



A Quarterly Newsletter of Nepal Agricultural Research Council (NARC)

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April-June, 2009

18th NARC Annual Day -2009 Celebrated

18th Annual Day of the establishment of Nepal Agricultural Research Council (NARC) was observed with a special function at NARC head office, Singh Durbar Plaza, Kathmandu on May 8, 2009 (Baisakh 25, 2066). The function was inaugurated by Honorable Minister for Agriculture and Cooperatives and Chairman

of NARC Mr. Jayaprakash Prasad Gupta and Chaired by Mr. Shankar Prasad Pande Secretary of Ministry of Agriculture and Cooperatives. Honorable Member of National Planning Commission Mr. Ratneshwor Lal Kayasta was the special guest of the function. The function was attended by the representatives from donor agencies, different government and non-government organizations, agriculture scientists, experts, journalists, farmers, NARC officials and employs.

Executive Director of NARC, Dr. Bharatendu Mishra welcoming all the guests and participants in the function



Honorable Minister for Agriculture & Cooperatives, Mr. Jayaprakash Prasad Gupta and other dignitaries at NARC's Annual Day Program



Honorable Minister for Agriculture & Cooperatives Distributing Plaque to NARC Scientist

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presented the highlights of activities and achievements of NARC in the past years. Mrs. Kamallesh Lata Rajbhandari, retired seed technologist, Mr. Ram Krishna Mahato, Senior Scientist spoke on the behalf of the recipients of honor during the occasion. Dr. Niranjan Prasad Adhikari, Director of Administration conveyed the vote of thanks to the participants. A special Exhibition showing the NARC's activities/achievements was also held on the occasion.

Plaque Distribution: Eighty one NARC employees having completed 25 years of their services were honored with plaque and certificate by the Chief Guest. Ten other NARC employees namely Mr. Ram Chandra Adhikari (S-4), Mr. Ram Krishna Mahato (S-4), Mrs. Neelam

Subba (S-1), Mr. Rajman Mulmi (T-7), Mr. Duryodhan Chaudhari (T-6), Mr. Jagat Bahadur Reshmomagar (A-6), Mr. Raju Pariyar (T-5), Mr. Nanda Lal Dhakal (T-4),

Mr. Ramesh Mahat (A-4) and Mr. Baitulla Kha Pathan (lower level) were given best performance award for their services. From among the agriculture journalist Mr. Prakriti Adhikari of Gorkhapatra Samsathan also received Certificate of Recognition for effectively disseminating the recent technologies developed by NARC through Gorkhapatra Daily. Special honor was also given to two retired agriculture scientists: Dr. Samundra Lal Joshi, entomologist and Mrs. Kamallesh Lata Rajbhandari, seed technologist with offering *Doshalla* for their valuable contribution on agriculture research. Mr. Arbinda Mehata, innovative farmer of Sunsari district and Jeevan Jyoti farmers' group of Dailekh district were also awarded during the occasion for adopting and dissemination of latest agricultural technologies effectively.

On the eve of the 18th NARC Annual Day, a press conference was organized at NARC Headquarters, Ramshahpath on May 7, 2009. In the program, Director of Planning and Coordination Mr. Bhola Man Singh Basnet had briefed about the works and achievements of NARC in the last year and the impacts of the recommended technologies. Journalists from various print and electronic media (radio, FM, Television) had discussion and interactions with NARC Scientists on different issues related to agriculture research and development.

