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Purbanchal University affiliate

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FOREWORD

Himalayan College of Agricultural Sciences and Technology (HICAST) has been conducting academic programs 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 theses based on research findings as a partial requirement for obtaining the degree the student is enrolled to. Without being properly and timely published, these research findings cannot reach to a wider readership, and continue to remain as decorative materials in the bookshelves 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 one hundred and fifteen theses researches conducted in 2017-2018. This is the eighth volume of this journal. Relevant thesis can be obtained at HICAST Library for more information.

This publication has seven chapters, viz. crop science and horticulture, plant protection, soil science, plant breeding, agri-economics and business management, sustainable agriculture and climate change, and veterinary sciences. This division is based on the departments the papers fall within.

I would like to acknowledge all the organizations (GOs, INGOs, and Private Organizations) and HICAST for providing financial as well as other support to the intern students for conducting these researches in various parts of the country. I would also like to thank all graduates of HICAST who sincerely and successfully accomplished their research responsibilities. I also acknowledge all the faculties and scientists who supervised HICAST students to conduct these researches.

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



1 December, 2018

Binayak Prasad Rajbhandari, Ph.D.

Executive Chairperson

Kathmandu Nepal

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AGRICULTURE

AGRICULTURAL ECONOMICS & BUSINESS MANAGEMENT

AN ECONOMIC ANALYSIS OF MAIZE PRODUCTION AND MARKETING IN BHAKTAPUR DISTRICT OF NEPAL

Alina Karki

An economic analysis of maize production and marketing in three municipalities of Bhaktapur district of Nepal was conducted. Three municipalities, Madhyapur Thimi, Suryabinayak, and Changunarayan were selected on the basis of maximum production of maize and availability of required respondents in said locations. Simple random sampling method was used for collecting the required information. In the total area of 7.02 hectare, the production was found to be 249.65 quintal and productivity (0.3 MT/HA). The net profit per ropani from maize cultivation was found to be highest in the Changunarayan municipality NRs.1802.89/ropani and lowest in the Madhyapur Thimi municipality NRs.1379.38/ropani. The gross margin per ropani was highest in the Changunarayan municipality (NRs.1932.16/ropani) and it was found lowest in Madhyapur Thimi municipality i.e. NRs.1489.86/ropani. The average B:C ratio of maize production in Bhaktapur district was 1:1.57. There were five main marketing channels used in maize marketing in the Bhaktapur district. It was found that lack of soil testing facilities, lack of technical know-how on maize production, lack of knowledge on appropriate dose of chemical fertilizers and no awareness about crop insurance were major production problems in the district. Nearest market and local collectors were the major agents in the marketing of the product in the said districts. Availability of labor, equipment and other facilities are the major strengths for maize production in the district while low profitability is the major weakness. If the problems are minimized, there can be a good benefit from maize cultivation. It can be suggested to cultivate maize commercially in the research area.

Keywords: *maize, marketing channel, market, collectors, economic analysis*

MARKET MARGIN ANALYSIS OF FLOWER PLANT–A CASE OF BHARATPUR METROPOLITAN CITY, CHITWAN, NEPAL

Anusha Acharya

A case study on market margin analysis of flower plant in ward numbers 10, 11 and 12 of Bharatpur Metropolitan City, Chitwan, Nepal was conducted for six months. The study objectives were to find the different marketing channels, the market margin and the problems faced by farmers in floriculture marketing. Simple random sampling was done to select the respondents. Both primary and secondary data were collected, and different statistical tools were used to analyze the data. Different socio-economic characteristics of respondents such as sex, age, education, types of family were analyzed. In very few cases the retailers/middlemen were found. The major flower plants in nurseries were found to be marigold, gerbera, godawari, hibiscus, ixora, azelia, petunia, geranium, silosia, and zinnia. Nurserymen or producer usually sell their product directly to the consumers. Among them gerbera has the highest profit margin at NRS 35 while marigold and zinnia have the lowest profit margin at NRS 5. The majority of farmers are facing the problem of proper price fixation mechanism. Other problems found were lack of marketing knowledge and information, low availability of high-quality seed in seasonal plantations, lack of availability of advance nursery tools, lack of sufficient funds, lack of coordination and partnership among public and private sectors.

Keywords: *market margin, flower plant, marketing channels, problems, Chitwan*

ECONOMIC ANALYSIS OF PIG FARMING IN THE KASKI DISTRICT OF NEPAL

Barsha Neupane

A study was conducted on economic analysis of pig farming in Kaski District of Nepal between July and November 2017. A total of 50 respondents were randomly selected from different wards in Pokhara and Lekhnath metropolitan cities of the District and interviewed using a pre-tested questionnaire. Information on the production of pigs, the marketing system of pigs and their profit regarding the farm were gathered. The farmers involved in the livestock farming and marketing were of all ages and most of them had a secondary level education. Economic analysis showed that pig production was a profitable enterprise. On average the B/C of pig farming was 1.57. The study revealed that per unit investment in pig farming returned .157 units. The average price at farm gate for pig meat was NRs.300/kg live weight. Most of the pigs were sold to traders. Along with the managerial problems, lack of labor, high interest rate for loan, and negative social cultural perceptions on pig farming were found to be major production problems. Rumors on swine flu as potential consumer health risks, market instability and transportation system were the major marketing problems in the study area.

Keywords: *economic analysis, pig farming, Kaski, production, marketing*

CONSUMERS' PREFERENCE IN BUYING VEGETABLES IN KATHMANDU VALLEY: ORDINARY MARKET VS SUPERMARKET

Bidhya Bhusal

A study on consumers' preference in buying vegetables in Kathmandu valley with ordinary markets versus supermarkets was done to know about the factors affecting the consumers' preferences. The study was carried out from August to November 2017. This covers Kathmandu, Bhaktapur, and Lalitpur districts of Kathmandu valley. Altogether 60 consumers were randomly selected and interviewed through the prepared questionnaire. The data collected was analyzed in SPSS and then a linear regression model was used to find the results. The demographic characters of the consumers of both the markets were analyzed using the descriptive statistics and frequencies. Linear regression analysis was carried out to know about the factors affecting the consumers' preference about the market. Out of 60 consumers, 30 were purchasing vegetables from ordinary market, 19 from both types of markets and 11 from only supermarkets. Of 20 variables considered for the study, only three visible variables - availability of vegetables in the market, easiness in vegetable purchase and various offers presented by the market, owners were found to be significant factors in determining the consumers' preferences. The findings of this study indicate that supermarkets and ordinary markets present in Kathmandu valley should ensure the availability of varieties of vegetables, make easy purchase of vegetables, and provide various types of offers for attracting more consumers.

Keywords: *consumers, preference, supermarkets, ordinary, market*

ECONOMICS OF BROILER POULTRY FARMING IN KATHMANDU DISTRICT

Dipika Adhikari

This study was conducted in Kathmandu district in 2017 for about six months with an objective to study the economics of broiler poultry production. For this, a survey was conducted in 35 broiler poultry farms of Kageshwori Manahara, Nagarjun, Tarkeshwor, Tokha Municipality of Kathmandu District and the data obtained through the survey were tabulated and analyzed. The findings showed that the majority of farmers have a farm size of 1000 to 2000 chicks and are doing poultry farming on the rented land; thereby, marketing their commodity through contractor from where they have brought the chicks and feed in contract. The average cost of production of 1000 chicks was found to be NRs.3,72,545 and the total return was found to be NRs.5,18,550. The gross profit obtained was NRs.1,46,005 and the net profit obtained was NRs 1,34,830. The benefit cost ratio found was greater than 1 (1.351). The cost components such as feed and chicks were found to contribute maximum percentage of about 57.71% and 21% respectively to the cost structure. The major problem faced by most of broiler poultry rearing farmers in the study area are untimely selling of chicken and rapid fluctuation in the market price. The other problems faced were found to be unmanaged market, unavailability of feed in time, unavailability of veterinary services and problem of mediator. The broiler poultry industry is a growing industry in Nepal that's why efficient policy regarding the production and marketing must be made to increase its profitability.

Keywords: broiler, poultry, production, profit, policy

PRODUCTION STATUS AND SUPPLY MECHANISM OF MANDARIN ORANGES IN DAILEKH DISTRICT

Jhakal Bahadur Bhandari

The present study was conducted in Dailekh districts in 2017 for about 2 months, with the objectives to examine the production status and supply mechanism of mandarin oranges. A survey was conducted on 100 mandarin orange producers, 10 wholesalers, 20 retailers and 50 consumers. The findings showed that the production of mandarin oranges in study area was higher than the previous years. The marketing system was a purely private based system dominated by pre-harvest contractors. The finding showed that both local and non-local pre-harvest contractors were involved in the marketing system of mandarin oranges. The supply of mandarin oranges during the on-season is more than off-season due to lack of storage facilities. Lack of improved variety, fertilizers, irrigation, orange disease (citrus declining, powdery mildew, cottony mildew and citrus greening), insects (citrus psylla, scale insect, bugs and fruit fly), lack of packaging material, storage facilities, post-harvest technology, linking road, a monopoly market system, problems in selling and unorganized nature of markets were major problems faced in the production and marketing of mandarin oranges.

Keywords: production, status, supply, mechanism, mandarin

A STUDY ON PRODUCTION AND MARKETING SYSTEM OF RICE IN THE DHANUSHA DISTRICT

Mukesh Kumar Yadav

A study on production and marketing system of rice was conducted at ward no 1, 2, and 3 of Mithila Bihari municipality in Dhanusha district. This study was performed for about 2 months, using a simple pre-tested questionnaire. A total of 100 farmers were surveyed. The findings showed that the production of rice in the study area was lower than the previous year. The marketing system of rice in the study area was a purely private based system. Agriculture is the main occupation for the people with about 90% people involved in agriculture. The local middlemen were found involved in the marketing system of rice. The marketing of rice during the on- season was more than the off season due to lack of proper storage facilities. The major problems were lack of irrigation facilities, scarce amounts of fertilizers, no improved variety, low skilled manpower, emergence of new rice diseases and insect pests related to rice production. Farmers are found at recent using tractors for plugging and transportation. Farmers are still dependent on rain for rice production because of which a large percentage of farmable land is uncultivated.

Keywords: *production, marketing, private, rice, middlemen*

MARKETING MARGIN ANALYSIS OF DIFFERENT VEGETABLES CROP IN BHAKTAPUR

Niraj Chaulagain

The study was conducted with the major objective to find out the marketing margin of different vegetables in the study area. The total number of respondents surveyed was 90. Among those, 30 farmers, 30 wholesalers and 30 retailers, 48.9% were male and 51.1 % were female. The data required in this research has been collected through a field survey and document analysis. Data analysis indicates that farm-gate price and harvest margin of dates are among the highly influential factors on the marketing margin. Calculation shows farm-gate price is less than the retail sale. On average the studied six crops (tomato, cauliflower, cabbage, radish, bitter gourd, and beans) have a benefit ratio for farmers, wholesalers and retailers as 1.54, 1.04, 1.20 per kg and the net margin were Rs.11.81, Rs.8.55, Rs. 8.1916 respectively. It was also found that the involvement of the middlemen was contributing to the increased price of the six crops. Two marketing channels were studied; Channel I where the product travelled from producer to consumers directly and Channel II where the product travelled from producer to consumer from wholesaler and retailer. It was found that farmers were not interested selling directly because they preferred selling through intermediaries. The price transmission from the producers to wholesalers was found to be highest and gradually decreasing by the retailers of the high value crops like tomato and cauliflower. It was also found that the more involvement of a middleman, there is more increase in the price.

Keywords: *vegetables, harvest margin, middlemen, channels, price*

BENEFIT COST ANALYSIS OF TOMATO CULTIVATION UNDER PLASTIC TUNNEL TECHNOLOGY IN KIRTIPUR, KATHMANDU

Nirmal Dhamala

A study on benefit cost analysis of tomato cultivation and production under plastic tunnel technology in Kirtipur Kathmandu was carried out during June to November 2017. Fifty farmers were randomly selected from different areas of the Kirtipur municipality and were interviewed with a pre-tested questionnaire. A greater number of male farmers (70.32 %) were found to be involved in tomato production under plastic tunnel as compared to female farmers (29.68 %). Agriculture was found as main occupation (78.77%). Average family size was found 4.55 with land holding size of 5.25 ropani. Economic analysis showed that tomato production was a highly beneficial enterprise justified by the higher (2.84) benefit/cost ratio of tomato production under the plastic tunnel. Another financial indicator the breakeven point of tomato production was estimated to be 23.86%, indicating lesser risk in this business. On average the cost of production, gross return and net profit per hectare per year, was estimated to be NRs. 730312.003, NRs.2080572.64 and NRs. 1350,260.637 respectively. The average tomato production per hectare per year was estimated to be 56537.3 kg. Most of the farmers sell their products to wholesale markets (41.11 %). The major advantages from the tomato cultivation under plastic tunnel are, higher income than other vegetables, higher production, and easy technique for off season production. Along with managerial problems; requirements of more labour, higher occurrence of disease and pests, higher initial cost, and higher price of inputs are found to be major problems for tomato farming in the study area.

Keywords: *tomato, production, land holding, breakeven point, benefit cost*

MARKETING MIX ASSESSMENT OF DIVERSIFIED DAIRY PRODUCTS FROM CONSUMERS' PERSPECTIVE IN LALITPUR DISTRICT

Prabin Devkota

This study on the Marketing mix of diversified dairy products from consumers' perspective in Lalitpur metropolitan municipality, Godawari municipality and Mahalaxmi municipality the Lalitpur district was carried out from July to August 2017 to know the status of market mix (product, price, place, promotion) of dairy products. A random sampling method was used for selection of respondents and the sample size was 100 consumers. Among the total respondents, 36% of respondents were female and 64% were male. The study showed that maximum respondents prefer curd and Ice-cream while butter is least preferred. According to the survey, price and quality are the major factors to be considered while purchasing dairy products. 58% of respondents purchasing decision are affected by packaging and labeling whereas 42% of respondents don't find packaging and labeling effective. Maximum respondents claimed that the most dairy products available in Lalitpur district are from DDC, NDs and Nava Pravati. Eighty-six percent of respondents buy dairy products from retailers. 82% of respondents said that advertisement is effective on purchasing decision. Only 22% of respondents admitted that they get discount on purchasing dairy products while the rest of them don't get any discount. For the advertisement purpose, social media, television and radio are thought to be the most effective by many respondents. According to the survey, the price of 500 gms/ltrs of Curd, Paneer, Butter, Ghee and Ice cream was found to be Rs 50-100, Rs 300-350, Rs 350-400, Rs 400-450 and Rs 100-200 respectively.

Keywords: *marketing, dairy products, consumers, packaging, labeling, advertising*

ECONOMIC ANALYSIS AND MARKETING OF TURMERIC IN SURKHET DISTRICT

Prakriti Neupane

A field-based study on economic analysis and marketing of turmeric in Surkhet district was conducted from July 26 to August 4, 2017 in two VDCs of Surkhet district. Random sampling method was adopted to analyze the economic aspects of the turmeric value chain. The cost of production of fresh turmeric was estimated to be NPR 13.6/kg and that for dried turmeric was estimated as NPR 83/kg. Dried turmeric is the largest traded turmeric product. There is gradual increase in the trading and price of turmeric in the last 5 years. On average, the B/C ratio of fresh turmeric was estimated to be 1.46 whereas that of the dried turmeric was 1.8. On average the producer's share of turmeric in the consumer's price was estimated to be 61.66%. There is instability in the price, with price differences up to 200% even within a single year and the price of the commodity even varies with the production pockets. Fixation on the selling price was largely done by mutual understanding between buyers and suppliers. Verbal agreement was almost universal for both farmers and traders; the mode of payment is mostly full payment after the delivery. Access to finance and storage was limited in the farm level. From the gender perspective, there was clear dominance of female responses. Family decision was popular among farmers in deciding for cultivation. Social analysis reveals that agriculture is the major source of income of all households of the project area followed by the governmental and non-governmental jobs.

Keywords: *turmeric, Surkhet, value chain, instability, price, production pocket*

COST BENEFIT ANALYSIS OF GOAT FARMING IN SURKHET DISTRICT

Priya Thapa

A study was conducted to analyze the cost and benefit of goats in Kunathari of Surkhet district during the year 2074/75. The total fixed cost was found to be NRS. 3,56,916 and total variable cost was NRS. 9,70,511.5 with the annual return of NRS. 36,15,920. The net profit was calculated to be NRS. 22,88,492.5. The Benefit- Cost ratio was found to be 2.724, which is greater than 1. This implies that by investing NRS. 1, the business (enterprise) can earn NRS.2.724 showing good return. The most common species was Khari while other species such as Jamunapari, Barbari, Boer were also found. Most of the farmers were found to be involved in a grazing system of farming followed by semi-stall fed and then stall-fed. They mostly follow a subsistence farming system whereas some are heading towards a commercial farming system. Active participation of both male and female was found, but women were found to be highly involved in the production system as goats are small and easy to handle. Locally available goods were found to be given more priority which decreases the cost of production for goat farmers. The initial cost of production was found to be very high which is recovered by the increasing return in the following year. As goat meat is the most accepted meat in the country, and the favorable climate for goat farming, farmers have also realized that by following the new farming techniques and improved goat breeds, the production system of goat has improved in the region.

Keywords: *goats, Surkhet, fixed cost, B:C ratio, meat, commercial*

ECONOMIC ANALYSIS OF DAIRY FARMING IN KASKI DISTRICT

Rakshya Poudel

A study on economic analysis of dairy farming in the Kaski District was conducted between 15th of July to 15th of November 2017. The market demand for milk and the area needed for farming is increasing day by day. A total of 63 participants were randomly selected from different wards of Pokhara and Lekhnath sub-metropolitan of the Kaski district and were interviewed using a pre-tested questionnaire. They were interviewed to gather information on production of milk, the marketing system, and the profit of the farm. The farmers involved in the livestock farming and marketing were of all ages and more of the farmers have up to level 10 education. On average B:C ratio of the dairy farming was 1.8. The study revealed that per unit investment in dairy farming returned 1.8 units. The average price of milk at farm gate is 85 NRs/lit. Therefore, for high economic return and livelihood improvement of the farmers the government and concerned agencies should play a vital role in overcoming the previously mentioned problems. Along with the managerial problems, lack of labor, high interest rates, and high price of dairy animals were found affecting the dairy industry as major production problems. Besides, the transportation system, price information and the high profit for the middlemen were the marketing problems in the study area.

Keywords: *dairy, Kaski, demand, average price, middlemen*

EFFECTIVENESS OF LIVESTOCK INSURANCE PROGRAM IN DHADING DISTRICT

Sagar Bidari

This study was conducted to access the effectiveness of a livestock insurance program among farmers of Dhading district during October 2017. Hundred households from different villages were randomly selected. A pre-tested questionnaire was used to collect the primary information on different aspects of livestock insurance and the insurer's perspective. Out of the total respondents, 65 were male and 35 were female. Majority of them were uneducated (54%). Agriculture was the major family source of income for (87%) of the respondents followed by service (7%), business (5%) and foreign employment (1%). The major source of information on livestock insurance was from relatives (44%), livestock service center (24%), cooperatives (22%), radio and television (7%), agent (2%) and self (1%). Ninety eight 98% of the insurer households were highly satisfied with the insurance services. Only 53% of the insurers were found able to read the terms and conditions while signing with literacy. 50% of the responding farmers had insured their animals through Shikhar Insurance Company followed by 26% by agriculture cooperatives, 21% by NLG insurance company and 2% by Sagarmatha Insurance Company. Out of total animal holdings, only 19% of goats, 15% of cattle and 12% of buffalo were insured by the farmers. About 90% of the people found it to be an easy procedure for insuring their livestock. Thirty three percent of the claims were reimbursed within a month and 58% of the claim files reimbursed within three months. The livestock insurance program in Dhading was found effective; and has highly satisfied client farmers.

Keywords: *livestock, insurance, Dhading, reimbursed, satisfied*

ECONOMIC ANALYSIS OF VEGETABLE SEED PRODUCTION IN WEST RUKUM

Samiksha R.C

This study was conducted in the Rukum district of Nepal to assess the economics of major vegetable seed production. The survey was conducted during the 15th of Nov 2017 employing a household survey and focus-group discussion (FDG). For the household survey, two village development committees (VDC) Machhimi and Solabang were purposively selected. A total of 50 households were selected randomly (twenty-five household from each VDC). Village level FGDs were conducted in both VDC's. Average area under seed production in Machhimi and Solabang were found to be 0.20 Ha and 0.13 Ha respectively and a total 62 % of farmers received training related to seed production. The economic analysis study of vegetable seed production revealed that the B:C ratio of radish seed, onion seed and cauliflower seed were 3.07, 13.26 and 2.5 respectively. 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.

