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Workshop on Market Research

An interaction workshop on 'Market Research' was held at NARC, Khumaltar on 7 June 2006.

The workshop was organized by NARC, Seed Entrepreneurs' Association Nepal (SEAN) and Agricultural Economics Research Institute, Wageningen University and Research Centre (AERI, WURC), The Netherlands. Dr Devendra Gauchan, Chief of Socio-economic and Agricultural Research Policy Division (SARPOD) under NARC presented the market research issues in Nepal. Mr Ben Kamphuis, Senior Economist and Dr Xiaoyong Zhang, Economist at Agriculture Economics Research Institute, Wageningen presented the works of WURC and market research

contd. on page 2

NARC Annual Day Observed

Fifteenth Annual Day of the establishment of Nepal Agricultural Research Council (NARC) was observed with a special function at NARC, Singh Durbar Plaza, Kathmandu on May 8, 2006. The function was inaugurated by the Hon'ble Minister for Agriculture and Cooperatives Mr Mahantha Thakur and chaired by the Secretary of Ministry of Agriculture and Cooperatives Mr Ganesh Kumar KC. The function was attended by representatives from different government and non-government institutions, donors, financial institutions, foreign agencies, print and electronic media, NARC officials, employees and others. The Minister for Agriculture and Cooperatives Mr Mahantha Thakur in his inaugural address said that the agricultural research has a very

contd. on page 2

Rice and Maize Crops Varieties Released

Variety Approval Release and Registration Sub-Committee under National Seed Board, by the meetings on different dates, officially released and registered five varieties of rice and two maize varieties for farmers to cultivate in different agroecoregions and conditions. The varieties are released along with complete package of practices after 7-8 years of research and experiments at different research stations, disciplinary divisions and farmers' fields in different parts of Nepal.

The varieties released are Loktantra, Mithila, Ram, Barkhe-3004, and Pokhareli Jethobudho of rice; and Deuti and Shitala of maize.

contd. on page 4



Hon'ble Minister Mahantha Thakur and other guests on the stage

Photo: Rajendra Bajracharya

IN THIS ISSUE

- Workshop on Market Research
- Fifteenth NARC Annual Day
- Rice and maize varieties released
- Interaction on Clubroot Disease
- A new fungicide for the management of clubroot disease of cole crops: A preliminary report
- SRI Performance in Morang
- NARC Scientist obtained PhD
- Varieties: Genetic Diversity, Heterosity and Combining Abilities within Nepalese Maize
- Talk on sustainable and conservation agriculture
- National Rice Day observed
- Combine-harvester: A New Introduction in Parsa District
- Animal Drawn harrow for reduced till-Wheat

contd. from page 1

important role in agricultural development in the country and the Government will give priority and help NARC scientists/researchers in their efforts. He also gave directives to researchers to work with their knowledge best for the development of agriculture sectors.

During the occasion, Dr GO ferrara, Regional Team Leader, CIMMYT, Nepal; Mr Kazuyuki Tsurumi, FAO Representative expressed their views on the importance of research and wished successful years of NARC to come.

Executive Director of NARC, Dr Ram Pratap Sah welcoming all the guests and participants in the function presented highlights of activities and achievements of the NARC in the past year. Mr Purushottam Lal Joshi, Senior Scientist, spoke on behalf of the recipients of honor plaques during the occasion. Mr Parshu Ram Lal Karna, Director of Administration conveyed the vote of thanks to the participants.

Honour and Plaque Distribution: Thirty nine NARC employees having completed 25 years of their service were honored with plaques and certificates by the Chief Guest.

Special Exhibition: An exhibition showing the NARC's activities/achievements was held on the occasion of NARC Day.

Press conference: Earlier on the eve of the 15th NARC Annual Day, a Press Conference was organized at NARC, Ramshahpath on 7 May. In the program Executive Director Dr Ram Pratap Sah briefed about the works and achievements of NARC in the last one year and the impacts of the recommended high yielding and location-specific varieties of different crops, breeds of livestock and fish species with total package of practices for farmers that have significantly covered the farmers' fields. Journalists from different print and electronic media had interactions with the NARC scientists on various issues related to agriculture. During the interaction, Scientists from different Disciplines and Directors answered the questions raised by journalists. About twenty journalists were present in the program. The program was coordinated by the Chief of Communication, Publication and Documentation Division, Mr Bhola Man Singh Basnet.