Review and Planning Meeting on Stress-tolerant Rice

Review and planning meeting of the project: *Stress-tolerant rice for poor farmers in Africa and South Asia* (STRASA) was held on 22 May, 2009 at NARC. The objective of the meeting was (i) to review the on-going and completed project activities undertaken at different research stations and (ii) to develop action plan of research and seed multiplication for the year 2009. The inaugural session of the meeting was chaired by Dr. Bharatendu Mishra, Executive Director of NARC. Uma Shankar Singh, Coordinator of STRASA project presented the brief introduction of the project. Technical remarks on various project activities were given by Mr. Bhola Man Singh Basnet, Director Planning and Coordination, NARC. A total of 20 Scientist from NARC, IAAS, Rampur, MoAC, STRASA and IRRI-India Office had participated the meeting. The technical session was chaired by Mr. Bhola Man Singh Basnet, Director Planning and Coordination of NARC. In this session, progress reports of on-going and completed projects and action plan for 2009 were presented from National Rice Research Program, Hardinath, Regional

Agriculture Research Station, Nepalgunj, Regional Agriculture Research Station, Tarahara, Socio-economic Division and IAAS, Lamjung Campus.

Policy Dialogue Meeting on Upland Rice

A policy Dialogue Meeting, Jointly organized by Nepal Agricultural Research Council and International Rice Research Institute (IRRI), was held on 21 June at NARC. The primary objectives of the meeting were (i) to apprise the senior Nepali agricultural policymakers and officials of the outputs and outcomes of the IRRI-led and IFAD-funded research grant project, *Managing Rice Landscapes in Marginal Uplands for Household Food Security and Environmental Sustainability* and (ii) discuss ways and strategies for promoting project-validated technologies and sharing knowledge products among stakeholders. To note, the project was initiated in mid-2005 and will close in September, 2009. The dialog was organized as a part of the project completion process. The principal participant was Mr. Shankar Prasad Pandey, Secretary and Dr. Hari Dahal Joint Secretary of MoAC. The Department of Agriculture was represented by Director General Phulgen Pradhan and Deputy Director Generals, Program Directors, and chiefs of various organizational units within DOA. NARC was represented by Executive Director Dr. Bharatendu Mishra, Directors, Chief of Technical Division and Coordinator of National Rice Research Program. The dialog was also joined by Project Coordinator Dhan B. Shrestha, representing the IFAD investment project *Western Upland Poverty Alleviation Project* (WUPAP). Mr. Ram Baran Yadav of NARC and Mr. Bishnu Adhikari of the Institute of Agriculture and Animal Science represented project researcher collaborators while Drs. Noel Magor, Hari Gurung and Bhaba Tripathi represented IRRI and the project.

In addition to presentations by various parties, a short video, *Hope for the Uplands*, which highlighted validated rice varieties and technologies, was shown to the participants. Mr. Shanker Pandey, Secretary of MoAC asked participants to come up with implementable and pragmatic proposals for wider dissemination of project-validated technologies and knowledge products through the DoA. The Secretary also apprised the participants of his recent visit to the community-based farmer seed producer group of the project at Lamjung field research site and expressed his satisfaction over the developments there.

The DoA acknowledged the onus for wider dissemination of the validated technologies and knowledge products. The dialog identified the dissemination of the technologies and knowledge generated through the Training Directorate of DoA and uploading of knowledge products, such as fact sheets, on the Nepal-IRRI Rice Knowledge Bank for wider access through Internet.

Director of Crops and Horticulture, NARC also indicated the possibility of research and extension organizations working together at NARC's outreach research sites and contemplated model villages in future.

Seminar on Trout Fish Farming

Fisheries Research Division, Godavari and Agro-enterprise Centre (AEC) jointly organized a seminar on Trout Fish Farming under One Village One Product (OVOP) program on 10th of June 2009 at Godhavari in the chairmanship of the Executive Director of NARC, Dr. Bharatendu Mishra. More than 30 participants representing NARC, Ministry of Agriculture and Cooperatives, Ministry of Industry and Commerce, National Planning Commission and farmer groups had attended the seminar. Two technical papers namely *participatory hatchery management* and *feed management for rainbow trout* were presented at the seminar by the scientists of Fisheries Research Division.