Keywords: *Rukum, seed, vegetable, B: C ratio, channel*

ECONOMICS OF TOMATO CULTIVATION AND MARKETING IN SURKHET DISTRICT

Sujita Lamichhane

Vegetables are the most promising and profitable agriculture enterprises to improve rural livelihood through income generation and self-employment. Among several vegetables, tomato is one of the major vegetable popular among farmers in the nation. The objective of the study was to assess the economic and marketing aspects of tomato production in the Surkhet district of Nepal. A household survey was conducted during the 24th August to the 16th September 2017. Hundred respondents from Panchapuri municipality of Surkhet district were randomly selected and interviewed. The average cost of tomato production was found to be NRs 5,69,167.99/ha while the gross return was NRs 21,78,000. On an average, B/C ratio of tomato enterprise was found to be 3.82. Similarly, an average market margin of tomato was found to be NRs. 24.8 per kg. The establishment of several collection centers as Palaitoy and different mandis by different institutions has helped farmers a lot to get the appropriate market for their produce. Bulbule market has been the major platform for their marketing. Producers, collection centers, middle men, traders, wholesalers, retailers and consumers were found involved in the marketing channel. Along with several socioeconomic and commercial benefits of the tomato enterprise, farmers described disease and pest as the major problems. Lack of packaging material and processing facility were the major post production problems. Therefore, benefits can be optimized through industrialization and commercialization of tomato production. The concerned government agencies should help to develop appropriate production technologies and extension facilities as well as marketing infrastructure.

Keywords: *vegetables, Surkhet, tomato, benefits, problems*

ASSESSMENTS OF MARKETING MIX OVERVIEW OF DIVERSIFIED DAIRY PRODUCTS FROM RETAILERS' PERSPECTIVE IN LALITPUR DISTRICT**Udit Bhandari**

This study on the marketing mix of diversified dairy products from retailer's perspective in Lalitpur Metropolitan city, Godawari Municipality and Mahalaxmi Municipality of Lalitpur district from June-July 2017 was conducted to know the status of the market mix (product, price, place, promotion) of dairy products. Ninety seven percent of the respondents were found to sell curd, 79% retailers sold ghee, 75% retailers sold paneer and 66% said that they sold cheese along with other products. The percentage of respondents that considered imported dairy products to have an advantage over local is 31% while, 69.1% thought there was no advantage. It was found that 55% of customers focused on quality aspect and taste, more than the pricing of the product. Research showed that 36% customers visiting retailer shops searched for labelling and 35% were influenced by brand image, while making purchasing decisions. The majority of respondents said that they have a refrigeration facility for dairy products while 5% are lacking this component. Seventy percent of the retailer respondents divulged that they would give space for a newer company's product. Fifty three percent of the respondents said TV advertisement was the main form of promotional activities that the dairy companies usually undertake while 41% said print advertisement, and 22% expressed that radio advertisement was the main form of advertisement. Likewise, 25% respondents voiced that Facebook and other social media forms could be a better option. Retailers were found to be not conscious of consumer's health issues and public health hazards which could create havoc if not addressed in time.

Keywords: dairy, diversified, perspectives, social media, retailers

HORTICULTURE

EFFECT OF INTEGRATED PLANT NUTRIENT MANAGEMENT ON GROWTH, YIELD AND SOIL NUTRIENT STATUS OF SPINACH

Areena Maharjan

A study was carried out to evaluate the effect of integrated plant nutrient management on the growth, yield and soil nutrient status of *Spinaceae oleraceae* in the field at Chandagiri Municipality, Naikap; Kathmandu during September 2017 with RCBD method. There were 7 treatments viz. T1 ($\frac{1}{2}$ NPK + 4 ton/ha vermicompost), T2 ($\frac{3}{4}$ NPK + 2 ton/ha vermicompost), T3 ($\frac{1}{2}$ NPK + 16 ton/ha FYM), T4 ($\frac{3}{4}$ NPK + 8 ton/ha FYM), T5 ($\frac{1}{2}$ NPK + 2.67 ton/ha poultry manure), T6 ($\frac{3}{4}$ NPK + 1.33 ton/ha poultry manure) and T7 (Control) with three replications. The maximum plant height, number of leaves per plant, yield per plot and yield per hectare were observed with the treatment T2. Similarly, the maximum organic matter percentage was recorded in the plot treated with T2 and the optimum pH was obtained from T3. The total soil nitrogen and available soil phosphorus were found maximum in the treatment T5 whereas maximum available soil potassium was found in treatment T4. Economic analysis showed that spinach production was highly profitable with the application T2. The highest gross return (Rs. 35,380), net returns (Rs. 14,740) as per the cost of cultivation (Rs. 20640) were obtained per hectare and the benefit-cost ratio was obtained 1.71; as per the investment it was acceptable from financial point of view. Vermi-compost along with NPK is effective in terms of growth and yield of field grown spinach; eventually, integrated plant nutrient supply will sustain the soil fertility and plant productivity.

Keywords: *spinach, treatments, phosphorus, potassium, productivity*

EFFECT OF INTEGRATED PLANT NUTRIENT MANAGEMENT ON GROWTH, YIELD AND LEAF NUTRIENT STATUS OF SPINACH

Bhagawati Shahi

A study on integrated plant nutrient management on growth, yield and leaf nutrient status of spinach (*Spinacia oleraceae* L.) was carried out in the Chandagiri Municipality, Kathmandu in September 2017. There were 7 treatments viz T₁ ($\frac{1}{2}$ NPK + VC @ 4 ton/ha), T₂ ($\frac{3}{4}$ NPK + VC @ 2 ton/ha), T₃ ($\frac{1}{2}$ NPK + FYM @ 16 ton/ha), T₄ ($\frac{3}{4}$ NPK + FYM @ 8 ton/ha), T₅ ($\frac{1}{2}$ NPK + PM @ 2.67 ton/ha), T₆ ($\frac{3}{4}$ NPK + PM @ 1.33 ton/ha) and T₇ (control) with 3 replications. The experiment was laid out in randomized complete block design. The maximum plant height (28.15 cm), number of leaves per plant (13.42), yield per plot (3.928 kg/plot), yield per ha (7.856 ton/ha) and the post-harvest losses (10.08) under room temperature were obtained in T₂. Similarly, all the applied treatments influenced significantly in the leaf nutrient status of spinach. The maximum total ash (27.52%), nitrogen (4.59%), magnesium (0.905%), potassium (0.506%) and phosphorus (0.0740%) content of leaf was obtained in T₃. The maximum plant dry matter (95.17%) and leaf calcium content (0.0195%) were obtained in T₄ and T₃. Economic analysis showed that spinach production was highly profitable in application of $\frac{3}{4}$ NPK + VC @ 2 ton/ha (T₂). The highest gross returns (Rs. 35,380 per ha), net returns (NRs. 14,740 per ha), cost of cultivation (Rs. 20,640 per ha) and benefit cost ratio (1.71) were obtained in T₂. Vermicompost along with NPK is effective in terms of growth and yield of spinach crop.

Keywords: *spinach, treatments, profitable, gross return, vermicompost*

SPONGE GOURD PRODUCTION AND MARKETING PRACTICES IN CHANGUNARAYAN MUNICIPALITY OF BHAKTAPUR DISTRICT

Bishnu Kala Thapa

The research entitled “Sponge gourd production and marketing practices in Changunarayan municipality of Bhaktapur district” was conducted from June to September 2017 to examine the existing production practices and marketing of sponge gourd in the study area. Primary data were collected through field visits, household surveys and farmer’s group discussion. 60 farmers were randomly but purposively selected. Socio-demographic features revealed that about 73% males and 27% females were involved in sponge gourd production with 52% of the farmers above age 50 and who were illiterate. The widely cultivated variety was variety New Narayani (F1) and spacing maintained was 1-2 m. No evidences of locally used varieties were found. Widely used intercrops were soya bean, cowpea and bitter gourd which help to enrich soil fertility. The highly occurred disease was downy mildew and insect pests were fruit flies and blue pumpkin beetle. Chemical control of pest management was followed and no other approaches were followed for plant protection. Sponge gourds were directly sold to collectors and wholesalers and major market places were Bhaktapur, Kalimati, Balkhu and Tukucha. The B:C ratio of sponge gourd was approximately 3.24 with cost of production NRs.10,333.33 kg per ropani and price per kg was NRs.28.083. Government support is needed to upgrade sponge gourd production and its marketing at national level for farmers’ welfare and consumers share.

Keywords: *sponge gourd, marketing, production, diseases, pests*

EFFECT OF INTEGRATED PLANT NUTRIENT MANGEMENT ON GROWTH, YIELD, LEAF NUTRIENT STATUS OF BROAD LEAF MUSTARD (*Brassica juncea* var. *rugosa*)

Chakra Devkota

An experiment on Integrated Plant Nutrient Management on Growth, Yield and Leaf Nutrient Status of Broad Leaf Mustard (*Brassica Juncea* var. *rugosa*) was carried out in open field condition in the farmers’ field at Bigam VDC of Dakshinkali municipality located in Kathmandu district during August 2017 to December 2017. The experiment was laid out in Randomized Complete Block Design. There were 9 treatment viz, T1(½ NPK +4 ton/ha Vermicompost), T2(¾ NPK + 2 ton/ha vermicompost), T3 (½ NPK+ 12 ton/ha FYM), T4(¾ NPK + 6ton/ha FYM), T5 (½ NPK+ 2 ton/ha Poultry Manure), T6 (¾ NPK+ 1 ton/ha Poultry Manure), T7 (½ NPK + 6 ton/ha Compost), T8(¾ NPK+ 3 ton/ha Compost) and T9 (Control) with three replications. All the treatments were applied at the time of transplantation as basal application. In the study maximum plant height and leaves size was observed in T5(½ NPK+ 2 ton/ha PM) and yield per plot and yield per ha was observed in T6(¾ NPK+ 1ton/ha PM). Similarly the maximum plant canopy volume was observed in T2 (¾ NPK+ 2ton/ha VC). The highest leaf nitrogen, phosphorous and potash were found in the treatment T7 (1/2 NPK+ 6 ton/ha Compost), T5(1/2 NPK+ 2 ton/ha Poultry Manure) and T2 (¾ NPK+ 2 ton/ha VC) respectively.

Keywords: *broad leaf mustard, treatments, transplantation, basal application*

COMPARATIVE STUDY OF CHILLI GROWING UNDER DIFFERENT MEDIA

Deepa Khadka

An experiment was conducted at the Standard Nursery on the chilli variety (NS-1701) grown in poly bags, in Bansbari, Kathmandu from the 26th of July to the 25th of September 2017 with the major objective to investigate the comparative study of chilli (*Capsicum annum*) under different growing media. The experiment followed the principle of randomization complete block design with six treatments and three replications. The six treatments of the experiment were T₁ 62.5%soil+ 25% compost + 12.5% ash(control), T₂60%cocopeat+ 10%% perlite+ 5%rice husk + 25%compost(control), T₃62.5%soil+25%compost+12.5% ash+ 1.68gmhydrogel, T₄60%cocopeat+ 10%perlite+ 5%rice husk+25%compost+1.68gmhydrogel, T₅85%cocopeat+ 15%perlite, T₆75% cocopeat +25% rice husk were used to check the better growth of chilly in polybags. Various parameters were analyzed using Gene Stat software. The overall best performance was recorded in media cocopeat+ perlite+ rice husk+ compost for almost all the parameters; plant height (23.60cm), no. of flowers (4.70), quantity of fruit (5.17) and the media soil+ hydrogel alone also performed significantly well for all the parameters including the maximum 28.62 leaves per plant. Cocopeat+ perlite and cocopeat +rice husk, were used as a growing medium and showed the least response. The study revealed that cocopeat+ perlite+ compost+ rice husk (control) is the best growing media for overall plant growth, flower number and fruit number for the chilli plant.

Keywords: *chilli, treatments, parameters, growing medium, response*

A STUDY ON MARKETING STATUS OF VEGETABLE CROPS IN DARCHULA DISTRICT

Gajendra Narayan Nath

A study on marketing status of vegetables crops at Boharigaun, Rithachaupata and Gokuleshwor VDCs in Darchula district was carried out. During 26th of July to the 26th of October 2017, ninety respondents were randomly selected and interviewed. The respondents included producers, wholesalers and retailers of the study area. The average area under cultivation was 36.7 percent of total usable land vegetable farming and it was gaining popularity across the study areas. Tomato, potato, cabbage and cauliflower were identified as the major vegetables produced in commercial scales. The average cost of tomato, cabbage, cauliflower and potato production was found NRs. 5.91, 6.93, 27.55 and 19.95 per Kg respectively. The marketing margin of tomato, cabbage, cauliflower and potato was found NRs. 10.23, 3.83, 8.17 and 6.78 per kg respectively. It was found that producers to consumers and producers to retailers to consumers were the most common and vibrant channels for vegetables flowing across the study areas. Attack of disease and insect pests were found as the major problems of vegetable production system. Similarly, lack of packaging material and processing facility were the major marketing problems. Therefore, the benefit can be optimized through commercialization of vegetable farming. Appropriate production technologies and extension facilities as well as marketing infrastructure and timely and quality input supply should be developed in the studied areas.

Keywords: *vegetables, marketing status, average cost, channels, diseases and pests*

COMPARATIVE STUDY ON SEASONAL AND OFF-SEASON CABBAGE PRODUCTION IN AMARGADI MUNICIPALITY OF DADELDHURA DISTRICT, NEPAL

Gyanendra Prasad Joshi

A comparative study on seasonal and off-season cabbage production in the Amargadi municipality of Dadeldhura district, Nepal was carried out from September to November 2017 to compare the benefit from seasonal and off-season cabbage production. Dadeldhura was selected as study area because seasonal and off-season cabbage growers were more in Dadeldhura than other places of the Far-Western Development Region. Sixty households were selected for an interview with the help of a semi-structured questionnaire. The study showed that the respondents between 15-59 years were found to be maximum (62.04%) in cabbage production. Both genders were involved in cabbage production among which 58.3% were males and 41.7% were females. When compared the seasonal and off-season cabbage production system, the yield was higher in seasonal cabbage production but the price of cabbage during off-season was higher. The B:C ratio of cabbage was 1.78 and 2.51 in seasonal and off-season respectively. This showed that the net profit was higher in off-season than in seasonal cabbage due to higher market price in addition to higher demand.

Keywords: seasonal, off-season, cabbage, B:C ratio, profit

STUDY ON PRESENT STATUS OF JUMLI BEAN PRODUCTION AND MARKETING IN JUMLA

Hari Shankar Chaulagain

The present study was conducted in the Jumla district from 9th of July to 9th of October 2017 with an objective to examine the present status of the Jumli bean production and marketing. A survey was conducted on 70 bean growers and 15 bean collectors. The findings showed that the production of the Jumli bean in the study area is in increasing trend. The result of the study had also revealed that the Jumli bean cultivation is profitable in the study area. The average benefit-cost ratio (BC) was found to be 1:1.82 and average productivity was 99.57 kg/ropani. The marketing margin of bean between farmers to consumer was found to be NRs. 16.42/kg. The average gross margin in the study area was NRs. 5272.84. The average variable cost and return per ropani in the study area were NRs. 6159.43 and NRs. 11432.25 respectively. Jumli bean growers and collectors are the major actors involved in Jumli bean marketing in the Jumla district. The major problems faced by the bean farmers are no access to improved bean seed and a technical support program for bean production, and no effective and organic pesticides for the management of diseases like bean rust, bean anthracnose and insect pests (weevils and black blister beetle). There is prevalence of unorganized marketing system with poor coordination among different actors involved in the marketing of beans. These problems should be well addressed to promote benefit oriented and commercial production of the bean in a more sustainable way.

Keywords: Jumla, Jumli bean, profitable, diseases, marketing system, commercial

PRODUCTION STATUS AND MARKET ANALYSIS OF SHIITAKE MUSHROOM IN KATHMANDU VALLEY AND KAVREPALANCHOK DISTRICT

Hasana Shrestha

A study on production status and market analysis of shiitake mushroom in Kathmandu valley and Kavrepalanchok district was carried out from September to November 2017. A survey was conducted at the producers, traders and consumers level through a semi-structured questionnaire. Forty, 30 and 30 respondents for producer, traders and consumer level survey respectively were selected randomly but purposively. The analysis of socioeconomic status of respondents showed that there were 93% of male and 7% of female with the majority of the age distribution (50%) between 21-40 years of age. The spawn strain of shiitake mushroom used by farmers in the study area was M290 and M299. Farmers used *Alnus nepalensis*, *Castanopsis*, *Betula* and other trees species (*Quercus sp*, *Prunus sp*) as substrate for the mushroom cultivation. The mushrooms are grown inside maize/ wheat straw thatch or plastic tunnel and require water as its nutrient supplement. Shiitake mushroom is affected by fungal competitors grown in substrate along with some pests like slugs and thrips. Fungal competitors are controlled by removing the fungus by scrubbing and cleaning with water. 40% of producers sell shiitake directly to consumers only and 60% of producers sell the mushroom both to traders and consumers. The B:C ratios of shiitake mushroom were 1.97, 17.97 and 4.89 with costs of production were NRs. 526.95, 172.45 and 180 per log and average yields were 1.22, 3.39 and 0.91 kg/log in 1st, 2nd and 3rd year respectively. Selling price of shiitake mushroom per kg was NRs.705.76 and average yield per log was 0.91 kg.

Keywords: *production status, market analysis, shiitake mushroom, pests, diseases*

PRODUCTION AND MARKET STATUS OF APPLE AND ITS ROLE IN INCOME GENERATION IN BAITADI DISTRICT

Jayant Prakash Bhatt

The present study on production and market status of apple and its role in income generation was carried out in the Dasharath Chand municipality of Baitadi district from 16th of September to 30th of November 2017. Altogether 60 farmer respondents were selected randomly for the survey and a pre-tested questionnaire were used to collect the necessary information. The farmers produced different types of apples but the major ones were high chilling cultivars such as Red Delicious, Royal Delicious, Golden Delicious and Golden Spur. The age group of the respondents was in between 35-45 years and was found to be maximum in apple production. Majority of the respondents had land holding of 2.5-3.5 ropani for apple production. The average benefit cost ratio of apple production was 2.11 which indicate that farmers were making a profit. Most farmers had their own land for apple cultivation while a few had rented land. The farmers were aware of the use of fertilizer and had used organic fertilizer for organic production. Government offices and I/NGOs have important role in motivating the farmers towards apple production. Gothalapani, Dehimandu, Musyachor, and Katpate Bazar of the Baitadi district were the major local markets whereas Dhangadi, Mahendranagar and Nepalganj were the major apple markets for both wholesalers and retailers.

Keywords: *production, market status, apple, income, B:C ratio*

STUDY ON VASE LIFE OF CUT CARNATION FLOWERS AND ITS POST-HARVEST HANDLING PRACTICES ADOPTED IN KATHMANDU VALLEY

Jayanti Khadka

A study on vase life of cut carnation flowers and its post-harvest handling practices adopted in Kathmandu valley was carried out at the Post-Harvest Laboratory of HICAST, Kalanki, Kathmandu, from the 29th of August to the 18th of September 2017. The main objective of the research was to study the vase life of carnations and its postharvest handling practices adopted by growers and retailers. There were 5 treatments viz. T₁ (3% sucrose), T₂ (6% sucrose), T₃ (6% ethanol) T₄ (8% ethanol) and T₅ (control) with 3 replications. The experiment was laid out in a complete randomized design. Among the different treatments, ethanol at 6% recorded highest water uptake (22.92 g/cut flower) and the lowest was 3% sucrose (9.25 g/cut flower). The highest fresh weight was observed in control (82.06 g/f). The highest flower diameter was observed in 6% sucrose (5.9 cm) during vase life period. The longest vase life was recorded in 8% ethanol (17.22 days) and time required for full flower opening was delayed with the 6% ethanol (9.78days). More acidic pH was observed in 3% sucrose (4.35) which was at par to 6% sucrose (4.63). The study showed that ethanol was found effective in terms of vase life, water uptake and visual rating of flowers. The growers and retailers did not use any chemical preservatives in pulsing and holding solutions.

Keywords: *vase life, carnation, treatments, preservatives, post harvest*

STUDY ON THE MARKETING SITUATION OF MAJOR FRUITS IN KATHMANDU AND BHAKTAPUR DISTRICTS

Kiran Joshi

A study on marketing situation of major fruits in Kathmandu and Bhaktapur District was conducted with the objective of assessing the future fruit market potentiality and strategies in the said districts. This study was done from July to September 2017 covering wholesale markets, supermarkets, retail shops and street vendors. Women's participation was found dominant in street vending but involvement of mainly men of the Madheshi community was higher in the wholesaling and bicycle vending. Supermarkets were fetching higher price due to their special packaging systems and good display whereas the retail shops and street vendors did not have any packaging systems. There was demand and supply of apple, pomegranate and banana all the year round in all kinds of fruit markets. The yearly supply of orange in Kathmandu and Bhaktapur was the highest (56,68,775 Kg) followed by mango (14,03,185 Kg), apple (9,42,013 Kg) and papaya (6,52,030 Kg) in 2017. The quantity of daily sales of fresh fruit commodities by street vendors was slightly greater than that of retail shops. This is due to the mobility of street vendors in several streets and the sale of fruit commodities at cheaper prices than that of the retail shops. The main source of fruits marketed in retail shops were Kalimati and Balkhu fruits and vegetables markets. If the production of the fruits is done in a more commercial manner all year round in Nepal, there would be huge potentiality for a successful fruit market in the Kathmandu and Bhaktapur districts.