Dr Peter Hobbs Talked on Sustainable and Conservation Agriculture

Dr Peter R Hobbs Agronomist (former CIMMYT Representative in Nepal), Cornell University, USA gave talk on 'Sustainable and Conservation Agriculture (CA): What is it and Why is it Important?' on 16 June 2006 at NARI Conference Hall, Khumaltar, Lalitpur.

Conservation agriculture is a concept for resource-saving agricultural crop production that strives to achieve acceptable profits together with high and sustained production levels while concurrently conserving the environment. It is based on enhancing natural biological processes above and below the ground. Interventions such as mechanical soil tillage are reduced to an absolute minimum, and the use of external inputs such as agrochemicals and nutrients of mineral or organic origin are applied

at an optimum level and in a way and quantity that does not interfere with, or disrupt, the biological processes. CA is characterized by three principles which are linked to each other, namely: Continuous minimum mechanical soil disturbance. Permanent organic soil cover; Diversified crop rotations in the case of annual crops or plant associations in case of perennial crops.

Dr Hobbs had been in Nepal for 14 years till May 2002 as Regional Representative of the South-Asia Regional Program of the Mexico based International Maize and Wheat Improvement Centre (CIMMYT). He spent 30 years in the Asian region working for the farming peoples to improve socio-economic status through new ideas and innovations in wheat.

Interaction on Clubroot Disease

With the view to share experiences on the Clubroot disease in Cole crops that has spread in Kathmandu Valley and surroundings causing serious problem in cauliflower and cabbage cultivation in the last 3-4 years, and to make out strategies against the disease for coming years, an interaction program was organized by Plant Pathology Division of Nepal Agricultural Research Council (NARC) on 16 May 2006.

In the program, farmers from Kathmandu, Lalitpur, Bhaktapur and Kavre Districts, NARC scientists and directors, had interactions on the issues related to the incidence of disease and control measures. During the occasions, Dr Ram Devi Timila, Senior Scientist at Plant Pathology Division gave out information about the disease and research activities conducted to manage it. Farmer representatives from Kathmandu, Lalitpur, Bhaktapur, and Kavre districts put out their experiences on the disease and the disease management measures. The Program was chaired by Director of National Agricultural Research Institute (NARI), Mr. Shreekrishna Adhikari.

Cole crops: cauliflower, cabbages and broad leaf mustard are the major winter vegetables of Nepal that give good profit to the farmers. Clubroot disease has been the most limiting factors for cole crops cultivation.

contd. from page 1

strategy development. The workshop was attended by fifty persons including Executive Director, Directors, Scientists/Researchers of NARC, representatives from Ministry of Agriculture, Department of Agriculture, SEAN and NGOs and Wageningen University and Research Centre.

SARPOD is newly established Division under NARC for the study on socio-economics, agricultural marketing and agriculture research policy.

Fungicide for Management of Clubroot Disease of Cole Crops: A Preliminary Report

- Dr Ram Devi Timila

Cole crops cauliflower, cabbage and broad leaf mustard are the major winter vegetables of Nepal. Cauliflower and cabbage cultivation is popular in Nepal and is profitable for vegetables growers. Unfortunately, the clubroot disease has been a serious constraint in its cultivation. This is the most important limiting factors for these crops. Clubroot disease caused by *Plasmodiophora brassicae* Woronin is one of the most difficult plant diseases to manage. The pathogen is wholly confined to the soil and its resting spores survive for a long time (more than 18 years) in the soil in absence of the suitable host plant.

The disease first appeared in 1993 from Kathmandu and authentically reported in Plant Pathology Division for the first time in some Brassicaceous vegetables such as Knol Khol, Radish, Broccoli and Broad leaf mustard. This was followed by severe infection of cauliflower. In recent years, the disease has been widely spreading at Kathmandu and Palung Valley and threatening the cauliflower cultivation. Hundred percent incidence and 86% yield loss in cauliflower has been reported. Some of the farmers were compelled to uproot the whole crop. Different cultural methods of disease management control have been suggested to the farmers such as managing good drainage of cultivated field, liming of infested field to raise pH to 7.2, and the use of healthy seedlings (grown in disease free area). These methods were not effective to control the diseases to the farmers. Crop rotation, one of the management practices is not a feasible options for the farmers.

