

A Quarterly Newsletter of Nepal Agricultural Research Council (NARC)

Vol. 11 No. 3

July-September 2004

### National Workshop on Livestock and Fisheries Research

The Sixth National Workshop on Livestock and Fisheries Research was held in Kathmandu on 1-2 July 2004.

The two-day workshop was held with the objectives to:

- Review research activities/outcomes in livestock and fisheries research
- Identify appropriate technologies at hand and in pipelines and find ways to transfer them to farmers, industrialists and entrepreneurs.
- Discuss and suggest for future plan in livestock research and development

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### Varieties of Wheat, Grain Legumes and Pasture Crops Released

Variety Approval Release and Registration Sub-Committee under National Seed Board officially released varieties of Wheat, Lentil, Cowpea and Oat for farmers to cultivate in different eco regions.

The varieties are released along with complete package of practices after years of research and experiments at different research stations, disciplinary divisions and farmers' fields.

#### Wheat

The wheat variety: "Gautam" (BL 1887) was released on 17 September. It is a high yielding variety recommended for farmers to cultivate in terai, tars and lower valleys under timely sown and

late sown irrigated conditions.

The variety Gautam has been developed from three way cross of "SIDDHARTHA/NANGING 8319//NEPAL 297, pedigree NC 1838-4B-020B-020B-2B-0B, following a modified pedigree bulk system of plant breeding and was evaluated in multilocation testing sites with Coordinated Varietal Trial (CVT), coordinated Farmers' Field Trials and Participatory Varietal Selection (PVS) in Chitwan and Rupandehi districts. It has large, elliptical shaped, amber and shining lustrous grain, high protein content with good bread and chapati making qualities. It is resistant to both leaf and yellow rust, resistant to leaf blight and moderately resistant to loose smut under field conditions. BL 1887 has been observed tolerant to sterility, a very common problem of the eastern Terai and Chitwan valley. It has higher grain yields of about 2.5 mt/ha.

#### Lentil

The Lentil variety: "Shital" (ILL 2580) was released on 10 September. It is a high yielding variety recommended for

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### International Workshop on Micronutrients

An International Workshop on Agricultural Strategies to reduce Micronutrients Problems in Mountains and other Marginal Areas in South and South-East Asia was held in Kathmandu on 8-11 Sept 2004.

The four-day workshop was formally inaugurated by Hon'ble Minister for Agriculture and Cooperatives, Mr. Hom

Nath Dahal in a special function chaired by Hon'ble Member of National Planning Commission, Dr. H K Upadhyaya. Mr. Dularchan Sahu Pathik, Executive Director of NARC welcomed the participants in the workshop. The workshop was participated by delegates from USA, UK, Norway, New Zeland, India,



*NARC Newsletter Vol. 11 No.3 (July-September 2004)*

### ISSUE HIGHLIGHTS

- Crop Varieties released
- National workshop on Livestock
- International workshop on Micronutrients
- NTWG meeting
- National workshop on Allo R & D
- Recent Advances in Yellow rust research in Nepal - S Sharma
- Workshop on Chiraito Research
- Workshop on Bovine Mastitis
- Workshop on Community Rice-Fish farming
- Market Linkages for promotion of agriculture

## NTWG Meeting

With the objectives to review linkage and coordination among R & D partners, identify constraints in R&D linkages and make out recommendations on major policies issues for improved linkages and coordination, the 4<sup>th</sup> National Technical Working Group (NTWG) workshop was held in Kathmandu on 13 July 2004.

The workshop was attended by over 60 delegates from NARC, Department of Agriculture, Department of Livestock Services and different institutions (public, private, I/NGOs) around the country and media personnel. Altogether fifteen papers focusing on linkages & coordination on technology generation and dissemination and constraints related to Regional Technical Working Groups (RTWGs) were presented.