Keywords: *fruits, market, supermarket, demand, supply*

PROTECTED GERBERA PRODUCTION AND MARKETING IN SOME LOCATIONS OF PROVINCE No. 3, NEPAL

Madhavi Baskota

A study on protected gerbera production and marketing in some locations of the Kathmandu, Bhaktapur, Kavrepalanchowk and Chitwan districts of Nepal was carried out from July to October 2017. Purposively 39 respondents were selected which included producers, wholesalers and retailers. A single marketing channel was figured out in the study area, i. e. Growers-Wholesaler cum Commission Agents-Retailers-Consumers. The cost of cultivation of gerbera varied with different types of protected structures. It was Rs. 1,006,450 per year in Semi hi-tech naturally ventilated greenhouse with subsidy and Rs. 1,136,450 in Semi hi-tech naturally ventilated greenhouse without subsidy. It was Rs. 873,666 and Rs. 516,800 per year in Bamboo polyhouse (Case-I and Case-II respectively). It was Rs. 777,333 in Semi hi-tech structure made by MS black pipe, Rs. 811,666 in Dome shaped Bamboo-iron polyhouse, Rs. 410,366 in Top-vent GI polyhouse, Rs. 839,253 in Top-vent Iron polyhouse and Rs. 357,333 in Dome shaped GI polyhouse. The highest B:C ratio (1.98 at farm gate and 1.65 after including wholesale charge) was found in case of Semi hi-tech natural ventilated greenhouse with subsidy while the lowest B:C ratio (0.87 at farm at farm gate and 0.8 after including wholesale charge) was found in case of Bamboo polyhouse (Case-I). The initial investment was the highest in Semi hi-tech greenhouse but production under condition was found profitable in the long run compared to all other types of conditions. Major problems of the respondents were high initial investment, lack of cold storage facilities, seasonal demand and lack of technical support.

Keywords: *gerbera, channel, B:C ratio, profitable, problems*

PRODUCTION AND MARKET STATUS OF VEGETABLE CROPS AND ITS ROLE IN INCOME GENERATION IN THE CHITWAN DISTRICT

Meena Poudel

A study on the production and market status of vegetable crops and its role in income generation in the Chitwan District was carried out in the two municipalities, Bharatpur and Ratnanagar and 2 VDCs, Shivaghat and Saranpur during the period of 25th August to the 28th November 2017. The main objective of this study was to see the impact on livelihood improvement of the people. All together 100 respondents were selected for survey applying random sampling techniques. Among them 40 respondents were from Bharatpur Municipality, 40 from Ratnanagar Municipality, 10 from Shivaghat VDC and remaining 10 respondents were from Saranpur VDC. Both genders were found to be involved in the vegetable production in the study area. 58% of the respondents were found to be male and 42% were female. Seventy seven percent of the respondents were literate. The largest percentages of respondents participating in vegetable production were between 25-35 years old. The majority of respondents had land holdings more than 0.3 hectares for vegetable production. There were several marketing channels adopted, Kathmandu, Pokhara, Hetauda, Butwal, Dhadhing and local markets whereas Chitwan was the main market for wholesaler, retailer and producer. The majority of respondents 39% earned NRs.1-4 lakhs annually. Fifty one percent of the respondents had a double increment in the annual income after vegetable farming. The lack of quality seed and fertilizer at required time, disease and pest attack, and the price fluctuation in the market were the major constraints in vegetable production in the Chitwan district.

Keywords: *market, production, Chitwan, constraints, vegetables*

EFFECT OF ORGANIC PLANT NUTRIENT MANAGEMENT ON GROWTH, YIELD AND SOIL NUTRIENT STATUS OF SWISS CHARD

Pratika Regmi

The present study on the effect of organic plant nutrient management on growth, yield and soil nutrient status of Swiss chard was carried out in a farmer's field in Tinthana, Chandragiri-15, Kathmandu during August 2017. The study consisted of five treatments, T₁(vermicompost), T₂(Compost), T₃(Poultry manure), T₄(Farmyard manure) and T₅(Control) with three replications which were laid out in randomized complete block design. The amounts of treatments applied were vermicompost 13.3 ton/ha, Compost 20 ton/ha, poultry manure 6.6 ton/ha, FYM 40 ton/ha. All the treatments were applied during transplantation of seedlings. Growth parameters such as plant height, number of leaves, leaf size, plant canopy volume, and yield per plant/plot/hectare were observed within the treatments during the harvesting stage. Microsoft Excel and Genstat (developed by VSN International Ltd.) were used for the analysis of variance and other data analysis. The treatment effects were tested at a 5 percent level of significance. The plant height, leaf size, plant canopy volume, yield, soil organic matter, soil potassium, were highest in T₁(Vermicompost). The number of leaves, soil nitrogen and soil phosphorous were at maximum in T₃ (Poultry manure). Optimum pH was obtained in T₂ (Compost). Thus, vermicompost is considered an effective organic nutrient for plant growth, yield and soil nutrient status of Swiss chard.

Keywords: *growth, yield, Swiss chard, treatments, vermicompost*

EFFECT OF ORGANIC PLANT NUTRIENT MANAGEMENT ON GROWTH, YIELD AND POST HARVEST QUALITY OF BROAD LEAF MUSTARD (*Brassica juncea* var. *rugosa*)

Punam Budhathoki

The field experiment was conducted to evaluate the effect of organic plant nutrient management on growth, yield and post harvest management of broad leaf mustard (*Brassica juncea* var. *rugosa*, BLM) which was carried out in the Bigam VDC of Dakshinkali municipality located in Kathmandu district during August 2017. The experimental plants were subjected to five treatments viz. T₁ (24ton/ha FYM), T₂ (8ton/ha vermicompost), T₃ (4ton/ha poultry manure), T₄ (12ton/ha compost) and T₅ (Control) with three replications. The experiment was laid out in a randomized complete block design. The results showed that the maximum plant height (36cm), number of leaves per plant (13), leaves size (868.89cm²) and leaf canopy (0.053m³) were found with treatment T₂(8ton/ha vermicompost); The maximum yield per plant (0.149kg/plant), yield per plot (4.37 kg/plot) and yield per hector (8.65kg/ha). The vitamin C content in BLM were also found in T₂ (8ton/ha vermicompost). Similarly, in case of post harvest quality, the maximum shelf life period in BLM was observed in T₂ (8ton/ha vermicompost) and T₄ (12 ton/ha compost) (9 days each). In terms of organoleptic test, maximum acceptance was found in T₂ (8ton/ha vermicompost) (7.5). The study concludes that the effect of 8 ton/ha vermicompost in terms of growth, yield and post harvest quality were more effective in selected crop.

Keywords: *broad leaf mustard, treatments, shelf life, growth, yield*

TOMATO PRODUCTION PRACTICES, PROBLEM AND MARKETING IN THE BAJHANG DISTRICT

Puskar Malla

Vegetables are not only beneficial for their contribution to the share of agriculture in the economy of Nepal, but also have a significant probability to compete where there are fewer government regulations and restrictions in the economy. Currently, the local demand for vegetables is higher than local production and hence the gap is filled by imports from India. “Tomato production, problem and marketing in the Bajhang district” was carried out in June to September 2017 in the Jayprithivi municipality and Thalara rural municipality. The major objective was to study production practices, problems and marketing of tomato in the Bajhang district. The study was conducted in the Bajhang district based on the area coverage, production, pest and disease along with the marketing and marketing problems. The results showed that the factors that significantly affected productivity of vegetable farmers the most were pests (tomato fruit borer), the tomato mosaic virus, traditional farming system, access to credit, selling price, fertilizer quantity, distance to market and gender of the farmer. The determinants of profitability of vegetable production were level of education, land under vegetable production and type of marketing agency.

Keywords: vegetables, imports, problem, marketing, production

STUDY ON PRODUCTION, PROBLEMS AND POST- HARVEST PRACTICES OF BANANA CULTIVATION IN THE KANCHANPUR DISTRICT

Puspa Bhatt

A study on production, problem and post- harvest practices of banana cultivation in 3 Municipalities of the Kanchanpur district, Nepal was conducted from August 2017 to January 2018 using a set of semi structured questionnaires. There were around 558 households cultivating banana commercially in around 400 ha. Agriculture is the main occupation in the study area where the literacy rate was 76%. Grand Nain (G9) was the dominant variety followed by the William Hybrid, and sucker was the major propagation material. Banana weevil and banana stem borer were the most common insects and banana bunchy top followed by panama wilt were the most common diseases found. Traditional type of farming, deformed market structure, labor shortage, and influence from the Indian banana import, low price and high transportation cost were major problems for commercial production and marketing. All farmers harvest their banana at a mature green stage. Most farmers (62%) grade their banana fruit basically by size and color. A large percentage of farmers (42.02%) were found using banana leaves as a cushioning material. The means of transportation used were tricycles, bicycles, trucks and jeeps. Forty nine percent of the farmers sold their fruits in local markets. Only a few farmers were found making value added products such as alcohol, chips, and vegetables only for their table purpose. All respondents reported that banana cultivation had been increasing the living standard of the farmers. The farmers should be encouraged to farm bananas commercially to uplift the living standard of the farmers and household economy.

Keywords: production, problem, post-harvest practices, banana, living standard

EFFECT OF INTEGRATED PLANT NUTRIENT MANAGEMENT ON GROWTH, YIELD AND SOIL NUTRIENT STATUS OF SPINACH

Rojina Shrestha

An experiment was conducted to evaluate the effect of integrated plant nutrient management on the growth, yield and soil nutrient status of spinach (*Spinaceae oleraceae*) in a field in the Chandagiri Municipality, Kathmandu during September 2017. Seven treatments viz. T₁ (½ NPK + 4 ton/ha vermicompost), T₂ (¾ NPK + 2 ton/ha vermicompost), T₃ (½ NPK + 16 ton/ha FYM), T₄ (¾ NPK + 8 ton/ha FYM), T₅ (½ NPK + 2.67 ton/ha poultry manure), T₆ (¾ NPK + 1.33 ton/ha poultry manure) and T₇ (Control) with three replications were applied. The maximum plant height, number of leaves per plant, yield per plot and yield per hectare were observed with the treatment ¾ NPK + 2 ton/ha vermicompost (T₂). The maximum organic matter percentage was recorded in the plot treated with ¾ NPK + 2 ton/ha vermicompost (T₂) and the optimum pH was obtained from ½ NPK + 16 ton/ha FYM (T₃). The total soil nitrogen and available soil phosphorus were found maximum in the treatment ½ NPK + 2.67 ton/ha poultry manure (T₅) whereas maximum available soil potassium was found in treatment ¾ NPK + 8 ton/ha FYM (T₄). Spinach production was highly profitable in the T₂. The highest gross return (Rs. 35,380), net returns (Rs. 14,740) as per the cost of cultivation (Rs. 20640) were obtained per hectare and the benefit-cost ratio obtained was 1.71. Vermicompost along with NPK was found effective in terms of growth and yield of field grown spinach.

Keywords: *spinach, treatments, nitrogen, potassium, vermicompost*

EFFECT OF INTEGRATED PLANT NUTRIENT MANAGEMENT ON GROWTH, YIELD, AND POST HARVEST QUALITY OF BROAD-LEAF MUSTARD (*Brassica juncea* var. *rugosa*)

Sajita Parajuli

The present investigations on effect of integrated plant nutrient management on growth, yield and post harvest quality of broad leaf mustard (*Brassica juncea* var. *rugosa*) was undertaken in the Divya Organic Agricultural Production Pvt. Ltd Farmers' field in the Dakshinkali Municipality-3 in Bigam Kathmandu district, Nepal, during August 2017. The experimental plants were subjected to 9 treatments viz. T₁ (½ NPK + 4 ton/ha Vermicompost) , T₂ (¾ NPK + 2ton/ha Vermicompost) , T₃ (½ NPK + 12ton/ha FYM) , T₄ (¾ NPK + 6ton/ha FYM) , T₅ (½ NPK + 2ton/ha Poultry Manure) ,T₆ (¾ NPK + 1ton/ha Poultry Manure), T₇ (½ NPK + 6ton/ha Compost) , T₈ (¾ NPK + 3ton/ha Compost) and T₉ (Control). The experiment was laid out in a randomized complete block design with 3 replications. For statistical analysis, data systematically arranged for observed parameters and analyzed with Microsoft Excel and Gen Stat software's. The treatments were tested at 5 percent level of significance. In this study, maximum plant height, number of leaves per plant, leaf size, plant canopy volume, yield per plant, yield per plot, yield per hectare were observed with treatment ¾ NPK + 2ton/ha Vermicompost. However, the rating of the highest preference on the organoleptic test based on taste was observed maximum with treatment ¾ NPK + 3 ton/ha compost. The maximum vitamin C content was observed with ½ NPK + 4 ton/ha Vermicompost. Vermicompost along with NPK has been observed as a very source of plant nutrients.

Keywords: *broad leaf mustard, treatments, height, preference, vermicompost*

EFFECT OF ORGANIC PLANT NUTRIENT MANAGEMENT ON GROWTH, YIELD AND LEAF NUTRIENT STATUS OF BROAD LEAF MUSTARD

Sajina Shrestha

An experiment was conducted to evaluate the effect of organic manure on the growth, yield and leaf nutrient status of broad leaf mustard (*Brassica juncea* var. *rugosa*) in Bigam, Dakshinkali Municipality - 3 in Kathmandu during August 2017. There were five treatments viz. farm yard manure (24 t/ha) (T₁), vermicompost (8 t/ha) (T₂), poultry manure (4 t/ha) (T₃), compost (12 t/ha) (T₄), control (T₅) with three replications. Randomized complete block design was applied. The result revealed that there is significant difference in yield per plant, yield per plot and yield per hectare. Maximum yield per plant (0.149kg/plant), maximum yield per plot (4.37kg/plot) and maximum yield per hectare (8.75ton/ha) was obtained from the treatment, T₂. In growth parameter, maximum plant height (36.7 cm), maximum number of leaves (13), maximum plant canopy (0.0523m³) and maximum leaf size (854.67cm²) were observed in T₂. However, the maximum leaf nitrogen (6.15%) and leaf potassium (3.41%) were observed in T₂ whereas maximum leaf phosphorous (2.42%) was observed in T₁. Present study revealed that vermicompost is the best source of organic manure for plant growth, yield and leaf nutrient status of broad leaf mustard.

Keywords: *broad leaf mustard, treatments, parameters, vermicompost, yield*

EFFECT OF INTEGRATED PLANT NUTRIENT MANAGEMENT ON GROWTH, YIELD, LEAF NUTRIENT STATUS OF BROAD LEAF MUSTARD (*Brassica juncea* var. *rugosa*)

Sajita Parajuli

An experiment on the effect of integrated plant nutrient management on growth, yield and leaf nutrient status of broad leaf mustard (*Brassica Juncea* var. *rugosa*) was carried out in open field condition in a farmer's field in the Bigam VDC of Dakshinkali municipality located in Kathmandu district during August to December 2017. The experiment was laid out in randomized complete block design. There were 9 treatment viz. T1(½ NPK +4 ton/ha vermicompost (VC)), T2(¾ NPK + 2 ton/ha VC), T3 (½ NPK+ 12 ton/ha farm yard manure (FYM), T4(¾ NPK + 6ton/ha FYM), T5 (½ NPK+ 2 ton/ha poultry manure (PM)), T6 (¾ NPK+ 1 ton/ha Poultry Manure), T7 (½ NPK + 6 ton/ha compost), T8(¾ NPK+ 3 ton/ha compost) and T9 (control) with three replications. All the treatments were applied at the time of transplantation as basal application. In the study the maximum plant height and leaf size was observed in T5 (½ NPK+ 2 ton/ha PM) and maximum yield per plot and yield per ha was observed in T6 (¾ NPK+ 1ton/ha PM). Similarly the maximum plant canopy volume was observed in T2 (¾ NPK+ 2ton/ha VC). The highest leaf nitrogen, phosphorous and potash were found in the treatment T7 (1/2 NPK+ 6 ton/ha compost), T5(1/2 NPK+ 2 ton/ha PM) and T2 (¾ NPK+ 2 ton/ha VC) respectively.

Keywords: *broad leaf mustard, treatments, transplantation, basal application*

ASSESSMENT OF THE BENEFIT COST RATIO OF PROTECTED TOMATO CULTIVATION IN THE NAGARJUN MUNICIPALITY, KATHMANDU DISTRICT, NEPAL

Sankar Rokaya

A study to assess the benefit cost ratio of protected tomato cultivation in the Nagarjun Municipality, Kathmandu District, Nepal was conducted from June 2017 to October 2017 by using a semi-structured questionnaire. A total of 100 respondent farmers were selected and interviewed. Tomato was one of the most important high value income generating crops in the study area. Almost 33% of the respondents were found to cultivate Nepalese variety called Srijana. Almost 50% of the respondents sold their produce at nearby local markets. The main problems in the study area were lack of irrigation and marketing of the produce at a reasonable price. Main marketing centers were Kalanki, Kalimati and Balkhu of Kathmandu. A limited percentage of the respondents had direct contract with hotel and wholesalers. Almost 60 % of the male respondents were involved in marketing. Tomato was in short supply during August to November when its price was the highest i.e. Rs 80/Kg. Severe problems of *Tuta absoluta*, whitefly and late blight occurred during summer season. The respondents were found deficient in the skill of cultivation and the knowledge about the correct dose, frequency and time of pesticide application. The respondents had no exposure to any technical training on scientific cultivation practices. Economic analysis showed that protected tomato was a highly profitable enterprise with a benefit cost ratio of 4.985.

Keywords: *B:C ratio, tomato, problems, respondents, economic analysis*

COMPARATIVE STUDY OF MARIGOLD IN SOIL AND SOIL LESS MEDIA

Santoshi Giri

The present study on comparison of marigold on soil and soilless media was carried out in the Standard Nursery (SN), in Bansbari, Kathmandu, Nepal from the 26th of July to the 21st of September 2017. This was done to compare the effectiveness of soil and soilless medium on the growth parameters and yield of marigold variety; African marigold. The experiments were carried out in the randomized complete block design with six treatments replicated thrice under greenhouse condition. Six different media were used; soil media T₁: 62.5% soil + 25% compost + 12.5% ash (Control) and T₂: 62.5% soil + 25% compost + 12.5% ash + hydrogel; soilless media T₃: 60% coco peat + 25% compost + 10% perlite + 5% rice husk (soilless control), T₄: 60% coco peat + 25% compost + 10% perlite + 5% rice husk + hydrogel, T₅: 85% coco peat + 15% perlite and T₆: 75% coco peat + 25% rice husk. Among the different media used the average plant height was 21.63 cm, the average leaf number 29.13, the average number of buds 3.25 and average flower number 2.50 was found significantly high in soilless media of 60% coco peat + 25% compost + 10% perlite + 5% rice husk + hydrogel. It is suggested that soilless medium consisting of coco peat, compost, perlite, and rice husk in a ratio of 60:25:10:5 with hydrogel can be used for the cultivation of marigold var. African marigold.

Keywords: *marigold, soil, soilless media, treatments, cultivation*

PLANT BREEDING

CHARACTERIZATION OF BLACK GRAM GERMPLASM ON THE BASIS OF AGRO-MORPHOLOGICAL CHARACTERS AT KHUMALTAR, LALITPUR

Anjeela Parajuli

The study about the characterization of agro-morphological traits of black-gram had been conducted at the research field in the Agro-Botany Division (ABD), Khumaltar. Sixteen genotypes were used during the field trial, which was conducted between July to October 2017. Both qualitative and quantitative characters were studied, where qualitative characters include hypocotyl color and shape of seed. The quantitative characters studied included days to flowering, plant height, early stand, days to maturity, final stand, grain yield, chlorophyll content, pod length, pods/plant seeds/pod, unfilled seed and test weight of 200 seeds. From the study it has been observed that genotype BLG0076-2 has the highest plant height, genotype BLG0069-1 has the highest early stand, genotype BLG0067-1 has earlier flowering in comparison to others. Genotype BLG0069-1 has early maturity. The highest number of final stands is found in SEKHAR-1 genotype. The total seed weight and the grain yield are found to be highest in SEKHAR-1 genotype. From the study it has been found that genotype SEKHAR-1 is a promising variety, which should be further studied.

Keywords: *black-gram, genotypes, seed weight, grain yield, quantitative*

IDENTIFICATION OF PROMISING SOYBEAN LINES FROM INITIAL EVALUATION TRIAL (IET)

Bidur Prasad Timilsena

A study was conducted to evaluate the soybean (*Glycine max*) genotypes on the basis of agro-morphological characterization. Twelve quantitative traits were evaluated during this research period. The results showed significant differences in traits like days to flowering, days to maturity, final plant stand, plant height, pods per plant, branch per plant, unfilled pods, grain weight (200 seeds) and grain yield per hectare. This research revealed that genotypes TGX1904-4F, TGX1989-19F, TGX1990-97F and TGX1987-11F showed best early stand. Genotypes G-8754, Tompomas, Tidar, Japhe, G-1946 and Ransom took fewer days to flower. Similarly, genotypes Tidar, TGX1835-10F, Ransom and TGX1876-4E showed early days to mature. This research showed that genotypes like TGX1990-86F, Sathiya, Tidar and G-8754 showed best late stand. It was found genotypes Coll#3, CINA-2, TGX1925-1F and TGX1987-11F were taller in height. The research showed higher pods per plant in genotypes Coll#3, G-1946, TGX 1990-8F and TGX1990-97F. Two seeds per pod were seen on all the 20 genotypes used in the research. The overall chlorophyll content among the three replications was found higher in genotypes TGX1989-19F and CINA-2. Grain weight (200 seeds) was found heaviest in genotypes TGX1990-8F, Japhe, G-8754 and Sathiya. Grain yield per hectare calculated was higher in genotypes Tidar, Ransom, TGX1485-1D, Coll#3 and TGX1925-1F. Genotypes Tidar, Ransom, TGX1485-1D, Coll#3, TGX1925-1F, Tompomas, TGX1835-10F and TGX1987-11F showed better performance in this trial.

