14.29%. In cattle quarterwise prevalence was 73.7, 33.52, 30.73 and 26.25% and animalwise prevalence was 91.11, 55.56, 57.78 and 51.11% respectively. Among the culture positive samples 36.24% was Klebsiella spp. followed by 32.21% Staphylococcus spp., 16.78% E.coli, 9.40% Streptococcus spp. and 5.37% were pseudomonas spp. No significant difference ( $p > 0.05$ ) was found between CMT, SFMT and MWT tests in by Chi square test. The CMT showed highest prevalence followed by SFMT and MWT. However there is very less difference between CMT and SFMT. The mastrip paper was found significantly different ( $p < 0.05$ ) with CMT, SFMT and MWT. In this study 9 sample were found to be non specific. The mean EC of buffalo milk sample was  $3.28 \pm 0.76$  SD. And the mean EC of cattle milk sample was  $4.99 \pm 0.85$  SD.

The average pH of buffalo milk sample was  $6.36 \pm 0.36$  SD and the average pH of cattle milk sample was  $6.39 \pm 0.09$  SD. Whereas for the detection of subclinical mastitis SFMT and CMT can be preferred for field test than the other test like MWT pH, EC, and Mastrip. However from the economical and compatibility with the technical capabilities of farmers and the availability of the required chemical SFMT can be cheaper, user friendly alternative animal side sub clinical mastitis diagnostic test.

## **Prevalence of *Eimeria* in Kids of Dang District**

**Manoj Oli**

A study was conducted to find out the prevalence of *Eimeria* in kids of Lalmatiya and Satbariya V.D.C s of Dang district. Altogether 208 fecal samples were brought from different villages of these two Village Development Committees (VDCs) and were examined for Coccidial Oocyst in the Parasitology Laboratory of Rapti Technical School, Lalmatiya Dang (RTS). The samples were examined qualitatively by floatation technique and quantitatively by McMaster counting method as per MAFF, (1986) for identification of Coccidial Oocysts. Out of 208 samples, 26 (12.50%) samples were found positive where as 182 (87.50%) samples were negative. Prevalence of *Eimeria* was found high in the female kids (65.38%) than male kids (34.62%). Similarly prevalence was found high in cross-bred kids (80.77%) than local (Khari) kids (19.23%). The kids of <3 months age group and >3 months age group had prevalence of (73.08%) and (26.92%) respectively. Mean OPG was found high in kids of <3 months old kids (2373.68) than kids of >3 months kids (1385.71). From the survey it was found that (36.05%) household's cleaned goat shed in every six months and (22.60%) of people knew about parasites. Less than (44.44%) farmers were doing regular fecal examination and drenching against internal parasites. In this study, (63.89%) of farmers had encountered the diarrhea in goats near the dying period. Majority of the farmers (77.78%) drenched their goats only when the fecal examination revealed parasitic eggs in their goats.

## **Prevalence of Helminth Parasites in Goats of Rukum District**

**Rup Narayan Shrestha**

A study was conducted to find out the prevalence of helminth parasites in goats of Khalanga, Syalapakha, Garayala Village Development Committee (VDCs), of Rukum district. Altogether 280 faecal samples were brought from these three VDCs and were examined for helminth parasites in the Parasitology Laboratory of District Livestock Service Office, Rukum. The samples were examined



qualitatively by sedimentation technique as per Soulsby (1976), and quantitatively by McMaster counting method as per Urquhart et al., (1987) for identification of helminths. Out of 280 samples, 235 (83.93%) samples were found positive for one or other type of helminth parasites where as 45 (16.07%) samples were negative. Prevalence of nematode parasites was highest (80.71%) while trematode showed a lowest prevalence (6.07%). The most common parasites encountered were Strongyle sp. (77.14%) (*Trichostrongylus* sp., *Ostertagia* sp., *Oesophagostomum* sp., *Haemonchus* sp. and *Chabertia* sp.), *Trichuris* sp. (16.43%), *Moniezia* sp. (7.5%) and *Fasciola* sp. (6.07%). The prevalence of helminth infection was (92.75%) and (75.35%) in the age group of (> 6 months) and (0-6 months) respectively. Garayala showed the highest prevalence (85.45%) while Syalapakha showed a lowest prevalence (81.52%). low altitude showed the highest prevalence (88.89%) while High altitude showed a lowest prevalence (77.08%) followed by (84.44%) in low altitude.

