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# HICAST RESEARCH ABSTRACTS

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**Himalayan College of Agricultural Sciences and Technology**  
**(HICAST)**  
**Purbanchal University affiliate**  
**Kalanki, Kirtipur-1, Kathmandu**



## 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.

I would like to acknowledge all the organizations (GOs, I/NGOs, 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.

This 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.



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Binayak Prasad Rajbhandari, Ph.D.  
Executive Chairperson

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## **AGRICULTURAL SCIENCES**

### **Income opportunities and dietary diversity of mother and child through homestead gardening in Makwanpur district**

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*Income opportunities, food and nutrition security are considered more critical for rural families so that this study has aimed to explore the income opportunities and dietary diversity of mother and child through homestead gardening in Makwanpur district conducted in September-October 2017. Inadequate dietary intake is one of the immediate causes of undernutrition. Homestead garden is primarily designed to address household food and nutrition security as well as income from sale of surplus products. For the purpose, Makwanpur, one of the 77th districts of Nepal is selected due to wider program coverage and agro-ecological diversity. The study applied cross sectional research design and structured questionnaire method where a multi-stage probability cluster sampling technique was used to recruit 210 beneficiaries' households into the study. Applied android based mobile phones for primary data collection and statistical approaches for data analysis. Linear and multivariate regression model is used to predict the outcome of continuous variables (homestead garden income, household income and food group consumed by mothers and children). Minimum dietary diversity of mothers and children is calculated based on 12 food groups by using logistic and multivariate logistic regression. Result demonstrates that homestead garden and its components are strongly associated with household income and mother dietary diversity whereas egg production increases child all food group consumption. Household income is strongly associated with mothers' dietary diversity. Homestead garden creates income opportunities from sale of surplus products; and also promotes individual dietary diversity of mother and child from rural families. Homestead garden can be taken as foundation of food based strategy to increase household income, food and nutrition security in future programming.*

## **Value chain analysis of dairy subsector in Banke district**

**Bishal Pandey**

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This study is done to understand about the value chain of dairy subsector in Banke District. Kohalpur, Baijanath and Duduwa rural municipality are selected purposively for study. These 3 municipalities were selected based on the highest number of populations of dairy farmers. Among them 20 milk producers from each municipality selected randomly. FGD and KII was done for more information. Among respondent 46 (76.67%) of them were male and 14 (23.33%) were female respondents. The major occupation of family member was agriculture (94.2%) and the ethnical composition showed that more than 41% of the population was brahmin in the study area. The maximum population of the surveyed area is engaged in agriculture 36 (60%). Daily average milk yield per cattle is 13.61 liter and per buffalo is 8.72 liter. Average milk production cost was found to be Rs. 53.73. Average revenue from per liter of milk production was found to be NRs 60.79. B/C ratio of milk production was found to be 1.3. This result shows Milk Production is a profitable business in Banke district. The problem related to High cost of feed (0.78) was most severe production problem followed by shortage of labor (0.63), lack of technical knowledge (0.54), lack of financial support (0.45) and lack of information about value addition techniques (0.36). The various formal and informal channels were used by milk producers. It was observed that 30% milk was marketed to cooperative/chilling centers for the marketing and about 15%, 5% and 45% milk was marketed through the local collectors, private dairies and to direct consumers respectively which were informal channel for milk marketing. The direct consumers provided highest price (NPR 70/Liter) to the milk producers. The processors were important actors in the dairy value chain as they were involved in value upgrading of milk through processing. It was believed to improve competitiveness and productivity by linking dairy producers to social and economic services. Institutional capacity development, Farmers Groups and Dairy Cooperative was presently active in developing institutional capacity of dairy farmers. Producers were the vital actors of dairy value chain who produce milk and sell the milk in market as source of income.

## **Value chain analysis of organic tea in Ilam District**

**Shambhu Chaudhary**

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*Due to the higher demand of quality organic tea in foreign and domestic market, development of competitive organic Nepalese tea is possible through the value addition approach. This study was conducted in Ilam district to assess the various factors related with organic tea production, to analyze the value chain and to identify the factors affecting the adoption of organic tea production. A total of 167 samples were selected using simple random sampling, snowball sampling and percentage contribution sampling techniques for collecting primary data relevant for the study. Household survey, focus group discussion and key informants' interview were also done. The findings revealed that comparatively young farmer is involved in organic tea production. Significantly higher organic tea producing farmers were engaged in cooperative. Among the tea producer 65% of the respondent perceived that there is more income from organic tea production. Cooperative based product selling was the dominant marketing channel. Organic certification was the major problem faced by organic tea producer and mainly due to the complex foreign legal standards of organic certification only 36% of the organic tea producer had certified farms. Good return from organic tea production was the major influencing factors for organic tea production while inadequate government support and more gap between farm gate price and retail price were the major production and marketing problems respectively. The total value addition cost, higher cost (58%) was shared by the processor/conditioner and packager but out of the total profit in the organic tea value chain higher profit (46%) was benefitted by the traders. Total owned land, membership in cooperatives etc. in organic tea production were the significantly positively affecting factors for adoption of organic tea production. Likewise, total owned land, tea cultivated area, cost on tea production and membership in cooperative were the significantly positively affecting factors for income from tea production in the study area. Value chain approach is the sustainable and competitive approach to meet the domestic and foreign quality aspect of organic tea. Government focus should be increased with formulation and implementation of appropriate and practical organic tea based policy to increase the area, production and productivity of organic tea for the sustainable growth in foreign and domestic trade.*

## **Effect of packaging materials on post-harvest loss of sweet orange**

**Aakriti Shrestha**

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*The present study was conducted in the laboratory of Himalayan College of Agricultural Sciences and Technology. This experiment was conducted from December 2020 to January 2021 to study the post-harvest loss of sweet orange under different packaging materials. The experimental fruits were subjected to 6 treatments viz: T<sub>1</sub>: Newspaper, T<sub>2</sub>: Plastic (20 $\mu$ ), T<sub>3</sub>: Plastic (20 $\mu$ ) with 5 holes, T<sub>4</sub>: Jute sack, T<sub>5</sub>: Nylon sack and T<sub>6</sub>: kept openly on trays as Control. The experiment was laid out in a Completely Randomized Design (CRD) with three replications. Physical attributes including shelf life, weight loss, total soluble solid, decay incidence and marketability were assessed at two days interval. The jute sack was found best as it increased shelf life of fruits up to 29 days. Weight loss was minimum in plastic wrapping with 5 holes and maximum in control treatment followed by newspaper wrapping. The percentage of fruit spoilage was the highest in plastic wrapping with 5 holes followed by plastic wrapping. Sweet orange fruits were found marketable even up to 30 days when kept in jute sack followed by 24 days when kept in newspaper packaging. The fruits kept in plastic wrapping and plastic wrapping with 5 holes were severely affected by the pathogens causing green mold diseases thus became unmarketable in shorter time.*

## **Aphid monitoring using yellow and blue sticky trap in sweet pepper field**

**Aashish Shrestha**

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*Sweet pepper (*Capsicum annuum*) is high-valued commercial crops grown for spice, and vegetable purposes. Production, productivity and product quality are influenced by biotic factors such as insect pest and diseases. Sucking pests like aphids, whiteflies, thrips, mites, etc. are the major insect pest in sweet pepper fields. Pesticide spray practices do not coincide with the timing of the peak population of aphids and other sucking pests. Similarly, farmers don't have an idea of the type of sticky trap use. Hence, a study was performed to know the population*

*dynamics, especially to assess the peak aphid (*Myzus persicae*) population and the efficient type of traps used. This field study was conducted in three different locations of Bharatpur-23, Chitwan from Oct 2019 to Jan 2020. Yellow and blue sticky traps of equal size were installed in three different places in the Capsicum field for 24 hours to record the captured aphid population. Data were analyzed by using paired sample t-test and correlation analysis with the help of SPSS (Statistical Package of the Social Sciences), a data analysis programme. The result showed that the aphid population was highest (11.69) in January month, and these aphid populations was negatively correlated to the temperatures, and positively correlated to the relative humidity and rainfall. The yellow sticky trap was significantly more effective than the blue sticky trap. These findings are helpful to make a pesticide spray calendar over a year and help to use an efficient management tools in sweet pepper fields.*

## **Gross margin analysis of major vegetables of Phedikhola Rural Municipality, Syangja**

**Aayusha Pandey**

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*Vegetable farming has been the cornerstone of the Nepalese economy and is in an increasing trend. Survey research was conducted for gross margin analysis of major vegetables of Phedikhola Rural Municipality of Syangja District from 12<sup>th</sup> February to 20<sup>th</sup> March 2021. For this, 4 major vegetables, viz. cabbage, cauliflower, potato, and tomato were selected. Six vegetable pocket areas were selected as the study site. A stratified random sampling method was adopted and 36 farmers (6 farmers each from 6 pocket areas) were interviewed for each of the vegetables using a pre-tested semi-structured questionnaire, altogether forming a 144 sample size. The study showed that the potato was cultivated in the largest area (1.31 ropani per household) than other vegetables. Post-harvest losses at the farm level were greater in tomatoes (5.59%). Per unit cost of cauliflower, cabbage, tomato, and potato production were NRs.10.41, NRs.6.96, NRs.13.24, and NRs.12.77 respectively. Productivity, gross margin, and net profit per ropani were highest in tomato, which were 2,209.03 kg/ropani, NRs.57,587.65, and NRs.49,522.83 respectively. B/C ratio was also highest in the case of tomato i.e. 2.69. Hypothesis testing was done by employing the ANOVA test and Tukey Kramer Multiple Comparison, which showed that there was a significant difference in the means of*

*gross margin of 5 pairs of vegetables. Limited Agri mechanization and human resources was the most important problem in vegetable farming. However, there is a huge opportunity for the improvement of yield and benefit of vegetable crops through the management of prevailing problems in this area.*