Keywords: *soybean, quantitative, chlorophyll, grain weight, performance*

IDENTIFICATION OF PROMISING SOYBEAN GENOTYPES FOR HILL REGION IN KHUMALTAR CONDITION

Bipul Kharel

A research was carried out to identify the promising genotypes from 16 Soybean (*Glycine max*) germplasm on the basis of agro-morphological characteristics. A data on 12 quantitative traits were studied. An ANOVA table revealed that significant differences were observed in the genotypes for the traits like days to maturity, final stand, unfilled pod per plant, 200 seed weight and grain yield per hectare. This research revealed that genotypes VLS-1, Chaing mow 60-63 and CM-9125 showed higher plant number per m² in early stand. Genotypes VLS-1, Ransom and G-4508 had higher plant number per square meter area in final stand. Genotypes TH-227, VLS-1, LS-77-16-16 and Sathiya had shorter days to flowering whereas genotypes CN-60, TH-227 and Chaing mow 60-63 showed early maturity. Genotypes CM-9106, SB-0095 and Chaing mow 60-63 were taller in plant height. Higher seed pods per plant were observed in genotypes SB-0095, CM-9106 and G-1872. Seed per pod was equal in all varieties. Genotypes G-4508, CM-9133, G-1872 and LS-77-16-16 had less unfilled pods per plant. Similarly, genotypes Chaing mow 60-63, CM-9106 and CM-9133 had the highest number of branches. Genotypes Sathiya, G-1873 and CN-60 had higher seed weight. And, higher grain yield per hectare was observed in genotypes CM- 9133, GC-82234-22C, Chaing mow 60-63 and CN-60.

Keywords: *soybean, quantitative, genotypes, seed pods, grain yield*

IDENTIFICATION OF PROMOSING BLACKGRAM GENOTYPES IN KHUMALTAR CONDITION

Pasang Galjen Sherpa

Sixteen genotypes of Black gram (*Vigna mungo*) viz BLG0067-1, BLG0066-1-1, BLG0092-1, BLG0061-2-2, BLG0072-1, BLG0035-1, BLG0068-2, BLG0059-1-1, BLG0076-2, BLG0041-1, BLG0069-1, BLG0038-1, BLG0003-2-1, BLG0036-1, SEKHAR-1, LOCAL CHECK were cultivated to identify the promising black gram lines through coordinated varietal trial. Considerable variations among the genotypes were observed for all the characters under study. This research illustrated that genotypes like BLG0066-1-1, BLG0068-2, SEKHAR-1 took 42 days to flower whereas the variety BLG0067-1 took 37 days to flower. Early stand was observed high in genotype BLG0067-1(20) and low in genotype BLG0059-1-1(11). The maturity days were highest in genotype SEKHAR-1(73 days) and the varieties BLG0072-1, BLG0041-1, LOCAL (70days) took shortest number of days to attain maturity. Late stand was observed high in genotype BLG0069-1(10) and low in genotype BLG0072-1(5). The chlorophyll content was found high in genotype BLG0035-1(48.9) and low in genotype BLG0067-1(36.6). Genotype BLG0038-1 had more branches (10) compared to other genotypes. The pods were noted most numerous in genotype BLG0076-2(14) and low in genotype BLG0068-2(6). Also, the tallest plant was found in genotype BLG0035-1(20cm) and shortest in genotypes BLG0066-1-1 and BLG0041-1(16cm). The weight of 200 seeds was found heaviest in genotype SEKHAR-1(7g) and lightest in genotype BLG0068-2(6g). The grain yield/plot was found high in genotype SEKHAR-1(159g) and low in genotype BLG0068-2(54g). The statistical analysis showed no significant differences among the parameters like early stand, late stand, flowering days, maturity days, no of branches, plant height, pods/plant, chlorophyll content, and total seed weight. A positive correlation was found between total seed weight and pods/plant.

Keywords: *genotypes, black gram, correlation, parameters, Khumaltar*

EVALUATION OF ADVANCE SOYBEAN GENOTYPES FOR HIGH GRAIN YIELD IN KHUMALTAR, LALITPUR

Research Sharma

Sixteen genotypes of soybeans (*Glycine max*) i.e. PI 94159, LS-77-16-16, IARS 87-1, SBO-122, AGS-376, TGX 1485-1D, F-778817, SBO-115, AGS-371, G-1873, TGX 1989-41F, TGX 1990-94F, TGX 1989-21F, TGX 1987-62F, KAVRE and PUJA were cultivated from the 28th of June to the 9th of December to identify the promising genotypes for high grain yield. It illustrated that genotypes like SBO-115, KAVRE, TGX 1990-94F and TGX 1989-21F took more days to flower in comparison to other genotypes like PI 94159, LS-77-16-16, AGS-376, G-1873, PUJA, F-778817 and IARS-87-1. It was found that TGX-1989-41F, TGX-1990-94F, TGX-1989-21F and KAVRE took the longest to mature, contrary to AGS-376, TGX-1485-1D, F-778817 and AGS-371. Yield was recorded most abundant in genotypes like TGX-1989-41F, TGX-1990-94F, TGX-1989-21F, and TGX-1987-62F. Plant height was tallest in genotypes like SBO-115, TGX-1990-94F and KAVRE. The weight of 200 seeds was found heaviest in G-1873 and TGX-1989-41F in comparison to genotypes like SBO-115, AGS-371 and KAVRE. The genotypes like TGX-1990-94F and TGX-1989-21F had more of pods per plant than genotypes such as LS-77-16-16, AGS-376 and AGS-379. Genotypes like SBO-122, TGX-1485-1D, F-778817, TGX-1989-41F, KAVRE and PUJA had greater number of branches in comparison to other genotypes. Chlorophyll content was observed highest in genotypes like TGX-1485-1D and TGX-1987-62F. Unfilled pods per plant were found highest in genotypes like PI-94159, IARS-87-1 and PUJA.

Keywords: *genotypes, soybeans, grain yield, Khumaltar, promising*

ASSESSMENT OF HYBRID MAIZE GENOTYPES UNDER KHUMALTAR, LALITPUR CONDITION OF NEPAL

Rohit Awasthi

A research study was carried out in Agro-Botany Division of NARC in Khumaltar, Lalitpur Nepal. Study was done to assess the hybrid maize genotype from April 2017 to November 2017. Twenty two genotypes of hybrid maize were planted for the assessment of hybrid maize genotypes. Sowing was done on same date starting from 23th April 2017 and each plots of size 3mX4m were arranged with two replications from where data were taken from randomly selected five plants. Variations among the genotypes were observed for all the characters under study. This research illustrated that genotype Kml-9B x kym-33(76 days) took more days to tassel whereas genotypes Kml-11B x kym-86 (58 days) took considerably less days to tassel. It was found that Kml-11B x kym-86 (59 days) took less days for silking whereas Rampur hyb-2 (73 days) took more days for silking. Similarly, shortest plant height was observed in genotype Kml-9B x kym-86 (192.3cm) and tallest plant height was observed in Khumal hybrid-2 (281.1cm). This research illustrated that genotype Kml-9B x kym-33(46) have more number of grains per row whereas the lowest number of grains per row was recorded in Kml-11A x kym-86(34). Genotype Kml-16 x kym-33 (17) has more number of rows per cob whereas the lowest number of rows per cob was obtained in Rampur hyb-4 (12) genotype. Highest coefficient of variation (CV) was observed in grain yield (ton/ha) (16.8 %) and lowest coefficient of variation (CV) was observed in shelling percentage (1.2 %).

Keywords: *hybrid maize, genotype, silking, grain yield, shelling percentage*

EVALUATION OF COLD TOLERANT RICE GENOTYPES FOR YIELD AND YIELD ATTRIBUTING CHARACTERS IN LUMLE, KASKI

Samikshya Paudel

A study on evaluation of cold tolerant rice genotypes for yield and yield attributing characters was conducted in the Regional Agricultural Research Station, Lumle, Kaski from June to December 2017. The main objective of this evaluation was to determine the characters of rice, to find out the heading and maturity period of rice in the natural cold temperature. Twelve genotypes of rice were taken and the observation on 11 quantitative traits was recorded at Lumle condition. The variability of plant height ranged from <85 to >105 cm, panicle length <15 to > 24 cm, tillers per 5 hills <5 to >11, moisture content <13 to > 17%, total yield < 2500kg to > 3600kg, days to maturity <144 days to > 158 days, days to fifty percent heading < 104 days to > 117 days, 100 grains weight < 2.3 gm to > 3.114. Twelve genotypes were studied which are NR-10695-B-B-B-57, NR-10682-B-B-B-2, NR-10682-B-B-B-3, NR-10914-1-4-1-3-2, Darmali-B (Pakhirbas), PR29399-3-2-2-1, LHAR 130005, LHAR 130006, LHAR 130009, Lumle 2, Resali dhan and Chhomrong and none of these genotypes have been released yet and are still under study. The examined genotypes of rice have high variability for agro-morphological traits which can be used in further crop improvement programs.

Keywords: *rice, genotypes, yield, characters, variability, agro-morphological traits*

EVALUATION OF POPCORN GENOTYPES UNDER KHUMALTAR CONDITION

Saugat Khatri

An evaluation of eight popcorn genotypes under Khumaltar condition was conducted at the research field at NARC, Khumaltar from April to September 2017. The RCBD design was used to evaluate and to determine the phenotypic variability of 19 quantitative and 4 qualitative traits. Sowing was done on the 5th of April 2017 and sizes of each plot, 3mX4m were arranged with three replications from where data was taken from randomly selected five plants. The study revealed significant variation in both quantitative and qualitative traits. The quantitative traits were ranged as; days of tasseling (53-63 DAS), days of silking (56-67 DAS), plant height (139.1-241.5 cm), ear height (72.60 -143.5 cm), leaf length (60.23-87.10 cm), tassel length (30.35-43.81 cm), cob diameter (2.930-3.813 cm), kernel length (1.033-1.447 cm), ears per plot (38-54), rows per cob (12-16), shelling percent (77.01-85.09%), popping quality (63.10-95.20%), yield (2.090-5.584 ton/ha). The 1000-kernel weight, leaf width, grains per row, stem diameter and cob length were found insignificant. Similarly, stem color ranged from green to sun red where maximum genotypes had green stem color, foliage was dominated by intermediate type, leaf orientation ranged from erect to pendant and the shape of popped kernels was completely dominated by butterfly type. So, it can be concluded that the maximum variation is present in popcorn genotypes. These variations can be used for further breeding programs for improvement of said genotypes for a specific purpose.

Keywords: *popcorn, genotypes, quantitative traits, qualitative traits, variations*

EVALUATION OF MAIZE VARIETIES FOR MID-HILLS AT KHUMALTAR CONDITION OF NEPAL

Shreya Dhungana

This study was carried out to evaluate the various maize varieties and to assess the variation on different agro-morphological traits and grain yield. A set of 10 released maize genotypes were studied at the research field of Agronomy Division of National Agricultural Research Council (NARC), Khumaltar, Nepal. The experiment was carried out in randomized complete block design with three replications. The variation among genotypes was observed for various quantitative traits. The genotype Manakamana-4 produced the highest grain yield (8657 kg/ha) followed by Deuti with a yield of 8107 kg/ha. The statistical analysis showed that the variety Murali Seto was found earlier in tasseling (65 days), silking (68 days) and maturity (109 days). It was closely followed by Arun-2 which took 65 days in tasseling, 69 days in silking and 110 days to attain maturity. The information on variation for the agro-morphological traits among studied maize genotypes will be helpful to plant breeders in constructing their breeding materials and implementing selection strategies in future.

Keywords: *maize, grain yield, genotypes, variation, strategies*

EVALUATION OF RICE VARIETIES FOR MID-HILLS IT KHUMALTAR CONDITIONS

Sirisha Amgain

Nine genotypes of rice (*Oryza sativa L.*) were studied for plant height, tiller/m², grain yield (kg/ha), panicle length, 1000 grain weight, straw yield, and maturity days. Genotypes Khumal 4 and LPNBR 1632 had plant height above 100 cm. Similarly, genotypes Dy 18, Dy 28 and Dy 69 had plant height, below 85 cm. Genotypes Dy 18, Dy 69, Khumal 4, LPNBR 1632 and Chainung 242 had more tillers/m² with more than 300 tillers whereas genotypes like Dy 28 LPNBR 1624 had the least number of tillers (143/m²). Genotypes Dy 28, LPNBR 1617, LPNBR 1624, and LPNBR 1638 had high yield, (>7000 Kg/ha). Genotypes LPNBR 1638, Chianung 242 had the longest panicle length (> 27 cm) and Dy 69 had the shortest panicle length at 21 cm. Genotypes Dy 18, Dy 28, LPNBR 1624, LPNBR 1632, LPNBR 1638 and Chainung 242 had more 1000 grains weight which was more than 25 grams. Dy 69, LPNBR 1617 had lesser grain weight than 25 gram and Khumal-4 had the least grain weight which was 18.65 gram. Genotypes Dy 18, Dy 28, Dy 69, Khumal 4 had straw yield more than 10,000 kg/ha whereas Chainung 242 and LPNBR 1617 had straw yield less than 7000 kg/ha and LPNBR 1623, LPNBR 1632, LPNBR 1638 had straw yield less than 6000 kg/ha. Genotypes such as Khumal-4 took a maximum of 157 days to mature and the least number of days taken were 144 by Chainung 242. LPNBR 1638 was considered the most superior variety for grain yield.

Keywords: *genotypes, rice, superior, Khumaltar, straw yield*

IDENTIFICATION OF PROMISING FINGER MILLET GENOTYPES OF HILLY REGION THROUGH INITIAL EVALUATION TRIAL

Ujjwol Dhoj Khadka

The study was carried out to evaluate the various finger millet genotypes of the hilly region through Initial Evaluation Trial (IET) in Hill Crop Research Program (HCRP). A seed of sixteen genotypes were planted in a RCBD design with two replications. The genotypes were ACC#2301, ACC#6542, ACC#6369, ACC#2286-1, ACC#2303, ACC#2844, ACC#2275, ACC#5434, ACC#513, ACC#6369, ACC#2400, GE-0480, ACC#2860, ACC#512, LOCAL CHECK and KK1. The highest grain yield was seen in ACC#513 (3125kg/ha) followed closely by ACC#6542 (3112kg/ha). Straw yield was seen highest in ACC#2286-1 (7562.5 kg/ha) followed intimately by ACC#513(6000kg/ha). Thus, the genotypes ACC#513, ACC#6542 are more preferred as it has the highest yield of grains. The majority of farmers in hill regions of Nepal own the couple of ruminants in their household and they need straw in dry season for their animals. So, the genotype ACC#2286-1 and ACC#513 are more preferred by them as these genotypes have high straw yield. National Agriculture Research Council (NARC) should show their concern to release these genotypes as varieties after performing further trials.

Keywords: finger millet, replications, ruminants, varieties, trials

PLANT PROTECTION

EVALUATION OF CARBON SOURCES FOR ANAEROBIC SOIL DISINFESTATION (ASD) IN TOMATO PRODUCTION IN LALITPUR DISTRICT

Anita Bhandari

A study was conducted to evaluate the carbon sources of anaerobic soil disinfestation (ASD) in tomatoes in Lele, Lalitpur. Eighty seven percent of the respondents were found engaged in agriculture whereas others were engaged in other jobs along with agriculture. Only 10% of respondents practiced the ASD method of soil sterilization while the rest (90%) did not practice it. Fifty seven percent of respondents knew about soil solarization but did not partake. A field experiment with six treatments which comprises molasses (T1), molasses and rice bran (T2), mustard cake (T3), undecomposed cattle manure (T4), chopped green leaves (T5) and control (soil solarization only) (T6) was done. Parameters like plant growth, number of weeds, soil temperature, late blight infestation and yield were recorded. The maximum temperature of the soil (37.8°C) was observed in T3 followed by T2 (35.3°C). Higher plant height was observed in T3 with the mean height of 121.7cm on 60 DAT which was in an increasing trend with different treatments. Seventy five DAT the growth of weeds in the cultivated tomato area with T3 found to be the lowest. Similarly the lowest leaf damage due to late blight was found in T3 (13%) as compared to other treatments. The plants subjected to T3 showed early flowering (average 27 DAT) and fruiting (35 DAT). In T3, yield was found to be higher (97.58 ton/ha) as compared to control and other treatments. Mustard cake treatment was found most effective for soil borne disease and weed management with better plant growth and development.

Keywords: *carbon sources, disinfestations, sterilization, parameters, mustard cake*

EVALUATION OF PEST EXCLUSION NET TO MAJOR INSECT PESTS OF TOMATO IN KAVRE AND LALITPUR DISTRICTS

Anushree Singh

A study was carried out from July to December 2017 to evaluate the pest exclusion net (PEN) in blocking the movement of major insect pests for tomato plants in Lele, VDC of Lalitpur district and Kushadevi, VDC of Kavre district.. There were three replications with two treatments with PEN and Open poly-house (OPH). Two replications were located in Lele, Lalitpur and third replication in Kushadevi, Kavre. Evaluation of insect pest activity was conducted through the monitoring of plant height, percentage of leaf damage, fruit damage, days for 50% flowering and fruiting, hereby yield was recorded. The study revealed that insect pest movement by the use of PEN consequently reduces the pest population. There was significant reduction of the damage of the leaf and fruit with PEN compared to OPH. PEN has the highest plant height; days for 50% flowering and fruiting were also faster i.e. 24 days after transplanting and 31 days after transplanting respectively. The yield was found maximum in PEN (93.7ton/ha) compared to OPH (71.2ton/ha). It was found that PEN is most effective for blocking the movement of major and minor insect pests which reduces quality and yield. It is obvious that early population build up of insect pests can be reduced substantially and economically by using these physical barriers.

Keywords: *tomato, pest exclusion net, insect pests, yield, population*

MAJOR RICE DISEASES AND THEIR MANAGEMENT PRACTICES ADOPTED BY FARMERS IN KATHMANDU VALLEY

Binita Tiwari

A study on major rice diseases and their management practices adopted by the farmers in Kathmandu valley was conducted from July to October 2017. Randomly 30 respondents were selected from (Shankharapur Municipality). Thirty respondents from Bhaktapur District (Suryabinayak Municipality) and 30 respondents were selected from Godawari Municipality. The majority of respondents were females (54%) and 44% were between the ages 30 and 60 years old. The farmers of Kathmandu valley mostly grow Taichng-242, Hybrid and Khumal-4 rice varieties. Among these three varieties grown the most preferred variety was Khumal-4. The farmers had multiple problems like lack of proper field sanitation, lack of fertilizers, lack of proper irrigation facilities, and insect pests and diseases. In the field study, plant disease was assessed on visual observations based on disease score and disease severity. Among the diseases, there was major economic loss from sheath blight (SB), brown spot blast (BSB), bacterial leaf blight (BLB), foot rot (FR) and false smut (FS) respectively. The incidence of blast disease was 18%, BS was 25%, SB was 40%, BLB was 10%, FR was 2%, and FS was 5%. Diseases were on the increasing trend when proper managerial practices were not followed. The presence of various diseases had caused high yield loss. Synthetic pesticides were in intensive use with Dithane M-45, Nuvan and Endosulfan being dominant followed by a few traditional cultural practices. The recommendation on the time and dose of agro-chemicals were mainly provided by the field technicians and agro-vets retailers.

Keywords: *rice, diseases, management, pesticides, farmers*

EFFICACY EVALUATION OF DIFFERENT BIO RATIONAL TACTICS FOR THE MANAGEMENT OF *Tuta absoluta*

Divya Tandukar

A study on the effect of biological and chemical pesticide on, incidence, leaf damage and fruit damage of *Tuta absoluta* and yield of tomato was carried out. The experiment was designed as randomized complete block design. Three different bio-pesticides, two chemical pesticides (Neem, *Bacillus thuringiensis*, *Metarhizium anisopliae*, Spinosad and Chlorantraniliprole) and pest pressure plot as control were considered as treatments, each replicated three times. Data of plant parameters (incidence, leaf damage) were taken and analyzed at 5% level of significance. All the tested insecticides had significantly affected the insect population and the average percentage reduction of infestation with *Tuta absoluta* in tomato fields. The infestation of *Tuta absoluta* reduced with neem-based formulation with minimum incidence of 11.88% followed by Spinosad (15.68%) and highest incidence was found in control treatment (33.23%). The least leaf damage was observed in neem treatment (10.94%) and highest in control treatment (17.96%). The number of larvae was found to be least in neem, Bt and Chlorantraniliprole with mean numbers 1.82, 2.08 and 2.42 respectively and highest was found in the Control treatment (5.17). The lowest fruit damage was found to be in Spinosad (4.40%) followed by neem (4.95%) with the highest fruit damage observed in the Control treatment (11.08%). The yield obtained from the treatments were significant with highest yield in neem (102.33 t/ha), followed by Spinosad (94.17 t/ha). Neem was the most efficient followed by *Bacillus thuringiensis*, Spinosad, Chlorantraniliprole, *Metarhizium anisopliae*.