## **Comparative Study On The Prevalence of Helminth Infestation in Wild Water Buffalo (*Bubalus bubalis arnee*) and Domestic Buffalo (*Bubalus bubalis*) in The Buffer Zone of Koshi Tappu Wildlife Reserve**

**Bhim Raj Karki**

Study on comparative helminth infection in wild water buffaloes (*Bubalus bubalis arnee*) and domestic buffaloes (*Bubalus bubalis*) in the buffer zone of Koshi Tappu Wildlife Reserve (KTWR) was conducted during June to September 2013. A total of 100 (50 samples each from wild and domestic buffalo) fecal samples were taken for the study. The samples were examined qualitatively by sedimentation and flotation method for identification of helminthes. This Reserve is bordered by a buffer zone, populated by humans and livestock. The border of the reserve and the buffer zone has become a common place of interactions between the wild animals and farm livestock leading to high possibility of transmission of diseases including parasites. A total of 100 (50 samples each from wild and domestic buffalo) fecal samples were taken for the study. The samples were examined qualitatively by sedimentation and flotation method for identification of helminthes. Out of selected samples, 65 (38 wild and 27 domestic buffalo) samples were found positive for different helminthes and revealed the parasitic prevalence of 65% in totality. Among positive samples, 86.2% were single type infestation and 13.8% were mixed type. Among positive sample, 76.92% were trematodes infestation, 7.69% were nematodes and 1.53% was cestode infestation. Out of two species of the animal, Wild water buffalo was found to have higher infestation of helminthes. The main helminthes found in wild water buffalo Arna were *Paramphistomes* (76.31%), *Fasciola* (28.94%), *Strongyles* (21.05%) and *Moneiza* (2.63%) were as in domestic buffaloes major

helminths were Paramphistomes (77.8%), Fasciola (25.9%), and Strongyles (22.22%). Better management practices can be developed to limit parasitic problem, transmission, and improve the people's relationship with the wildlife and livestock.

## **Prevalence of Gastro-intestinal Nematodal infection in Piglets of Kathmandu Valley**

**Bijaya Ghimire**

A study was conducted to find out the prevalence of Gastro-intestinal nematode infection of piglets in Kathmandu Valley. Current study includes 27 Swine farms, 13 farms were hygienic and well-managed and 14 farms were unhygienic and ill managed. In total 176 fecal samples of piglets below 3 months were collected from 12 areas of 3 districts of Kathmandu Valley and investigated for Gastro-intestinal nematode eggs. Result of fecal examination showed Ascaris (24) and Strongylides (18) as major intestinal nematode in piglets below three months (up to 95 days) of age. 49 samples showed positive case representing 27.84 % prevalence. The overall prevalence as detected by fecal egg output in swine was found low to those reported by few researchers in eastern region. Out of total samples collected (4-8) weeks and above showed 29.32 % prevalence. 2 cases of first week showed the prevalence of Strongyloides infection. Piglets above 36 days showed higher prevalence of Ascaris, while Strongyloides was found in various age groups. The prevalence percent found to be higher in female (33.33%) than in male (22.83%). Jadibuti showed the highest prevalence (63.33 %) while Imadol showed a lowest prevalence (10 %). Unhygienic farm showed 71.42 % prevalence while hygienic showed just 28 % prevalence. The mean Egg Per Gram (EPG) of Ascaris was found to be  $103 \pm 8.011$  and Strongylus was found to be  $104 \pm 7.594$ . From the interaction with farmers, it was found the most of farmers conscious about deworming of swine. Albendazole, Ivermectin, Fenbendazole, Levamisole, etc were used in every 3-5 months interval as antihelmenthics.