The workshop, after interactive discussions made out suggestions and recommendations on different policy issues regarding improved linkages and coordination for agriculture research and development. The recommendations include:

### Implementation of ATWG guidelines

- Approval as it is now and later revising of Agriculture Technical Working Group) ATWG guidelines with the multistakeholder discussions and (NTWG has provision of revision in the changing context)
- NARC Executive Director takes leadership with participation from DOA/DLS on approving of signing/revising ATWG guidelines

### Identification of functional linkage

- Create new forum/platform in the MOAC (Linkage and Coordination Cell or Research Extension Liason Office)
- Enhance ownerships of existing linkage mechanisms e.g. RTWG, NTWG, DTWG
- Enhance linkage through Training of SMS and extension agents at center and region levels
- Enhance linkages in livestock, horticulture and Cash crops
- Ensure and enhance extension feed-backs to Research
- Implementation of District level linkage mechanisms (DTWG or DAIC)

- Resource Centres for Information Technologies through new project initiatives e.g. Joint websites for R&D workers, Community information centers, Resource centers in OR sites using IT

### Mechanism for scaling-up of success stories and technologies

- Better incentives mechanisms to strengthen OR research at the regions, sites level
- Establishment of Producers, Processors, Marketers Alliances
- Create platform for review, synthesize and release technology packages
- Regional Technology /Variety/ Breed Release Committee, Technology Transfer Days
- Formal & Informal Technology Release Systems
- Effective technology uptake pathways
- Funding and Revenue generations for technology
- Up-scaling, Promotion and Impact

### Mechanism for joint planning and monitoring

- Joint monitoring at the national level and regional level
- Formation of high level monitoring team
- Synthesize overall review and outputs of linkage mechanisms (RTWGs/ NTWGs)

### R & D Priority Settings

- Priority research agenda from development partners

### Integrate bottom-up planning process

- NARC's Village level planning workshop
- District Agriculture planning process and joint planning with Local Government of the DOA/DLS

### General Issues

- Policy to attract private sectors as active Co-partners in R & D activities
- Devolution of authority to regions and local government
- Improved human resources and financial resources
- Better incentives mechanisms for strengthening OR research
- Inclusions of forestry and other public sectors

## National Workshop on Allo Research and Development

A two-day workshop on "Allo (Himalayan Giant Nettle) Research and Development" was organized at NARC, Kathmandu on 1-2 July 2004.

In the workshop, existing situation of Allo products and marketing, export scenario in foreign countries, availability of raw material and experiences in Allo research and development work and findings were presented. The workshop had deliberate discussion on different issues and made out recommendations on plant cultivation, product diversification and development, and Market Networking.

The workshop was participated by delegates from NARC, Ministry of Agriculture; Department of Agriculture; Handicrafts Association of Nepal; Eco Himal, Sankhuwasabha; Livelihood Forestry Program, Dhankutta; MADEP Nepal; East Foundation, Sankhuwasabha; ANSAB, Kathmandu; Social Development Centre, Terhathum and Dahal Traders.

## Seminar on Agriculture Communication

With the view to present the findings of the studies on the impact of Agriculture Program on Nepal Television and coverage of agriculture related subjects in some national daily newspapers, a seminar was organized at NARC, Ramshah Path, Kathmandu on 14 July 2004.

In the Seminar, Mr. Manoj Kumar Thakur, Technical Officer presented the findings of the studies on the impact of Agriculture Program on Nepal Television and Mr. Kul Prasad Aryal, Scientist presented the study on the coverage of agriculture news by some daily newspapers.

The seminar was inaugurated by Mr Durga Nath Sharma, General Manager and Chief Guest chaired by Mr. Bhairab Raj Kaini the then Chief of Agriculture Information and Communication Centre. The Seminar was attended by NARC scientists and media personnel from different publications, radios and televisions.

Suggestions based on the responses of the farmers on improving the agriculture program on NTV was also presented.

## Recent Advances in Yellow Rust Research In Nepal

- S. Sharma

Yellow rust (*Puccinia striiformis f. sp. tritici*) has posed an important threat to wheat in river basin, low and midhill region of Nepal. The farmers of hills had faced several round of epidemics in the past and had to bear around 20-30% yield losses. During mid eighties the occurrence of 7E150 race resulted break down of variety RR 21 to yellow rust. Similarly the varieties Annapurna 1 and Annapurna 4 with effective Yr 9 gene became susceptible when the new virulent race 46S119 appeared during 1999. Heavy infection of the rust was noted in variety Nepal 297 during 2004 on northern part of Kathmandu valley. It had been felt necessary to have effective screening techniques for sound breeding program. For this purpose source of inoculums was needed to multiply in mass scale during October and November and test entries has to be inoculated in early January/ February. Frequently rust inoculums were available in summer planted wheat at Nigale farm, Mudhe, of Sindhupalchok district. In recent years it was not possible to get rust inoculums in these areas. Preservation of rust was tried several times in viable condition in the refrigerator in the lab at Khumaltar but it was not successful in the past. Liquid nitrogen preservation and Deep freeze (-80°C) has been reported to be ideal for

