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Summer crop workshop

Nepal Agricultural Research Council organized the 26th National Summer Crop Workshop on March 3-5, 2010 at National Maize Research Program, Rampur, Chitawan. Mrs. Karina Begum, Hon. State Minister for Agriculture and Cooperatives inaugurated the workshop. Dr. Subodh Narayan Jha, Hon. Member of National Planning Commission was also present in the workshop as a special guest. The



Hon. State Minister Mrs. Karina Begum inaugurating Summer Crop Workshop at NMRP, Rampur

ceremony of the workshop was chaired by Dr. Bharatendu Mishra, Executive Director of NARC. More than 100 researchers from different disciplinary divisions and research stations actively participated the workshop. More than 80 research papers related to variety improvement, crop husbandry, plant protection, and

socio-economic of rice, maize, summer legumes, summer oilseeds, jute and finger millet were presented in the workshop. In the final day of the workshop three groups namely genetics and breeding, plant protection, agronomy; soil science and socioeconomics were formed to review the presentations. Each group presented the recommendations in the plenary session. Participants of plenary session critically analyzed the group presentations and made final recommendations as given below:

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Workshop on Dairy Cattle Improvement

Dairy Cattle Improvement Project (DCIP) organized a one-day workshop on 17 March, 2010 in Kathmandu under the chairmanship of Dr. Prabhakar Pathak, Director General of Department of Livestock Services. The objective of the workshop was to review the achievements of the project. Mr. Nathu Prasad Chaudhary, Secretary, Ministry of Agriculture and Cooperatives was the Chief Guest of the workshop. Executive Director of NARC Dr. Bharatendu Mishra, Joint Secretary of MOAC and NARC Directors were also present in the workshop. Representatives from Dairy Industries, NGOs and farmers groups involved in livestock development also had active participation in the workshop.

While addressing the workshop Secretary of MoAC Mr. Nathu Prasad Chaudhary pointed out that at present milk availability in Nepal is only 150 gm/day/person against the minimum requirement of 250 grams. He also made commitment on behalf of MoAC to provide all possible support to public-private partnership programs on cattle and buffalo breed improvement which is very vital for increasing milk productivity in the country. Senior Scientist of Animal Breeding Division Mr. Bhola Shankar Shrestha and Technical Advisor of the project Dr. Nanda Prasad Shrestha presented the preliminary results, lesson learnt and problems encountered during project implementation. The Dairy Cattle

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Recommendations

Rice

- Genotypes for immediate release:
Spring season: NR274-10, Kachorwa Dhan-4
Boro Season: BIRRI Dhan-38
Rainfed, lowland, early: NR 1824
Rainfed, lowland, medium: NR 1190
Aerobic (Rainfed): IR 80411B-49-, B 6144FMR-6
Irrigated normal: BM 9958
Fine and aromatic: IR 70422
Upland: B 6149F-MR7
Warm temperate: NR 10492-7, NR 10515
Cold temperate: NR 10582 B
- Pipeline elite genotypes:
Spring season: IR 51656-2k, WAT 307
Boro Season: BR-36, DR-11
Rainfed, lowland, early BG 358, RP 2439
Rainfed, lowland, medium: NR 1893, NAVEEN
Irrigated normal: SPR 85163, RHS 379
Fine and aromatic: IR 6701
Upland RR 166-224
Warm temperate: NR 10490, NR 10600
Cold temperate: NR 10479, NR 10695
- Planting at 20x30 cm spacing and alternate irrigation (3-4 days interval) found effective in Brown Plant Hopper management with yield increase by 28%

Maize

- Open pollinated genotypes for immediate release:
For hills: S99TLYQ-B (Y-QPM), Arun-4 (Early Yellow)
For Terai, Inner Terai and Foothills: Arun-1 EV
- Hybrid genotypes for immediate release: NML-4/NML-2
- Elite OP pipeline genotypes for recommendation and release:
For hills: BGPYP, across 9942/across 9944
For Terai/Inner Terai & foothills: Pool, 15, Pool-17, Across 9331
- Hybrid pipeline genotypes for future release:
Single cross for Terai: RML-3/RML-2, RL111/RL-189, RML-57/RL-174, NML-1/RML-6

Top cross for Terai: RC/RML-8, Arun-1/KWM-5
Top cross for hill: Deuti/Khumal white maize 36, Mana-3/KWM-5