## **Study on Prevalence of Gastro-intestinal Helminths of Equines in Kathmandu Valley**

**Rabin Ghimire**

Study on prevalence of gastro- intestinal helminths of equines in Kathmandu valley was conducted from June to October 2013. A total of 114(20 horses, 41 donkeys, 53 mules) fecal samples were collected and taken for the study. McMaster counting method examined qualitatively by sedimentation and the samples quantitatively. Out of 114 randomly selected samples, 77 (11 horses, 25

donkeys and 41 mules) samples were found positive for different helminth eggs and revealed the parasitic prevalence of 67.54% in totality among which 41.55% were single type infestation and 58.44% were mixed type. Highest prevalence of helminth infestation was found in mules and donkeys than horse. Helminths found in Kathmandu valley were Strongyles 44(57.14%), Parascaris 17(22.07%), Oxyuris 22(28.57%), Fasciola 18(23.37%), Gastrodiscus 21(27.27%), Anoplocephala 18(23.37%). Out of 2 positive samples of Nepal Police, helminthes found were Strongyles 1(1.29%), Oxyuris 1(1.29%) and Anoplocephala 1 (1.29%). Similarly in Godawari Donkey Sanctuary out of 9 positive samples Strongyles 5(6.49%), Parascaris 1(1.29%), Oxyuris 1(1.29%), Fasciola 3(3.89%), Gastrodiscus 2(2.59%), Anoplocephala 1(1.29%). In the same way in Brick kilns, out of 66 positive samples, Strongyles 38(49.35%), Parascaris 16(20.77%), Oxyuris 20(25.97%), Fasciola 15(19.48%), Gastrodiscus 19(24.67%), Anoplocephala 16(20.77%) were found positive. Nematodal infestation was found higher than trematodal and cestodal. Prevalence was higher in females than in males. Young and old animals showed high infestation. Animals in brick kilns were more infested. The EPG value of samples of Nepal Police is 100-200, similarly of Godawari Donkey Sanctuary is 100-800 and that of Brick kilns is 100-1700 showing high parasitic load in Brick kilns in comparison to that of Nepal Police and Godawari Donkey Sanctuary management system.

## **Survey on Stress among Registered Veterinarians of Nepal**

### **Suraj Dangi**

A study was carried out to assess the cause of stress and stress management strategies of registered veterinarians of Nepal. A questionnaire survey was carried out among registered veterinarians of Nepal. The study showed that veterinary is stressful job in Nepal. Source of stress in male veterinarians were Marital status (married, 67%), Number of children (>3,8%), less sleeping hours (39%), inappropriate post/job and salary (76% and 69%), inequality in facilities (76%), no moral support from professional colleagues (84%), long working hours (90%), surgery (37%) and large animal practice (47%). Stressor for female veterinarians was Marital status (single, 27%), Number of children (>3, 7%), less respect from others (50%), sexism (67%), emphasis to male staff (80%) and large animal practice (60%). Stress management strategies followed by male veterinarians were Tobacco/cigarette (39%), Coffee/Tea (30%), alcohol consumption (17%) and rest (14%) whereas female veterinarians followed Coffee/Tea (87%) and rest (13%). No female veterinarians adopted Tobacco/cigarette and alcohol to cope with the stress but few female veterinarians took anti-stress medicine to suppress their depression level. Many veterinarians suggested that Continue education

from Council, exercise, frequent holidays and working in interested field help to reduce from work-related stress in veterinary profession.

## **Seroprevalence of Echinococcosis in Slaughtered Buffaloes of Kathmandu District**

**Bhupendra Khaniya**

A study was conducted as a part of internship research during May to July 2013 to assess the seroprevalence of echinococcosis in slaughtered buffaloes of Kathmandu district of Nepal and their association with different risk factors to assess the possible zoonotic transmission. Ninety-six buffaloes were randomly selected and ante mortem and postmortem diagnostic indicators were evaluated. The ELISA testing of 92 cases was performed. Serologic evidence of echinococcosis for IgG was conducted by (BIOCBD Anti-Hydatid IgG ELISA Kit, china). The result was analyzed using chi-square test and Fisher exact test when indicated. The study showed that 10.86% of slaughtered buffaloes analyzed had serologic evidence of Echinococcus infection (IgG). The findings demonstrated the significance of echinococcosis as a disease of zoonotic importance. Postmortem examination revealed the presence of hydatid cyst in lungs and liver. The diameter of the cyst ranged from 0.5 to 14 cm and the weight of the cyst ranged from 0.05 kg to 1 kg. Out of 11 cysts, 63.63% (7/11) were fertile and 36.36% (4/11) were sterile. Some of the cysts were caseated whereas some contained thick creamy pus. Postmortem prevalence of echinococcosis in slaughtered buffaloes was 11.45 %. The sensitivity and specificity of ELISA were found to be 72.72% and 97.53% respectively. The result of this study clearly indicates that prevalence of naturally occurring hydatid cyst infection remain relatively high in the study area. This study will support the scientific pursuit in managing echinococcosis.