## **Production and marketing of mandarin in Putalibazar Municipality of Syangja**

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*This study was conducted to analyze the production and marketing scenario of Putalibazar Municipality, Syangja. The field survey was carried out in 2021 to collect information from the mandarin growers and traders. Semi-structured questionnaires were used to collect the primary data from 75 producers, 10 traders, 10 retailers, and 10 wholesalers by applying the simple random sampling method. The producers were categorized into small- and large-scale farmers based on average land holding under mandarin cultivation. The majority of mandarin growers was commercial farmers. 52%. The overall mandarin producer has average land holding of 1.05. The average area used for mandarin cultivation was 0.32. The average farm-gate price was NRS 48 and average retail price is NRS 94. The average price spread was found 52% with producer share 51%. Market margin was NPR 46/Kg respectively. The overall average BC ratio was 2.3 indicating farmers are benefitted by their production. A Cobb-Douglas production model was run to find out the effect of different factors on the gross return of mandarin production. The major problems in mandarin production are limited technical knowledge, weather uncertainty, lack of irrigation, invasion of insect pest, lack of transportation, price fluctuation, lack of processing and storage facilities. This study suggests that mandarin producers can be benefitted by the help of lowering cost of production, increase farm size, establishment of cold storage, processing centers, grading, and product differentiation for value addition with stabilization of price and export.*

**Study on vegetables production and its role in income generation and livelihood improvement at Namobuddha, Kavrepalanchok district**

**Arjana Basnet**

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*The study on vegetable production and its role in income generation and livelihood improvement at Namobuddha, Kavrepalanchok District was conducted during February 2021. This study covered 70 respondents. Farmers were growing mainly potato, cauliflower, tomato. During this study, it was found that the percentage of total land holding of 0.2-0.4 ha on the vegetable cultivation as 41.30 percent, those respondents who had total land holding less than 0.2ha in vegetable production were 42.90 percent. About 15 percent of the respondents had more than 0.4ha of land. It indicates that most of the respondents were doing commercial farming in the study areas. Vegetable farming provided the employment opportunities to two or three members of each family in every season. Primarily, farmers use their income to manage foods, clothes, children education and daily-required goods and improved farmer's livelihood status. Further, due to the lack of sufficient human resources, improved seeds and fertilizer, the majorities of the farmers are facing challenges in their vegetable farming. The average income per ha of land from potato, cauliflower and tomato in one cropping season was found to be Nrs.907000, Nrs.252000 and Nrs.2450000 respectively. On an average B/C ratio of potato, cauliflower and tomato cultivation per ha was found to be 1.7, 2.2 and 1.4. Since, the B/C ratio was found greater than 1, the business seems profitable leading to livelihood improvement of the farmers.*

**Economics of early-season cauliflower production and marketing in Benighat Rorang Rural Municipality, Dhading District**

**Ashma Pandey**

*The study was conducted to assess the economics of early-season cauliflower production and marketing in Benighat Rorang Rural Municipality of Dhading district. Benighat Rorang Rural Municipality was purposely selected as it is one of the pocket areas for cauliflower*



*production. Altogether 75 respondents including 60 farmers and 15 traders were selected using simple random sampling method. The study estimated the total cost of production of early-season cauliflower per ropani was NRs 13,588.81 while the yield was 727.94 kg/ropani. The average farm gate price of early season cauliflower was found to be NRs 50.065/kg. The gross return, gross margin, and net profit were calculated NRs 36444.32, NRs 25194.54, and NRs 22855.51 per ropani respectively. The benefit-cost ratio was estimated to be 2.68 that revealed the early season cauliflower production is highly attractive and profitable enterprise. Among the different cost factors, chemical fertilizers and manure were found to be significant contributors ( $P<0.05$ ) in total gross return. The major marketing channel was found to be Producer-Collector-Wholesaler-Retailer-Consumer with highest price speared of NRs 35/kg. Major problem in the production and marketing of cauliflower in the study area was diseases and pests and inappropriate marketing channels. Hence, the study revealed that the production of early-season cauliflower is one of the profitable options for farmers in the study area.*

## **Production and marketing practices of cauliflower crop in Changunarayan Municipality, Bhaktapur District, Nepal**

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*The study was conducted during February to March, 2021AD to assess the existing production practices of main season cauliflower, to delineate its marketing activities and to identify the major problems that had been causing a barrier among the farmers. A total of 60 respondent farmers were purposely selected and interviewed by using a semi- structured questionnaire. The study revealed that 62 percent of the respondents were male. Maximum number of farmers belonged to the age group of 35-45 years. 72 percent of the respondents were found to be literate. It was found that 61.67 percent of the respondents were dependent on agro vet for the seed. 48% percent were using Snow Mystique (hybrid) variety. September to October was the main sowing season for cauliflower production. Tube well and river water was the major source of irrigation and manual weeding was carried out by all the respondents. The infestation of disease and pest was the major problem in the survey site. The respondents were found deficient in the skill of cultivation and the knowledge about correct dose, frequency*

*and time of pesticides application. They had been selling their cauliflower produce to middleman and also to consumer directly. The average benefit cost ratio of the cauliflower farming in the study area was 1.83 at an average price of Rs. 25-35 per kg cauliflower.*

## **Production and marketing status of cut flowers (Carnation and Gerbera) in Kathmandu Valley**

**Asim Paudyal**

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*The study entitled “Production and marketing status of cut flowers (Carnation and Gerbera) in Kathmandu valley” was carried out in three districts of Kathmandu valley from 15<sup>th</sup> December 2020 to 10<sup>th</sup> February 2021. The main objective of this study was to assess the production techniques and marketing situation of both the cut flowers. Randomly selected 100 respondents included producers (40), wholesalers (10), retailers (30) and consumers (20) from Bhaktapur, Kathmandu and Lalitpur districts and they were interviewed using questionnaire. The study showed that mostly males were active in floriculture business than women. The active age of producers, wholesalers and retailers were 31-40 years old. It was found that almost all respondents were literate. The average yield of Carnation 75,000-90,000 sticks per year and of Gerbera was 1,00,000- 1,40,000 sticks per year in Kathmandu valley. Producers sold the cut flowers in Kamaladi, Tripureshwor, Thapathali and Jawalakhel in Kathmandu valley. They also sold their flowers outside the valley such as Butwal, Biratnagar, Hetauda, Nepalgunj, Chitwan, Pokhara etc. Three marketing channels were observed. During off-season, producers, wholesalers and retailers were compelled to sell these flowers at low price. But during the season they reported that they got high profit from cut flower business. Most of the producers, retailers and wholesalers faced post-harvest loss and seasonal fluctuation in price as major constraints in cut flower production.*

## **Status of potato production and its role upon income generation and livelihood improvement in Ghodaghodi municipality of Kailali district**

**Bashanti Bista**

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*A study on “Potato production status and its role upon income generation and livelihood improvement were carried out in Ghodaghodi municipality of Kailali district”. The Study was carried out from November 2020 to March 2021. Questionnaire survey, focal group discussion interview, observation and various relevant publications were used as a source of information of this study. A total of 60 respondents were selected for primary data collection. In the studied area, majority of the respondents (65%) depends upon the agriculture for income generation. Majority of the respondents, i.e. 50% had land holding in between 0.1-0.2 ha for potato production. Among the respondents 35% had annual income in between NRs.22500-45000. The average annual income of the family per hectare was found to be NRs. 389300.1 from potato farming. The average cost of production per hectare was found NRs. 263250 and the average benefit cost ratio of potato farming was found to be 1.51. Mainly both male and female were involved in production of potato. Household assets were observed to be increased in 10 years time interval. Trend of household expenses was increased in 10 years time which denotes that purchasing power of people have increased significantly. The major problem for potato cultivation was unavailability of improve quality seed and chemical fertilizer on time at reasonable price. However, other problems namely disease and pest, technical knowledge, storage and lack of proper marketing were observed during the study. To overcome these problem different practical oriented trainings should be given to the farmers, modern tools and technologies should be introduced at the farmer access level and local government agency should manage market and agricultural loan at low interest rate to the farmers.*

## **The study of feminization on different aspects of rice farming in Kapilvastu, Nepal**

**Bishesh Khanal**

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*A study was conducted in 80 emigrant's household of Banganga municipality Ward no 3 and 4 in Kapilvastu District. The criteria for the survey was at least one of the members from each household was emigrant. To unravel and understand the feminization in various dimensions of rice based in the light of male out migration. In the nutshell, the study showed that peasant women undertook increased role and responsibility in rice-based farming in the region generally referred to as 'feminization' following the muscle drain of large pool of male population from village to abroad. The feminization in the region, in essence, implied to female-centric asymmetric division of labor beginning from sowing to end in harvesting. However, other vital aspects of rice-based agriculture like decision-making on factors of production, dominance over resources and distribution of the return and revenue obtained after marketing and selling were, in under the male domain. Similarly, perineal mode of land and property inheritance pattern and male-headed household were overwhelmingly predominant in the region. The capitalization of remittance on small scale agro machinery, the issue of strategic significance which could have far-reaching consequences in term of ensuring gender balanced distribution of labor and overall mechanization of agriculture, was found to be least prioritized. The study suggests the need to design and develop appropriate agricultural plans, policies and program under the broader framework of gender-mainstreaming to create gender-inclusive, gender-just and gender-balanced milieu in all the dimension of rice farming.*

## **Status of mango (*Mangifera indica* L) farming and marketing in Saptari District**

**Deepa Yadav**

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*Mango is one of the important tropical fruits of Nepal. Saptari district in eastern terai is one of the major areas where mango cultivation is done commercially and as well as marketed in other areas of the*

country. This study aims to evaluate the status of mango farming in Saptari district and to identify the problems of mango marketing in Saptari district. Five point Likert scale was used to prepare questionnaire. Survey study, focus group discussion and interviews were carried out and the collected data was analyzed with SPSS and MS Excel. Farmers are satisfied with the production level. The farmers have to overcome the issues of storage and transportation for most of the time. At the same time there is no insurance system or minimum support price (MSP) by government. The wholesalers mostly control the system while the farmers are most of the time deprived of their benefits. Proper marketing strategy along with the publicity and advertising efforts are lacking and are hindrance to the economic growth of mango farmers in Saptari. Quality based brand, storage and transportation, facilities. Marketing by skilled manpower with the information and skilled technology is the need.