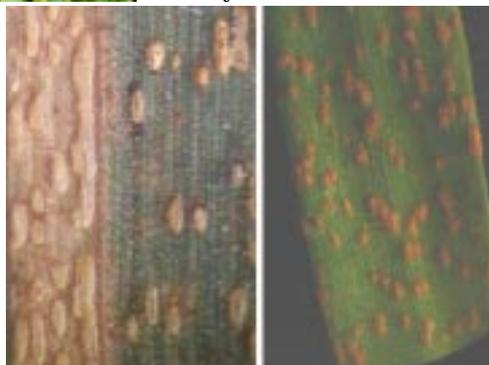
and it was sealed in a polythene bag. Thus the polythene bag was kept in between two-ice box of size 16x8 cm and was placed on deep freeze of ordinary refrigerator. During October the leaves were taken out and placed on moist filter paper in a petri dish. Next day much sporulation was observed under Stereo microscope and the rust spores in the pustules were found viable. The spores from the leaves were inoculated on seedling of two-week-old Morocco variety grown on small pots. The pots were kept on a tray filled with sand and some ices were placed around the pots to maintain cool temperature approximately 9 °C that is ideal for infection. The inoculated pots were covered with plastic polythene sheets for one night. After sixteen days rust started to develop on the seedling. Thus low cost technology for spore preservation and multiplication was identified. This is an achievement in rust research work in Nepal as rust is an obligate parasite and cannot be cultured in artificial media.

In this year revival of rust spore was also possible as suggested by C. R. Weilling Scientist at University Sydney, Australia keeping dried spore in sealed vials for several months in deep freeze. Retrieval was done by heat shocking in 42 °C for 4 minutes before using in experimental purpose. Recently Dr Etienne Duveiller Regional Plant Pathologist, CIMMYT/ Nepal has supported for Screening Genotypes in multi location sites. He also installed polyhouse with controlled temperature and humidity that will help in mass production of inoculums for screening purpose. It will be also utilized for identification of rust pathotypes prevalent in the country.



preservation of yellow rust in well-equipped lab of other developed countries.

During April of 2004 wheat season leaves infected with yellow rust disease were collected from Ramkot and Nagarkot. The moisture of the leaves was removed by keeping between sheets of the blotting paper. Then after twenty days of collection the leaves were kept in Nepali envelop



## Consultation Meeting on Agro-bio Diversity Policy Draft

Multi-stakeholders consultation meeting on National Agro-biodiversity Policy Draft was held on July 1 2004 in Kathmandu. The meeting attended by about 50 participants from Ministry of Agriculture, Ministry of Forestry and Soil Conservation, International Plant Genetic Resources Institute, NARC, Department of Agriculture and NGOs had the objective to workout to finalize the policy draft on agro-biodiversity.

The national policy on bio-diversity has been development in line with the International General Agreement made during the International Convention on Biological Diversity in 1992 and the "Genetic Resource Act, 2058" of Nepal. The objectives of the national policy are to:

- Promote agriculture and improve food security status through conservation and proper utilization of agro-biodiversity
- Safeguard and promote rights of the farmers communities in the use and exercise of indigenous knowledge, skills, innovations and technologies
- Manage for the equitable and judicious distribution of the benefit and opportunities from access and use of agro-biodiversity resources
- Make effective management, commercialization and utilization of the agro genetic resources in the context of national, regional and international trades
- Contribute in maintaining sustainable ecological balance while using the agro biological resources

The meeting had brainstorming exercises on different aspects of the policy draft in three separate groups, namely Background, Vision, Definition; Objectives, Policy, Strategy; Working policy, scope.

The ccope of the agro biodiversity is agri genetic resources, organisms helping in agriculture production system , abiotic factors affecting the agro biodiversity, socio-economic and cultural aspects.

Contd. from page 1 (Livestock..)

In the workshop, more than forty different policy and technical papers and research reports on livestock production and management, fisheries, animal nutrition, animal breeding, pasture, forage and agro-forestry, and animal health were presented. The workshop reviewed the technologies in use and recommended for further actions/activities to improve livestock sector.