Keywords: *efficacy, Tuta absoluta, management, tactics, pesticides*

ASSESSMENT OF THE PESTICIDE USE BY COMMERCIAL VEGETABLE GROWERS IN KATHMANDU VALLEY

Garima Rai

An assessment study on the use of pesticide by commercial vegetable growers in Kathmandu valley was carried out in 4 different Municipalities, i.e. Shankharapur, Kirtipur, Karyabibayak and Suryabinayak during the 20th of August to the 18th of November 2017. All together 60 respondents were selected for survey applying a random sampling technique. Both the genders were found to be involved in the commercial vegetable production in the study area, but over three-fourths of the respondents (78%) were male and the remaining percentage (22%) were female. The majority of the respondents fell into the age group of 35-45 years old. Most of the farmers used leased land for commercial production. The results showed that the major insect pests on the research area were the red pumpkin beetle, whitefly, fruit fly, cabbage butterfly, aphids, PTM, red ants, white grub, Tuta, and tomato fruit worm. Similarly blight, wilt, powdery mildew, damping-off were the major diseases. The respondents applied synthetic chemical pesticides for the management of the insect pests and diseases. The major source of pesticide in the study area was agro-vet. Chloripyriphos, Emamectin benzoate, Imidachloprid, Deltamethrin and Cartap hydrochloride were the major insecticides used in the study area. Mancozeb, Metelaxyl, Carbendazim, Dimethomorph, Thiophanate methyl and Fenamide were the major fungicides used in the study area. *Azadirachtin*, *Bacillus thuringiensis* and *Trichoderma viride* were the bio-pesticides used in study area, where as jholmol, cow urine and tobacco liquid were the botanical pesticides used in the study area.

Keywords: *pesticides, commercial, vegetables, Kathmandu, assessment*

EFFECTIVENESS OF DIFFERENT TYPES OF TRAPS AGAINST *Tuta absoluta* MANAGEMENT

Jyoti Kadel

A field experiment was conducted to find out the effectiveness of different types of traps against *Tuta absoluta* management. Experiments were setup using different types of traps (Delta trap, Wota-T trap and solar light trap) each with pheromone capsule i.e. TLM lure. The influence of color (orange, white, yellow and green) in delta trap, height (ground level, 1 feet, 2feet, 3 feet and 4 feet) in wota-T trap and different types of light traps (Locally prepared light trap with led bulb, solar light trap with high power of 65 lumens, solar light trap with low power of 25 lumens) on capturing the Tuta moth were tested. The result revealed that white colored delta trap captured maximum mean number of Tuta moth (22) followed by green (16), yellow (13) and orange (10). Similarly, Wota- T trap when placed at different heights; the trap placed at ground level captured maximum mean number of Tuta moths (15) followed by 1 foot (12), 2 feet (11), 3 feet (8) and 4 feet(2). Among the different types of light traps; the solar light trap with high power of 65 lumens captured maximum mean number of Tuta moth's (5) followed by solar light trap with low power of 25 lumens (3) and locally prepared light trap with led bulb (2). Trap color, trap height and light trap types are the characteristics that strongly affect the response of *Tuta absoluta* to pheromone-baited traps. Light traps can be used along with sex pheromone to control *Tuta absoluta*.

Keywords: *traps, Tuta absoluta, pheromone, response, effectiveness*

SURVEY OF PUMPKIN DISEASES, PROBLEM FACED AND THEIR MANAGEMENT IN KATHMANDU VALLEY

Nirmala Sharma

A study of pumpkin cultivation, disease prevalence and their management in Kathmandu valley was conducted to evaluate the occurrence of diseases in pumpkin, problems faced during cultivation and the practices adopted by local farmers for their management. A survey of pumpkin diseases was carried out in farmer's fields in Ramkot, Katunje and Bungmati of the Kathmandu valley by purposively selecting 102 households where data was collected using a semi-structured questionnaire. It was found that the majority of farmers belong to the 30 to 50 age group accounting 74% and most of them were females. About seventy six percent of the people interviewed were literate whereas 24.5% were illiterate. Among the different castes of farmers, a high number of Newar populations were engaged in farming (41.17%). The total cultivated land is 622.875 ropani (20 Ropani = 1 Hectare). Various types of diseases were seen in farmers' fields among which viral diseases like anthracnose, powdery mildew and downy mildew caused high amount of economic losses. Farmers used different methods of disease management practices such as cultural methods and chemical methods. Farmers who use chemicals mostly spray them in the morning. Most of the farmers were well known about the negative impact of chemicals.

Keywords: *pumpkin, disease, management, negative impact*

STUDY ON EFFICACY OF CHEMICAL FUNGICIDES AND BIO-AGENT AGAINST GERBERA ROT DISEASE

Purnima Chaudhary

A study on efficacy of synthetic fungicides and bio-agent against gerbera rot disease was done for the disease prevalence in the farmer's field. A field experiment was conducted from the 27th of July to the 7th of November 2017 at the field of HICAST campus. Samples from 12 farms growing gerbera flowers from three different districts of the valley were selected to collect the information about the occurrence of the disease. In addition to disease and soil samples the source of inoculation was also collected. The *Phytophthora* rot disease (PRT) results in symptoms of gerbera plant wilting, where the crown of the plant becomes black. PRT can be managed by cultural methods, use of biocontrol agents and synthetic fungicides. Different synthetic fungicides, Metalaxyl + Copper oxychloride (Vacomil), Bordeaux mixture and bio-agent *Trichoderma viride* and *Pseudomonas fluorescence* against the disease with three replications were done through a soil drenching method after one week of plantation in pot experiment. Application of treatments was done at the interval of two weeks. The maximum number of flower buds were recorded in T1 (*T. viride*) about (2.33%) then followed by T4 (Metalaxyl+Copper oxychloride), then followed by T2 (*Pseudomonas fluorescence*) and T3 (1% Bordeaux mixture). The minimum number of flower buds was recorded in T5 (Control) which was about 0.33%. Plant biomass ranged from 123.800g to 21g. The maximum plant biomass was recorded in (T₁) (123.800g) which is statistically significant. Then the results are followed by (T₃), (T₂) and (T₄). The minimum plant biomass (21g) was recorded from (T₅) (Control). The reading of disease severity T5 (control) received maximum of (48.33%) of disease severity and T1 (*T. viride*) received (3.33%) of the minimum disease severity.

Keywords: *synthetic fungicides, gerbera rot disease, field experiment, severity*

STUDY ON MANAGEMENT OF RICE BLAST DISEASE CAUSED BY *Magnaporthe grisea* THROUGH FUNGICIDAL SEED TREATMENT

Sachin Karki

The study on the management of rice blast disease through fungicidal treatment of seed was carried out initiating with seed sample collection from Kirtipur, Bhaktapur, Gokarna and Mulpani as sources of inoculums. The laboratory methodologies include a study on the effect of selected treatments (Tricyclazole, Bavistin, Kasu-B and *Trichoderma viride*) on rice seed germination, growth of radicles and coleoptiles. Similarly, the study was done on the treatments on the reduction of disease incidence and disease severity of seedling and calculation of seedlings raised by treating with particular treatment. The treatments effect was compared with control (untreated seeds). Throughout the research, Bavistin treated seeds showed the best result in part of reducing infection (0%), and severity (2.96%). Besides, there was no significant differences between Tricyclazole treated seeds and Kasu-B treated seeds in terms of reduction of the infection and severity. And the impact of *Trichoderma viride* treated seeds and untreated seeds weren't significantly different in all parts of research. In terms of germination, Bavistin treated seeds showed less germination percentage among treatments but it doesn't mean failure of germination; but the delayed germination. Besides, radicle and coleoptiles growth of Bavistin treated seeds were comparatively less among treatments. It was because the Bavistin treated seeds produce more seed leachates than other. It was concluded that Bavistin treatment was found effective whereas there was no significant difference in effect of *Trichoderma viride* and untreated seeds. Tricyclazole and Kasu-B effects were similar. Thus, Bavistin is recommended for seed treatment and Tricyclazole and Kasu-B are appropriate for foliar application.

Keywords: *rice blast disease, treatment, severity, incidence, management*

SURVEILLANCE OF MAIZE DISEASES AND THEIR MANAGEMENT PRACTICES ADOPTED BY FARMERS IN KATHMANDU VALLEY

Sachin Sharma

Surveillance of maize diseases and their management practices adopted by farmers in Kathmandu valley was carried out from June to September 2017 in Ramkot-5, Bungmati-25 and Katunje-5 VDCs representing Kathmandu, Lalitpur and Bhaktapur districts respectively. Primary data were obtained through field visits and household survey of 102 maize farmers in equal proportion from each surveyed VDCs. Disease prevalence was calculated by randomly inspecting 10 sample plants from each farmer's fields (1020 sample plants in total from 102 farmer's fields). It was found that on average, 53% of plants were mainly infected with Northern Leaf Blight (NLB), 30% of plants from grey leaf spot (GLS) and 17% of plants from southern leaf blight (SLB) disease. GLS ranked on top with severity rating of 3.8, NLB on second with severity rating 2.5 and SLB on third with severity rating 1.5. Eighty five percent of farmers weren't applying any kind of control measure against diseases in fields, 10% were applying cultural control and only 5% were applying chemical control measures. In storage condition, 80% farmers weren't using any kind of control measure, 18% were using traditional control measures and 2% were using chemicals. Thirty one percent of farmers were illiterate and possibly unaware of modern farming practices. Limited accesses to cultivable land, inputs (fertilizers, pesticides & improved seeds), irrigation facility and market for obtained products were identified problems associated with limited maize productions.

Keywords: *surveillance, maize, management, diseases, problems*

STUDY ON PREVALENCE OF TOMATO DISEASES IN KATHMANDU, KAVREPALANCHOK AND SARLAHI DISTRICTS

Sajan Sah

This study conducted from mid -June to mid -December 2017 mainly focused on prevalence of tomato diseases and their management practices followed by farmers in Kathmandu, Kavrepalanchok and Sarlahi districts. The study was completed to collect information on disease and obtained data was computed using Microsoft excel. Thirty-four farmers from each district had a total cultivated area of 269, 194.5 and 205 ropani in Kathmandu, Kavrepalanchok and Sarlahi respectively whereas tomato cultivation was on 202, 148 and 87 ropani in Kathmandu, Kavrepalanchok and Sarlahi respectively. To know the disease prevalence, plants were randomly inspected from each farmer's fields. The prevalence of tomato diseases was almost similar in Kathmandu and Kavrepalanchok. Major diseases in these two districts were early blight, late blight, bacterial wilt and viral diseases. However, in the case of Sarlahi the major problems were Damping-off and physiological disorders. In case of management practices adopted by farmers, it was found that, the major management practices were cultural and chemical methods; only a few farmers were using biological methods in Kathmandu. The major cause for loss of tomato production may be due to disease problems and lack of proper management practice. Hence, proper identification of the problem and the best management practice to tomato diseases should be disseminated to farmers immediately, which may be useful to increase the tomato production in the area for better and higher yield.

Keywords: *prevalence, tomato, diseases, management, identification*

MONITORING AND MANAGEMENT OF INSECT PESTS OF MAIZE IN KATHMANDU VALLEY

Sophiya Shrestha

A study on management of insect pests of maize in Kathmandu valley (Ramkot -5 Kathmandu district, Katunje -5, Bhaktapur district and Bungmati -25 Lalitpur district) was conducted between mid-junes to mid-September 2017. Both qualitative and quantitative research approaches were used. Hundred households randomly surveyed where information was collected from; 33 households each from Kathmandu and Lalitpur districts and 34 households from Bhaktapur district. Sets of questionnaires were prepared to acquire the primary information from maize growers through face to face interview method. This survey primarily focused on maize pest diversity in Kathmandu valley and the management practices adopted by the farmers, and secondarily on socio-economic condition of people in this area. The majority of respondents were found to be female, around 53%. It was obtained that most of the farmers cultivate maize on their small piece of land utilizing limited sources of inputs and for their household consumption rather than for commercial purpose. In the study area, the major pests found are cobworm or earworm (*Helicoverpa zea*), maize aphid (*Rhopalosiphum maidis*), hairy caterpillar and white grub, (*Phyllophaga spp.*) while storage pests are grain moth (*Sitotorga spp.*) and maize weevil (*Sitophilus zeamais*). It was found that 88% of the population was not applying any type of control measures, 110% were following cultural control methods, and only 2% were applying chemicals for control in their field.

Keywords: *management, insect pests, maize, control measures, chemicals*

SURVEY OF RICE INSECT PEST AND THEIR MANAGEMENT PRACTICES ADOPTED BY THE FARMERS OF KATHMANDU VALLEY

Sujata Regmi

This study entitled “Survey of Rice insect pest and their management practices adopted by the farmers of Kathmandu Valley” was carried out in different Municipalities (Ramkot – 5, Kathmandu district; Bungmati – 25; Lalitpur district, and katonje – 5, Bhaktapur district) in Kathmandu valley covering 90 households during mid - June 2017 to mid - September 2017. Major ethnicity in the study area were Newar (42.2 percentage), Sanyasi (16.7 percentage) and Chhetri (14.4 percentage) dominated and 26.7 percentage includes other castes, among them 43 percentage respondents were male and 57 percentage were female. It showed that 93 percentage respondents were physically active age group. It was found that four major pests namely; rice ear-head bug (*Leptocorisa oratorius*), rice leaf folder (*Cnaphalocrocis medinalis*), rice gall-midge (*Orseolia oryzae*) and rice swarming caterpillar (*Spodoptera mauritia*), were prevalent in the survey site. As a control measure the respondents were found dependent on traditional (cultural) method of control. Only 3 respondents were using chemical control (Chloropyrifos, Carbaryl, Endosulfan) measures at their fields and majority of them were found unaware of pest management practices and control measures. On an average severity of rice ear head bug was found predominant, ranking in first score, followed by rice leaf folder in second rank, rice gall midge with score 5 and rice swarming caterpillar with score 3. Lower incidence and severity of rice pests were obtained in the surveyed area. This survey also explored that seed used by the farmers were maximum local varieties and almost no any kind of pest management practices were adopted by the farmers at the study site. This is because of the lack of knowledge on the identification and management practices.

Keywords: *rice, insect pest, management, control measures, survey*

INCIDENCE OF *Tuta absoluta* IN TOMATO AND ITS MANAGEMENT PRACTICES UNDER PLASTIC HOUSE IN KATHMANDU

Suman Rimal

Over the years, leaf miner *Tuta absoluta* (Ta) (Lepidoptera: Gelechiidae) has become a devastating pest of tomato plants (*Lycopersicon esculentum* Miller) in Nepal. The study was conducted in Kathmandu district to know the general scenario of the tomato and infestation of Ta and its management. The specific objectives were to monitor Ta on tomato crops inside tunnel houses in Kathmandu District. A total of 100 households were taken as a sample size using a semi-structured questionnaire. Farmers of Kathmandu district mostly grow Srijana, Samjhana and Surya 111 varieties of tomatoes and all the varieties have been destroyed by *Tuta absoluta* in considerable extent. However, the farmers of Kathmandu district were unable to adopt the IPM techniques to manage *Tuta absoluta* because population of this pest has reached a no turning point for the economic threshold level hence; the farmers were encouraged to apply synthetic pesticides for desired results. As a result, it might cause a huge loss in the production and possibly in the future, farmers will be unable to produce tomatoes. The study showed that the incidence percentage has decreased to 11-30% from the previous year as farmers were able to control its heavy population and able to reduce its damage using different chemical pesticides along with some IPM techniques. Also, the production of tomato has increased two times more than previous years.

Keywords: *Tuta absoluta, tomato, incidence, management, plastic house*

MANAGEMENT OF WHITEFLY AND APHID PESTS ON TOMATOES IN PLASTIC HOUSE BY THE FARMERS OF KATHMANDU VALLEY

Sushima Dhital

A study on management of whitefly and aphid pests on tomatoes in plastic house by the farmers of Kathmandu valley was carried out in Ramkot, Bhudanilkantha, Naikap of Kathmandu, Lele, Thecho, Bhaishapati, Chapagaun, Bajrabarahi of Lalitpur and Gamcha-Dhadikot, Madhyapur Thimi of Bhaktapur districts from the 2nd of September to the 9th of November 2017. Primary data were collected from 100 respondents using semi-structured questionnaires. The surveys revealed that the majority of the respondents were of the middle age category (30 to 50 years) and illiterate. Regarding the insect pest incidence, whitefly, leaf miner and aphid were considered as major problems for tomatoes in plastic housing causing economic damage. The pest status increased each year due to inappropriate management practices, like cultural and chemical measures followed by the farmers. Over half of the respondents used only chemicals for controlling pests, nearly one-third used cultural and chemical measures together. Commonly used pesticides were chloropyrifos, cypermethrin, nuvan and bavistin. The indiscriminate use of chemical pesticide causes pest resistance, resurgence and outbreaks. The majority of the farmers were unaware of alternatives to chemical pest management measures because of poor knowledge and information about bio-pesticides, while those integrated pest management trained farmers were aware about the safety measures.

Keywords: *management, plastic house, safety measures, farmers*

ASSESSMENT ON PRELIMINARY EFFECT OF PLANT CLINICS IN KATHMANDU AND KAVREPALANCHOK DISTRICTS

Ujjwol Bikram Shahi

The present study was for the assessment of preliminary effect of plant clinics in Kathmandu and Kavrepalanchok districts and to know the opportunities of plant clinics and understand further ideas to improving them. The method of survey focused on collecting data by directly interviewing with open-ended questionnaires to target groups. The study was carried out for 6 months from June to December 2017. Four plant clinic locations namely Sankhu from Kathmandu district, Nala, Panchkhal and Khhopasi Panauti from Kavrepalanchok district were involved. The total sample size was 60 equaling 15 from each location. Fewer farmers were found participating in plant clinics. Broadcasting or announcing about the service of plant clinics was poor. There was no vast difference between gender participation and there was more male participation than female. Actively participant's age was 30-59 years and the majority of participants had less than or secondary level education. About the same number of regular and irregular participants were found but relatively regular were more than irregular overall. From participants' family both male and female who gave time for participation, prioritized plant clinic visit. The farmers who regularly participate in plant clinics were getting advantage from plant clinic. Plant clinic gave effective suggestions and diagnosis of diseases properly. Semi commercial type of farming was done by maximum farmers. Plant clinic's suggestions were found very effective in field level.

Keywords: *assessment, plant clinic, effective, opportunities, field level*

SOIL SCIENCE

SURVEY ON THE AVAILABILITY OF MICRO-NUTRIENTS, PLANT GROWTH REGULATORS, SOIL CONDITIONERS, ENZYMES AND HORMONES IN THE KATHMANDU VALLEY MARKET

Ashish K.C

A study on the availability of micro-nutrients, plant growth regulators, soil conditioners, enzymes, and hormones, in the Kathmandu Valley Market was conducted from the 28th of October to the 17th of November. The method of survey was mainly focused on collecting data by directly interviewing targeted groups i.e. agro-vets owner through the random selection. The survey sample size was 30 consisting of 13 agro-vets from Kathmandu, 10 from Lalitpur and remaining 7 from Bhaktapur. Altogether there were 78 agrochemicals out of them 35 were micronutrients, 35 were PGRs/Enzymes/Hormones and 8 soil conditioners. Among them 7 micronutrients were registered, no single PGRs/Enzymes/Hormones were found registered and 2 soil conditioners were ready for registration at Ministry of Agriculture Development, Singhadurbar. Most of the micronutrients were found to have a complex nature and mixed/complex with primary macro nutrients (N, P and K) and secondary macro nutrients (Ca, Mg and S). Most of the PGRs/Enzymes/Hormones were found containing seaweed extract with various enzymatic acids, amino acids, humic acids, and fluvic acids. Nepalese manufacturing companies were playing the important role in fulfilling the demand of nutrient based agro-chemicals. They were supplying the most agro-chemicals in Kathmandu valley compared to other countries. Maximum agro-chemicals reported during the survey had usable time period of 3 years. According to the respondents the basis of agrochemicals selling was mostly found to accord with the problems addressed by farmers to the agro-vets owner.