The effectiveness of commercial biological products of *Trichoderma viride* (Sanjivani) against this disease is not significant. Introduction of different exotic hybrid varieties of cauliflower/cabbage varieties favored the year round cultivation and high value of the crop encouraged farmers monocropping cultivation of cauliflower.

Monocropping of either cauliflower or cabbage are enhancing the rapid build up of the inoculum density in the fields, which is favoring the epidemic occurrence of this disease.

Taking all these into account, it has been felt necessary to have effective control measure for managing this destructive disease. For this purpose, the chemical fungicide, Nebijin (Flusulphamide 0.3DP) was tested in one of the farmers' infested fields at Bhaktapur. The test sample was received from Mitsui Chemicals, Inc., Japan. The chemical is formulated for soil application at the rate of 200-300 kg per hectare depending on soil type. In our test, the dosage applied was 200 kg per hectare in rows instead of surface application. The chemical was applied one day before transplanting and was well mixed in soil, although it was recommended for application three weeks before seeding or transplanting. The chemical was found to be very effective compared to check

Table 1. Effect of Nebijin on the incidence and severity of Clubroot disease of cauliflower (original data)

Treatment	Clubroot incidence percent	Percent reduction in incidence	Clubroot severity percent	Percent reduction in severity
Nebijin	34.58	61.66	10.15	83.68
Control	90.75	-	63.24	-

as shown in Table 1. Clubroot incidence and severity reduction were found 62% and 84% respectively. It could be one of the alternatives to manage clubroot disease. From Integrated Disease Management point of view and in absence of satisfactory non chemical tool for managing this destructive disease, use of this chemical could be options for non organic growers. At present, research on different non chemical approaches is going on at Plant Pathology Division.

Of the chemical (Personal communication, Mitsui Chemicals, Inc.), the cost will be US\$500 per hectare if applied at the rate of 300 kg per hecter. Efficacy of different doses and possible application methods in our context has to be researched. It is the preliminary test report. Its verification will be done in coming season at farmers infested field.



Clubroot infected cauliflower



Clubbed roots of cabbage

RICE

Loktantra

The rice variety: 'Loktantra' (NR 1487-2-1-2-21-1) was released on 4 May 2006. It is a high yielding variety recommended for farmers to cultivate in terai, inner terai, low hills and river basin areas under mid-hills as a main season rice, both in rain-fed intermediate types of lowland *khet* in terai, inner terai, for low fertility condition and partially irrigated to rain-fed lowland *khet* in low hills and river basin areas under mid-hills of western region and similar environment.

The variety 'Loktantra' has been developed in Nepal from a cross of "MAHASURI" and "IR 4547-6-2-2" following a modified pedigree bulk system of plant breeding and was evaluated at NARC research stations and in multilocation testing sites with Coordinated Varietal Trial (CVT), Coordinated Farmers' Field Trials at locations in different districts. It has medium sized grain, medium sized plant height, good milling recovery and good taste. It is resistant to blast and moderately resistant to bacterial leaf blight. It has an yield potential of 3644 kg/ha and maturity period 125-130 days from seeding

Mithila

The variety: 'Mithila' (BPI 3-2) was released on 5 May 2006. It is a high yielding variety recommended for farmers to cultivate in terai under irrigated to partially irrigated condition as a main season rice in Rice-Wheat, Rice-Lentil cropping pattern.

The variety 'Mithila' developed from the cross parents: Fortuna/Milfor 6*2/Azucena was originated in Philippines. The variety has been identified as the farmers preferred variety through on station testing and on-farm varietal evaluation and selection which was extensively examined and evaluated by farmers in participatory approach.

It has slender and fine grain, medium sized plant height, good milling recovery and good cooking quality. It is resistant to blast, brown plant hopper and moderately resistant to stem borer. It has an yield of 3500-4500 kg/ha and maturity period 145 days from seeding.

Ram

The variety: 'Ram' (OR-367-SP-11) was released on 5 May 2006. It is a high yielding variety recommended for farmers to cultivate in Siwalik valley of Makwanpur, Chitwan and Nawalparasi and similar environment, and central terai under rain-fed and irrigated condition as a main season rice in Rice-Wheat-Maize, Rice-Lentil- Maize, Rice-Wheat cropping pattern.