Rainbow trout fish is one of the commodities selected under OVOP program in Nuwakot and Rasuwa district. The program has set the target of producing 400 metric tones of table fish within the period of 3 years from Nuwakot and Rasuwa districts. The program has helped four trout farmers in the year 2063/64 and two in the year 2064/65 in Nuwakot district to produce fingerlings in their own raceways. Technical support has been provided to farmers by Fishery Research Division (NARC). District Agricultural Office and Nuwakot Chamber of Commerce and Industry have been providing all other administrative support to the program under direct supervision of Ministry of Agriculture and Cooperatives and the OVOP Secretariat, AEC/FNCCI.

Fisheries Research Division of NARC has developed technologies on breeding, hatchery management and feed formulation for rainbow trout. Under OVOP program these technologies are being disseminated to trout farmers of Nuwakot and Rasuwa districts. As a result, some of the farmers of these districts have started producing trout feed and fingerlings for their own use as well for supplying to nearby areas. The trout feed formulation prescribed by Fisheries Research Division for table and mother stock trout fish is presented in Table 1 and 2.

Following constraints associated with production of trout feed were identified in the seminar:

- Variation in the quality of raw materials
- Inadequate knowledge among farmers on feed formulation and quality maintenance
- Lack of laboratory facility for quality testing of trout feed
- Storage problem and quality losses during storage
- Lack of extrusion technology

- Lack of qualified manpower in private sector
- High price for protein supplementation
- Insufficient infrastructure to fulfill ever growing demand of trout feed.
- Weak feed supply system

The participants of the seminar made following recommendations regarding quality trout feed production in private sector:

- Establishment of laboratory for quality test of trout feed
- Trainings to farmers on feed preparation and storage
- More research is needed to reduce the cost of protein in feed
- Establishment of bigger trout feed industry preferably through farmers' cooperative

Table 1. Formulation of feed for table purpose trout fish

Ingredients	Ratio	Protein %	Protein obtained (%)	Cost/kg feed (Rs)	Cost %
Prawn fish	20	40	8	28.75	41.4
Roasted soybean	35	45	15.75	30.80	44.4
Wheat flour	22	12	2.64	4.80	6.9
Rice bran	12	13	1.56	1.95	2.8
Mustard cake	9	31	2.79	1.60	2.3
Vitamin/mineral	2			1.50	2.2
Total			30.74	69.40	100

Table 2. Formulation of feed for breeding stick fish

Ingredients	Ratio	Protein %	Protein obtained (%)	Cost/kg feed (Rs)	Cost %
Prawn fish	30	40	12.00	43.70	52.9
Roasted soybean	35	45	15.75	30.80	37.3
Wheat flour	17	12	2.04	3.80	4.6
Rice bran	10	13	1.30	1.650	2.0
Mustard cake	6	31	1.86	1.12	1.4
Vitamin/mineral	2			1.50	1.8
Total			32.95	69.40	100.0

Workshop on E-village

A one day workshop on Electronic Village in Kavre (E-village in Kavre) was held at Information Technology Park, Banepa, Kavre on 20 May, 2009. The main objective of the workshop was to share the experiences among different stake-holders regarding benefits and multiple uses of E-village proposed to be established in Kavre district. .

The workshop was participated by senior officials of High Level Commission for Information Technology (HLCIT) senior members of Computer Association of Nepal (CAN), Vice-chairman of Kathmandu University, Joint Secretary of Ministry of local development, Joint Secretary of Ministry of Agriculture and Cooperative, Technical Officer of Communication, Publication & Documentation Division of NARC, FNCCI and other local agencies. In the workshop three technical papers

were presented on E-education, E-medicine and E-agriculture and various comments and suggestions were provided on the papers by the participants. The Workshop was inaugurated by the chief guest Honorable Minister for Science & Technology Mr. Ganesh Sah and chaired by Mr. Manoj Man Bhattarai, chairman of High Level Commission for Information Technology (HLCIT).