## Suggestions and Recommendations

### Buffalo

- Selection of superior germplasm and crossbreeding for better milch and meat breed
- Embryo transfer technology nucleus herd development
- Characterization of indigenous breed/strain in molecular level
- Health and nutritional management
- Low-cost farming, rearing and housing management
- Dairy production, value addition and Marketing
- Tackling of Infertility
- Quality Meat (Fattening, Growth curve, )
- Tannery (Hide)
- Development of herbal drugs

### Cattle

- Selection of superior germplasm and crossbreeding for better milch and meat breed
- Embryo transfer technology nucleus herd development
- Conservation and utilization of indigenous breed
- Characterization of indigenous breeds in molecular level
- Health and nutritional management
- Low-cost farming, rearing and housing management
- Dairy production, value addition and marketing
- Tackling of Infertility

### Goat

- Selection of superior germplasms and crossbreeding for better wool and meat breed
- Health and nutritional management
- Low-cost farming, rearing and housing management
- Wool and fur production, value addition and marketing
- Quality of meat (Fattening, Growth curve, )

### Sheep

- Selection of superior germplasm, cross breeding for meat and wool breeds
- Health and nutritional management
- Low-cost farming
- Wool and fur production, value addition and marketing
- Quality Meat (Fattening, Growth curve, )

### Pig

- Meat quality
- Local breed conservation

### Poultry

- Germplasm conservation of principal breeds
- Upgrading of native chicken
- Forage based research (Green fodder supplementation)

- AI and sexing (Turkey)
- Double tract system in poultry
- New technologies for commercial poultry farming
- Promote quick return on quail farming
- Feed formulation

### Fish

- Fish Breeding and fingerlings production
- Further research and upscaling of Lacustrine Fishery, Pond aquaculture, Riverine Fishery, Rice-fish Integrated farming and organic aquaculture
- Use and integration of Traditional knowledge and practices
- Technology transfer for commercial fish farming in cooperatives
- Further research on Fish Health and nutrition
- Research on and promotion of ornamental fishery
- Farming Technology development of indigenous aquatic species

### Health

- Development of vaccines and antigens and other diagnostics
- Development of Herbal drugs and other drugs
- Safe guarding Public Health in connection to WHO, WTO, SAFTA
- Prevention and control technologies of zoonotic diseases
- Lab development for quality testing of food of animal origin according to OIE standard
- Prevention and control technologies of parasitic, bacterial, viral and metabolic and other livestock and poultry disease
- Collection, preservation and utilization of organism

### General

#### Approaches for implementing new strategy

- Strengthening National Institute
- In-built training mechanism for ToT
- Capacity building and proper resource allocation
- More responsibility of project leader (technical and financial)
- Effective monitoring
- Core research and need based research
- Integrated research program-potential commodities and disciplines
- Strengthening of Laboratory: strong back-up for all commodities
- Research for fodder, rangeland and agro-forestry
- Socio-economic study
- 'Model' village for action research

#### Technology Dissemination Approaches

- Need identifications with stakeholders
- Development of complete PoP/ Commodity approach
- Establishment of nucleus stock and seed production in NARC station
- Incorporation of different stakeholders in programme formulation, implementation and monitoring (Multidisciplinary Team)
- Timely communication of developed technologies through different media

## National Workshop on Chiraito

The National Workshop on Scaling-up Appropriate Methodology for Domestication and Sustainable Development of 'Chiraito' (*Swerta chirata*) in Nepal was held in Kathmandu on 31 August 2004.

The workshop was jointly organized by Nepal Agricultural Research Council (NARC), Agriculture Research Station, Pakhribas and Ethnobotanical Society of Nepal (ESON) sponsored by Hill Agriculture Research Project (HARP) that had objectives to:

- Familiarize cultivation technologies of "Chiraito"
- Share experiences and feedback collection
- Discuss policies and planning for sustainable development of "Chiraito"

Chiraito is a high value medicinal herb that grows in the subtropical to temperate zones of the Himalayan region. It possesses properties for Ayurvedic and allopathic medicines useful in jaundice, chronic fever, malaria, diarrhoea, gastric ulcer, inflammation, asthma, skin diseases, burning sensation, leucorrhoea, cold, cough, diabetes, urinary disorder, leucoderma, wounds, eye strain, various liver disorder. Nepal has been exporting Chiraito in crude form to India and to other Asian, European, American and African countries. It trades about 50 % of the world's total volume. However the export has declined in the last some years due to depletion of Chiraito in the natural habitat as there is lack of conservation and cultivation practices.