## **Impact of Climate Change on Livestock Production and Health and Adaptation Measures Adopted by Farmers of Lamjung Districts**

**Rakesh Kumar Thakur**

This study was conducted in Duradada and Chandeshwori VDCs of Lamjung from where 70 households were sampled randomly 35 from each VDC. The primary data was collected through, key informant interview, questionnaire survey, focus group discussion, direct observations, etc. In that VDCs crop productivity is not so well developed due to the land topography. The productivity of livestock is more than Himalayans and lesser than terai area. In

the survey 71.42% of respondent reported that the climate is changing as compared to past decades. Change in temperature, rainfall pattern and amount, snowfall, drought, decreased in water source and increased in mosquito population are the major climate change issue people have noticed in this area. In Lamjung 93% of household reared livestock and rest 7% households were involved in others occupation than livestock rearing. Most of the common diseases of the livestock reported in this district particularly in cattle and buffalo was FMD, Liver fluke, Roundworm, Tympani, Flea, Mites and Mosquito infestation, Pyrexia, etc. New parasites and diseases in all altitude especially skin diseases in livestock have been reported to be emerging due to climate change. The causes of increase in livestock disease trend was due to decrease in the availability of the forage and grass due to adverse climate, decrease in the productivity of agricultural products, increase in prevalence of livestock parasites and vector borne diseases as well as lack of regular veterinary check up. It was found that rural communities of the study area experience some special signs of climate change. Local communities experienced increasing warm days and shortening cold/winter days. Income level from agriculture and livestock had decreased, so people are separating from their traditional occupation, way of life and they are seeking alternative professions. It is concluded that climate change is creating multidimensional impacts on the life of rural communities. Adaptation practices must be developed and awareness level of the people on climate change must be increased.

## **Seroprevalance of *Toxoplasma gondii* in Slaughtered Pigs in Kathmandu Valley**

**Krishna Chandra Ojha**

A study was conducted as a part of internship research from May to July 2013 to determine the Seroprevalence of *Toxoplasma gondii* infection in slaughtered pigs of Kathmandu Valley of Nepal and their association with different risk factors to assess the possible zoonotic transmission. A total of 86 slaughtered pig samples collected from different slaughter houses were studied. Serologic evidence of toxoplasmosis for IgG was conducted by the Enzyme Linked Immunoassay (DSI, Italy). The result was analyzed using chi-square test and Fisher exact test was used when indicated. The study showed that 10.46% of slaughtered pigs analyzed had serologic evidence of *Toxoplasma* infection (IgG). The findings demonstrated the significance of Toxoplasmosis as a disease of zoonotic importance. It showed that close contact with cat and the consumption of raw or undercooked meat were the major risk factors in the transmission of the disease. Considering the relatively high prevalence as revealed by this study, the study will provide a baseline for further research and studies on a wider scale.

## **Prevalence of Gastro-Intestinal Nematodes in Calves of Chitwan District**

**Tulsi Pandey**

A total of 120 faecal sample of cattle and buffalo calves were collected between 5<sup>th</sup> June to 19<sup>th</sup> June, 2013 from calves exhibiting all or one of the following sign of infections like loss of condition, rough hair coat, scours, diarrhea, bottle jaw, pale Mucous membrane, anaemia, But sample collected from irrespective of sex and bread. An overall prevalence of G.I. Nematodes was recorded as 43%, *Neosascaris vitulorum*, *strongyloides* 17.5%, *strongyles* spp 3.33% and *Trichuris bovis* 2.5%. *Neosacuris vilulorum* and *strongyloides* spp infestation were objsserved more than other identified worms.