Interaction on Gray Leaf Spot Disease of Maize

One-day technical interaction program on gray leaf spot disease of maize was organized by Plant Pathology Division of NARC on 10th of April, 2009 at Khumaltar. The objective of the interaction program was to create



Grey Leaf Spot Disease of Maize

awareness among the stakeholders about the threat of this disease in maize farming in the hills of Nepal and provide technical inputs on disease management. Lalita Kingring, member of Constituent Assembly from Kavrepalanchok district was the chief guest in the interaction program. A total of 81 participants from NARC, DOA, CIMMYT, NGOs, Farmers and District Agriculture Development offices of Kavrepalanchok, Lalitpur and Kathmandu had attended the interaction program. On this occasion, Gyanu Manandhar, Senior Scientists from Plant Pathology Division had presented a technical paper covering all aspects of the disease.

Grey leaf spot disease caused by fungus, *Cercospora zeaemaydis* was first time reported in September, 2006 from Dhungharkha-8, Kavrepalanchok district. At present, the disease has also been reported from Illam, Terathum, Dhankuta, Khotang, Dolakha, Lalitpur, Bhaktapur and Kathmandu districts. In some cases yield loss due to this disease in local varieties is reported as high as 75 percent. Maize plants at higher than 1400 m altitude are severely affected by this disease. But the effect of the disease is less on maize planted in early season and at lower elevations. Since the disease can be easily spread by wind, it may infect in other hill districts of the country if proper management techniques are not applied effectively. Maize varieties, Manakamna-3, Deuti and Ganesh-1 have been found less affected by this disease.

Management of Rootknot Nematode Disease in Tomato through Grafting Technology

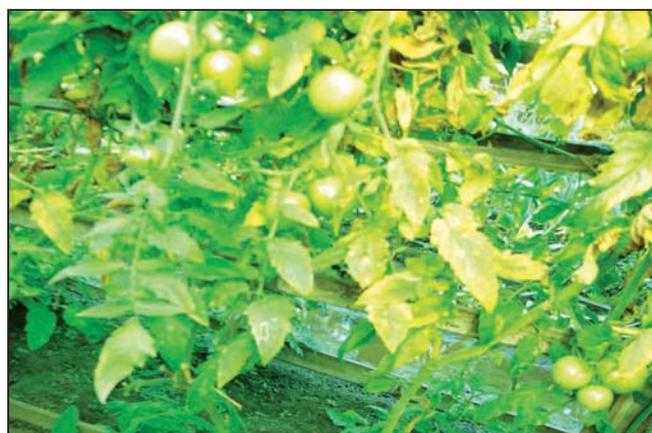
Dr. RD Timila, S. Baidya and RB. KC

Off-season tomato cultivation is one of the income generating enterprises for Nepalese farmers. At Hemja, Kaski tomato cultivation under plastic tunnel has become a popular source of income for livelihood of the farmers. With intensive monoculture of tomato under plastic tunnel outbreak of various diseases has been resulted causing huge economic losses. Among various diseases, root-knot nematode caused by *Meloidogyne* spp. is the major one for tomato cultivation under plastic tunnel at Hemja, Pokhara and different locations of Kaski and Syangja districts.



Grafted tomato Seedling ready for transplanting

Root-knot nematode generally damages the root system of the plants making galls as well as inhibiting the growth of the root tips. The gall in root disturbs the absorption of nutrients and water from soil. Four different species, *Meloidogyne incognita*, *M. arenaria*, *M. hapla* and *M. javanica* have been reported to infect tomato in Nepal. As revealed in the interaction with the growers of Hemja, approximately 30% yield reduction has been caused by rootknot nematode under plastic tunnel.



Grafted tomato Plant at Fruiting Stage



Nematode-free roots of grafted plant



Nematode galls on roots of non-grafted tomato plants

In other countries, various bio-agents such as *Trichoderma* spp. and *Paecilomyces lilacinus*, and the fumigating chemicals such as Methyl bromide, Carbofuran and Chlopicrin are used to control root-knot nematodes. But it is difficult to have satisfactory level of control.