Realizing this fact NARC implemented a project on "Developing propagation and management techniques for the domestication of Chiraito" at Agriculture Research Station Pakhribas. Various field experiments were conducted at Pakhribas Station and its outreach sites to test/verify cost effective and easy methods for quick and higher germination of Chiraito seeds and to study on planting/cultivation techniques. The research has made out several findings as follows.

- Chiraito can successfully be propagated from seeds without treating, but special care should be taken in seed preparation and nursery
- Germination of seed can be achieved as early as nursery environment

- Optimum time for early and higher germination is April - June. The number of germinated seedling may vary from 500 to 3500 per square meter from 1 gram of seed
- Seedlings from nursery can be transplanted into poly-bag at 4, 6-leaved stage after 60 days, and in the field at 6, 8-leaved stage 90 days after sowing
- More suitable substrate for the nursery is sand mixed with 1/3 forest soil and 1/3 compost; all sieved, mixed and covered in the 5-8 cm thick layer
- In the meadow of high hills, Chiraito seed germinates also in the barren land, however, forest soil/compost applied in the tilled land enhances higher germination and vigorous growth
- Seedlings can be transplanted in terrace riser successfully
- Suitable spacing for Chiraito is 50x25 cm to obtain higher yield (2-3 tons/ha)
- Chiraito grows better in the fertile soil. Application of FYM@ 200g/plant at planting and another same rate at branching time may give more yield. Thus the total dose will be 32 t/ha
- Weeding is necessary for better growth of Chiraito during rainy season at an interval of about one month

Various promotional/extension activities have been conducted to scale-up the technologies on conservation and cultivation of Chiraito.

- Publication and distribution of technical materials in farmers' level to disseminate the identified technologies
- Publication of Chiraito serial (Chiraito Mala)
- "Chiraito conservation and development organization" an NGO formed
- Workshops with different agencies, farmers./forest users conducted
- Training for farmers and staffs in different districts conducted

In the workshop, presentation of concept paper and discussion on the problems identified were held. The workshop was participated by scientists and officials from NARC, RONAST, HAARP, Ministry of Agriculture and Cooperatives, Department of Agriculture, Department of Forestry, NGOs, traders and farmers

## Workshop on Control of Bovine Mastitis

A one-day workshop on "Up-scaling of Control Strategy of Bovine Mastitis in Dairy Animals" was held on 17<sup>th</sup> August 2004 at NARC, Khumaltar.

In the workshop presentation on Bovine Mastitis, its epidemiology and significance in Nepalese Dairy Industry and its control by Post-milking Teat dipping technology were held. Field reports on prevalence and importance of clinical Bovine mastitis and responses to post-milking teat dipping practices in different project implemented areas of Rupandehi, Banke and Kailali districts were presented. Role of dairy cooperatives on introduction of technologies and possibilities was presented from Central Milk Producers Cooperatives Union (CMPCU) and discussions for further improvement were held.

The workshop was chaired by Executive Director of NARC, Mr. D S Pathik that was participated by scientists, veterinarian and officials from NARC, Department of Livestock Services, HARP and CMPCU.

## Workshop on Rice-Fish Farming

A workshop/Interaction program on "Status and future on Scaling-up of community Rice-Fish Farming" was jointly organized by Fisheries Research Station/NARC, Pokhara; LIBIRD and Directorate of Fisheries Development on 9 August 2004 at Fisheries Research Division, Godavary.

In the workshop present status of rice-fish farming in Nepal and status of scaling-up of community rice-fish farming research and its expansion were presented. After deliberate discussions on various issues, the workshop made out recommendations on future research areas and strategies for disseminating community rice-fish farming.

The workshop was chaired by NARC Executive Director, D S Pathik and participated by delegates from NARC, Department of Agriculture, Directorate of Fisheries Development, LIBIRD and HARP.

## NARC Scientist: Recent Ph.D. Holder

Mr. Subarna Man Pradhan, Senior Scientist (S4), in NARC obtained PhD degree in Animal Science from Central Luzon State University (CLSU), Munoz, Nueva Ecija, The Philippines.



In his Ph.D. course, Dr. Pradhan made study on "Rice Bran in Quail (*Coturnix coturnix japonica*) layer diets formulated based on total amino acid and digestible aminoacids"

The experiments were carried out at CLSU, Poultry Module I, Munoz, Nueva Ecija, the Philippines in 2003 and 2004. The study had the objectives to find out the appropriate level of rice bran inclusion

in quail layer diet for optimal production and to improve the performance of the birds fed with high level of rice bran

Dr. Pradhan, born in 1952 had his MSc. studies in Animal Science from the University of Aberdeen, Scotland, UK. He has been working in Livestock Development and Animal Science Research field for the last 25 years.