## **Marketing efficiency analysis of major vegetable crops in Bhimdatta Municipality**

**Diksha Pandey**

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The study was conducted with the major objective to find out the marketing margin of different vegetables for knowing the best possible marketing channel for goods produced to reach the ultimate consumer on optimum price. The study was carried out among 90 respondents of Bhimdatta municipality among which 30 were farmers 30 wholesalers and remaining 30 retailers. The data required in this research has been collected through field survey using random sampling technique and document analysis as per required. The analysis used in this study is descriptive analysis using the market margin formula. The retail-margin function is influenced by retail price and retailer cost and the wholesale margin function is affected by wholesale price and wholesaler cost. . On average of the cost benefit ratio of the four crops (Tomato, Cauliflower, Cabbage and Bitter gourd) for the farmers, wholesalers and retailers were 1.6, 1.24, 1.26 per kg and the net margin were Rs. 12.75, Rs 9.28, and Rs 7.68 respectively in the channel where the all producers, wholesalers, retailers and consumers were altogether. For the further developments of vegetable agriculture in this region, the state level government should focus on promoting local agricultural products and the government policies must balance the cost and benefits to farmers, retailers, wholesalers and consumers.

## **Effectiveness of some chemical and biological pesticides against *Sitophilus zeamais* (Motsch)**

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*The study was carried out at National Entomology Research Center, NARC, Khumaltar, Lalitpur from December 2020 to March 2021. S. zeamais Motsch remains one of the most serious and internal feeding pests of maize. It causes extensive losses in quantity and quality of the grain in the field as well as in storage. Objective of this study was to find the residual effect of the pesticides on S. zeamais mortality. Each pesticide was applied in 3 concentrations: Emmamectin Benzoate @ 0.3ml/liter, @0.1ml/liter and @0.6ml/liter, Neem @ 5ml/liter, @2.5ml/liter and @10ml/liter ; Chloropyrifos (50%) + Cypermethrin (5%) @ 1.5ml/liter, @0.75ml/liter and @3ml/liter; and Malathion @ 2ml/liter, @1ml/liter and 4ml/liter. The residue of pesticide on weevil mortality was seen the highest on Chloropyrifos (50%) + Cypermethrin (5%) till the 87<sup>th</sup> Day and was least on Neem even on the 1<sup>st</sup> day of observation. The mortality % was highest (100%) on Chloropyrifos (50%) + Cypermethrin (5%) and Malathion and was lowest (0%) on Neem. The maximum weight loss was observed on Neem @2.5ml/liter which was 9.4% whereas, minimum wt. loss was observed on Chloropyrifos (50%) + Cypermethrin (5%) @ 3ml/liter which was 0.25% of the total grain weight. The maximum percent of damaged grain was observed on Neem which was 100% while the minimum percent of damaged grain was observed on Chloropyrifos (50%) + Cypermethrin (5%) @1.5ml/liter which was 11.21% of the total grain. There was no weevil progeny emerged from Chloropyrifos (50%) + Cypermethrin (5%) @1.5ml/liter treated seeds whereas the maximum number of progeny was emerged from Neem @2.5ml/liter treated seeds which was 149.67. Out of the 4 pesticides tested on adult of Sitophilus Zeamais, Chloropyrifos (50%) + Cypermethrin (5%) was found to be most effective while Neem was least effective.*

## **Identification of value chain constraints of sweet orange (*Citrus sinensis*) in Sindhuli District of Nepal**

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*With the aim to assess major constraints in value chain of sweet orange, the survey entitled "Identification of value chain constraints of sweet orange (*Citrus sinensis*) in Sindhuli district of Nepal" was conducted from 6<sup>th</sup> February 2021 to 13<sup>th</sup> March, 2021 in ward no.6 of Golanjor rural municipality, Sindhuli district by using semi-structured questionnaire for interview with sweet orange growers. The result from the study portrays that despite the long term farming experiences in sweet orange, sweet orange had many constraints disturbing the fluent value chain. Majority of the respondents (70 %) were educated only to primary level education, 65 % farmers owned land less than 10 ropani indicating sweet orange was an enterprise of small land holders. Similarly, 75% of respondents had not taken any training related to sweet orange farming and marketing. Lack of quality planting materials (40%) dominated technical problem, small land holding (18%) dominated production constraints, shortage of transport facility (40%) dominated marketing constraints, powdery mildew (30%) and fruit fly (34%) were major disease and insect in the study area. Study urges dissemination of technical information among farmers through scheduled trainings, provision of loan, subsidy and incentives, in sweet orange growing areas. Study further urges development of suitable and more effective policies to strengthen market linkages to benefit the farmers.*

## **Nitrogen uptake in maize plants and its influence on foliage damage by *Spodoptera frugiperda* (J.E. Smith)**

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*Nitrogen fertilizer management can affect plant quality, which, in turn, can affect insect pest abundance and consequent levels of damage. To understand the relationship between soil fertilization and incidence of*

damage done by *Spodoptera frugiperda*, a research was conducted in a long-term fertility trial field in DoAR, Lumle, Kaski using eight different treatments with three replications. The treatments were  $T_1$  (control),  $T_2$  (120:0:0 kg N:P:K per ha),  $T_3$  (120:60:0 kg N:P:K per ha),  $T_4$  (120:0:40 kg N:P:K per ha),  $T_5$  (120:60:40 kg N:P:K per ha),  $T_6$  (120:60:40 kg N:P:K and 20 ton FYM per ha),  $T_7$  (60:30:20 kg N:P:K and 10 ton FYM per ha) and  $T_8$  (20 ton FYM per ha). Ganesh-2 variety of maize was used for this research. Various leaf damage scales were followed for foliar damage assessment and total nitrogen content was analyzed using Kjeldahl digestion method. Significant difference was observed on foliage damage by *S. frugiperda* ( $F_{7, 13} = 3.24, P = 0.03$ ) with the application of different levels of fertilizers. The lowest level of damage ( $41.02 \pm 2.97\%$ ) was recorded for the  $T_6$  whereas the highest level of the infestation ( $80.06 \pm 8.18\%$ ) was found in  $T_3$ . The percent damage for maize plant leaves didn't vary significantly with the application of different levels of fertilizers, but distinct levels of differences can be observed in damage level between balanced and imbalanced application of fertilizers. Leaf Damage score varied significantly between different experimental plots ( $F_{7, 12} = 6.60, P = 0.002$ ), highest score was observed in  $T_4$  and lowest score was obtained in  $T_6$ . Similarly, maize yield was highest in  $T_8$  and lowest in control plot.

## **Economics of production and marketing of oyster mushroom in Lalitpur District**

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The study was carried out from December 2020 to March 2021. The main objective of the study was to assess the economics of the production and marketing of oyster mushroom in the Lalitpur district of Nepal. A total of 30 respondents were randomly selected from the different ward of Godwari municipality and Lalitpur metropolitan city and interviewed using a semi-structured questionnaire. The study was focused on analyzing the cost of production, benefit costs ratio, gross margin analysis, net profit, marketing margin, producer's shares and marketing channel. The study showed that for average tunnel size of area 16 x 40 ft. average cost of production was NRs. 1, 02,939. Economic analysis showed that average B/C ratio of mushroom farming were 1.45 (summer season), 1.63 (winter season) which suggest that farming in winter seasons is more profitable compared to the summer season. Three different marketing channels are found in



*study area among them marketing channel Producers-Wholesalers-Retailers-Consumers, was predominant one. The study showed that 64% farmers have not taken any training related to mushroom farming and market management so training should be given to farmers from government level to enhance the productivity. Effective and fair marketing channel should be established for the distribution and government should intervene for price discrimination.*

## **Seed borne fungal pathogens associated with finger millet**

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*Seed health testing to detect seed borne pathogens is an important step in the management of crop diseases. A study on detection and identification of seed-borne fungi was carried out in finger millet (*Eleusine coracana* (L.) Gaetrn) seeds. The research was undertaken at National Agriculture Genetic Resources Centre, Genebank, Khumaltar, Lalitpur during 2020 November 27 to 2021 February 25, with the objective of determining different seed-borne fungal pathogens associated with finger millet seeds. A total of 85 seed samples collected from different parts of the country were used for the research. Hundred seeds of each sample were tested for the presence of seed-borne fungi using Deep Freeze blotter method following the International Rules for Seed Testing Association, 2001 (ISTA, 2001) and identification was done based on the growth habit, morphology and spores observed. One or more pathogens were detected in 65 out of 85 samples. Four different pathogens (*Bipolaris nodulosa*, *Alternaria* spp., *Cladosporium* spp. and *Pyricularia grisea*) were identified. *Bipolaris nodulosa* and *Cladosporium* spp. were predominant in most of the samples with seed infection in 42 (49.4%) and 40 (47.05%) seed accessions respectively. But *Pyricularia grisea* was recorded in only 6 samples (7.05%). *Bipolaris nodulosa* not only had the highest pathogenic incidence but also the highest germination and rot % among the other fungal species. The highest total incidence of these pathogens was recorded in EN 99, EN 146 and NGRC03459 with 17, 14 and 14 (out of 100) total infections respectively. *Bipolaris nodulosa* causing one of the severe diseases of finger millet, more research activities should be conducted on a national and international level for effective control and*

*management of the disease. Seed health testing should be done before taking the seeds to the field for timely control of the disease.*

## **Economic analysis of wheat in Changunarayan Municipality, Bhaktapur**

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*Wheat is the third most important cereal crop of Nepal after rice and maize in terms of production and area of cultivation. The study entitled “economic analysis of wheat production in Changunarayan municipality, Bhaktapur” was conducted in 2021 with primary objective to analyze the cost benefit analysis of wheat production in the study area. Total of 50 wheat farmers selected by employing simple random sampling method. Primary information was collected through face- to- face household survey with help of semi-structured questionnaire. Microsoft excel was used to analyze data. The study found average productivity of wheat in the study area 2.6 mt/ha where the cost of cultivation was found to be NRs.143,555.82/ha and total revenue was found to be NRs178,469.16/ha. The benefit cost ratio obtained from the analysis was 1.38 which revealed the profitability of the wheat cultivation in the study area. The major problems reported in the study area were high labor cost, limited availability of quality seeds and lack of irrigation facilities. Introduction of farm machineries, use of sustainable nutrient management techniques and use of good quality seed would increase the productivity and profitability of wheat farmers of the study area.*