Recently grafting technology has been introduced for the management of bacterial wilt and root knot nematode of tomato in Nepal. Research was started in 2007 at Plant Pathology Division, Khumaltar. Grafting of desirable susceptible tomato variety in resistant root stock of wild eggplant (*Solanum sisymbriifolium*) has been appeared to be potential option for the management of root knot nematode at Hemja. Test was conducted in one of the plastic tunnels infested with root-knot nematode at Hemja during 2008 season. Tomato plants grafted on wild eggplant were compared to non-grafted plants on nematode infection and yield (Table 1) The technology appeared to be promising in controlling root-knot nematode and also it could be used as one of the component of organic solanaceous vegetable cultivation in such disease prone areas. Popular tomato variety at Hemja, *Theme 16* was grafted

on root stock of wild eggplant at Horticulture Research Center, Malepatan Pokhara. Root galling was indexed from 0-10 scale as described by Bridge and Page (1980) where 0 was given for healthy root system without infection and 10 for all root severely knotted and plant usually dead. Five grafted plants and equal number of non-grafted plants were scored for the galls in root system. Fruit yield of both types of plants was also recorded at harvesting. As shown in table 3, grafted plants were free from root knot nematode. The galling score for the non-grafted plants was 6 showing numerous knots in root system. Harvesting period in grafted plants was also longer than in non-grafted plants. Fruit yield was increased by 33 percent over non-grafted plants (Table 3). Here shorter harvesting duration in non-grafted plants was due to death of plants by severe root galling by nematode.

The technology showed great potential in managing root-knot nematode and bacterial wilt diseases. Several farmers have already started to adopt this technology for the management of root-knot nematode disease under plastic tunnel condition. However, our study is in continuation for verification of the result in replicated plastic tunnels. At the same time, this technology is also under test for Bacterial wilt disease management of Solanaceous vegetables.

Table 3. Difference in root-knot severity and yield in grafted and non-grafted tomato

Treatment	Nematode severity (0-10 scale)	Fruit yield in 5 plants (kg)	yield increase over non-grafted (%)	Harvesting period
Grafted	0.0	30.70	33.47	30 weeks
Non-grafted	6.0	23.00		25 weeks

Intergovernmental expert meeting on zero energy cold storage

At the Fourth Meeting of the Technical Committee on Agriculture and Rural Development (*New Delhi, 8-9 January 2008*) of SAARC, Nepal submitted a Concept Paper/Project Proposal on “Scaling up of Zero Energy Cold Storage Technology for the Horticultural

Commodities in the Hills of SAARC Countries”. At the Special Session of the TCARD (*New Delhi, 3 November 2009*) Nepal circulated a revised Proposal, as a sub-regional project (covering Afghanistan, Bhutan, India, Pakistan, Nepal). Delegations agreed that Nepal would modify the

Project further to cover testing and skill development in the interested SAARC countries; and organize an inter-governmental meeting to discuss the revised project document in March 2009. This would then be finalized at the Fifth Meeting of TCARD. Pursuant to the above, the Government of Nepal convened an Inter-governmental Experts Meeting in Kathmandu on 26 May 2009 to discuss and finalize the Project.

The Meeting was inaugurated by Dr. Shankar P. Pandey, Secretary, Ministry of Agriculture and Cooperatives, who emphasized the significance of holding this important meeting. He appreciated the Scientists, who broached this idea and prepared the project document in connection with this Meeting. The leader of the delegation of the host country Nepal, Dr. D. P. Sherchan, Director (Crop & Horticulture), NARC was elected the Chairperson of the Meeting by acclamation. Dr. Madhusudan Ghale, Chief of Horticulture Research Division of NARC welcomed the delegations attending the Meeting. Mr. K.B. Poudel, Senior Scientist of HRD, NARC briefed the session on the objective of holding this meeting. As the representative of the Secretary General of SAARC, Mr. Riaz Hamidullah, Director of the SAARC Secretariat opened the meeting. A total of 22 representatives from Afghanistan, India, Nepal and Pakistan attended the Meeting.