Mr. Chet Raj Upreti, Senior Scientist (S4), in NARC obtained PhD degree in Animal Science majoring Animal Nutrition from the Central Luzon State University, N.E. Munoz, Philippines in June 2004.



Dr. Upreti in his Ph.D. course made study on "Rice Bran and Leucaena Supplementation on the Growth and Digestibility by Goats fed urea-treated rice straw". His study was funded by NARC under World Bank-funded Agriculture Research and Extension Project (AREP)..

The effect of different level of rice bran as a source of energy as supplementation to the urea treated rice straw (UTRS) that includes 20% Leucaena in leaves was studied to find out degradability, digestibility and growth performance of growing goats. The economics of feeding different level of rice bran (RB) as supplementation to UTRS was also determined. Urea treatment resulted in higher degradability of the straw diets, fraction B<sub>1</sub> in both CP and NDF. The increasing level of RB supplementation to UTRS did not increase DM intake and nutrient digestibility but with 20 % and 30 % RB inclusion. The total dry matter (DM) intake increased that resulted to significantly higher (P<0.05) organic matter digestibility. The average daily gain (ADG) of 41.1 g/d was significantly higher (p<0.05) to 20% level than those animal fed with 0, 10 and 30 % level of RB supplementation. Likewise, higher feed conversion efficiency (FCE) was noted with the addition of 20 % RB.

The application of this finding can be useful to Nepalese condition as the country is rich in crop residue, crop grain by-product and fodder trees. At present, technique is lacking about the appropriate level of crop grain by-product on the straw based diet for ruminant animal.

Dr. Upreti had his MS studies in Animal Science from the University of Canterbury-Lincoln College, New Zealand under Government Scholarship of New Zealand.

Mr. Govind Prasad Acharya, Senior Scientist (S4), in NARC obtained PhD degree in Soil Science from School of Agriculture and Forest Science, University of Wales, Bangor, UK.



Dr. Acharya in his Ph.D. course made study on " The development of interventions to minimize soil and nutrients losses in the Bari land of the middle hills of Western Development Region of Nepal". His study was funded by DFID through the University of Wales.

The main objective of his research was to identify suitable technology to minimize soil loss and improve soil fertility in farmers' fields involving local knowledge and farmers' participation in the research. The experiments conducted at different agro-ecological sites in the middle hills of Nepal.

The results indicate that a low proportion of rainwater flows into runoff compared with infiltration. However, some erosive rainfall events occurred during the early season causing heavy soil loss from the cultivated Bari lands in the hills. Ginger strip with mulch or legume crop such as soybean in strip alternate with maize strips across the slope reduces soil loss in the maize based cropping system on the sloping Bari lands Run-on diversion as well as grass cover in terrace risers can also reduce soil loss from bench terraces under high rainfall area. An intercrop of legume in citrus orchard minimizes soil erosion.

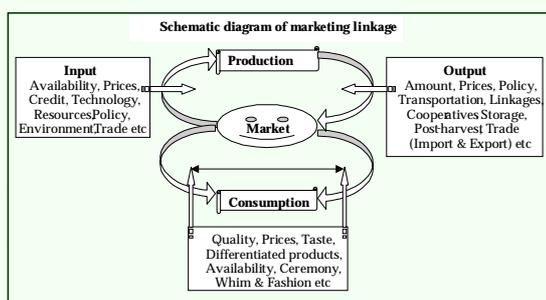
Organic carbon is a major loss among the nutrient elements in soil erosion. However, N and K losses are significant in leachate.

### Market Linkage to Promote Agriculture

- KP Aryal

Relationship among producers, wholesalers and retailers play an important role in marketing agricultural produce. Such linkages create mutual trust among different functionaries of the market, but might cause a dependency relationship between and among stakeholders, and make it difficult for new comers to enter the business. Linkages are mostly based on village proximity (area) based rather than on family relationship. Farmers are not compel to sell produce to such traders but would prefer to do so unless the price offered was too low. Farmers sometimes sell their produce directly to consumers but give a part of the produce to the collection agents in order to maintain the relationship. The linkages between wholesalers and retailers seem to be developed mostly through repeated dealings. Linkages among producers, wholesalers and retailers can be established based on ethnicity, political affiliation, language, economic status, friendship, behavior, investment of traders and so on. The linkages established through agency function well in limited situation however, it can guide and establish a relationship between and among unknown stakeholders previously whom they do not have trust. The cost involved in marketing also guides to establish relationship between farmers and traders. Forward and backward linkages connect the parties, remain relationship and become stronger and stronger.