Keywords: *micronutrients, plant growth regulators, agrochemicals, agro-vets owner*

EFFECTS OF UREA APPLICATION METHODS ON AVAILABILITY OF NITROGEN AND YIELD OF CAPSICUM

Bhagwan Uchai Thakuri

An experiment on the effect of urea on availability of Nitrogen and yield of Capsicum was carried out in open field condition. Five different urea application methods as a treatment viz. T1 (Broadcast incorporation), T2 (Ring placement), T3 (Band placement), T4 (Urea mud-balls) and T5 (Fertigation) with three replications were done. All the required doses of phosphorus and potassium were applied in single application whereas urea was applied in two splits. Half dose of urea and full doses of phosphorus and potassium were applied at 7 days after transplanting to avoid root burn of young seedlings during urea hydrolysis. The remaining half dose of urea was applied at 30 days after transplanting. To compare the effect of different treatments various plant growth traits and soil traits were studied and analyzed. The result showed insignificant effect of different urea application methods in plant and soil pH. Maximum plant height, number of leaves and number of branches were observed in T1 and minimum and maximum effect on soil pH was observed in T4 and T5 respectively. Significant effect of different urea application methods was also observed in terms of total yield, soil N content, plant N content and dry plant matter content. The maximum fruit yield, dry plant matter content and plant N content were obtained from T2 whereas maximum soil N content was obtained from T1. Thus, treatments T1 and T2 were found superior in terms of plant growth, yield and availability of N in soil and plant compared to other treatments.

Keywords: *urea, nitrogen, capsicum, treatments, application, superior*

EFFECT OF ORGANIC MANURES UNDER OPEN FIELD AND GLASS HOUSE CONDITION

Dipak Kumar Jha

Two experiments were conducted on the physical parameter of the French bean to evaluate the influence of different types of organic manures on the soil properties under a glasshouse and open field condition in Khumaltar, Lalitpur during the 18th of July to the 15th of October 2017. The recommended dose of Organic Manures i.e. Vermicompost (VC) at 10:1 gkg⁻¹ of soil (T₁), FYM at 10:1 gkg⁻¹ of soil (T₂), Poultry Manure (PM) at 10:1 gkg⁻¹ of soil (T₃), Safal Kishan (SK) at 10:1 gkg⁻¹ of soil (T₄), Nepalese Organic Fertilizer (NOF) at 10:1 gkg⁻¹ of soil (T₅) and Control (T₆). The application of different types of organic manures showed insignificant effects on soil parameters as well as on the physical parameter in both conditions on all sampling days. However, application of Safal Kishan at 10:1 gkg⁻¹ in the soil recorded a better yield in both conditions; followed by the Nepalese Organic fertilizer application of about 10:1 gkg⁻¹ in the soil, and the lowest was recorded in the control treatment. Similarly, in the case of soil properties T₃ and T₄ of glasshouse at 90 DAS have the highest organic matter (6.40%), T₃ at 30 DAS of open field condition has the highest total Nitrogen Content (0.53%), T₁ and T₃ of open condition at 60 DAS have the highest available Phosphorous content (381 kg ha⁻¹), and T₃ of open condition at 60 DAS has the highest available Potassium content (782 kg ha⁻¹). The result showed insignificant effects of organic manures on various parameters studied.

Keywords: *organic manures, open field, glass house, parameters, french bean*

EFFECT OF AGRICULTURAL LIME IN DIFFERENT ACIDIC SOILS

Dipendra Chaudhary

An experiment on effect of agricultural lime in different acidic soils was carried out inside a glasshouse from the 24th of July to the 8th of October 2017. The objective was to study the effect of lime in soil acidity reduction, macro-nutrients (P & K) availability and plant growth. The experiment followed Completely Randomized Design. Five different acidic soils (Pine Forest Soil, Black Soil, Red Soil, Swampy Soil and Cultivated Soil) plus respective recommended lime dose (SMP method) were considered as treatments, each replicated three times. Data of soil parameters (soil pH, P & K availability) and plant parameter (plant height) at different times were critically analyzed for significance test at 5% probability level. All soil parameters and plant parameter were found statistically significant due to liming when compared between different treatments. Optimum soil pH level was achieved at 45-60 days after lime application and was stabilized. However, desirable pH range for crop cultivation was achieved after 30 days. Depending upon the physical and chemical properties of soil, availability of soil potash was increased by 1-3 times its initial level while availability of soil phosphorus was increased by 2-9 times. Plant growth was mostly favored by cultivated soil after lime application.

Keywords: *agricultural lime, acidic soils, glasshouse, soil parameters, plant growth*

ALTITUDINAL VARIATION IN SOIL MICROBIAL POPULATION AND ASSOCIATED SOIL PROPERTIES IN LONG TERM SOIL FERTILITY TRIAL

Dipesh Pokhrel

A soil sample assessment on the altitudinal variation in soil microbial population and associated soil properties was carried out in 3 different altitudes; Terai (Agriculture Research Station, Parwanipur, Bara), Mid-hills (Regional Agriculture Research Station, Pakhribas, Dhankuta) and High-hills (Agriculture Research Station, Bijaynagar Jumla). There were 7 treatments in Jumla, 7 treatments in Pakhribas and 12 treatments in Parwanipur which were replicated thrice. Soil samples were taken after harvesting rice and the soil was subjected to determination of microbial population such as (*Azotobacter*, Fungus and Bacteria) along with soil chemical properties. The highest pH (6.49) was obtained from T4 (130:50:50NPK+6FYM) at Jumla and the lowest pH was recorded in the Pakhribas treatments. The organic matter content in Jumla (high-hills) was very low except in T2 (70:10:10NPK+6FYM) and T5 (160:70:70NPK+6FYM) which was 1.005%. The highest organic matter content in Pakhribas (mid-hills) was 0.4355 in T5 (25:7.5:7.5NPK) and T6 (4.5 mt compost) and the lowest was in Parwanipur, 0.0335-0.603. The nitrogen was very high (0.803%) in Jumla with T4 (130:50:50NPK+6FYM), medium to high in Pakhribas and very low 0.035% in T6 (100:0:30NPK) to high 0.385% in T9 (10 mt FYM) at Parwanipur. The highest amount of K obtained from control condition at Jumla was 136.36 kg/ha from T7. Potassium content was very low in Parwanipur i.e. < 20 kg/ha K₂O in all treatments. Fungus and bacteria were present in every altitude but the *Azotobacter* was only found on lower altitude. The overall microbial population was highest in Parwanipur but decreased with increase in altitude.

Keywords: *treatments, Jumla, microbial population, soil sample, altitudinal variation*

ESTIMATION OF NITROGEN UPTAKE IN TOMATO VARIETY SRIJANA BY SPAD METER UNDER GREENHOUSE CONDITION

Ganga Basnet

Nitrogen has a direct role on the development and yield of crops. This research was conducted using ten different treatments with five replications in RCBD design with an objective to find out the best treatment combination for nitrogen uptake. The treatments were T₁ (Control), T₂ (2% compost added), T₃ (2% compost + NPK full dose), T₄ (T₃+ Biochar at 4t/ha), T₅ (T₂ + biochar at 4t/ha + 50ml cattle urine per pot), T₆ (T₂ + biochar at 4t/ha + 50ml cattle urine at hotspot), T₇ (T₃ + 8t/ha biochar), T₈ (T₅ at 8t/ha biochar), T₉ (T₆ at 8t/ha biochar), T₁₀ (compost at 4%). Srijana variety of tomato was used for this research. Observations were made for Soil Plant Analysis Development (SPAD) reading; plant height, number of fruits, fruit yield, and soil nitrogen content and the obtained data were analyzed using Analysis of Variance (ANOVA). SPAD reading showed a non-significant variation among the treatments. The correlation between SPAD readings and total nitrogen in soil was found statistically non-significant and least positively correlated. Highest mean value of plant height was obtained from T₂ of 1-7.03cm. T₃ gave the highest number of fruits at 68. There was significant difference on total fruit yield, T₁₀ the highest fruit yielding treatment of 1.523kg. There was high significant difference on total soil nitrogen and most of the soil had total nitrogen content ranging from high to medium with T₁ having lowest nitrogen content.

Keywords: *nitrogen, treatments, yielding, tomato variety, greenhouse condition*

RELEASE OF PHOSPHATES IN DIFFERENT TYPES OF SOIL BY USING PHOSPHATE SOLUBILIZING (*Pseudomonas fluorescens*)

Grishma Lamichhane

An experiment was conducted to study the release of phosphates and change in soil pH by phosphate solubilizing microorganisms (PSM) in different types of soil. The experiment followed the principle of completely randomized design with five treatments and three replications. The five treatments of the experiment were T₁ (Pine forest Soil), T₂ (Red Soil), T₃ (Swampy area Soil), T₄ (Clay Soil) and T₅ (Normal Cultivated Soil). Three plastic bags were filled with soil for each treatment. Two French bean seeds inoculated with 0.1% PSM @ 5ml per seed was planted in each plastic bag. Various parameters were observed and analyzed using SPSS. Results of PSM application on different treatments revealed that the release of phosphates varied significantly among the treatments in different time intervals. The highest phosphate release (390.57kg P₂O₅ ha⁻¹) was found in the treatment T₄ (Clay Soil) and the time of maximum release was recorded at 20 days after PSM application. Similarly, the change in pH after the PSM application was also found statistically significant between the treatments in different time intervals. The maximum change in soil pH was recorded in treatment T₃ (Swampy Soil). Significant positive correlation was found between plant height and available phosphorus content of soil. Likewise, positive correlation was found between plant height and soil pH and between available phosphorus and soil pH but it was not significant. It can be concluded that application of PSM in soil can solubilize the insoluble phosphorus and make it available for plant uptake.

Keywords: *phosphates, soil pH, treatments, parameters, release*

STUDY ON SOIL FERTILITY STATUS AND SOCIO-ECONOMIC STATUS OF FARMERS IN THE GODAWARI MUNICIPALITY, LALITPUR DISTRICT

Monika Pokhrel

A study was conducted to assess the soil fertility and socio-economic status of farmers of the Godawari municipality, Lalitpur district, from the 12th of August to the 23rd of October 2017. The sample size was 30 farmers selected by a simple random sampling method. The semi-structured questionnaires were developed to gather required information from the farmers such as, socio-economic status, soil fertility management practices and soil fertility status. A total of 30 soil samples were collected randomly from a depth of 0-20 cm using soil sampling auger. The observed data revealed the soil fertility status in the Godawari municipality was moderate. The majority of the land i.e. 53.33% (vegetable growing area) had medium nitrogen content, about 60% had medium to high phosphorus content, and about 80% had medium to high potash content. About 56% had medium soil organic matter and about 53% had neutral soil pH. Majority of the soil i.e. 87% belonged to sandy loam textural class which is favorable for maize, potato, cultivation. Though soil fertility status was found to be moderate, farmers were not satisfied with the existing soil and crop productivity. Farmers perceived that the crops yield was in a decreasing trend. The productivity trend of paddy decreased by 2% over a 3 years' interval i.e. from 2015 to 2017. About 60% of the farmers were unaware about the proper soil conservation methods and soil productivity improvement technologies. Thus, local farmers need to be made aware about the effective ways to improve soil health.

Keywords: *soil fertility, Godawari, soil health, productivity, soil organic matter*

IDENTIFICATION AND EVALUATION OF ORGANIC VEGETABLE FARMING AT DAKCHINKALI MUNICIPALITY

Reema Adhikari

A study was conducted for assessing nutrient status of organic vegetable farming at Dakchinkali municipality of Kathmandu District in the month of 28th July to 15th September 2017. Twenty five households were purposively selected through snow ball sampling method and semi- structured questionnaires were developed to gather required information from the farmers like socio-economic status, issues identification and soil fertility status of organic vegetable growing areas. Simultaneously 25 soil samples were collected from respective farmers' field at 0-20 cm depth by using sampling augur. Soil parameters like pH, OM, N, P₂O₅, and K₂O along with soil textural classes were measured following standard method in the soil management directorate (SMD) lab Hariharbhawan, Lalitpur. The 88% of the organic vegetable growing areas had about 84% potassium content, about 96% of the areas had medium to high nitrogen content, 68% land had medium organic matter content and about 48% land had slightly acidic soil pH. Majority of the soil i.e. 92% belonged to sandy loam textural class. Only 60% of total respondents had sufficient manure for crop production. The major constraints faced by the respondents were labor constraints and production constraints which include pest and disease management, low yield, lack of technical knowledge, and insufficient training and extension facilities. Seventy two percent farmers reported that organic vegetable products had better flavor as compared to non-organic produces. Farmers reported the deterioration of soil fertility due to the lack of proper knowledge, skill, new technology and insufficient organic manures.

Keywords: *organic, vegetable farming, nutrient status, organic manures, soil*

EVALUATION OF SOIL FERTILITY STATUS AND CONSTRAINTS UNDER VEGETABLE CROPPING IN BUDHANILKANTHA, KATHMANDU

Sajana Thapa

The soil fertility evaluation is one of the most basic decision-making tools in order to follow nutrient management strategies. A field study was carried out from July-October 2017 in Budhanilkantha with the objective to find out the fertility status of the soil, the constraints occurring under the vegetable cropping system and to know about the demographic features of the farmers. 30 respondents were sampled randomly and their soil was analyzed in a laboratory. The soils tested in the Budanilikantha area were found to be medium to high in nutrient content; whereas the nitrogen level ranged from 0.13-0.33, phosphorus was 7.79-624.71, potassium was 85.3-1309.90, soil organic matter was 2.61-6.70, and the pH of the soil was slightly acidic 37%. Eighty three percent of the sampled soil was of loam texture. Both the use of chemical fertilizers and organic manure by farmers was observed in the study area. The farmers followed cultural practices that help to increase the production of their crops. This study confirms that the fertility status of the Budhanilkantha area under vegetable farming is satisfactory and is at the increasing rate despite the constraints faced by farmers. There is still an urge to lessen the use of chemical fertilizers in the soil that cause long term constraints for farmers. The major constraints of the farmers were price fluctuation, pest and disease infestation and lack of proper market for their product. The use of organic fertilizer must be increased to enhance the soil quality and improve soil health.

Keywords: *soil fertility, nutrient management, vegetable cropping, constraints, soil health*

EXPLORING EXISTING SUSTAINABLE CROP PRODUCTIVITY ISSUES OF THE SURYABINAYAK MUNICIPALITY, BHAKTAPUR

Sasmita Ranabhat

The study entitled “Exploring existing sustainable crop productivity issue of Suryabinayak Municipality, Bhaktapur” was conducted for exploring and identifying the existing soil fertility management practices for sustainable crop production in rain fed system by farmers of Suryabinayak Municipality. Questionnaire survey was scheduled for 30 farmer households which were selected randomly comprising 8 places of Suryabinayak Municipality. Simultaneously, 30 soil samples were collected from respective farmer’s field at 0-20 cm depth. Laboratory analysis for the determination of soil parameters like pH, OM, N, P_2O_5 and K_2O was done following standard method in the SMD, Harihar-Bhawan, Lalitpur. The soil test revealed that there was no strong presence of strongly acidic or strongly alkaline soil. Most of the farmers have neutral type of soil (6.5-7.5) and only few numbers of farmers have slightly acidic (5.5-6.5) and slightly alkaline soil (7.5-8.0). The analysis report has revealed that available phosphorus and available potassium was found very high in farmers’ soil. Available phosphorus ($>110 P_2O_5 \text{ kg ha}^{-1}$) covered about 67% of the farmers field whereas, available potassium ($>550 K_2O \text{ kg ha}^{-1}$) covered about 43% of the farmers field. Only two types of soil textures had been found in the farmers’ soil; sandy loam covering 63% and Sandy clay loam covering 37% respectively. The study confirmed that the fertility status of the soil was not deteriorated to an extreme level. However, use of chemical fertilizer should be minimized and focus should be done in organic farming. Farmers’ awareness on importance of integrated nutrient management is required.

Keywords: *sustainable, crop, organic farming, awareness, nutrient management*

EXISTING SOIL PRODUCTIVITY OF VEGETABLES GROWING AREAS IN NEELKANTHA MUNICIPALITY, DHADING DISTRICT

Suman Bista

A study was conducted on the, existing soil productivity of vegetables growing areas in ward 12 and 3 of Neelkantha Municipality, Dhading district. A total of 30 soil samples were collected using soil sampling auger and laboratory analysis was carried out to determine soil parameters; ward 12 soil’s pH was found to be neutral (7.0), medium in organic matter (4.42%), high in total nitrogen (0.22%), high in potassium ($333.38 \text{ kg ha}^{-1}$) and high in phosphorus (225 kg ha^{-1}). Similarly, ward 3’s soil pH was alkaline (7.8), high in organic matter (5.47%), high in total nitrogen (0.27%), high in potassium ($347.71 \text{ kg ha}^{-1}$) and high in phosphorus (118.7 kg ha^{-1}). Out of these 17% was slightly acidic, 33% was found to be neutral and 50% was alkaline. Organic matters of 10% of households were very high, 10% was high, 57% was medium, 10% was low and 13% was very low. Total nitrogen percentage for 13% of households was found to be very high, 27% was found to be high, 43% was medium, 3% was low and 14% was found to be very low. Available potassium for 17% of households was very high, 30% was high and 40% was medium, 13% was low. Available phosphorus for 63% of households was very high, 23% was high, 7% was medium and 7% was low. About 60% of farmers reported increasing trend of productivity whereas, 20% of farmers reported decreasing trend of productivity and the remaining 20% confirmed a stagnant crop productivity trend. Commercially vegetable cultivated total areas were 8 hectares. Estimated total vegetable production of previous year was 100 tons worth 45 lakhs with an average cost of Rs. 45/kg. The crop productivity is 12.5 tons/hectare.

Keywords: *soil, productivity, vegetables, parameters, analysis*

SUSTAINABLE AGRICULTURE

PROSPECT OF ROOFTOP ORGANIC VEGETABLE PRODUCTION AND ENVIRONMENT PROTECTION IN URBAN AREAS

Anuj Dangol

The present study on prospect of rooftop organic vegetable production and environment protection was carried out in the 2 metropolitan cities, Kathmandu and Lalitpur from September to November 2017. The main objective of this study was to assess the information about the rooftop gardening status and its role in food security, urban environment and income saving for people living in the research sites. All together 99 respondents were selected for survey, applying a random sampling technique. Among them, 50 respondents were from Kathmandu metropolitan city and 49 respondents were from Lalitpur metropolitan city. Both male and female members were found to be involved in the vegetable production in the study areas. The female percent of the respondents was found to be higher in Lalitpur. The age group of respondents in between 40-50 was found to be most involved in the rooftop gardening in both study areas. The majority of respondents had never participated in training in rooftop gardening. The majority of respondents (18% in KMC and 20% in LMC) had monthly income savings of around NRs. 1000 - 1500 by reducing purchase of vegetables from the market. Majority of respondents (52% in KMC and 49% in LMC) used only organic manure while a smaller percentage used both organic and chemical. Seventy eight percent of respondents in Kathmandu and 90% in Lalitpur practiced composting of decomposable household waste. We find that the practice of rooftop gardening provides an easy and healthy option for families, and aids in management of urban household waste.

Keywords: *rooftop, organic vegetable, urban areas, environment protection*

EFFECT OF AGE OF RICE SEEDLINGS IN THE PADDY YIELD IN THE CONTEXT OF BANKE DISTRICT

Barun Dhital

A study was carried out to observe the effect of age of rice seedlings in the paddy yield on the basis of agro-morphological characteristics. Data on 10 quantitative parameters were studied. ANOVA table revealed that a significant difference was observed in the varieties for the parameters like number of tiller per meter square, total weight per plot, number of filled grain per panicle, number of unfilled grain per panicle, moisture and grain yield per hectare. This research showed that varieties with 60-67 days of seedlings had higher number of tillers. Arize 6444 and Sukha-3 with 65-72 days of seedlings were evaluated as better varieties in terms of plant height. Ram dhan was a better variety in terms of panicle length. Arize 6444 with 65 days of seedlings was a better variety in terms of number of filled grain per panicle. Radha-4 with 62 days of seedlings and Arize 6444 with 65 days of seedlings were evaluated as better varieties in terms of thousand seed weight. Swarna-sub having 72 days of seedlings was evaluated to contain higher moisture percentage. Swarna-sub and Arize 6444 with normal ages of seedlings were evaluated as better varieties in terms of yield per hectare.

Keywords: *rice seedlings, parameters, varieties, paddy, yield*

ASSESSMENT OF FOOD SECURITY AND LIVELIHOOD SITUATIONS IN ACHHAM DISTRICT

Bibek Sedhain

The main objective of my study “Assessment of Food security and livelihood in Achham district (Baradevi, Darna and Kalika)” was to reveal the food security and livelihood status of the Achham district. The study was done by applying interview technique. Three VDCs (Baradevi, Darna and Kalika) were taken as study sites. The people’s sources of income to sustain their livelihood and food security were agriculture (79.94%) and remittance (14.91%). Raising livestock like goat, cattle was another income source which helps to contribute in poverty alleviation, self-employment and income generation to improve their livelihood and food security status. In the study area, crop production was found to be very low because of less cultivable land, small land holding, and irrigation facility. In Achham there was no households (HHs) fully food sufficient on own food production. Nineteen percent had 6-11 months sufficiency and 81% HHs had less than six months food sufficiency. Disease/pests had been found to be affecting crop yields in the study area. They had not adopted any effective measures to manage them. The study area was found to be male dominated area as male were involved in income generating work but women were confined inside the household activities. In addition, the technical assistance and support by NGO and INGO had enabled them to achieve positive impact on their livelihoods and food security.