Nepal made a presentation on the project, especially drawing on its national experience at the meeting. The meeting had a through discussion on the technical, management and implementation aspects of the proposed project. The meeting also noted that a number of participating member states are already utilizing Zero Energy Cold Storage (ZES) principles at facilities at grassroots level over past years and are convinced of the utility and benefits of ZES facilities. The meeting agreed on the viability of the ZESs in the Member States. Following detailed discussions, the meeting thus agreed that on the basis of the following observations, as also various technical aspects underlined by the delegations, Nepal Agriculture Research Council (NARC) would submit an updated Project to the Fifth Meeting of TCARD for its final consideration:

- NARC would immediately initiate interaction with the identified country collaborating institutions, respective NARS system; and confirm respective country location where 2 – 3 ZES facilities could be constructed. The ZES locations are to be finalised in consultation with the country collaborating institutions;
- Each country would also confirm the primary product/commodities that it intends to cover through the proposed ZESs in the established facilities;

- All Member States, except for Afghanistan, agreed to have the ZES facilities of 24 Ton capacity in order to harness optimum benefit. Delegation of Afghanistan conveyed their preference for ZES facilities each having five ton capacity;
- Some modifications of the Prototype of the ZESs, depending upon the local conditions, availability of local materials/commodities, etc. may be required;

International News

Golden Rice: According to an article published in current issue of the American Journal of Clinical Nutrition, four units of beta-carotene from Golden Rice convert to one unit of vitamin A in humans. Researchers determined this by feeding five healthy adults a specific amount of specially-labeled Golden Rice and measured the amount of retinol, a form of vitamin A, in the blood. Additional research is necessary before Golden Rice is made commercially available. The next step of the research includes incorporating this technology into the rice grains found in various regions and continuing testing the conversion rate. The beta-carotene in Golden Rice converts to vitamin A in humans. Golden Rice was developed in the early 1990s with the grant from the Rockefeller Foundation with the goal of increasing rice that had beta-carotene – a vitamin A precursor- in the rice grain. In its current form Golden Rice contains 35 micrograms of beta-carotene per gram Vitamin A deficiency affects over 200 million children and women and about 500 thousands children go blind every year in the world (Source: ScienceDaily, May 13,2009) .

Orange Cauliflower: The researchers from Cornell University have recently identified the genetic mutation behind the development of orange cauliflower. While orange cauliflower may seem unappealing to some, it has distinct nutritional advantages. The findings may lead to more nutritious staple crops, including maize, potato, rice sorghum and wheat. The genetic mutant recently isolated allows the vegetable to hold more beta-carotene which causes the orange color and is a precursor to the essential nutrient vitamin A. While normal cauliflower and many staple crops have the ability to synthesize beta-carotene, they are limited partially because they lack ‘metabolic sink’ or place to store the compound. The research provides a possible new technique for genetically modifying staple crops to increase their ability to store beta-carotene and increase nutritional content in the staple crops. Other researchers have created ‘Golden Rice’ by inserting several genes that increases synthesis of beta-carotene. But this technique has proved less effective in many plants. Present research in orange cauliflower which increases a plant’s ability

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TRAINING, WORKSHOP / SEMINARS, STUDY AND TOURS (April – June, 2009)