In view of the considerable potential of vegetables, spices and fruit sector from production (supply) side as well as from the consumption (demand) side, it is imperative to examine the various linkages that facilitate / constraint the performance of this sector. The perishability of the produce coupled with



seasonality in production and the distance between production and consumption centers warrants an effective linking of producers and consumers through strong market support. This necessitates infrastructural facilities such as motorable roads, regulated markets, cold storage, refrigerated transport, grading, packaging, processing facilities, credit support, market information, research and development and so on. Based on these factors, a conceptual framework showing the marketing linkage is developed and presented in figure, which can address the activities need to be emphasized before bringing the produce in market.

## TRAINING WORKSHOP/SEMINARS, STUDY & TOURS (July - September 2004)

S.N.	Name	Position/Discipline	Subject	Duration	Country
1.	Dr. Ram Pratap Sah	Director/Crop & Hort.	A Small Group Discussion Meeting	5-6 July	India
2.	Dr. Buddhi Ratna Khadge	S-4/Pathology	IFAD-NUS Steering Committee Meeting	9-10 July	Yemen
3.	Mr. Shahab Uddin Khan	S-4/Agronomy	Rice Technology Transfer Systems in Asia	15-28 August	Korea
4.	Dr. Ram Pratap Sah	Director/Crop & Hort.	Strengthening Partnership for more Effective Planning	1-3 September	India
5.	Mr. Pitambar Thakur	S-4/Entomology	"Rice is Life" Various Aspects of Rice Based Agricultural System	8-15 September	Japan
6.	Mr. Madan Raj Bhatta	S-4/Plant Breeding	All India Wheat Workshop	27-30 August	India
7.	Mr. Dipak Bhandari	S-4/Pathologist	All India Wheat Workshop	27-30 August	India
8.	Mr. Krishna Prasad Dhital	T-6/Agronomy	HNPV Production Training	12-25 September	India
9.	Mr. Ram Prasad Ghimire	T-6/Livestock	Sustainable Utilization and Management of Agrobioliversity	19 July-20 Aug	Germany
10.	Mr. Thaneswor Pokharel	S-5/Agronomy	Travelling Seminar on Rice Wheat Consortium	11-23 September	India
11.	Mr. Govind Prasad Koirala	S-4/Agronomy	Travelling Seminar on Rice Wheat Consortium	11-23 September	India
12.	Mr. Raghavendra Mishra	S-4/Soil Science	Travelling Seminar on Rice Wheat Consortium	11-23 Sept, 2004	India
13.	Mr. Gautam B Manandhar	S-4/Ag. Engg.	Travelling Seminar on Rice Wheat Consortium	11-23 September	India
14.	Mr. Nilam Kumar Shakya	T-6/Agronomy	Travelling Seminar on Rice Wheat Consortium	11-23 September	India
15.	Mr. Mathura Prasad Yadav	T-6/Agronomy	Travelling Seminar on Rice Wheat Consortium	11-23 September	India
16.	Dr. Dil Prasad Sherchan	S-5/Soil Science	Study Visit on Maize and Wheat	9-16 September	Bhutan
17.	Mr. Mahendra Jung Thapa	S-4/Food Science	International Post Production Training Workshop	20 September	Philippines
18.	Mr. Ram Baran Yadav	T-6/Agronomy	International Post Production Training Workshop	20 Sept-8 Oct.	Philippines
19.	Mr. Bed Bahadur Rokaya	S-4/Agronomy	4th International Crop Science Congress	26 Sept-1 Oct.	Australia
20.	Mr. Tara Bahadur Ghimire	S-4/Agronomy	Workshop on Modern Technology of Retgting of Jute	15-17 September	Bangladesh
19.	Dr. Ram Pratap Sah	Director/Crop & Hort.	International Crop Science Conference	26 Sept-1 Oct	Australia
20.	Dr. Madhusudan Pd. Upadhyay	S-4/Plant Breeding	Project Orientation and Management Meeting	27-29 September	Italy
21.	Dr. Devendra Gauchan	S-4/Agri Economics	Interface of Eco. And national Genetic Resources Policy Making	28-30 September	Italy
22.	Mr. Khadga Bhakta Paudel	S-4/Horticulture	Reduction of Post Harvest Losses of Fruits & Vegetables	5-11 October	India