## **A study on ferti-fortification of cereals with Zinc**

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*An experiment was conducted to study the effect of ferti-fortification of various cereal crops at different concentrations of Zn. Seeds of nine different cereal crops were used for the study. This study works as the base for further studying the possibility of Zn fortification and for determining the tolerance threshold of the cereal crops that were used in this experiment. The seeds were primed in 0.5 % (T1), 1% (T2), 1.5%*

(T3), 2% (T4), 2.5% (T5) and 3% (T6) of  $ZnSO_4$ , respectively for 12 hours. Hydropriming was controlled. The test was conducted in the Seed Quality Control Center (SQCC), Harihar Bhawan, Lalitpur. The research was conducted in a germination chamber at 26 °C temperature and 63 % relative humidity for 7 consecutive days. The samples were laid out in one factor completely randomized design with 7 treatments and 3 replications. The data were noted on a daily basis for 7 days. In this experiment it was found that all the cereal crops seeds performed well in terms of germination percentage and MGT, at all different concentrations of  $ZnSO_4$ . The data obtained were statistically similar. Seed priming with  $ZnSO_4$  up to 5% concentration improved the mean germination time and final germination rate. The results varied depending upon the variety of the cereals, as well. However, few seeds (2-3 %) were observed to be damaged or were lacking a proper root development, which may be due to the use of infected seeds rather than being the effect of Zn concentration. Zn fortification was very cost-effective and could be a good alternative to tackle Zn deficiency in the crops that grows in the Zn deficit soil. The study was limited to laboratory test and limited concentration of  $ZnSO_4$  only. Therefore, further test at higher concentration of  $ZnSO_4$  and a field trail is recommended.

## **A study on the present status of commercial mushroom cultivation in Chandragiri Municipality, Kathmandu district**

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A study entitled "A study on the present status of commercial mushroom cultivation in Chandragiri Municipality, Kathmandu district" was carried out during December to February 2020/21 to examine the situation of mushroom farming in the study area as well as to analyze the benefit-cost ratio of mushroom cultivation in Chandragiri municipality. Altogether 90 respondent farmers were randomly selected in the study area. A pre-tested semi-structured questionnaire was used for the collection of the required information. About 83 percent of the respondent farmers were involved in oyster mushroom cultivation followed by 8 percent in button mushroom cultivation. Around 80 percent of the respondents were dependent on

*agro vets for the spawn. About 86% of the respondents preferred summer season while only 14 % of the respondents preferred winter season. About 62% of the respondents sold mushrooms to wholesalers. Fruit fly and Green mold were found to have caused higher infestation in the study area. The average benefit-cost ratio of the oyster mushroom 2.98 with the average cost of production per tunnel (30\*20 ft.) of NRs 29682.93 at the average selling price per kg mushroom of NRs 115.61 whereas it was 3.90 in case of button mushroom with the average cost of production of NRs 53857.14 per tunnel (30\*20 ft.) at the average selling price per kg mushroom of NRs 410.71. The study showed that major problems faced by the farmers were found to be difficulty in spawn availability followed by lack of easy market accessibility in the study area.*

## **Efficacy of different fungicides against alternaria brassicicola (Schweinitz) wiltshire under laboratory condition**

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*Alternaria leaf spot caused by Alternaria brassicicola is one of the destructive diseases of crucifers and causes considerable loss in the yield and quality of the produce. An experiment was conducted in in-vitro to evaluate the efficacy of eight commercial chemical fungicides at two concentrations i.e. 100ppm and 200ppm. The study was conducted using poison food technique in Completely Randomized Design (CRD). The study consisted of 9 treatments with 4 replications. The treatments were- Saaf (Carbendazim 12%+ Mancozeb 63% WP) Vacomil-plus (Metalaxyl 15% + Copper oxychloride 35% w/w), Topcare (Azoxytrobilin 50%), Sectin (Fenamidonone 10%+ Mancozeb 50% WG), Tilt (Propiconazole 25% w/w), Curex (Copper Oxychloride 50% WP), Trip (Tricyclazole 75% WP) and G-Surakshya (Chlorothalonil 75% WP) and control. At the end of the fourteenth day, the research revealed that Propiconazole showed complete inhibition of pathogen at both 100 and 200 ppm followed by Azoxytrobilin at 86.8% & 89.4% at 100ppm and 200ppm respectively followed by Sectin at 72.1% and 86.8%. At 100 ppm, it showed that there is no significant difference in the use of saaf, Vacomil-plus and curex. In the same way, topcare and sectin were also statistically par with each other at 200ppm. At 100 ppm, Saaf (40.1%), Curex (38.8%), Vacomil-plus*

(36.0%) and Chlorothalonil (33%) showed low level of efficacy. Chlorothalonil at 100ppm was least effective among all chemicals used. The mycelial growth inhibition increased with an increase in chemical concentration.

## **Soil fertility assessment under vegetable based cropping systems in Bahudarmai municipality, Parsa district, Nepal**

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*The study was conducted on “” to evaluate soil fertility status under different vegetable growing area in Bahaudarmai municipality, Parsa district at ward number 2, 3, 5, 6, 7 and 9. Questionnaire survey was scheduled from 30 vegetable growing farmer households of selected wards. Simultaneously, 30 soil samples were collected from respective farmer’s field at 0-16 cm depth. Laboratory analysis for the determination of soil parameters like  $p^H$ , organic matter, N,  $P_2O_5$  &  $K_2O$  was done by adopting the standard method in the Soil & Fertilizer Testing Laboratory, Hetauda. The soil test shows that mean soil pH of ward number 2 was nearly neutral (6.72), medium in organic matter (1.67%), medium in total nitrogen (0.0856%), very high in available phosphorus (183.5 Kg/ha) and low in available potassium (62 Kg/ha). Ward number 3 was slightly acidic (5.86 Ph), low in organic matter (1.37%), low in total nitrogen (0.068%), very high in available phosphorus (331.1 kg/ha) and low in available potassium (73 kg/ha). The mean soil pH of ward number 5 was acidic (5.24), low in organic matter (1.45%), low in total nitrogen (0.072%), very high in available phosphorus (396.4 kg/ha) and medium in available potassium (118 kg/ha). The mean soil pH of ward number 6 was slightly acidic (6.02), medium in organic matter (1.6%), medium in total nitrogen (0.082%), very high in available phosphorus (227.6 kg/ha) and medium in available potassium (140.6 kg/ha). The mean soil pH of ward number 7 was slightly acidic (5.86), low in organic matter (1.25%), low in total nitrogen (0.0624%), very high in available phosphorus (354.6 kg/ha) and low in available potassium (67.2 kg/ha). The mean soil pH of ward number 9 was slightly acidic (6.22), low in organic matter (1.42%), low in total nitrogen (0.0746%), very high in available phosphorus (190.3 kg/ha) and low in available potassium (68.6 kg/ha). These data revealed the unbalanced use of chemical fertilizers. Therefore, it is*

*recommended to apply organic manures and balanced dose of fertilizers through different sources as well as to incorporate green manures and legumes in the field for improving soil fertility and ultimately increasing production.*

## **Sweet orange production and its role in income generation of farmers of Sunkoshi Rural Municipality, Sindhuli**

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*In view of suitable climatic condition in mid hill of Nepal, sweet orange is emerging as a new enterprise for farmers, for which the government of Nepal has also given priority to this crop. In the light of these facts, a study was conducted in Sunkoshi Rural Municipality of Sindhuli district to analyze the production of sweet orange and its role in income generation and livelihood improvement. The study was conducted during December 2020 to March 2021. All together 50 respondents were selected, among them 8 respondents were from Gaunkharka (Ward No. 6), 4 respondents were from Hilekharka (Ward No. 4), 18 respondents were from Majuwa (Ward No. 7), 2 respondents were from Kaflechaur (Ward No. 2), 4 respondents were from Odrekot (Ward No. 2), 5 respondents were from Hayugaun (Ward No. 2), 2 respondents from Naagi (Ward No.7), 2 respondents from PakhaTole (Ward No. 4) and the remaining 5 respondents were from Amare (Ward No. 5) of Sunkoshi Rural Municipality. Both the gender was found to be involved in Sweet orange production in the study area. 76 percent of the respondents were found to be male and 24 percent were female. 58 and 42 percent of the respondents were found to be literate and illiterate respectively. The age group between 30-40 were found to be maximum (48 %). All the farmers had their own land for Sweet orange production. Majority of the respondents (80%) had the annual income below Rs. 20000. Average productivity of study area was observed 10.06 MT/ha. Farmers were able to increase their higher education, household expenses, health, and savings from Sweet orange production. Transportation, irrigation, citrus greening disorder, and Citrus fruit fly were major problem in Sweet orange production in study area. Study suggested that concerned stakeholders should focus their program on quality seedling production, input use, human resource management, scientific orchard management, capacity development of farmers, insect pest management, scientific value chain*

*management and post-harvest loss reduction for overall development of sweet orange industry in Sunkoshi Rural Municipality.*

## **Role of agroforestry for sustainable rural livelihood: case study of Bhardeu, Lalitpur**

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*The research was conducted in Bhardeu of Konjyosom Rural Municipality in Bagmati Province for the assessment of existing agroforestry practices, and their contribution on livelihood improvement of community forest user group members and to find out the problems for practicing agroforestry. Both primary and secondary data were collected using tools such as household survey with open ended questionnaire with 100 household sample considering gender, age groups and well-being ranks, interview with key informants, and direct observation. Secondary data were collected from community forest operational and constitution, reviewed from library of different academic and nonacademic organizations like HICAST, KAFCOL, NAF and different publication in agroforestry. The collected data were analyzed using MS excel and tables and figures were used for data interpretation.*