The variety 'Ram' developed from the cross parents: Masuli/IR-20 was originated in India. The variety has been identified as the farmers preferred variety through on-farm farmers' field trials and coordinated farmers' field trials.

Farmers preferred this variety due to its earliness, medium fine grain type, higher yield and less prone to disease and insects, high milling recovery, good cooking quality, tolerance to lodging, tolerance to drought and foliar diseases. It has an yield of 4000-7230 kg/ha and maturity period 130-137 days from seeding.

A farmer in Chitwan, Ms. Ganga Subedi had received a cash prize in 2005 from "The 24th World Food Day Committee, Nepal" for promising yield by growing this variety of rice

Barkhe-3004

The rice variety: 'Barkhe 3004' (LD-LIRI-M-11) was released on 20 June 2006. It is a high yielding variety recommended for farmers to cultivate in terai and inner terai, low hills and river basin areas and foot-hills up to 500 masl. under rainfed, medium land to low land and irrigated condition in number of rice based cropping patterns: Rice-Wheat-Mungbean, Rice-Wheat-Maize+Mungbean, Rice-Winter crops/vegetables-Mungbean, Rice-Fallow-Mungbean.

The variety 'Barkhe 3004' was originated in Nepal and cross was made from 'Kalinga III' / 'IR 64' at IRRI, Philippines for CAZS-Natural Resources. Client oriented breeding (COB), previously known as participatory plant breeding (PPB) was implemented by LIBIRD with technical support from CAZS Natural Resources (CAZS-NR), University of Wales, UK and in collaboration with National Rice Research Programme (NRRP), NARC, Jaskelo Yuba Club, Chitwan, District Agricultural Development Offices (DADOs) and farming community of Chitwan and many other districts in Nepal. Department for International Development (DFID) Plant Sciences Research Programme (PSP) provided the financial support.

The variety 'Barkhe 3004' has been released as it has a good combination of high yield along with other agronomic traits i.e. non-lodging, short and sturdy plants, and input responsiveness. It is resistant to blast (leaf and neck), tolerant to sheath blight and bacterial leaf blight. It has also good post-harvest quality and quality fodder to feed animals as the leaves remain green even after plant reach maturity. It has an yield potential of 5.2 t/ha and maturity period 157 days from seeding.

Pokhareli Jethobudho

The variety 'Pokhareli Jethobudho', a common rice land race native to Pokhara valley was released on 20 June 2006. It is an aromatic variety recommended for farmers to cultivate in mid-hills particularly for Pokhara valley and its surroundings (600-900 masl) where irrigation with cold water is possible.

The variety 'Pokhareli Jethobudho' was developed by selection through landrace enhancement process jointly accomplished by Local Initiative for Biodiversity Research and Development (LI-BIRD), Nepal Agricultural Research

Council (NARC), District Agriculture Development Office (DADO), Kaski, International Plant Genetic Resources Institute (IPGRI), and Fewa Seed Producer Group, Kaski with farmers' participation.

The variety 'Pokhareli Jethobudho' has been released for its quality traits (aroma, taste, softness, flakiness). It has small grain size and high milling recovery that give it a high market potential in the regional and international market. It is resistant to blast (neck), tolerant to lodging. It has good post-harvest quality and quality fodder to feed animals as the leaves remain green even after plant reach maturity at harvest. It has an yield potential of 3141 kg/ha and maturity period 180-185 days from seeding.

MAIZE

Deuti

The maize variety: 'Deuti' (ZM621) was released on 5 May 2006. It is a high yielding variety recommended for farmers to cultivate in Mid-hills under rain-fed condition to grow in *bari* land and *khet* in summer season in the cropping pattern: Maize-millet, Maize-potato, Rice-maize, Maize-legumes.

The variety was received from CIMMYT-Zimbabwe along with intermediate to late white OPVs and tested at research stations and farmers' fields at different locations. Different characters of this variety were improved by cycles of stratified mass selection and family selection.

The variety has been released for its higher yield, good taste, resistance to lodging, tolerance to leaf disease and very good stay green character. It has a grain yield of 5715 kg/ha, maturity period 130-135 days from seeding and plant height 240 cm.