Keywords: *assessment, food security, livelihood, positive impact, income*

EFFECT OF LARGE CARDAMOM PRODUCTION IN THE LIVELIHOODS OF FARMERS IN THE BAITESHWAR RURAL MUNICIPALITY, DOLAKHA DISTRICT

Dipak Ghimire

Large cardamom (*Amomum subulatum Roxb.*) is an important cash crop mainly cultivated in the eastern hilly region of Nepal. A study on effect of large cardamom production in livelihood farmers in the Baiteshwar rural municipality, Dolakha district was done to understand the existing situation and develop effective solution to the production aspects and problems of large cardamom plantation. A formal field survey was done along with observations in the plantations. A survey was carried out in the Baiteshwar rural municipality using a structured questionnaire. Face to face interview method was used to collect the primary information from randomly selected large cardamom growers in the study site. The study shows there is more female involvement in cardamom cultivation than male. The main varieties grown were Ramshahi, Golshahi, Dammarshahi. The major proportion (38%) of area under large cardamom cultivation of the farmers ranged between 1 to 10 ropanies. The study revealed an emerging trend of employment opportunities and an increase in annual income through the large cardamom in the studied sites. Major insects reported by the respondents were leaf eating caterpillars followed by Shoot Borer. Similarly, Furke was the number one disease followed by Chhirke. The price fluctuation and the marketing of the product were other problems reported by the respondents from the study site. From the study, it is known that farmers are fulfilling their basic need and generating income from the cardamom cultivation.

Keywords: *Large cardamom, cash crop, emerging trend, income, basic need*

ASSESSMENT OF WOMEN AND CHILDREN EMPOWERMENT AND LIVELIHOOD IMPROVEMENT PROGRAM IMPLEMENTED BY TUKI IN THE NORTHERN AREAS OF DOLAKHA DISTRICT

Elija Pradhan

A study on women and children empowerment and livelihood improvement program implemented by TUKI, a non-governmental development organization, was conducted from September to December 2017 in the northern eight wards of Dolakha district in order to assess the effectiveness of the program in the targeted areas. A total of 100 beneficiaries were selected through a random sampling technique. Out of 100 respondents, 71% were female respondents and 29% were male respondents. The areas were dominated by the Brahmin/Chhetri ethnicity. Forty eight percent respondents were literate through primary, secondary, +2 and Bachelor level of education. Fifty percent respondents had family size with 4 to 6 people. Only 7% of respondents had more than 14 Ropanis of land and the majority of respondents (68%) had only up to 4 Ropanis of land. Majority of HHs had access to drinking water, decent toilet, electricity, transportation and means of communication (mobile and radio) whereas, 7% of respondents had a temporary house. The trend of land ownership, decision making and income generation was highly patriarchal but women participation in agriculture activities, household activities and participation in meeting was high. Sixty percent respondents were depended only in agriculture for their livelihood. Collective empowerment of people, women's groups, institution build up, improvement of food habit, improvement in child and maternal health as well as public health, school enrolment of resource poor children, and the upliftment of economic status in households were reported as the positive changes brought by the efforts of the run program.

Keywords: *women, children empowerment, livelihood, agriculture, empowerment*

ASSESSMENT ON KNOWLEDGE, ATTITUDE AND PRACTICES OF FARMERS AGAINST CLIMATE CHANGE

Manoranjan Regmi

A study was carried out to assess the climate change status of farmers in Mandandeupur and Panchkhal municipality of Kavrepalanchowk, Nepal during the months of August to September. The sample size was 150 and almost 50:50 ratios of males and females were maintained to obtain uniformity in the results. The observed data revealed that the majority of the population had some knowledge regarding climate change and their basic understanding was the change in the rainfall patterns and increased temperatures. Majority of the farmers were keen to adapt the climate change practices and 64% reported that they were already taking measures to adapt to climate change. Practices adopted by the farmers even brought forward changes in the productivity and soil health. Wild animals like Jackal, bear and medicinal plants like chiraito and panchaule which were abundant a few years back have now been reduced considerably in the study area. Though climate change adaptation was found to be moderate, farmers were not satisfied with the existing practices and crop productivity. According to farmers versions crop yields are in a decreasing trend. Many of them were unaware about the climate change effects on productivity. Thus, local farmers should be made aware about the effective ways to mitigate and cope up with climate change. They should be encouraged to adopt efficient water use technology and best climate change practices. Increment in agricultural productivity could be helpful to increase the socio-economic status of the farmers.

Keywords: *climate change, assessment, knowledge, practices, socio-economic status*

PROSPECT OF KIWI FARMING IN THE IMPROVEMENT OF HOUSEHOLD ECONOMY IN THE DOLAKHA DISTRICT

Namrata Basnet

The study titled “Prospect of kiwi farming in the improvement of household economy” was conducted in 3 places in the Dolakha district; namely Boach, Jiri and Bigu. The study was conducted during the 20th of July to the 6th of September 2017. The main objective of this study was to find out whether kiwi farming is improving household economy of people living in study area. A total of 60 households were selected randomly for the study. Both genders male and female were found to be involved in kiwi cultivation, about 60% of respondents were male and 40% were female. 20% of respondents were illiterate, 38% of people have primary level education, and 17% were people having secondary and S.L.C. level education. Kiwi was the major cash crop in the study area, the most widely used variety in the study site was Monti. Agriculture is the major occupation followed by Government jobs, business and others. Among 60 respondents 50% were cultivating kiwi on 1-5 ropani of land and 12% cultivated kiwi on 15 ropani area. Training related to kiwi cultivation was also given to the respondents; 47% of respondents were trained in kiwi cultivation and 53% were not trained. Training was organized by DADO and some other organizations who were concerned about agriculture. Kiwi was mostly sold to local markets by the farmers themselves. Kiwi cultivation is helping farmers economically and there is an improvement of household economy by kiwi farming.

Keywords: kiwi, household, economy, local markets, improvement

ASSESSMENT OF THE ROLE OF ORGANIC VEGETABLE FARMING ON HOUSEHOLD INCOME OF FARMERS IN BAGHCHAUR MUNICIPALITY OF SALYAN

Sanju D.C

Baghchaur ecovillage is one of the five traditional villages in Salyan district which is in the process of transformation into sustainable ecovillages based on a bio-intensive farming approach. Most of the vegetable growers cultivated high value vegetable crops on upland integrating with the existing maize-based cropping system. Major succeeding vegetable crops to maize included cauliflower, cabbage, radish, tomato, and potato. Seventy percent of the respondents were engaged in the compost / farm yard manure production and they used that on their farms. It is noteworthy that 50% of respondents (N=100) were engaged in organic vegetable production primarily for home consumption, which is an indicator of their awareness to health and nutrition for household members. Only one third of the respondents reported that they were involved in organic vegetable production for income generation due to its profitability. This number was limited due to their access and control over small farm size. The study revealed that 40% of respondents (farm households) earned Rs 50,000-100,000/- annually and 10% of households earned Rs 200,000-250,000/ per year depending on the size of the farm. In our attempt to assess their satisfaction to conversion into organic mode of production of vegetables, 70% of the respondents reported that they were happy and satisfied with organic vegetable production. Fifty percent of the respondents reported that the productivity of vegetables was increasing while 20% of respondents said that the productivity was constant.

Keywords: organic vegetable, household income, bio-intensive, satisfied, productivity

AN ASSESSMENT OF INTEGRATED PEST MANAGEMENT GROWN PRODUCTS MARKETING STATUS IN THE KASKI DISTRICT

Sudeep Raj Adhikari

This study was conducted to understand the market opportunities for vegetable growers using the IPM approach. The study was carried out among 150 respondents of 6 different areas of the Kaski district purposively during the 1st of August to the 30th of September 2017. The respondents were found to have already attended the integrated pest management- farmer's field school. The farmers in study area were mostly between the ages of 40-49 years old with maximum of 40% people having 1-2 ropani of the land. Farmers adopted the IPM approach for commercial vegetable cultivation after attainment of IPM-FFS training provided by CARITAS Nepal. Consumers preferred buying IPM vegetables in comparison to the conventionally grown vegetables. Both the producers and the consumers in the study were well aware about the impact of chemicals on vegetables. Among wholesalers and retailers, retailer's preferred selling the IPM products compared to the wholesalers as they pointed out the problem of regular supply and smaller amount of vegetables. In the case of price fixation, they negotiated among the sellers and buyers during the process of selling. Due to the awareness among the respondents, they were able to use precaution regarding the quality of vegetables, procedures like washing vegetables properly before cooking, and deep freezing. The average B:C ratio for the district was 1.52 per ropanies for the IPM product. The related suggestions were made to promote the marketing opportunities for IPM products.

Keywords: *marketing status, IPM, vegetable cultivation, B:C ratio*

ASSESSMENT OF FARMERS KNOWLEDGE ON THE ROLE OF IPM AND FFS ON THEIR LIVELIHOODS IN KASKI DISTRICT

Sunita Thapa

A study on farmer's knowledge on the role of integrated pest management (IPM) and farmer's field school (FFS) on their livelihoods in Kaski district was conducted to assess its effectiveness. Seventy farmers of 6 different areas in the Kaski districts during the 1st of August to the 30th of September 2017 were covered for survey. Information was gathered by using a questionnaire and direct interview with respondents. The respondents had already attended the integrated pest management-farmers field school. Among the farmers attending the training, the main source for their livelihood was agriculture and remittance. Apart from vegetables, rice farming, goat rearing, cattle and buffalo rearing, remittance were other sources of income to ensure their livelihoods and food security. Farmers initially didn't sell or grow vegetables in a commercial way but after the IPM training they started growing vegetables both seasonally and off seasonally and started selling them to generate income for meeting the basic requirement of the family like education, health facility and others. Disease and pest outbreak, lack of technical knowledge on pest management were the problems found to be faced by farmers. The farmers also reported the lack of awareness and similar price in vegetables grown using IPM approach and conventionally grown in the market. However farmers were benefitted from the organization through regular monitoring, seed assistance and other technical assistance along with the assistance of water drum, drip irrigation and tunnels. Farmers with small land were also trained to grow vegetables in their kitchen gardens to ensure their nutritional requirement.

Keywords: *livelihoods, IPM, FFS, disease, farmers*

VETERINARY SCIENCE

B.V. Sc. & AH

SCREENING OF FECAL SAMPLES FOR CRYPTOSPORIDIUM OOCYSTS IN GOATS OF PANCHKHAL, KAVREPALANCHOK

Aashish Mahat

Cryptosporidium is an important zoonotic pathogen transmitted primarily through water. This study was conducted to determine the occurrence of Cryptosporidium in goat where the water drains from the rain water, and surface water. This cross-sectional study was conducted during month of November 2017 to March, 2018. A total of 200 fecal samples from goats were collected from Panchkhal municipality, Kavrepalanchok district and 22 samples were found positive. The laboratory examination was carried at HICAST, Kalanki and DLSO, Dhulikhel, Kavre. The samples were stained by Ziehl-Neelsen's Staining technique and observed at low power microscope (10x) for the presence of parasites. The overall prevalence of Cryptosporidium oocyst from the coprological study was 11%. The prevalence against the age groups of 6 months to 1 year was 13.07%, 1 year to 2 years was 6% and above 2 years was 10%. The sex wise prevalence was found to be 12.10% in males with 13 positive samples and 9.67% in females with 9 positive samples. Faecal examination showed statistical difference between the age group of the goat. Thus, the study suggests further studies regarding cryptosporidium in kids of Kavre district.

Keywords: *zoonotic, pathogen, prevalence, faecal, age group*

SEROPREVALENCE OF BLUETONGUE IN SHEEP OF PROVINCE NO. 3, NEPAL

Ashma Lamichhane

Bluetongue virus (BTV) is an orbivirus of Reoviridae that infects both domestic and wild ruminants and is transmitted by *Culicoides* spp. biting midges. A study on sero prevalence of bluetongue in sheep was conducted during November 2017- March 2018. A total of 100 serum samples were collected from sheep flocks of Bhaktapur, Ramechhap, Dolakha and Sindhuli Districts. The serum samples were tested for BTV antibody using cELISA at the national FMD and TADs laboratory, Budhanilkantha Kathmandu. Out of 92 samples examined 11 samples (11.95%) were found positive for antibody for blue tongue virus. Among four districts, the seroprevalence of BTV was higher in Ramechhap 8(44.44) % than Sindhuli 3 (12%) and all the samples were found negative for Bhaktapur and Dolakha districts. It might be due to variation in sample size, along with variation in environmental temperature and vector prevalence. Similarly the age wise prevalence was found to be 16.67%, 25% and 27.27% among the age groups < 1 years, 1-3 years and 4-6 years respectively. As bluetongue is considered to be a major TAD Transboundary Animal Diseases, (TAD) there is a need to carry out clinical surveillance of bluetongue in sheep and seroprevalence studies in other susceptible ruminants and also subsequently developing the control strategy of bluetongue disease in the country. The epidemiology and seroprevalence of blue tongue in national herd has not been sufficiently evaluated in the country and the government has not yet formulated the national strategy for blue tongue control. Awareness among the sheep farmers regarding Bluetongue disease and its control measures has to be created. Continuous monitoring of circulating serotypes is essential to understand the distribution and spread of BTV in endemic areas and for devising suitable control measures.

Keywords: *domestic, ruminants, sero prevalence, epidemiology, bluetongue disease*

PREVALENCE OF (*Toxocara vitulorum*) IN CATTLE CALVES OF DOLAKHA DISTRICT

Bishal Bhattarai

A study on the prevalence of *Toxocara vitulorum* in young calves was conducted from February to April 2018 in the different Municipalities of Dolakha district. A total of 120 samples were collected from cattle calves, 23(19%) calves were found positive for *Toxocara vitulorum* ova. The present study showed that *Toxocara vitulorum* is prevalent in cattle calves of the study area. Similarly the prevalence of *Toxocara vitulorum* was more in young animal than older calves. Age wise highest prevalence (33.33%) was found in less than three month old calves followed by (8.69%) prevalence in greater than 3 months old calves. The study was statically significant ($p=0.0007$). Area wise prevalence of *Toxocara* was observed similar in Jiri(18.88%) and Bhimeshwor(18.88%) and higher prevalence were observed in Tamakoshi(25%) and Baiteshwor (26.66%). All the samples from Melung were found to be negative for *Toxocara Vitulorum*. Similarly sex wise prevalence was 16.32 % (8/49) in males and 18.75% (15/71) in females. The study was not statistically significant ($p=0.511$). Prevalence based on history of deworming shows 14.28% (2/14) in dewormed calves and in non- dewormed calves prevalence was 19.81% (12/106).The study was not statistically significant ($p=0.621$).

Keywords: *prevalence, cattle, deworming, calves, Dolakha*

A COMPARATIVE HEMATOLOGICAL AND BIOCHEMICAL STUDY OF LULU CATTLE AT TWO ALTITUDES

Digambar Joshi

A comparative hematological and biochemical study was done in the Lulu cattle (*Bos taurus*) at different locations. A total of the 55 blood samples were taken from Mustang district (30) and from Animal Breeding Division, Khumaltar, Lalitpur (25). The average hematological and biochemical parameters were calculated at two locations. The sex wise and age wise (below 3 years and above 3 years) comparison of the parameters in the same location and in between the location was carried out. The study of the average hematology and biochemistry at two locations showed significant difference ($P<0.05$) for MON %, MCV, MCHC and serum calcium at two locations. There was significant difference in the total protein ($P=0.013$) in the sexes at low altitude. The significant difference was observed for the WBC and Hb among the male population. No significance difference was observed for the LYM %, MON% NEU% and MCV values of the female sexes of two locations. The age wise study revealed significant difference between in total protein ($P=0.005$) between the age groups at low altitude. Significant difference was observed between the mean values of the above 3 years' age group at two locations. The hematological study showed that there was significant difference in the EOS% ($P=0.028$), MCV% ($P=0.012$) between the age group at high altitude.

Keywords: *hematological, biochemical, cattle, lulu, mustang*

PREVALENCE OF HELMINTHES PARASITES OF GOAT IN SANDHIKHARKA MUNICIPALITY OF ARGHAKHANCHI DISTRICT

Dobin Bhusal

A study was conducted to find out the prevalence of Helminthes parasites in goat of Sandhikharka Municipality of Arghakhanchi District. Altogether 236 faecal samples were collected from three VDCs and were examined for helminthes parasites in the parasitology laboratory of HICAST. The samples were examined qualitatively by Sedimentation Techniques (Soulsby, (1976), Test tubes floatation Techniques (2013 FOA) and quantitatively by Mc master counting Methods as per Urquhart et al, (1987) for identification of helminthes. Out of 236 samples, 186 (78%) samples were found positive. Prevalence of nematodes was higher (75.42 %) while trematodes showed a lowest prevalence (9.32%). The most common parasite encountered were *Strongyle sps* (75.43%) (*Trichostrongylus sps*, *Ostertagia sps*, *Oesophagostomum sps*, *Haemonchus sps*, and *Chabertia sps*), *Trichuris sps*, (13.95%) *Moniezia sps* (16.12%) and *Fasciola sps*. (9.322%). The prevalence of helminthes infestation were 119 (92.96%) and 74 (68.51%) in the age group of >6 months and 0- 6 months respectively. Lower prevalence of helminthes parasites was observed in Dharampani and the highest prevalence 79(80.62%) of the same parasites was found in Argha.

Keywords: *helminthes, parasites, faecal, parasitology, prevalence*

STUDY OF BIOCHEMICAL PARAMETERS OF GOAT BREEDS (KHARI AND JAMUNAPARI) OF PANCHKHAL MUNICIPALITY, KAVRE

Durga Pandey

Most popular breeds of goats in the mid hills of Nepal are Dominant Khari (DK) and Dominant Jamunapari (DJ). Despite the importance of these goats, the normal serum biochemical parameters have not yet been determined. This study was conducted to determine the normal serum bio-chemical values in goats and the effect of breed, age, sex and physiological states on them. The parameters considered were serum Glucose, Total protein, Albumin, Calcium and Phosphorus. A total of 105 Blood samples from apparently healthy goats (DK, n= 56 and DJ, n= 49) were considered for the study and data obtained was analyzed using Microsoft excel data analyzer software, 2007 and SPSS version 2016. Mean of serum Glucose, Total Protein, Albumin, Calcium and Phosphorus were found to be 60.92 ± 1.78 mg/dl, 6.65 ± 0.16 gm/dl, 2.45 ± 0.072 gm/dl, 10.88 ± 0.32 mg/dl and 3.34 ± 0.12 mg/dl respectively which were not significant breed wise and different physiological state wise ($P < 0.05$). Serum Total Protein was found decreased during Pregnancy and Post-partum stage. Serum Calcium however was increased during pregnancy (10.65 ± 0.55 mg/dl) and during post-partum (11.48 ± 0.84 mg/dl) stage which showed significant difference ($P < 0.05$). Sex wise and age wise, significant difference ($p < 0.05$) was observed in serum Total protein (male, 7.5 ± 0.58 gm/dl and female 6.41 ± 0.18 gm/dl), higher in young <2 years (7.95 ± 0.7) and lower >2-6 years (6.92 ± 0.45). The determined biochemical values from this study provide the normal biochemical indices which can be used for baseline references for both DK and DJ goats and can be used as comparison for diagnostic and therapeutic purposes in the goat population of mid-hills.

Keywords: *breeds, goats, mid-hills, Khari, biochemical values*

SEROPREVALANCE OF *Toxoplasma gondii* IN CATTLES OF PARASI, RUPANDEHI, CHITWAN AND MAKWANPUR DISTRICTS OF NEPAL

Ganesh Gautam

A study entitled “Seroprevalance of *Toxoplasma gondii* in cattle of Rupandehi, Parasi, Chitwan and Makwanpur districts of Nepal” was conducted during December 1 to April 28 (2017-2018). Laboratory examination was carried out in laboratory of National Cattle Research Program (NCRP), Rampur, Chitwan. Enzyme Linked Immuno Sorbent Assay (ELISA) test was used to detect the antibodies against *Toxoplasma gondii*. Out of 155 serum samples, 11(7.1%) serum samples were found positive for *Toxoplasma gondii* antibodies. For district-wise seroprevalance of *Toxoplasma gondii*, 40 samples were collected each from Rupandehi, Parasi and Makwanpur district and 35 samples were collected from Chitwan district in which 3(7.5%) samples were found positive in Rupandehi, 3(7.5%) samples positive in Parasi, 8(12.5%) samples positive in Makwanpur. However none of the samples yielded positive result in Chitwan district. The result showed that there was no significant difference in prevalence ($p=0.84$). The result showed that there was no significant difference in prevalence ($p=0.51$). For breed-wise seroprevalance of *Toxoplasma gondii*, 35 samples were collected from local cattle of which 3(8.57%) samples were positive and out of 120 samples of crossbreed cattle, 8(2.5%) were positive. The result showed that there was no significant difference in prevalence($p=0.699$).The findings demonstrated that there is seroprevalence of Toxoplasmosis in cattle’s in the above mentioned districts and the study will provide a baseline for further research and studies on a wider scale.