SN	Name	Position	Office	Subject	Duration	Country
1	Mr. Rajendra Pandit	A-6	NARC	Masters in International & Development Economics	April 1, 2009-Sep. 30, 2010	Germany
2	Mr. Kamal Sah	S-4	SSD, Khumal	Documentation & Dissemination of Sustainable Land Management	April 6-11, 2009	Nepal
3	Mr. Srimat Shrestha	S-4	AED, Khumal	Documentation & Dissemination of Sustainable Land Management	April 6-11, 2009	Nepal
4	Mr. Tirtha Raj Pokharel	T-7	HRD, Khumal	Advance in Vegetables & Vegetable Legumes Breeding	April 27-May 2, 2009	India
5	Mr. Nutan Raj Gautam	T-7	NWRP, Bhairahawa	Phenotyping for Physiological Trait Base Breeding	April 13-May 8, 2009	Mexico
6	Mr. Naresh Sing Thakur	S-4	SARPOD, Khumal	Support Economist for Impact Study-Final Report	April 11-30, 2009	Bhutan
7	Mr. Surya Narayan Sah	S-4	NRRP, Hardinath	Cereals Systems Initiative for South Asia (CSISA)	April 23-24, 2009	India
8	Mr. Krishna Kumar Mishra	T-7	RARS, Nepalgunj	PhD	2066/01/05-2069/01/04	India
9	Mr. Madan Raj Bhatta	Coordinator	NWRP, Bhairahawa	1-2 Meeting CSISA, India	April 27-29, 2009	India
10	Dr. Dil Prd. Sherchan	Director	Crop & Horticulture	1-2 Meeting CSISA, India	April 27-28, 2009	India
11	Dr. Bharatendu Mishra	ED	NARC	1-2 Meeting CSISA, India	April 27-29, 2009	India
12	Mr. Janmejy Tripathi	S-4	NWRP, Bhairahawa	1-2 Meeting CSISA, India	April 27-29, 2009	India
13	Dr. Ananta Prd. Regmi	S-4	NWRP, Bhairahawa	1-2 Meeting CSISA, India	April 27-29, 2009	India
14	Mr. Kailash Prd. Bhurer	S-4	RARS, Parwanipur	1-2 Meeting CSISA, India	April 27-29, 2009	India
15	Mr. Dil Bdr. Gurung	Coordinator	NMRP, Rampur	1-2 Meeting CSISA, India	April 27-29, 2009	India
16	Mr. Ganesh Sah	Chief	AIRS, Ranighat	1-2 Meeting CSISA, India	April 27-29, 2009	India
17	Mr. Mishri Lal Sah	Coordinator	NRRP, Hardinath	1-2 Meeting CSISA, India	April 27-29, 2009	India
18	Mr. Dinesh Pariyar	Director	Livestock & Fisheries	Grass Land Fodder	May 4-12, 2009	India
19	Mr. Kishor Kumar Shrestha	Chief	PFRD, Khumal	Grass Land Fodder	May 4-12, 2009	India
20	Dr. Ananda Kumar Gautam	Chief	AEU, Khumal	Workshop on Building Climate Resilience in the Agriculture Sector	May 14-15, 2009	Philippines
21	Dr. Renuka Shrestha	Coordinator	NGLRP, Rampur	National Grain Legumes Improvement Program	May 17-22, 2009	Syria
22	Mr. Siddhi Jevan Bhusal	S-1	Ent. Davison,	Training in RBPR in Foods & Vegetables for Market Inspection & Farm Education	May 18-22, 2009	Taiwan
23	Mr. Bholu Man Singh Basnet	Director,	Planning & Coordination.	CURE Annual Meeting	May 27-29, 2009	Vietnam
24	Mr. Bal Krishna Joshi	S-1	Biotech. Unit	Ph.D.	May 31, 09-May30, 2012	USA
25	Mr. Ganesh Sah	Chief	ARS, Ranighat	Laser land leveling training	June 5-9, 2009	India
30	Dr. Doj Raj Khanal	S-4	AHRD, Khumal	International Symposium	June 8-11, 2009	Austria
31	Mr. Krishna Hari Ghimire	T-6	RARS, Lumle	M. Sc. Ag. Plant Breeding	June 9, 09-June 8, 2011	Philippines
32	Mr. Ajaya Shree Ratna Bajracharya	T-6	ARS, Pakhribas	Strengthening bio-control research & extension	June 15-26, 2009	Thailand
33	Mr. Suraj Baidya	T-6	PPD, Khumal	Strengthening bio-control research & extension	June 15-26, 2009	Thailand
34	Mr. Manas Kumar Kandel	Chief	Finance, NARC	Computer Based Accounting Training	June 22-Sept.21, 2009	Nepal
35	Mr. Dev Raj Dhakal	A-7	NARC	Computer Based Accounting Training	June 22-Sept.21, 2009	Nepal
36	Mr. Tilak Bdr. Shrestha	A-7	NARC	Computer Based Accounting Training	June 22-Sept.21, 2009	Nepal
37	Mr. Suresh Kumar Wagle	S-4	FRD, Godawari	10th International symposium on genetics in aquaculture	June 22-26, 2009	Thailand
38	Mrs. Neeta Pradhan	S-1	FRD, Godawari	11th International symposium on genetics in aquaculture	June 22-26, 2009	Thailand