*Home gardens, live fences around the farmlands, agri-silviculture systems and silvi-pastoral systems were the major agroforestry practices found in study areas. In total 30 tree species were found in agroforestry systems in which 37% trees were fodder species, 37% species were fruit trees and remaining 26% were found to be timber and fuel wood species. Majority of the total respondents 78% reported that fodder trees grown in agroforestry systems helped to increase livestock production and 22% of them reported decrease in time for fodder collection from forests. The weighted average of trees per hectare was 104.04 trees/ha which showed household were more involved in agroforestry practice implementation. Multiple responses about 33% have generated income from fruits and vegetables grown in agroforestry systems. Similarly, 87% of the respondents have generated income from livestock, 4% have generated from honey, 6% have generated from bamboo grown in agroforestry systems. The major limitations for application of agroforestry practices in studied area were shading effects of trees on agricultural crops and fragmented small land holdings. Finally, it is recommended that capacity of*

*household and CFUG members should be strengthened for the promotion of commercial agroforestry through trainings and cross visits.*

## **Screening of different native genotypes of broadleaf mustard against different diseases**

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*This study was conducted to evaluate broad leaf mustard genotypes for resistance different diseases. The study was conducted from December 2020 to March 2021. A total of 35 native genotypes of broad leaf mustard were screened at weekly interval by scoring the plants for 10 weeks. Five different diseases such as Rhizoctonia root rot, Alternaria blight, Black rot, Turnip mosaic virus disease and white rust were reported from the broad leaf mustard genotypes. Out of 35 genotypes, 23 genotypes were found with very high Rhizoctonia root rot severity whereas 8 genotypes showed very high Alternaria blight severity. Likewise, 3 genotypes were found with high Black rot severity and 1 genotype was found with very high Turnip mosaic virus disease incidence. Similarly, 2 genotypes were found with very high White rust severity. Among the disease of national importance Rhizoctonia root rot was found to be the most severe disease and loss due to the disease was high. BLM genotypes like Rato rayo, CO 1002, CO 11007 showed average to high level of field resistance, therefore should be used in mustard improvement program.*

## **Farmers' knowledge, perceptions and practices of vegetable insect pest managements in Banganga Municipality of Kapilvastu District**

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*A survey was carried out in Banganga Municipality of Kapilvastu district during winter to summer season of 2021 to assess the farmer's situation, practices and management method used in Insect pests of vegetables. The survey involved 160 randomly selected farmers who were interviewed using semi-structured questionnaires and based on field observation. The primary information indicated that female*



*farmer respondents were higher as compared to male respondents. In the case of the age group, 54% of respondents fall under the age group of 40-50 years. Majority of farmers from Banganga municipality is dominated by Tharu caste i.e., 48%. Similarly, the education status of the majority of the respondents was literate i.e., 47% belongs to the primary level of education. Major vegetables planted by the farmers were tomato, potato, chili, cauliflower, cabbage, garlic and onion during winter season and cucumber, bottle gourd, bitter gourd, sponge gourd, tomato, chili, brinjal during summer season. In the study area, while visiting the field the major pests found are aphids, cabbage butterfly, pumpkin beetle, tomato leaf miner, and cutworm and tomato fruit borer. The major diseases observed were Alternaria leaf spot of cabbage and cauliflower, blight of potato and tomato, powdery mildew of bottle gourd and chili anthracnose. About 60% of respondents were found using pesticides to control pests, 4% of respondents were using botanical plant extract and 24% were using cultural methods. Only a few farmers' groups were found to know about IPM, Biological pest management practices and natural enemies.*

## **Comparative profitability of staple food crops in Tanahun, Nepal**

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*This study was conducted in Ward-6 of Vyas municipality of Tanahun district, Nepal to compare the profitability of four major staple food crops i.e. Rice, Maize, Millet and Wheat. Field study was conducted during August and September (2021) employing household survey. Total of 112 households were selected by using simple random sampling technique. The study revealed that 63.4% of the respondents were male, maximum respondent belong to age group of 20 to 60 and 79.5% of farmer were found literate. The main occupation of the farmers was agriculture (73.1%) while few respondents were involved in government service and private business as well. Average landholding of the respondents was 10.20 ropani. Rice, Maize, Millet and Wheat were the major staple food crops grown in the study area. Some pulse crops and seasonal vegetables were also grown on study area. Average annual household income of the respondents was 429430.75 rupees. On an average 80.62% share of total expenditure was covered by labour, 2.13% was covered by seeds and about 14% by*

*fertilizers. Only about 3% of the total cost was covered by fixed inputs. Among the staple crops rice was the most profitable one with total income of Rs. 7858.45/ ropani for which total cost of production was estimated to be Rs. 4532.33/ ropani. Among the four staple food crops wheat was found to be the least profitable with the gross and net profits of Rs. 775.8 and Rs. 649.32 per ropani, respectively. B/C ratio of the staple food crops rice, maize millet and wheat were 1.74, 1.7, 1.38 and 1.24 respectively. Thus, it was concluded that rice was the most profitable staple food crop among all four crops in Tanahun.*

## **Diversity and use of neglected, underutilized and wild horticultural species at Godawari Municipality**

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*The study was conducted in Godawari municipality, Nepal to assess the use and diversity of neglected and underutilized species (NUS) as well as the traditional management and future potentialities. Wide range of participatory tools through household survey (100 respondents), 8 focus group discussions, and 20 key informant interviews were followed by rapid market assessments and supplemented by literature review. This study recorded 95 NUS belonging to 43 families. Twenty seven species had multiple uses. The NUS observed during the study belonged to various categories like vegetables (31spp), fruits (20 spp), and wild species (14 spp). Eighty nine species were observed as medicinally valued species. It is very interesting to note that 84% of respondents used these species variously during food deficient period of the year. Diversity of NUS has huge potential as an alternative future smart food (FSF) due to its remarkable ability to be adapted in marginal soil and harsh climatic condition as well as higher nutritional values.*

## **Status of commercial cauliflower production practices in Kirtipur**

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*The study was conducted in Kirtipur during the months from October 2020 to February 2021 to identify the status of cauliflower cultivation and how it has helped in the livelihood of respondents*

*in Kirtipur valley. Socio-demographic study reveals that both male (60%) and female(40%) respondents were involved in this cultivation because of its profitability.40% of the respondents were illiterate. 70% of respondents had their own land and 30% had taken land on lease. have been using hybrid seeds especially White Top and Snow Mystique. Most of the respondents (60%) had 2-6 ropani of land for cultivation. Amount of application of fertilizers (Urea, DAP and Potash) per ropani was high as compared to other fertilizers. Insect pests like white grub, red ants and cut worms and the diseases like curd rot, wilt, damping off of seedlings were major pests. Use of banned insecticide like Metacid was observed in the study area. Eighty five percent of respondents earned 10-12 thousand per ropani from cauliflower cultivation. The market of the products was Kirtipur (20%), Balkhu (40%), Kalimati (30%), and restaurants (10%). Major problems were lack of irrigation facility and attack of insect pests and diseases. Awareness creation and campaign on safe use of pesticides at local level and on the spot practical technical training has been suggested to address those problems.*

## **Study on the medicinal and aromatic plants collected and its role of income generation in Humla district**

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*The present study on Medicinal and Aromatic plants entitled “was carried out from 15<sup>th</sup> July to 15<sup>th</sup> December. 2020. The main objective of this study was to assess the information about Medicinal and Aromatic plants collected in Humla and its role in income generation as well as in poverty reduction. Altogether 65 respondents were selected randomly for survey and pre -tested questionnaire were used to collect the necessary information. Among them 40 respondents were from Simkot RM and remaining 25 respondents were from Namkha RM. 69.35 percent respondents were Male and 30.65 were Female. The age group of respondents in between 30-50 was found to be maximum in collection of Medicinal and Aromatic plants.75.81 percent of the respondent were found to be illiterate and remaining others were literate. Maximum numbers of respondent were found to be economically dependent on MAPs and more than 50 percent of*

*respondent earned around 2-3 lacks per season. It was found that most of the MAPs were collected during the time of summer and in winter it's not possible to collect due to snowfall. According to respondent Yarsha gumbha was major profit giving but it was hard to collect. Jatamashi was found in maximum amount than compared to other MAPs. The major market center was Simkot from where they are exported to India and China. The major problems faced by the respondents were transportation and another major problem was lack of processing facilities.*

## **Knowledge, perceptions and practice of pesticide use among vegetable growers in Rapti Municipality, Chitwan, Nepal**

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*A field study was conducted to assess knowledge, perception, and practice of pesticide use among vegetable growers in Rapti Municipality, Chitwan, Nepal. Thirteen wards of Rapti Municipality were purposively selected for the study. A total of 104 households, 8 from each ward were selected by simple random sampling. Primary data were collected through interviews with semi-structured questionnaires; Key Informant Interview and Focus Group Discussion in the study sites. Secondary data were collected from various publications of MoALD, various world-wide non-governmental organizations, and journals of universities. Study was performed from October 2020 to January 2021. The study revealed 100% of the population had the general knowledge on pesticides. 40.4% of farmers were aware about the toxicity label of pesticide. 62.5% of farmers were aware about the waiting period of the pesticide. Regarding frequency of insects, diseases, and weeds, 58.7%, 64.4% and 30.8% of farmers reported an increasing trend respectively in recent years. Considering negative effects on environment, 78.8% of farmers agreed with the term that pesticide is degrading the soil, 71.2% of farmers agreed on term that pesticide is affecting the bee/pollinators, 76.9% of farmers agreed on term that the pesticide is polluting both air and water. Farmers were categorized as trained and untrained based on the basis of training received on vegetable cultivation. Major and least problems ranked in the survey were unavailability of inputs and Marketing with index value of 0.896 and 0.45 respectively.*

## **Livelihood improvement and income generation of rural farmers through ginger production in Triveni Rural Municipality**