## DS Pathik: Acting NARC Executive Director



Mr. Dularchan Sahu Pathik, Principal Scientist (S-5) has been appointed as Acting Executive Director of NARC to work until confirmed appointment is made by His Majesty's Government as per "Nepal Agricultural Research Council Act, 1991" He was appointed by the decision of Hon'ble Minister for Agriculture and Cooperatives and the Chairman of the NARC Council Mr. Hom Nath Dahal on 23 July 2004.

Mr. Pathik has been working in the field of agriculture for over last thirty-five years with various managerial and technical capacities.

Mr. Pathik an M.Sc. in Agriculture from UPLB, Philippines in 1978 has already had the positions of Director for Crop and Horticulture Research, Planning and Coordination and Administration; Regional Director.

The Executive Director is the Administrative Head of the Institution, Member-Secretary for the NARC Council chaired by Minister of Agriculture and Cooperatives and Chairman of the NARC Executive Board.

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Pakistan, Bangladesh and representatives from national and international government and non-government organizations in Nepal.

The workshop had its concentration on making out different strategies to address the micronutrient problems, with special reference to people and lands in marginal regions of Asia. The themes of the workshop were: Human Nutrition; Soil Mapping and Soil Nutrient Management; Soil / Plant Interaction.

*Contd. from page 1 (Varieties..)*

farmers to cultivate in terai and mid-hills in rice or maize-based cropping pattern.

The variety "Shital" is a selection from local race of Pakistan received from ICARDA. It has a small round shaped seed in gray colour. The variety has given over 30 % higher grain yield in coordinated varietal trial (CVT) and over 28 % in coordinated farmers' field trial as compared to that of previously released variety "Simal". It is moderately resistant to wilt and root rot and is less affected by BGM and stemphyllum blight. It has wider adaptability and is also suitable for rain-fed upland Bari condition. Farmers have liked this variety because of consistent yield and better cooking quality.

### Cowpea

The Cowpea variety: Surya (IT86D-792) was released on 10 September. It is a high yielding variety recommended for farmers to cultivate in central and western terai and inner terai in both irrigated and rainfed condition.

The variety "Surya" is a selection from local land race of Nigeria received from Cowpea International Trial 1989. It has a rhomboid shaped seed in brown colour. The variety has given higher yield than the previously released varieties- Akash and Prakash. It is resistant to Cowpea yellow mosaic virus disease and pests like Pod borer and Aphid. As it has an erect and determinate plant with faster growth habit, the effect of weed is less. This variety is recommended for its response to

stresses, higher yield, succulent (less less fibrous) pods suitable as green vegetable.

### Oat

The oat varieties, "Kamdhenu Jai" and "Netra Jai" were released on 14 September after about 12 years' research and experiment at Khumaltar and on-farm in different dairy pocket areas. The high green matter yielding variety with multi-cuts in dry winter season helps to increase milk production.

The Kamdhenu Jai is a selection from local race of New Zealand recommended for farmers to cultivate as a very important annual winter fodder in terai to mid-hills of Nepal. It gives high quality (over 12 % CP) green matter yielding 51-75 t/ha in more than 4 cuts during winter season (October-March). Its sole feeding or feeding with paddy straw reduces the cost of milk production. The plant has longer height and wider leaf and the straw remains green at the time of seed harvest. It is drought disease and insect resistant variety.

The Netra Jai is a selection from local race of Canada recommended for farmers to cultivate as an important annual winter fodder in terai to mid-hills (subtropical to warm temperate zone) of Nepal. It gives high quality (over 12.9 % CP) green matter yielding up to 91 t/ha in more than 4 cuts for longer period during winter season. The plant has longer height and wider leaf that gives good straw yield. It is drought tolerant and disease and insect resistant variety.



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**Published by:**  
Communication, Publication and Documentation Division  
Khumaltar, Lalitpur, **Phone:** (977-1) 5523041, 5525704, 5540818,  
**Fax:** 5521197, **Email:** cpdd@mos.com.np

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**Website:** <http://www.narc-nepal.org>

To

Printed at : Arunyodaya Printers & Traders Co-operative Ltd., Teku, Kathmandu