## **Prevalence of Haemoprotozoan parasites in clinical cases of Dog**

**Indra Narayan Ray**

Out of 400 dogs brought to Mobile Veterinary Hospital, Jawlakhel; 100 blood samples were collected from June 2013 to August 2013, from suspected clinical cases of 100 dogs exhibiting all or one of the following sign like high temperature, lethargic, enteric mucus membrane, enlarged lymph nodes, progressive anemia, haemoglobunuria, anorexia, weight loss. Collected samples were examined by rapid test kit and blood smear examination, which revealed an overall prevalence of 23% for haemoprotozoans. Among the positive cases were *Ehrlichia canis* (22%) and *Trypanosomosis* (1%). Out of positive cases of *Ehrlichia canis* 18% was positive based on rapid test kit and remaining 4% was positive based on thin smear microscopic examination. The percentage of infection was not specific to any age, sex and breed of dogs.

## **Study on Prevalence of Ectoparasitic Infestation in Skin Problematic Dogs of Lalitpur District**

**Ram Bahadur Bogati**

A study on prevalence of ectoparasites infestation among the skin problematic dogs of Lalitpur district was conducted from June 2013 to September 2013. The prevalence of ectoparasites was done to determine associated risk factors and identify the most important ectoparasites of dogs. Skin scrapings for mange, mite

and collection of ectoparasites for lice, fleas and ticks etc were done from those dogs having skin problems. Age, sex and breed were considered as risk factors. A total of 120 dogs were taken as samples animals. Of these 68(56.67%) were positive to one or more ectoparasites. Out of 68 positive samples, single and mixed infestations were present in 47 and 21 samples respectively. Mites were the most prevalent ectoparasites, which was 35.29%. Ectoparasitic infestation is nearly similar in both sexes. Highest prevalence was found between the age group of 3-6 yrs, it was 68.42%. Highest prevalence was found in exotic breed German shepherd. From this study it could be concluded that the dogs of Lalitpur district were highly infested with ectoparasites and hence ectoparasites were serious dermatologic problems in Lalitpur.

## **Survey on Good Hygiene Practices in Retail Meat Shops in Butwal Municipality**

**Bivek Ghimire**

The present study was conducted to assess the Good Hygiene practices in the retail meat shops for safe and wholesome meat production as well to understand different roles performed by delegated institutions in ensuring quality meat production. A descriptive survey design was used to answer questions concerning the current status of meat hygiene and sanitation practiced in the retail meat shops in Butwal municipality. Meat handlers from the meat shops were interviewed through a structured questionnaire to assess their meat safety knowledge. A total of 190 retail meat shops from 376 were analyzed in random basis. It was found that 93.68% of the meat handlers had no regular health check up and 38.42% of the butchers didn't use protective clothes and 95.26% of meat shops there was no Evisceration facility and 77.37% meat shops disposed their waste materials in open space nearby and 96.84% lack lairage facilities and 99.47% was not followed ante-mortem and post mortem inspection. There was a knowledge gap about meat act within 96.32% of the meat handlers. The results, however, highlighted that a need for improved communication between veterinarian/municipal bodies and meat shop workers. The study recommends implementation of Slaughterhouse and Meat Inspection Act 1999 which has been approved in 1999 by the then GoN to promote hygienic practices and animal welfare thereby improving the quality standard of meat shops and finally the quality of meat.