Shitala

The maize variety: 'Shitala' (Pop 44C10) was released on 5 May 2006. It is a high yielding variety recommended for farmers to cultivate in Mid-hills under rain-fed condition to grow in summer season in *bari* and *khet* land in Maize-millet, Maize-potato, Rice-maize, Maize-legumes cropping patterns.

The variety was received from CIMMYT- Mexico and tested at research stations and farmers' fields at different locations of the hills of Nepal. Different characters (plant height, ear height, grain type, husk cover, grain yield) of this variety were improved by three cycles of modified mass selection.

The variety has been released for its higher yield, good taste, resistance to lodging, tolerance to leaf disease and very good stay green character. It has a grain yield of 6083 kg/ha, maturity period 145-150 days from seeding and plant height 237 cm.

Fingerlings Released in Kaligandaki River

Fingerlings of different indigenous fish species were released in Kaligandaki river with a special function held at Mirmi, Syangja on 12 May 2006.

More than 202,000 fingerlings of *Sahar*, *Katle*, *Asala*, *Gardi* and other local species produced at the Kaligandaki Fish Hatchery were released with the view to maintain the fish diversity. The function was chaired by Dr. Adarsha Pradhan, Director of National Animal Science Research Institute (NASRI). Mr. Rajendra Narsingh Pradhan, Chief Director of Nepal Electricity Authority (NEA) as the Chief Guest initiated the release of fingerlings. Mr. Purushottam Lal Joshi, Coordinator of the Kaligandaki Fish Hatchery Program briefed about the objectives, activities and achievements of the Program.

During the occasion, Dr. Ash Kumar Rai, Chief, Fisheries Research Division, NARC; Mr. Bhola Man Singh Basnet Chief Communication, Publication and Documentation Division; Mr. Prem Bahadur Majhi, President of Kaligandaki Fish Conservation Society, Mr. Nilkantha Bhattarai, Social worker spoke on the importance of fish hatchery in conservation of fish diversity. Dr. Tek Bahadur Gurung, Chief of Fishery Research Centre, Pokhara conveyed the vote of thanks.

The program was jointly organized by Nepal Agricultural Research Council (NARC) and Nepal Electricity Authority (NEA) under the MoU signed to run the fishery program at the Kali Gandaki Hydroelectric Project.

The memorandum of understanding (MoU) was first signed in July 2003 for running the fishery program at the Kaligandaki 'A' Project and to produce fingerlings of indigenous fish species, study and develop technology of economically high value riverine fish species to culture as well as stock in the river system to maintain the fish population, to develop suitable technologies as a model to improve the livelihood of people through enhancing fish production and providing job opportunities to the fisher "Bote" community and local people of the affected areas without hampering the mandated work.

According to MoU, NARC has been responsible to arrange the required experts, scientists, technical and other supporting staffs to run the fishery project utilizing the fish hatchery, research laboratories and its station facilities for the research work and to produce fingerlings of possible and economically important riverine indigenous fish species and stock in to the river. NEA has been providing physical facilities at the Project site. Kali Gandaki Hydroelectricity Project is the largest hydropower (144 MW) in Nepal.

NARC Scientist obtained PhD



Mr Dil Bahadur Gurung, Senior Scientist (S-4) in Nepal Agricultural Research Council (NARC) has obtained Ph D in Plant Breeding from Central Luzon State University (CLSU), Nueva Ecija, Munz Philippines in January, 2006. He has done his dissertation on "Genetic diversity, heterosity and combining abilities within Nepalese maize varieties". He conducted two studies with the main objective of analyzing genetic diversity, heterosis, and combining abilities of some yellow maize varieties.

In study I, two field experiments were conducted using 14 Nepalese maize varieties and 40 F1 hybrids in order to estimate heterotic effects on yield and other important quantitative traits; to determine general and specific combining ability of parental lines; to identify parents with high combining ability; and to establish heterotic groupings based on the Specific Combining Ability (SCA) effects. In study II, four selected maize varieties such as Rampur Composite, Khumal Yellow, Manakamana-2 and Arun-4 were fingerprinted using 30 SSR markers to analyze the relationships of the Nepalese maize varieties and to determine the breadth of genetic diversity. The analysis work was carried out in the Service Laboratory of the Asian Maize Biotechnology Network (AMBIONET) of CIMMYT at International Rice Research Institute (IRRI), Philippines.