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*This study was carried out in all ward of Triveni Rural Municipality, Salyan to assess the role of ginger farming in livelihood improvement and income generation of ginger growers. This study covered 100 households, ward - 3 covered 20 respondents, ward-4 with 20, ward -1 with 20 ,ward -2 with 30,ward -5 with 5,ward -6 with 5 of Triveni Rural Municipality. In the study area, majority of the respondents (60%) depended upon the agriculture for the income generation and livelihoods while the remaining (40%) population was involved in other occupations. Majority (70%) of the farmers produced ginger seeds by themselves. Most of farmers in the study area were using local Nasey variety (80%) and rest 20% was using improved variety Kapurkot-1. Farming was done under rained condition. Average annual income from local var. Nasey per family was Nrs.3,00,000. There was no irrigation available in the study area. Incidences of rhizome rot was one of the major problems in study area. Lack of irrigation facility, poor transportation and road network in the study area and lower market price and fluctuation in market price were the major problems faced by ginger growers.*

## **A study on efficacy of different pesticides against potato tuber moth (*Phthorimaea operculella*) in storage seed potato**

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*Potato Tuber Moth has been reported in Nepal from more than 15 districts including high altitudes. A study was carried out to find out suitable control measure against Potato Tuber Moth pest. The experiment was carried out in Bio-control Laboratory of Entomology Division, NARC, Khumaltar, Lalitpur started from 16<sup>th</sup> march and ended on 16<sup>th</sup> May. Mass rearing of potato tuber moth was conducted in a bio control laboratory with an objective to find suitable control measure of the pest. The larvicidal efficacy of insecticides was studied*

*by using four insecticides Bojho, Emamectine benzoate, Spinosad, Neem. The study revealed effectiveness of all the insecticides, but the three pesticides had higher efficacy in comparison to Neem. The overall result indicates the highest mortality rate in treatments Bojho (100%), Emamectine benzoate (100%) and Spinosad (100%) whereas the lowest mortality rate in treatment Neem (94%). Infestation was also high in Neem compare to other three pesticides. In order to check efficacy of pesticide against PTM the applied treatments Bojho, Emamectine benzoate and Spinosad were found to be the best insecticide among the trials in bringing down PTM population as Neem showed to be less effective out of the total four pesticides applied. All the pesticides were effective in reducing insect population under laboratory conditions; however, their effectiveness was directly proportional to concentration and exposure periods. The study has demonstrated the possibility of using novel compounds in IPM program.*

## **Economic analysis of tomato production and marketing in Kapilvastu District**

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*Tomato crop occupies an important position in the vegetable cropping system of Kapilvastu district. For the present study primary data were collected from the selected farmers and the market middle men through personal interview method with the help of a set of pre- tested schedules for the period 2021-02 to 2021-04. A total 100 tomato farmers were selected from three municipality of Kapilvastu district including Banganga municipality, Buddhabhumi municipality and Kapilbastu municipality using simple random sampling technique. Economic analysis was done by random sampling 5 farmers based on the area of land. Farmer involved in less than 1 ropani, 1-4 ropani, 4-8 ropani, 8-12 ropani and more than 12 ropani were selected. Descriptive statistics, gross margin analysis, marketing margin analysis were used to analyze the data. The net profit margin was shown in a bar graph. The graph indicates that with an increase in area and input cost the production is more as well as the net profit margin increase. In the economic analysis the profit by middleman, wholesaler and retailer were calculated and selling price of farmer is calculated which is shown in a pie chart. The study shows that male farmers dominated (67.7%) the markets. Most (45%) were within the age bracket of 40-45 years and 70% of them had formal education. The study revealed that only (35%)*

*farmers have taken training for the production of tomato. Problems associated with fresh tomato marketing included inadequate storage facilities, Traditional knowledge, Lack of improved variety of seed and price variation.*

## **Effects of scarification on germination of coriander seed**

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*The study, entitled was conducted in the month of Falgun (mid-February to mid-March), 2077 BS. Five different treatments including one control were applied to assess the effects on seed germination and seedling growth parameters. The experiment was designed according to CRD with five replications and each replication had population of seven. The emergence of seedlings was observed in every alternate day from 18 DAS to 30 DAS. The total germination data and other biometric measurements (Root length and Shoot length) were recorded on 33<sup>rd</sup> day of sowing. The germination percentage was maximum in T4 treatment (82.85 %) while it was only 31.42 % in control. The earliest emergence was recorded in T1 at 20 DAS with average time of emergence of 24.7 days among emerged seedlings. T3 had lowest abnormal germination followed by T1. The treatment (T1) had higher number of double seedlings germinated as compared to other treatments. T1 also produced significantly longer shoots and roots over the control. Breaking of seed coat had performed better on all parameters, so it is advised to break seed coat of coriander before sowing.*

## **Profitability of oyster mushroom spawn production in Kathmandu valley, Nepal**

**Sachita Bhandari**

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*The study was carried out from December 2020 to March 2021 to analyze the profitability in oyster mushroom spawn production in the study areas. The main aims of the study are to evaluate the cost involved in oyster mushroom spawn production, to estimate profits, and to analyze the Benefit: Cost Ratio (BCR) and Break Even Point (BEP). The Survey was conducted at the spawn production site scattered in Kathmandu valley to collect primary information using the*

*pretested semi structured questionnaire. The selling price of oyster mushroom spawn was found NRs 30/200gm packet. The total cost of production was NRs 4217351.75per/100,000kg/annum of which fixed cost and variable cost constitute 12% and 88%respectively and the Break even quantity was found 22,846 packets of 200gm.The study reveals Gross and Net profit margin of oyster mushroom spawn production was 75.33% and 71.89% respectively. Further, the benefit cost ratio was 3.5 which indicate the Oyster mushroom spawn production is a profitable enterprise. In conclusion, the results are resembled with strengthening public private partnership, proper technical support from mushroom expert would help to increase spawn production.*

## **Commercial potato production in Shankharapur municipality, Kathmandu**

**Sahan Shrestha**

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*The Study entitled "Commercial Potato Production In Shankharapur Municipality of Kathmandu District" was carried out during on Mangsir 20" to Magh 12" 2077. The main objective of the study was to assess the present scenario, problems, and socio-demographic features of commercial potato farmers in the study area as well as toanalyze the benefit cost ratio of potato cultivation. 100 respondents were randomly selected. The study revealed that more male respondents (80%) were involved in potato cultivation as compared to female (20%). About 42 percent respondents were illiterate and 85percent were engaged in agriculture as main occupation. Majority of the respondents (57%) had land holding of 2-Sropani. Likewise, majority of the respondents (63%) had medium size family (5-9members). About 74percent respondents have not taken any kind of training regarding potato cultivation. On an average 26 years of involvement was found in potato farming. Poush-Magh was the main season of potato production because of high production. 74% respondents reported red ant, potato tuber moth, and white grubs as main insect pests and 45% respondents reported damping off as major disease. The average B/C ratio of potato production per ropani was estimated to be 1.32. The seed tuber replacement rate was very low as most of the respondents used seed tubers produced by themselves. Use of drained water is also an issue. The major problems found were insect-pests and diseases and fluctuation of the price of the produce.*



## **Status of Banana production and its role in income generation in Kanchanpur district**

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*This study was conducted from December 2020 to March 2021. The study was carried out in 3 Municipalities of Kanchanpur district, using a set of semi structured questionnaire. Agriculture was the main occupation in the study area where literacy rate was 72%. Grand Nain (G9) i.e 55% was the dominant variety followed by the William Hybrid i.e 25%. Banana weevil and Banana stem borer was the most common insect and banana bunchy top followed by panama wilt were the most common disease. Traditional type of farming, deformed market structure, labor shortage, influence of Indian banana, low price and high transportation cost were major problems for commercial production and marketing. Majority of the respondents 37% had their annual income between (4000 to 60000). Both the gender was found to be involved in Banana production in the study area. 87% of the respondents were found to be male and 13% were female. The age group 22-59 Years comprises the economically active population in the surveyed area. All respondents reported that banana cultivation has been increasing the living standard of the farmer. Farmers were able to increase their higher education, health, household expenses saving from banana production. Although there were some problems noticed in banana enterprise, the farmers should be encouraged for banana farming for the commercialization of agriculture that helps to uplift the living standard of the farmers and helps to add a brick in national economy.*

## **The role of organic vegetable farming on household income in Thekre Rural Municipality, Dhading**

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*This study entitled “The role of organic vegetable farming on household income in Thakre Rural Municipality” was conducted in Dhading. This study covered 100 households from different places of Thakre Rural Municipality. Major crops grown are cauliflower, cabbage, tomato, potato, squash etc. Among the respondents seventy*

*two percent of farmers were engaged in compost preparation. Forty eight percent of respondents were engaged in organic vegetable farming due to health consciousness on the other hand twenty two percent were engaged due to awareness and rest of the respondents were engaged due to its profitability. This study revealed that ten percent of respondents earned fifty thousand annually, fifty percent respondents earned 50,000 to 1,00,000/- annually, ten percent earned 1,00,000-1,50,000/- annually and thirty percent respondents earned 1,50,000-2,50,000/- annually based on farm size. Fifty percent of the respondents reported that the productivity of vegetables was increasing while twenty percent of the respondents reported that the productivity was constant. Benefit cost ratio of tomato production was greater than 1 indicating economic feasibility of the crop in the study area.*

## **Traditional farming system in Tharu community of Dang District**

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*The study was conducted to study and find out the indigenous knowledge which identifies the specific community where indigenous knowledge is being prevailed. Survey was conducted in Rapti Rural Municipality of Dang district which was conducted from January to March where primary data was collected from household survey and relevant data were collected from other sources. Most of the people from both communities are engaged in agriculture as Tharu people are known as store of indigenous knowledge. Most of the houses of communities depend on firewood as primary sources of cooking whereas dung-cake (Guintha) making is also in practice among Tharu community. Tharu have large amount of land but a smaller number of the livestock, which has led to insufficient organic fertilizer, FYM; and has deviated farmers towards using chemical fertilizers. That has thereby slowly depleting indigenous resources, knowledge and their use. Tharu farmers have started using heavy tractors for tillage which has resulted in soil compaction. Tharu use hired labour for weeding and harvesting. They have started using weedicides also as per recommendation of agro-vets. Tharu community preserve and use own crop seed and crop residues for different purposes. Indigenous practice of fishing with locally made tools and materials were found still in practice but in decreasing order.*