Keywords: *seroprevalence, cattle, research, ELISA, toxoplasmosis*

DETECTION OF ANTIBIOTIC RESIDUES IN MARKETED BROILER MEAT OF DHADING AND DOLAKHA DISTRICTS

Hema Yonjan

The study was carried out to detect the antibiotic residues in broiler meat collected from the retail meat shops of Dhading and Dolakha districts during the period of December, 2017 to May, 2018. The study was a cross-sectional study. A total of 100 breast muscle samples were collected purposively from randomly selected 50 retail meat shops in both districts. Laboratory examination was conducted at Veterinary Public Health Office Laboratory, Department of Livestock Services, Tripureshwor, Kathmandu. The samples were tested according to the protocol of the RR test kits (G9 Co. Ltd, Thailand). The data were collected, coded, recorded in computer and analyzed by using MS-EXCEL 2007 and SPSS statistics version 16. Out of 100 meat samples analyzed, 31 (31%) samples were found positive for different antibiotic residues. The study showed the highest residue for Sulfonamide (19%), followed by Tetracycline (7%) and Penicillin (5%). Out of 50 muscle samples from each district, positive case for antibiotic residues was found highest, (17 %) in the samples of Dolakha followed by Dhading (14%). Location-wise, Sulfonamide residue was found to be highest (14 %) in Dhading followed by Dolakha (7 %), and all 50 muscle samples of Dhading District were found negative for Tetracycline whereas 7% of muscle samples showed positive for Tetracycline. Like-wise all 50 muscle samples from Dhading were negative for Penicillin whereas 5% of samples showed positive for Penicillin in Dolakha district. This study showed the presence of significant antibiotic residues in the marketed chicken meat of both Dolakha and Dhading Districts.

Keywords: *antibiotic, broiler, Sulfonamide, chicken, Tetracycline*

PREVALENCE OF HAEMOPROTOZOAN PARASITES IN CATTLE OF SIRUTAR, BHAKTAPUR

Mandip Raut

The prevalence of haemoprotozoan disease in crossbred cattle of Sirutar was studied by screening 125 blood samples (76 Jersey crossbreeds, 49 Holstein-Freisian crossbreed) under microscope (100x) by Wright/Giemsa stained blood smear method. Among 125 crossbred cattle screened, 41(32.8%) animals were found positive for haemoprotozoan parasites. Out of 41 positive cases, 15 (12%) were found positive for *Anaplasma spp.*, 2 (1.6%) were found positive for *Theileria spp.*, 8 (6.4%) were positive for *Babesia spp.* and the remaining were found to have mixed infection with *Anaplasma spp.* and *Babesia spp.* seen in 10 (8%) cattle, *Anaplasma spp.* and *Theileria spp.* in 4 (3.2%) cattle and all three protozoa in 2(1.6%) cattle. Out of 76 Jersey crossbreeds, 27 (21.6%) were found to be infected and out of 49 HF crossbreeds, 14 (11.2%) were found to be positive. Clinical severity was found to be more severe in Jersey crossbreeds than in HF crossbreeds with clinical signs like high fever, anorexia, labored breathing, pale, whitish or yellowish mucus membrane, jaundice, swollen lymph nodes, lethargy, anemia, hyperbilirubinuria or hemoglobinuria. The highest prevalence was found in cattle greater than three years of age with lowest prevalence seen in calves less than one year of age. The result showed that there was higher prevalence rate of the hemoprotozoan disease on the jersey than on the Holstein cattle but there was no significant relationship between the breed and the occurrence ($P>0.05$) of the disease. The treatment with Oxytetracycline for *Anaplasma spp.* and *Theileria spp.* and DiminazeneAceturate for *Babesia spp.* was found effective.

Keywords: *haemoprotozoan, cattle, severity, prevalence, treatment*

PREVALENCE OF COCCIDIOSIS IN GOAT KIDS IN GAJURA MUNICIPALITY OF RAUTAHAT DISTRICT

Niroj Kumar Majhi

A study was conducted to find out the prevalence of Coccidiosis in kids of Gujra municipality (Simri, Junglesaiya and Baluwa), of Rautahat district. This study was carried out during February to May 2018 to find out the prevalence of Coccidiosis. All together 150 fecal samples were brought from different villages of Gujra municipality and were examined for Coccidial Oocyst in the Parasitology Laboratory of HICAST, Kalanki, Kathmandu. The samples were examined qualitatively by floatation and sedimentation method for identification of Coccidial Oocysts. Out of 150 samples, 22 (14.66%) samples were found positive whereas 128 (85.34%) samples were negative. Prevalence of Eimeria was found high in the female kids (20%) than male kids (11.11%), but the result was not statistically significant ($p=0.131$). Similarly prevalence was found in <3 months of age group 16.8% while in >3 months age group it was 10.9%. The result showed that there was no significant difference in prevalence ($p=0.322$). From the survey it was found that 60.40 percent household's cleaned goat shed in every six months and 31.3 percent of people knew about parasites.

Keywords: *prevalence, Coccidiosis, goat, samples, parasites*

PREVALENCE OF SALMONELLOSIS AND IDENTIFICATION OF SALMONELLA ENTERICA BY PCR IN UNHATCHED EGG IN AND AROUND KATHMANDU VALLEY

Prajwala Amatya

Salmonellosis is one of the leading food borne diseases in developing countries including Nepal. The present study was conducted with an objective to find the prevalence of Salmonella in unhatched eggs along with their antibiotic sensitivity test profile from different sites in and around Kathmandu Valley. A total of 120 unhatched egg samples were collected, then isolated and analyzed at Microbiology Laboratory of Animal Health Research Division, Khumaltar, Lalitpur. Samples were identified as Salmonella by conventional microbiological method and PCR and antibiotic sensitivity testing was performed. Out of 120 samples analyzed, 15(12.5%) samples showed positive to Salmonella through biochemical analysis where positive reaction was shown for, XLD, SIM, Citrate, TSI, Indole and Methyl red. Out of 15 positive samples, 7 (46.67%) were found to be *S. enterica* and confirmed by PCR test, 6 (40%) as *S. pullorum*, and 2 (13.34%) as *S. gallinarum*. Antibiotic sensitivity test was also performed and out of 15 positive samples, all were resistant to Colistin, Chloramphenicol, Gentamycin and Tetracycline. Out of 15 isolated *Salmonella spp*, 12 were intermediate and 3 *Salmonella spp* were resistant to Ceftriaxone. Out of 15 *Salmonella spp*, 5 were intermediate to Ciprofloxacin and 10 were resistant to Ciprofloxacin. None of isolated *Salmonella spp* were sensitive to Colistin (CL), Chloramphenicol (C), Gentamycin (GEN), Tetracycline (TE), Ceftriaxone (CTR) and Ciprofloxacin (CIP).

Keywords: *prevalence, Salmonellosis, PCR, identification, unhatched,*

SEROPREVALENCE OF BLUETONGUE IN SHEEP OF THREE ECOLOGICAL ZONES OF WESTERN DEVELOPMENT REGION OF NEPAL

Priyanka Bhandari

Bluetongue disease is an infectious, non contagious disease of sheep transmitted by arthropods of *Culicoides* species characterized by fever, facial edema, hemorrhagic ulceration on oral mucosa, cyanosis of tongue and coronitis. A cross sectional study was conducted in Western Development Region representing three ecological zones to know the seroprevalence of bluetongue disease in the sheep population from November 2017 to February 2018. A total of 210 serum samples were collected from the sheep of three ecological zones, 70 from Mustang, 70 from Kaski and 70 from Kapilbastu district of Nepal for the antibody of BTV by using c- ELISA test. Out of 210 samples 52 (24.76%) serum samples were seropositive for bluetongue antibodies. 45(64.2%) serum sample of Kapilbastu and 7(10%) serum sample of Kaski district were seropositive and 70 serum samples of Mustang district were found to be seronegative for bluetongue antibodies. There was a significant difference between the locations to seroprevalence of disease ($p < 0.001$). Presence of Culicoides vectors was also significant for seroprevalence of disease ($p < 0.001$) whereas the history and clinical symptoms remained insignificant for the seroprevalence of disease. Further, detailed research on screening of the disease in sheep population of the country should be done to find the status of this disease in order to understand its distribution and economic impact on the livestock sector so as to develop appropriate control measures in national level.

Keywords: *bluetongue, seroprevalence, sheep, economic impact, control*

PREVALENCE OF HAEMOPROTOZOAN PARASITES IN CROSS BRED CATTLE OF DUWAKOT IN BHAKTAPUR, NEPAL

Pujan Singh Kunwar

The prevalence of haemoprotozoan disease in crossbred cattle of Duwakot was studied by screening 125 blood samples (76 Jersey crossbreeds, 49 Holstein-Friesian crossbreed) under microscope (100x) by Wright/Giemsa stained blood smear method. Among 125 crossbred cattle screened, 41(32.8%) animals were found positive for haemoprotozoan parasites. Out of 41 positive cases, 15 (12%) were found positive for *Anaplasma spp.*, 2 (1.6%) were found positive for *Theileria spp.*, 8 (6.4%) were positive for *Babesia spp.* and the remaining were found to have mixed infection with *Anaplasma spp.* and *Babesia spp.* seen in 10 (8%) cattle, *Anaplasma spp.* and *Theileria spp.* in 4 (3.2%) cattle and all three protozoa in 2(1.6%) cattle. Out of 76 Jersey crossbreeds, 27 (21.6%) were found to be infected and out of 49 HF crossbreeds, 14 (11.2%) were found to be positive. Clinical severity was found to be more severe in Jersey crossbreeds than in HF crossbreeds with clinical signs like high fever, anorexia, labored breathing, pale, whitish or yellowish mucus membrane, jaundice, swollen lymph nodes, lethargy, anemia, hyperbilirubinuria or hemoglobinuria. The result showed that there was higher prevalence rate of the hemoprotozoan disease on the jersey than on the Holstein cattle but there was no significant relationship between the breed and the occurrence ($P>0.05$) of the disease. The treatment with Oxytetracycline for *Anaplasma spp.* and *Theileria spp.* and Diminazene Aceturate for *Babesia spp.* was found effective.

Keywords: prevalence, hemoprotozoan, cattle, treatment, severity

SEROPREVALENCE OF *Chlamydia abortus* IN CATTLE OF RUPANDEHI, PARASI, CHITWAN AND MAKWANPUR DISTRICTS

Rakesh Chaudhary

Chlamydiosis is one of the highly prevalent zoonotic diseases in wide range that causes abortion and infertility in dairy cattle. To find out its status, a sero-prevalence study was conducted during December-April 2018 in aborted and reproductive disorder dairy cattle of Rupandehi, Parasi, Chitwan and Makwanpur districts. A total of 155 samples (40 samples were collected from Rupandehi, 40 from Parasi, 40 samples from Makwanpur and 35 from Chitwan districts) were collected from dairy cattle with recent history of abortion. Out of 155 samples 9 (5.80%) were positive on Enzyme Linked Immuno-sorbent Assay (ELISA). Among 9 positive samples, 4 (10%) were from Rupandehi, 1 (2.5%) from Parasi, 3 (7.5%) from Chitwan and 1 (2.85%) from Makwanpur districts. The result showed that there was no significant difference in prevalence ($p= 0.807$). Prevalence in <4 year's age group was found to be 5.73% and in >4 years age group was 6.06%. The result showed that there was no significant difference in prevalence ($p= 0.94$). Similarly, prevalence in local breeds was found to be 8.88% and in crossbred was found to be 4.54%. The result showed that there was no significant difference in prevalence ($p= 0.29$). Considering the prevalence of the chlamydiosis in dairy cattle of these places and its threat for the transmission to other animals and human, a sui preventive and control measure including the regular test and segregation of sero positive animals, effective quarantine, legislative measure and awareness programs for farmers, veterinarians and stakeholders at all level are warranted.

Keywords: Chlamydiosis, prevalence, prevention, control, cattle

REPRODUCTIVE DISORDER AND MANAGEMENT IN CHAURIES OF KALINCHOWK, DOLAKHA

Ramita Lama

Reproductive problems like anestrus, abortion, repeat breeding, retention of fetal membrane which are the common problems in Chauries could result in low productivity and may be one of the major reasons for declining farming of Yak/Chauries. Therefore, this study was carried out to determine the prevalence of reproductive problems in Chauries of Kalinchowk during November 2017 to March 2018. One hundred and sixty four questionnaire survey regarding reproductive problems and Chauri husbandry practices was carried out in the study site. Also, 100 fecal samples were collected and examined to know the parasitic prevalence in the study areas. This study also assessed the efficacy of mineral mixture (Mintrus), ovulatory estrus inducer (Janova) and uterine cleanser (Exapar) of Ayurved. Out of the 164 Chauries surveyed, majority reported the presence of retention of fetal membrane (10.00%) and few reported repeat breeding (2.50%). Majority farmers had 4-6 years old of Chauries (60.40%) and they had either irregularly or never dewormed Chauries. None of the farmers in the study area had ever vaccinated their animal. There was significant difference in finding the retention of fetal membrane between Chauri breeds ($P < 0.032$) whereas the deworming and age group remained insignificant with prevalence of reproductive problems. The prevalence of the helminthes parasite was found (13.00%) positive. A total of 10 out of 30 Chauries in treatment group showed the sign of estrus in 20 days.

Keywords: *reproductive, Chauries, disorder, estrus, treatment*

PREVALENCE OF BLOOD PROTOZOAN PARASITES IN CHAURIES OF RASUWA DISTRICT OF NEPAL

Romi Lamichhane

Blood parasitic diseases in Cattle are caused by the protozoans such as *Babesia spp.*, *Trypanosoma spp.*, *Theileria spp.* and *Anaplasma spp.* Hyperthermia is an important symptom for suspecting such disease condition. This study was carried out during November 2017 to February 2018 to find out the prevalence of haemoprotozoans in Chauries of Rasuwa district. Blood samples were collected from 53 Chauries of Rasuwa district mainly Thuman and Dhunche and blood smear was made on the spot (farm). The blood smear was fixed by using methanol on the spot (farm) and it was examined later on for blood parasites by staining with Giemsa's method. The haematological parameter especially Differential Leucocyte Count (DLC) of positive samples was also carried out and analyzed. Data was analyzed to determine prevalence of various species of blood parasites to establish the correlation of the infections with age and location. Out of 53 samples examined, blood parasites were identified in 19(36%) samples of which 12(22%) were found positive for *Anaplasma spp.*, 4(8%) were positive for *Theileria spp.*, 1(2%) was found positive for *Babesia spp.* and 2(4%) were found positive for *Anaplasma* and *Babesia* mixed infection. To determine significant difference in relation to age and location Chi-square test was performed. The confidence level for the analysis was set at 95 percent with significance level assessed at $p < 0.05$. The study revealed statistically significant difference in age-wise prevalence ($p = 0.03$) whereas it did not have any significant difference in location wise prevalence ($p = 0.88$). Mean Neutrophil was decreased whereas Eosinophil were found to be increased in infected Chauries. The control of ticks has to be done to prevent Chauries suffering from Blood Protozoan Parasites.

Keywords: *prevalence, Chauries, blood protozoans, cattle, control*

PREVALENCE OF SUB-CLINICAL MASTITIS AND ASSOCIATED RISK FACTORS IN REGISTERED DAIRY CATTLE FARMS OF BARDIYA DISTRICT

Srijana Paudel

Mastitis is recognized as one of the most costly health disorder affecting dairy cows. Subclinical mastitis (SCM) is a well-known problem in the dairy sector, where it causes severe economic losses mainly due to reduced milk production. Subclinical mastitis (SCM) is a well-known problem in the dairy sector, where it causes severe economic losses mainly due to reduced milk production. This is a problem not only in the western world but also in developing countries. A study was carried out during December 2017 to May 2018 to find out the prevalence and risk factors of sub clinical mastitis in dairy cattle of different VDCs (Dhadawar, Bansgadi, Sorahawa, Kalika, Mainapokhar and Thakurdwara) of Bardiya District. Milk of 25 dairy cattle (comprised of 100 quarters) were collected and analyzed in Central Veterinary Laboratory, Tripureshor, Kathmandu. Among 25 samples of cattle examined, breed of the animals were Holstein Fresian and Jersey. Milk samples were tested using California Mastitis Test (CMT), Mastrip test and Somatic Cell Count (SCC). Among the two tests, CMT was found to be more efficient than mastrip test. However, the result were statistically not significant at 5% level of significance ($p=.666$). The most effective way to control sub-clinical mastitis is to take preventive measures such as regular cleaning of the floor, keeping the udder clean, milkman's cleanliness, dry cow therapy specially in high yielding dairy cows. Good Veterinary practices (GVP) and Good Agricultures (GAP) should be encouraged to the farmer's level. The major preventive measures include good management practices.

Keywords: *prevalence, mastitis, risk, cattle, Rasuwa*

SEROPREVALENCE OF COXIELLOSIS (Q FEVER) IN GOATS AT KAVRE DISTRICT

Subash Poudel

Coxiellosis, caused by *Coxiella burnetii*, a rickettial microorganism attributed to reproductive disorders in goats and other ruminants, is still unexplored in Nepal despite its identification in neighbor countries. The main objective of the study was to detect the antibodies against *C.burnetii* in goats. A cross sectional study was carried out in Kavre district, during March 2018 in Nepal. A total 92 numbers of serum samples were collected purposively. Blood samples were collected from the jugular vein in serum collecting vials and sera were separated and stored at -40 degree centigrade until the laboratory investigation. The collected samples were tested by indirect ELISA by following the manufacturer's protocol (ID Screen® manufactured by ID Vet, France). The overall prevalence was found to be 6.52% (6/ 92) among 6 positive samples 4 were strong positives. The prevalence in males and females were found to be 4.54%, and 7.14% respectively. However the result was statistically not significant at 5% level of significance. ($p=.666$). Similarly prevalence in dominant Khari (local) breed was found to be 5% while in dominant Jamunapari (cross breeds) was 7.69%. Statistically this result was not significant. ($p=0.604$) This study has detected seropositivity of coxiellosis in goats for the first time in Kavre district, Nepal. Enhanced surveillance using molecular techniques such as PCR with large sample size is warranted to assess economic losses and zoonotic consequences.

Keywords: *seroprevalence, coxiellosis, goats, Kavre, surveillance*

PREVALENCE OF GASTROINTESTINAL PARASITES IN YAK/NAK OF RASUWA DISTRICT

Sunita Shrestha

Gastrointestinal (GI) parasites are a major problem in Yak (*Bos poephagus*) causing economic losses, primarily through severe weight loss, poor meat, milk and wool production, and impaired reproductive performance. A study was conducted to estimate the prevalence of gastrointestinal parasites of Yak/Nak of Rasuwa district from Nov 2017 to Feb 2018. Altogether 100 faecal samples were brought from Langtang and Gatlang of Rasuwa district and were examined for parasites in Parasitology Laboratory of HICAST. The qualitative parasitic investigation was carried out through different methods as by Soulsby (1978). Sedimentation and differential flotation methods were done to examine the faecal samples. Out of 100 fecal samples examined 18 (18%) were found positive for different gastrointestinal parasites. The overall occurrence of different parasites recorded was *Moneizia spp* and *Eimeria spp*. The prevalence was found to be 19.11% in Langtang and 15.62% in Gatlang Yaks of Rasuwa district. There was no significant difference in prevalence among two locations ($p=0.67>9.05$) at 5% level of significance. The lower prevalence in our study may be due to the altitude and location of our research area.

Keywords: prevalence, gastrointestinal, Yak, Nak, parasites

MORPHOLOGICAL STUDY OF TICK SPECIES IN DIFFERENT LIVESTOCK SPECIES OF RASUWA DISTRICT

Sushma Gurung

Ticks are considered as the main vector for transmission of various diseases to animal. The study was carried out to investigate the species of ticks belonging to families of ticks, Ixodidae (hard ticks) in yak/nak, chauri, cattle, sheep and goat of Rasuwa district. A total no. of 3 yak/nak, 20 cattle, 70 goats, 12 chauries and 20 sheep were selected from the different places of Rasuwa district. From the study area all together 369 ticks were collected with purposively random method, after collection they were preserved in 70% alcohol containing 5% glycerine properly labeled and transported to AHRD, NARC, Khumaltar until further laboratory analysis carried out. The preserved ticks were examined by morphological characteristics using stereomicroscope and identified according to the figures and key described by Acarology Division, IMR (1995), Kaiser and Hoogstral (1964), Morel(1989) and MAFF(1986). Out of 369 ticks collected, *Boophilusmicroplus* ticks identified were 3 (100%) in Yaks, 30(83.33%) in Chauries, 55(91.66%) in Cattle, 140(66.66%) in goats, 30(50%) in sheep's. Similarly, *Haemophysalis* ticks identified were 3(8.3%) in chauries, 5(8.33%) in cattle, 70(33.33%) in goats and 20(33.33%) in sheep. Similarly, *Ixodes spp.* ticks identified were 3(8.3%) in chauries and 10(16.66%) in sheep. The three genera of the hard ticks were identified in yak, chauri, cattle, goat and sheep of Rasuwa district viz. *Boophilus*, *Haemophysalis* and *Ixodes*. *Boophilusmicroplus* infestation and the percentage of which is dominating the other ticks species may be the result of climate change of favoring the single host tick *Boophilusmicroplus* to others. Further detailed study of prevalent tick population in different ecozones is to be carried out to complement the findings of the present study.

Keywords: morphological, tick, livestock, Rasuwa, vector