Dr Gurung born on January 30, 1956 in Lamjung, Nepal had his M Sc Agriculture in Genetics and Plant Breeding from Chandra Shekhar Azad, University of Agriculture and Technology (CSAUAT), Kanpur, UP, India in 1996 and BSc Ag from the Institute of Agriculture and Animal Science (IAAS), Rampur, Nepal in 1981. He has been working in the field of agricultural research and development for the last 23 years. Many many congratulations to Dr Gurung for his academic efforts and achievements.

Varieties: Genetic Diversity, Heterosity and Combining Abilities within Nepalese Maize

- Dr Dil Bahadur Gurung

Fourteen Nepalese maize varieties and 40 F1 hybrids were tested to estimate heterotic effects on yield and other important quantitative traits; determine general and specific combining ability of parental lines; identify parents with high combining ability; and to establish heterotic groupings based on the Specific Combining Ability (SCA) during 2004/05 at NMRP, Rampur and ARS, Dailekh.

There were significant differences among parents, parents versus crosses, crosses lines, testers and line x testers for yield and most of the quantitative traits evaluated. Significant variations were also observed in heterosis of the crosses for yield and other traits indicating presence of high magnitude of heterosis in these traits. Rampur So3Eo2 x NML-2 produced the highest grain yield among the crosses. Population 46C1 x Rampur Composite, Population 46C1 x NML-2, Upahar x Arun-4, Rampur So3Fo2 x Pool 17E and Rampur So3Eo2 x NML-2 were other good performing crosses. The highest heterosis for grain yield was found in the cross Population 46C1 x Rampur Composite. Manakamana-2 x NML-2, Rampur So3 Fo2 x Rampur Composite, Rampur So3 Eo2 x NML-2, Rampur So3Eo2 x Rampur Composite which had higher grain yield. Crosses involving NML-2 as male parent manifested higher heterosis. This could be due to a stable inbred line with high positive GCA effects for most of the traits under investigation. Based on the GCA effects for all traits under investigation, Rampur So3Fo2 was identified as the best combiner among the female parents. Khumal Yellow, Hill Pool Yellow and Rampur So3Eo2 were also good combiners. Among the testers, NML-2 and Rampur Composite were good combiners with positive GCA effects. These genotypes are potential parents for population improvement. The highest SCA effect for grain yield was observed in the cross Upahar x Arun-4. The other superior performing crosses were Population 46C1 x Rampur Composite, Population 46C1 x NML-2, Rampur So3 Eo2 x NML-2, Across x Pool 17E, and Rampur So3Fo2 x Rampur Composite and thus identified as good specific cross combinations. Parents of these superior crosses could be used for developing high yielding hybrids. Based on SCA effects for grain yield, 10 Nepalese yellow maize varieties were assigned into A, B, and AB heterotic groups. Population 46C1, Rampur So3Eo2, and Rampur So3Fo2 were put under group A. Upahar, Across 9331, Population 35C5 and Narayani were grouped under B. Heterotic group AB consisted of Manakamana-2 and Hill Pool Yellow. Khumal Yellow was under an undetermined category because of the negative SCA effects observed in both of the testers. These groupings coincided with their production environments to which they are adapted and cultivated. These groupings can be a useful guide to breeders for maximizing heterosis for hybrid cultivar development.

Further, four selected maize varieties such as Rampur Composite, Khumal Yellow, Manakamana-2 and Arun-4 were fingerprinted using 30 SSR markers to analyze the relationships of the Nepalese maize varieties and to determine the breadth of genetic diversity. The analysis work was carried out in the Service Laboratory of the Asian Maize Biotechnology Network (AMBIONET), CIMMYT, based in the International Rice Research Institute (IRRI), Philippines. The 30 SSR markers employed for genetic fingerprinting detected a total of 415 alleles in 60 individual plants from the four maize populations. Two loci bnlgl118 and phi109188 exhibited the highest number of alleles at 7 per locus in the populations analyzed. Khumal Yellow showed the highest number of alleles per locus (3.76) while Manakamana-2 showed the lowest (3.21). The average number of allele per locus was 3.45 among the populations indicating considerable allelic diversity present in these populations. Khumal Yellow and Arun-4 showed the highest PIC value (0.52) among the populations. The highest heterozygosity was found in Arun-4 and the minimum value, in Rampur Composite. The average percent heterozygosity was 35.23% at the population level reflecting considerable gene diversity in these populations. The highest gene diversity was observed in Khumal Yellow and Arun-4 (0.56) and the minimum was in Manakamana-2 (0.51) indicating average level of gene diversity in these four populations. The dendrogram generated based on Modified Rogers' Distance (MRD) showed two distinct clusters; Cluster I contained only Arun-4 while cluster II consisted of Rampur Composite, Khumal Yellow and Manakamana-2 revealing genetic relationships among four populations. Arun-4 was found to be genetically distinct from the three others, which share similar genetic backgrounds.