## **Economics of production and marketing of vegetables in Pokhara, Kaski**

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*Considering the substantial contribution of urban or peri-urban farming and its marketing to the increasing urban population, the economic study on vegetable production and marketing was performed in Pokhara, one of the major cities in Nepal. This study deals with the economic aspects such as cost of production, marketing cost incurred to farmers, gross and net return, benefit-cost ratio and producers share that was obtained through the farming and includes marketing structure and margins obtained by different stakeholders in five major vegetable produced in the study area: Cauliflower, Sponge Gourd, Bitter Gourd, Cucumber and Coriander greens. The survey was performed by taking interview personally with 85 respondents in which 40, 20, 20 and 5 of them were producers, retailers, wholesalers and collectors respectively. Findings of the study revealed that the vegetable farmers in the study area are receiving a fair share of the benefit accruing from the marketing of the selected vegetables. Out of different marketing channels, farmers preferred to market their product through collectors but inconsistency in availability of collectors compels farmer to take other route of marketing. Small land holdings and lack of interest of younger generation in vegetable farming had been observed as a major problem in the study area. There is an immense need to adopt market oriented policy and programs to encourage urban farming in the study area.*

## **Identification of grain weevils and evaluation of some management practices**

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*This study was conducted from 17<sup>th</sup> August, 2020 to 20<sup>th</sup> April, 2021 in Entomology laboratory of Directorate of Agricultural Research, Lumle with two major aims. One was to identify the most dominant species of grain weevils, while another was to evaluate different management practices against the most dominant one. Species of weevil were identified using compound microscope (10X) based on the media carina and punctuations of pronotum. Entire experiment was carried out under controlled conditions (29.1±2°C and RH 70±5%). For*

*evaluation of different management practices, seven treatments (all treatments maize+celphos (Aluminium phosphide 50% m/m)@ 3g/1000kgmaize, mixture of maize and mustard at two different ratio@3:1 and 10:1 and mixture of maize and millet@ and mixture of maize and Zanthoxylum alatum (robx) and control ) were evaluated in three replications. The filling ratio for each of the treatments in 5l jar was maintained at 50% on weight by weight ratio. To determine the cumulative number of adult emergence of Sitophilus zeamais, Tukey's Honestly Significant Different (HSD) test were carried out. Two species of the weevils; S. zeamais and Sitophilus oryzae(l.) were identified. S. zeamais(Motschulsky) was dominant in the study site both in terms of sample number and population. Among the treatments against the most dominant species, S. zeamais, the use of Z.alatum was equally effective as that of celphos. Celphos is a recently regulated insecticide which was a main agent of post-harvest protection of grains and legumes. This study revealed Z. alatum an equally efficient botanical to keep safe maize from S. zeamais.*

## **Seasonal occurrence and abundance of fruit fly species in Lumle and Malepatan**

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*Tephritid flies are the major challenges for fruit and fleshy vegetable growers of the tropics and sub-tropics. Nepal also incurs huge losses of fruits and fruity vegetables to the tephritids. This study was conducted from May to October, 2020 and was designed to identify the seasonal occurrence and abundance of tephritid species found in Malepatan and Lumle of Gandaki Province. Bucket traps baited with methyl eugenol (ME) lures in Malepatan, and ME, cue lure (CL) and mixture of ME and CL (ME+CL) in Lumle were installed during the summer season of 2020. Only three species of the fly (Bactrocera dorsalis, Bactrocera zonata and Bactrocera correcta) were recorded from Malepatan, dominated by B. dorsalis. The B. correcta count was negligible in Malepatan. While in Lumle, B. dorsalis was the all-time dominant tephritid followed by B. zonata till July after which, till August, Bactrocera tau population was following the B. dorsalis. For the first time, seven species of the tephritids (B. zonata, B. dorsalis, B. correcta, B. tau, Bactrocera diversa, Bactrocera scutellaris, and Bactrocera cucurbitae) were recorded from this region at a time. This study unveils the fact that the fruit fly species are mostly abundant during the spring, when the temperature gets warmer and there is continuous availability*

*of suitable host plants as the number of fruit flies were seen to be found greater in Malepattan having comparatively warmer temperatures than in Lumle. So, the monitoring with different lures in the favourable season of infestation could be an effective tool as the management practices. Additionally, the installation of traps before the flowering of vegetable crops could be recommended for further monitoring and mass trapping purposes.*

## **In-vitro efficacy of *trichoderma* isolates and fungicides against *Fusarium Oxysporum* F. Sp. *Lentis***

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*The study was conducted to explore the efficacy of bio-control agents against Fol by dual culture method and fungicides against Fol by poisoned food technique in PDA media at Plant Pathology Division, NARC, Khumaltar. The treatments used for dual culture technique were ten different isolates of Trichoderma, three species of Trichoderma (*T. viride*, *T. harzianum* and *T. koningii*) along with one control. Fourteen treatments with three replications were used in the experiment. Maximum inhibition percentage of radial growth of Fol by was shown by *T. koningi* (71%) followed by *T. harzianum* (60%) and *T. viride* (59%) along with *T. isolates* (T6 and T7) 56% after 168 hrs of incubation. Eight fungicides Azoxystrobin (50% WP), Bavistin (50%WP), Carbendazim (50% WP), Chlorothalonil (75% WP), Copper oxychloride (50% WP), Nativo (75%WG), Saaf (75%WP), Propiconazole (25% WP), Triazole (70% WP) were tested at four different concentrations (50ppm, 100ppm, 150ppm and 200ppm) and replicated three times. All the fungicides inhibited the fungal growth significantly, among which Bavistin was highly effective in all the concentrations reducing 100% of mycelial growth followed by Nativo and Tilt (100%) in 150ppm and 200ppm. Copper oxychloride showed least inhibition in all the concentrations. The chemicals exhibited an increased tendency of inhibition with increased concentration.*

## **Role of vegetable production for income generation and poverty reduction in Morang district**

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*The study was conducted during March to April, 2021. 100 respondents were selected randomly from different municipalities where vegetables were commercially grown. The main objective of the study was to assess the different aspects of vegetable production and its role of income generation for poverty reduction. Majority of the respondents was from 25-45 years old with average area of 5.68 Bihga under vegetable production. Cauliflower, cabbage, tomato, chili, okra, brinjal and cucurbits were the major vegetables. Majority of the respondents (44%) were focused on riverbed farming. 92% of the respondents reported using both organic manure and chemical fertilizers. Majority of the respondents reported that Club Root, Leaf Curl, Wilt, Leaf Spot, Powdery Mildew as major diseases and Cabbage Butterfly, Aphids, Leaf Miner, and Fruit Flies etc. as major insect-pests in vegetables. 64% of the respondents performed post-harvest activities like sorting, grading and packaging. Collector-Wholesaler-Retailer-Consumer was the common marketing channel followed by majority of the respondents. Price fluctuation of vegetables (58%), insect pests and climate change (41%), lack of Irrigation facilities (16%), lack of quality seeds (5%), inadequate technical knowledge (20%) and poor market (18%) were the major problems. A number of unregistered varieties of vegetables were found used; it needs to be addressed through organizing awareness creating campaign. The Vegetable cultivation was found profitable on the study area with a B C ratio 1.72.*

## **Ethno-botanical study and socio economic influence of medicinal and aromatic plants in Jumla district of Nepal**

**Sushmita Gautam**

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*The study was carried out in 4 rural municipalities and 1 municipality of Jumla district from December 2020 to June 2021. Altogether 100 respondents were randomly selected and interviewed through the*

*pretested questionnaires. The data obtained were analyzed by using statistical package for the social sciences and Microsoft Excel. Altogether 16 medicinal and aromatic plants were studied in which 11 were considered as commercial, such as Yarsagumba, Gucchi chyau, Satuwa, Kutki, Sugandawal, Pasaanbed, Padamchal, Banlasun, Jatamasi, Setakchini and Chiriato. Whereas, 5 were considered as non-commercial, they were Ghodemaccho, Biojadi, Ninaijadi, Jimbu and Gannaino. There were 14 medicinal plants whereas 2 were both medicinal as well as aromatic plants. A total of 91% of the respondents used medicinal and aromatic plants for different health related issues. From selling medicinal and aromatic plants higher percentage of respondents were able to pay loans despite the fact that higher percentage of respondent's primary occupation was agriculture. Average profit was higher for traders than collectors. The study showed that about 15% respondents stated that availability of medicinal and aromatic plants is decreasing day by day and 14.74% respondents stated that due to increasing population availability of medicinal and aromatic plants is decreasing day by day. Agro technological package should be developed and more research should be conducted in this field to explore further medicinal importance.*

## **Economic analysis of potato production in Kavrepalanchok district**

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*The study entitled on “Economic Analysis of Potato Production in Kavrepalanchok District” was undertaken in four municipalities. This research tries to address the benefit and cost of potato cultivating farmers of Kavrepalanchok district. Total of 100 potato cultivating farmers of Banepa, Panauti, Panchkhal and Mandandeupur of Kavrepalanchok district were randomly selected and surveyed to determine the economic analysis of potato cultivation. The respondents were categorized into small and large size farms for the economic analysis based on the mean of land holding under potato cultivation. The data were analyzed using MS Excel and SPSS. The average potato production per ropani was estimated to be 1,090.50 kg and there was no significant difference in production between small scale and large-scale farm. The total average cost, gross revenue and gross margin per ropani were estimated Rs 21,322, Rs 31,053.07 and Rs 9,777.01. The findings showed the significant difference in variable input cost*

*between small-scale and large-scale farm. The average B:C ratio was found 1.45. Trader's monopoly, low price at the time of harvest, unavailability of inputs in time was major problem faced by the farmers growing potato. There is immense need to adopt market-oriented policy and programs linking with production to enhance production and marketing efficiency in study area.*

## **Role of ginger production for livelihood upliftment and income for farmers of Chingad and Simta Rural Municipality, Surkhet**