to store beta-carotene, may offer an alternate and complementary technique for making staple crops more nutritious (Source: ScienceDaily, June 4, 2007)

Bio-fuel: Scientists in California have reported use of a first-of-its-kind approach to craft genetically engineered microbes with the much-sought ability to transform switchgrass, corn cobs, and other organic materials into methyl halides-the raw material for making gasoline. The new bioprocess could help pave the way for producing bio-fuels from agricultural waste, easing concerns about stress on the global food supply from using corn and other food crops. Using the database of 89 genes from plants, fungi and bacteria known to produce methyl halides, the researchers identified genes that were the most likely to produce the highest levels of these substances. The scientists then spliced these genes into Brewer’s yeast – used to make beer and wine so that the yeast cells churned out methyl halides instead of alcohol. In laboratory studies, the two engineered microbes helped boost methyl halide production from switchgrass, corn cob husks, sugarcane waste and poplar wood to levels with commercial potential (Source: American Chemical Society, May 13, 2009; *Advance Toward Producing Biofuels Without Stressing Global Food Security*).

Exposure to pesticides: A study involving 678 individuals who apply pesticides, culled from a U.S. Agriculture Health Study of over 50,000 farmers, recently found that exposure to certain pesticides doubles one’s risk of developing an abnormal blood condition called MGUS (monoclonal gammopathy of undetermined significance) compared with individuals in the general population. The disorder, characterized by an abnormal level of a plasma protein, requires lifelong monitoring as it is a pre-cancerous condition that can lead to multiple myeloma, a painful cancer of the plasma cells in the bone marrow. The research article was published in *Blood* (June 18, 2009), the official journal of the American Society of Hematology.

Media People Visit to HMRP Sites

A seven member team of Media Personnel led by Mr. Manoj Kumar Thakur, Technical Officer of Communication, Publication & Documentation Division, NARC visited the Hill Maize Research Project (HMRP) sites of Baglung, Palpa and Syangja districts from 10-17 June, 2009. The team observed the HMRP research and community based seed production activities undertaken at farmers’ fields of different locations and interacted with various farmers groups.

Variety improvement and quality seed production of maize are the two major components of HMRP program.



Media People with Women Maize Seed Growers

With the support of this project several varieties of maize like Deuti, Shitala, Manakamana-3, Manakamana-1, Hill Pool Yellow, Hill Pool White, Manakamana-4

and Poshilo Makai-1 have been already released by NARC. At present, major focus has been given on seed production of released varieties at research stations and community level.

Hill Maize Research Project was initiated in Nepal in 1999 and its first phase was completed in 2002. The second phase was started in 2003 and ended in 2007. The third phase that started in 2008 will be completed on 2010. The HMRP has been working closely with the maize growers through partnership and adopted inclusive participatory approaches while implementing field activities. While implementing the programs the project has also appreciated the complexity of the bio-physical and socio-economic constraints prevailing in Nepal such as difficult terrain, fluctuating environment and exclusion of *dalit*.

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