SRI Performance

The performance of SRI (System of Rice Intensification) in the eastern terai has been reported to be highly encouraging. District Agriculture Development Office (DADO), Morang has been working to promote and disseminate SRI method in the area for last three years. Nepal Agricultural Research Council (NARC) has also been conducting research on SRI at different research stations and farmers' fields.

SRI is a new method or agronomic manipulation of rice cultivation developed in Madagascar, two decades ago. Now it is already spreading about 30 countries around the world. It would be a suitable method to address our food deficit problems. Because by using SRI method, we can increase rice production without using more inputs and investment. It will perform better even with local rice seed and less water. In this way, we can increase our food production, at the same time we can conserve rice bio-diversity and environment. There are several SRI plots in different stages (seeding to harvesting). The District Agriculture Development Office (DADO), Morang, Biratnagar welcomes to visitors on SRI and requests for joint collaboration for further dissemination of SRI. (More about SRI at www.ciifad.cornell.edu/sri/countries/nepal).

National Rice Day

Second National Rice Day was observed with a special function at NARC Khumaltar and at Gokarna on 29 June 2006. The function at Khumaltar was attended by Executive Directors, directors, scientists, representative from Ministry of Agriculture and Cooperatives, Department of Agriculture and farmers. Minister for Agriculture and Cooperatives Mahantha Thakur; Secretary Ganesh KC also attended the program at Gokarna. Rice transplanting in the research farm at Agronomy Division and at Gokarna was initiated during the occasion. The Government in 2004 had declared Ashar 15 of Nepali Calendar as National Rice Day to be observed every year. The 2004 was observed as International Year of Rice as declared by the UNO.

Agro-Expo to be Held

The 3rd AGRO EXPO-2006 is going to be held on 12-16 October 2006 at Birendra International Convention Centre, Baneshwor, Kathmandu. Agro Enterprise Centre (AEC) of the Federation of Nepalese Chambers of Commerce and Industries (FNCCI) has been organizing the national level exhibition every two years for exhibition and sale of agriculture inputs and products by different organizations, firms and industries from all over the country.

Horticulture Research Workshop

A one-day workshop on Horticulture Research and Development was held at Horticulture Research Division of NARC, Khumaltar on 29 May 2006.

Talk Programs Held

"Sustainable Agriculture and Conservation Agriculture: What is it and Why is it Important?" by Dr. Peter R Hobbs, Agronomist (former CIMMYT Representative in Nepal), Cornell University, USA on 16 June 2006 at NARI Conference Hall, Khumaltar, Lalitpur •

"CIP Activities on Potato Tuber Moth Management in Potato Crop and Stored Potato Tubers" by Jurgens Kroschel, International Potato Centre (CIP), Lima, Peru on 11 June 2006 at NARI Conference Hall, Khumaltar, Lalitpur •

"Tilapia Production" by Dr. Ram C Bhujel, Senior Scientist, AIT/Director SEA-Volunteer Programs on 25 June 2006 at Fisheries Research Division, Godawary, Lalitpur •

"Current Trends in Aquaculture" by Amrit Bart, Associate Professor, AIT/Project Chief Senior Scientist, AIT/Director SEA-Volunteer Programs on 25 June 2006 at Fisheries Research Division, Godawary, Lalitpur •

TRAINING WORKSHOP/SEMINARS, STUDY & TOURS ABROAD (April - June 2006)