## **Prevalence of *Neoscaris Vitulorum* in Cattle and Buffalo Calves of Kamalamai Municipality of Sindhuli District**

**Manoj Shrestha**

A study on the prevalence of *Neoscaris vitulorum* in young calves was conducted in the period of May to June 2013 in the different areas like Dhungrabash, Ratmata, Dhakalgaun, Milanchowk, Sangbale, Panitanki, Katthar and Majhitar of Kamalamai municipality of Sindhuli district. A total of 150 samples were collected from calves of cattle and buffalo. 96 cattle calves and 54 buffalo calves with age of 1-5 months were selected. Faecal samples were collected in clean polythene bags and preserved in 10% formalin. Each sample was labeled and preserved in refrigeration. Laboratory examination at DLS, Sindhuli was carried out for quantitative method of infection and the positive samples were centrifuged and supernatant was excreted out and charged in Mac Master Slide for 1 minute and counted in Mac Master Slide. Among 150 samples, 43 (28.66%) calves were positive for *Neoscaris vitulorum* eggs. Out of 96 cattle calves, 25(26.04%) and out of 54 buffalo calves 18(33.33%) were positive for *Neoscaris vitulorum* eggs. The present study showed that *Neoscaris vitulorum* egg is prevalent in bovine (cattle and buffalo) calves of this study area. In this study prevalence of *Neoscaris vitulorum* eggs in buffalo calves (33.33%) was more than cattle calves (26.04%). Similarly 43 samples were processed for egg per gram of *neoscaris vitulorum* and egg per gram from 1500 to 3000 was found. Calves having range of egg per gram from 1500 to 2000 were 12, 2000 to 2500 were 20 and 2500 to 3000 were 11 simultaneously.

## **An Investigation on Gastro-Intestinal Helminths of Pet Puppies in Kathmandu Valley and Knowledge, Attitude and Practice Survey of Pet Owners**

**Sandhya Bista**

Pets may carry zoonotic pathogens for which owners are at risk. The aim of the study was to investigate whether the healthy pet harbors zoonotic parasitic (helminths) infections and also to make an inventory of the knowledge, attitude, and practice of the owners regarding their companion animals. To determine the prevalence of gastrointestinal helminth parasites in apparently healthy puppies of between fifteen days to sixty days in Kathmandu Valley, Nepal, examination of 140 samples was conducted from May to September 2013. The prevalence of gastrointestinal helminths was 55.7%, of which only 12.825% was of mixed kind. The coproscopical examination revealed that all the positive samples contained *Toxocaracanis* whereas *Ancylostomacanium* was found in ten samples. There was no significant difference between the two groups of ages (15-30 days and 31-60 days) and also not between the pre weaning and post weaning puppies. Here, almost all of the mongrels were found to be infested even though they seemed healthy. However, the sources from where the samples were collected hold a significant difference, the prevalence was greater in the puppies of dog breeders (92.3%), followed by those brought in the clinics for vaccination purpose



(73.68%) whereas, those in kennel clubs had low prevalence rate (5.2%). No significant difference in prevalence between sexes was noticed. Out of 132 owners, 90.9% allowed their children to play with and groom their pets and only 56.8% of them took their dog for the regular health checkup. 72.7% thought that deworming was only required when the pets were found infested and none of the owners participated in pets related programs. This lack of proper knowledge, gap between attitude and practice of existing knowledge and close physical contact between owners and their pets possess an increased risk of transmission of zoonotic parasites. Furthermore, pets acting as asymptomatic carriers amplify the threat.

## **Comparative Study of *Cryptosporidium* Infestation in Wild Water Buffaloes (*Bubalus arnee*) and Domestic Buffaloes (*Bubalus bubalis*) of Koshi Tappu Wildlife Reserve**

**Pramesh Chalise**

*Cryptosporidium* is an important zoonotic pathogen transmitted primarily through water. This study was conducted to determine the occurrence of *Cryptosporidium* in wild water buffalo and domestic buffalo in relation to the river water in the river basins of Saptakoshi. This cross sectional study was conducted from June 2013 to October 2013. A total of 200 dung samples (100 wild water buffalo and 100 domestic buffalo living near the river basins of Saptakoshi) were examined for the presence of *Cryptosporidium* by Ziehl-Neelsen Staining technique after Modified Sheather concentration method with centrifugation. A comparative study has been conducted between pre monsoon study and post monsoon study. Overall 6% were positive for *Cryptosporidium* oocysts, wild water buffalo having higher chances of being infected than domestic buffalo ( $P < 0.05$ ). The prevalence was higher in post monsoon than pre monsoon ( $P < 0.05$ ). *Cryptosporidium* has been identified in wild water buffalo and domestic buffalo residing in the periphery of Saptakoshi river basin establishing river as an epidemiological factor for transmission. *Cryptosporidiosis* is reported for the first time in wild water buffalo in Nepal. Thus, the study suggests further research for the conservation of endangered wild water buffalo.