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*This study on “Role of Ginger Production for Livelihood Upliftment and Income for Farmers of Chingad and Simta Rural Municipality, Surkhet” was carried out in Chingad and Shimta rural municipality of Surkhet district to assess the role of ginger farming in livelihood security of ginger growers. This study covered 100 households from two different rural areas of Surkhet district. In the study area, majority of the respondents (60%) depend on the agriculture for the income generation and livelihoods while remaining (40%) population was involved in other occupations. Majority of the farmers produced ginger seeds by themselves. Farmers in the study area were using local Bose variety (46%), Nase (47%) and the rest (7%) was improved Kapurkot-1 variety. Farming was done under rained condition. Average total income from local variety per family was **Nrs.** 138,710 per 0.05 hectare. There were few incidences of rhizome rot and leaf spot diseases. Red ant and leaf roller attack in ginger plant was found occasionally in most of the surveyed area but the degree of crop damage was negligible. Lack of irrigation facility, poor transportation and road network in the study area and lower market price were the major problems faced by ginger growers. There should be equal participation among ginger growers and government sector for development, production and extension of appropriate production as well as post-harvest technologies and infrastructure to produce transport and marketing facilities of ginger for good profit.*



## **VETERINARY SCIENCE**

### **Prevalence of gasrto intestinal helminths in pigs of Gadi Gaupalika, Makawanpur**

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Pigs are one of the most common domesticated animals with a great meat value. Thus, pig rearing has been one of the popular and supportive occupations among the rural farmers of the country. To understand GI parasitic species found in pigs, this study was conducted during April, 2020 to March, 2020 at Makawanpur, Gadi, Gaupalika area, the rural part of Makawanpur district. A total of 100 fresh fecal samples of pigs were collected in zip lock bags, labelled and pre and preserved at 70% ethanol. The stool samples were processed through the sedimentation and flotation, techniques. A total Prevalence of 56% was recorded; *Ascaris* spp had the highest prevalence 50% followed *Eimeria* spp (21%) and *Trichuris* spp (14%) while mixed infestation was 14%. Significantly higher prevalence was found in female and adult pigs than in male and young pigs. This study therefore confirms the prevalence of GI nematodes in pigs and it was therefore recommended that farmers to improve on their bio-security, farm maintenance and also adhere to routine de-worming.

### **Assessment of bacteriological quality of marketed pork meat from retail meat shops of Kathmandu valley**

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*A qualitative and quantitative study of raw pork meat samples from different retail meat shops of Kathmandu valley was carried out in Microbiology Laboratory of Himalayan College of Agricultural Sciences and Technology (HICAST) during February to April 2021 with an aim to assess bacteriological quality of pork with special emphasis on isolation of *Salmonella* spp and *E. coli*. Out of 48 samples, 97.91% were positive for Total viable count (TVC), 83.33% were positive for coliforms, 54.16% were positive for *E. coli* and 12.5% were*

positive for *Salmonella* spp. Out of 26 *E. coli* positive samples, 12 (46.15%), 9 (34.61%) and 5 (19.230%) samples were from Kathmandu, Lalitpur and Bhaktapur respectively. Out of 6 *Salmonella* positive samples, 2 (33.33%), 3 (50%) and 1 (16.66%) samples were from Kathmandu, Lalitpur and Bhaktapur respectively. The mean TVC and Total coliform count (TCC) was found to be  $7.73 \pm 0.179 \log_{10} \text{cfu/g}$  and  $3.82 \pm 0.252 \log_{10} \text{cfu/g}$  respectively which is more than the standard prescribed by the ISO. These also exceeded the standards of Bureau of Indian Standards i.e.  $<10^5 \text{cfu/g}$  for TVC and  $5 \times 10^2 \text{cfu/g}$  for TCC. Higher bacterial load and presence of intestinal commensals *E. coli* and *Salmonella* spp indicated that the meat have been contaminated by the visceral contents and consumers are at risk of getting foodborne diseases when eaten raw.

## **Study on external egg quality parameters and hatchability of Sakini breed in Lalitpur district, Nepal**

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Eggs are an important and convenient source of protein for those living in rural regions. In addition, eggs from local hens are popular and trade for a fair price. As a result, the primary goal of this study was to evaluate egg laying and egg quality parameters in Sakini (*Gallus domesticus*) from Nepal in order to better understand the chicken's reproductive fitness and the relationship between the parameters. For this, a total of 120 eggs of different weeks (30 from each weeks) weretaken as sample. The egg sample were collected from the birds of different ages i.e. 43<sup>rd</sup>, 48<sup>th</sup>, 56<sup>th</sup> and 57<sup>th</sup> weeks. These chickens were raised in same environment and management condition at Swine and Avian Research Program (SARP), Khumaltar. Eggs were candled during incubation, i.e., on the 18th day. A strong light was held under the eggs to observe the fertility during candling of eggs. External egg quality parameters like Egg weight, Egg length, Egg breadth, Shape index and Egg color were measured. Fertility and hatchability percentages were calculated. The findings have shown that the highest fertility rate was observed for 48.47  $\pm$  0.71 gm egg weight group i.e., 80 %. However, the highest overall hatchability was

*observed in the  $48.73 \pm 0.68$  gm egg weight group that is 70 %. On the basis of their shape index, there is a significantly highest ( $P < 0.01$ ) fertility rate was observed in the  $67.26 \pm 0.56$  group that is 70 %.*

## **Phenotypic characterization of the goat population and their production system in Tanahun district, Nepal**

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*The study investigated the production system and morphometric traits of goats to understand variability and phenotypic association among body traits in goats of Ghiring and Anbukhaireni rural municipality of Tanahun districts. Bodyweight and morphometric measurements were collected from 110 goats above 8 months of age with the help of a format developed. Data were statistically analyzed using mixed model least square and maximum likelihood computer program (pc-2) developed by Harvey (1990) and Pearson's phenotypic correlation among body traits using SPSS 26. Bodyweight and linear body measurements traits such as heart girth (hg), body length (bl), wither height (wh), rump height (rh), thigh circumference (tc), tail length (tl) were determined. Location, production system, breed, sex, birth type, color, and age. The result of this study revealed that morphometrical traits were significantly affected ( $< 0.001$ ) by breed and age. Accordingly, boer goats had higher ( $p < 0.001$ ) morphometrical values followed by the jamunapari cross. Khari breed results in the lowest morphometric value among all breeds. All quantitative traits increased ( $p < 0.001$ ) with the increase in age of the goats with the highest value in the older age group. Heart girth (hg) and body length (bl) showed strong and positive correlations ( $p < 0.01$ ) with live body weight. The highest correlation was found between bodyweight and heart girth (0.914). Results of this study indicated that phenotypic characterization, body weight, and linear body measurement description would provide valuable information that will assist breeders and genetic improvement specialists when conducting selection, designing improvement strategies, and conservation programs in the community.*

**A study on efficacy of different anthelmintics  
against gastro- intestinal nematodes in goats  
in Anbukhaireni Rural Municipality of  
Tanahun District in Nepal**

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*A study was performed for five months (during December 2020 to April 2021) with the objective of determining the efficacy of commonly available anthelmintic drugs in goats at Anbukhaireni rural municipality (Baradi) of Tanahun district. Eighty breeding bucks were randomly selected for this purpose. Fecal eggs per gram count was used to evaluate the efficacy of anthelmintics. About 3 grams of fecal sample per goat was collected and examined in the Parasitology Laboratory of National Animal Health Research Centre, under NARC. For undertaking the research, four groups with 20 goats in each group were formed. Group 1 was kept as control group, Group 2 was drenched with Albendazole @7.5mg/kg body weight, Group 3 was drenched with Fenbendazole @10mg/kg body weight and Group 4 was medicated with Ivermectin injection with dose rate of @0.05mg/kg body weight respectively. We have followed the drug administrating protocol developed by NAHRC under NARC for achieving the effectiveness of anthelmintic. The protocol recommended two consecutive administration of drug in two weeks interval for efficacy of anthelmintic. In this research, we have taken eggs per gram (EPG) count as the basis for therapeutic efficacy of anthelmintics. EPG were counted before treatment on day 0, and on post-treatment days 7, 14, and 21 of study. Data were loaded in Microsoft office excel and analyzed. Pre- and post-treatment EPG values were recorded and efficacies compared. The results showed that the efficacy of Albendazole 98.02 %, Ivermectin 100% and Fenbendazole 100% against Gastro-intestinal nematodes. This study concludes that all three anthelmintic were found effective against gastro-intestinal nematodes and further similar study in larger buck population including calculation of economic benefit is recommended.*

**A study on efficacy of different anthelmintics  
against gastro-intestinal nematodes in goats in  
Ghiring Rural Municipality of Tanahun  
District in Nepal**

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*A study was performed for five months (during December 2020 to April 2021) with the objective of determining the efficacy of commonly available anthelmintic drugs in goats at Ghiring rural municipality of Tanahun district. Eighty breeding bucks were randomly selected for this purpose. A fecal egg per gram count was used to evaluate the efficacy of anthelmintics. About 3 grams of fecal sample per goat was collected and examined in the Parasitology Laboratory of National Animal Health Research Centre, under NARC. For undertaking the research, four groups with 20 goats in each group were formed. Group 1 was kept as control group, Group 2 was drenched with Albendazole @7.5mg/kg body weight, Group 3 was drenched with Fenbendazole @10mg/kg body weight and Group 4 was medicated with Ivermectin injection with dose rate of @0.05mg/kg body weight respectively. We have followed the drug administrating protocol developed by NAHRC under NARC for achieving the effectiveness of anthelmintic. The protocol recommended two consecutive administration of drug in two weeks interval for efficacy of anthelmintic. In this research, we have taken eggs per gram (EPG) count as the basis for therapeutic efficacy of anthelmintics. EPG were counted before treatment on day 0, and on post-treatment days 7, 14, and 21 of study. Data were loaded in Microsoft office excel and analyzed. Pre- and post-treatment EPG values were recorded and efficacies compared. The results showed that the efficacy of Albendazole 100 %, Ivermectin 93.5% and Fenbendazole 100% against Gastro-intestinal nematodes. This study concludes that all three anthelmintic were found effective against gastro-intestinal nematodes and further similar study in larger buck population including calculation of economic benefit is recommended.*