SN.	Name	Position	Subject	Duration	Country
1.	Dr. Nirajan Prasad Adhikary	S-4/Coordinator,NRRP	Int'l Workshop on Aerobic Rice & ADB Project Meeting	3-6 April	Philippines
2.	Mr. Tufail Akhtar	S-4, NRRP, Hardinath	Int'l Workshop on Aerobic Rice, ADB Project Meeting & Training	3-28 April	Philippines
3.	Mr. Hari Krishna Uprety	S-4, Agri. Botany Div.	Rice Breeding Training at IRRI	17-28 April	Philippines
4.	Dr. Heera Kaji Manandhar	Chief, Planning Div.	Seed Health in Agricultural Development	4-6 April	Tanzania
5.	Mr. Rajendra Darai	T-7, NGLRP, Rampur	Lentil Improvement	16 Apr-16 May	Syria
6.	Mr. Kul Prasad Aryal	S-1, CPDD	Introductory Course in Environmental & Natural Resources Economics	4-24 May	Bangladesh
7.	Mr. Salik Ram Gupta	T-7, Botany Div.	Conservation Management & Use of Plant Genetic Resources in Agri.	8 May-30 June	Netherlands
8.	Dr. Surya Laxmi Maskey	Director, Crop & Hort.	The Project Completion Meeting of IFAD	8-10 May	India
9.	Mr. Nawal Kishore Yadav	S-4, NGLRP, Rampur	The Project Completion Meeting of IFAD	8-10 May	India
10.	Mr. Ram Narayan Chaudhary	S-4, Oilseed Res.Prog.	The Project Completion Meeting of IFAD	8-10 May	India
11.	Mr. Bal Krishna Joshi	S-1, Botany Div.	Sustainable Use of Plant Genetic Resources	9 May-2 Nov	Japan
12.	Mr. Binod Prasad Luintel	S-1, NPRP	Seed Potato Technology, Certification and Supply Systems	6-30 June	Netherlands

Animal Drawn harrow for reduced till-Wheat

Animal drawn harrow is becoming popular among farmers in central terai for wheat seeding under minimum tillage that helps in the conservation of resources and higher yield.

The farmers' concept about the tillage practice has been changing with the introduction of new technologies in their fields. Farmers used to believe that 'the better the pulverization of soil, the better will be the production'. This led them for continuous tillage with high cost and energy. Now farmers have realized that minimum tillage, zero-tillage or conservation tillage not only saves cost and energy but also produce higher yields. The farmers have begun to modify their tillage practice utilizing their own resources. Under this practice the farmers broadcast wheat seed on rice-harvested untilled field and make single or double passes with animal-drawn harrow followed by a planking.

Coordinated and helped by Agriculture Implements Research Centre (AIRC) of NARC at Ranighat, Birgunj; in 2004/05; a total number of 1317 farmers in 25 villages in Bara District adopted this technology on an area of 1848 ha. The mean grain yield received was 2697 kg/ha which was 36.96% higher than farmers' practice (2208 kg/ha).

The Agriculture Engineering Division, Khumaltar and AIRC, Ranighat under NARC have developed and introduced several resource conserving technologies including reduced till-wheat by animal drawn harrow, zero-till seed drills, minimum-till wheat with power tiller drills, reaper harvester in rice-wheat system, direct seeded rice by drum seeder, four-wheel tractor operator reaper, furrow irrigated raised bed as tillage practice and several others as harvesting and post-harvest technologies.

Combine-Harvester: A New Introduction in Parsa District

Labor scarcity at planting/transplanting; harvesting and threshing of Rice and Wheat crops has been a serious problem in Terai of Nepal that compels farmers to leave their good part of the land fallow every year. Late transplanted/sown rice and wheat crops are, sometimes, damaged by natural calamities like rainfall, hailstorm, and storm at crop maturity. In rice crops, grain shattering and grasshoppers' damage of matured panicles are the major consequences of late planting. Apart from this, manual harvesting charge (12.5%) and threshing charge (10%) make the farming more expensive.

In order to avoid these problems, the Combine-harvester has been introduced at farmer's level in some terai districts of Nepal. In Parsa district, the Combine-harvester was first introduced in April 2006 by Mr Kasim Ansari, a progressive farmer in Kataiya VDC, who purchased a combine set from Punjab, India with an investment of about 18 lakh NRs. The service users are happy to have the combine harvester in their locality as they hope it will help them for timely completion of rice and wheat harvesting & threshing, lowered production cost, minimized weather risks, avoid grain losses, overcome the labor scarcity problem. The capacity of the combine-harvester is 1 ha/hr to 1.2 ha/hr with the cutting width of 12 ft and grain storage capacity of 1.4 ton.



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