- *Metarhizium anisopliae* found effective to control white grubs up to 75% under laboratory condition
- Shade dried leaf + stem powder of *Sambucus hookeria* and *Carum copticum* grain powder @ 70 g per kg found effective against grain moth and *Sitophilus* weevil in maize cob
- Pool 15, Across 9331, Arun-2, Rampur composit found tolerant to Maize stem borer
- Manakamana-6, Manakamana-5, Mankamana-1, Ganesh-2 found resistant to maize weevil in storage condition
- Sole neem leaf compost + dung compost (1:1) @ 1 kg/m² found up to 76% effective against cut worms
- Maize genotypes S99TLYQ-AB, SOOTLYQ-B, Bioseed 9681, RML-18 x RML-17, EEYC1 & POP-45 C1 found resistant to maize stem borer (*Chilo partellus*)
- Occurrence of Grey Leaf Spot (GLS) disease recorded first time in Nepal with up to 19 % yield losses in the hills. Fungicide spray has been found effective to control it.
- Four early maturing maize genotypes identified moderately resistant against Northern Leaf Blight (NLB)
- Seven full season maize genotypes identified moderately resistant against NLB

Finger Millet

- Genotypes for immediate release for mid and high hills: GE-5016
- Eight finger millet genotypes have been found superior on agronomic characters and resistant to blast disease.
- Eleven finger millet genotypes found resistant to *Cercospora* leaf spot

Buckwheat (Common)

- Genotypes for immediate release for mid hill: IR 13
- Elite pipeline genotypes: GF 5289

Buckwheat (Tartary)

- Genotypes for immediate release for mid hill: Acc # 2223

Jute

- Genotypes for immediate release for upland, eastern Terai: TRO-524
- Elite pipeline genotypes: KEN-DS-058, KEN-DS-06C

Pigeonpea

- Genotypes for immediate release: ICP 7035 (Long duration for western Terai), ICPL 86005 (mid duration for central Terai)
- Pipeline genotypes: Acc # 8661, ICPL 88039, Dhanusha local

Soybean (seed type):

- Genotypes for immediate release: PK 327 9 for Terai and mid hills and suitable for industrial use
- Promising pipeline genotypes: Kavre local, LS-77-16-16, CM 9106, Changmow 60-63

Soybean (Vegetable type)

- Promising pipeline genotypes for mid hills: AGS 351, AGS 352

Blackgram

- Promising pipeline genotypes for Terai and mid-hills: BLG 0003-2-1, BLG 0076-2, BLG0068-2, BLG0067-1

Mungbean

- Promising pipeline genotypes for Terai: BARI mung, VC 617A

Cowpea

- Promising pipeline genotype for Terai: IT99K-216-2

Groundnut

- Genotypes for immediate release: ICGV91058 (early), ICGV91074 (normal)
- Promising pipeline genotype: ICGV87885, ICGV86339 (early); ICGV91104, ICGV95005 (medium)

Seed related issues

- Resumption and privatization of the seed network for source seed production, distribution and monitoring mechanism is needed
- Physical facilities for source seed production should be strengthened
- Success stories of NMRP/HMRP in Community Based Seed Production (CBSP) should be scaled up in cereals and other commodities for systematic seed production and distribution

Policy related issues

- Proper policy formulation for maize inbreds and its hybrids
- Membership in Hybrid Rice Consortium & International Jute Study Group should be

obtained for germplasm exchange of advanced lines for crop improvement.

- Provision of hiring consultant for hybrid rice technology and establishment of the national team on it
- Institutionalize the responsibility of varietal improvement network of various crops in different research centres under NARC
- Initiate and establish the international collaborative research on oil seeds, jute, barley, finger millet, buckwheat.
- Project accounting system should to be revitalized

International News

Governments 'misjudging' scale of CO₂ emissions: Policy makers in Europe and United States are markedly underestimating the changes needed to mitigate CO₂ emission required to prevent dangerous climate change because they work in 'silos,' according to pioneering research. Dr Sebastian Carney, from The University of Manchester, discovered that the lack of communication between government departments, NGOs and other authorities has resulted in significant differences over who is responsible for what. He presented the report of his work at American Association for the Advancement of Science Annual Meeting on 21 February, 2010 in San Diego. Using special computer software he developed at The University of Manchester, Dr Carney has worked with authorities in England, Scotland and California to troubleshoot the way they calculate emissions reductions. He found that in most cases, they have never sat down and quantified their energy futures in terms of changes in CO₂. The United Nation's International Panel on Climate Change (IPCC) and the European Commission both say a CO₂ reduction of at least 80% on 1990 emission levels by 2050 will be required to limit the average global temperature rise to 2 degrees centigrade. But according to Dr Carney, Governments do not realise the extent of the work needed to achieve the 80 per cent figure because they have not played with their own numbers, policy makers just don't realise the scale of the changes needed to deliver the reductions required.

Source: <http://www.sciencecentric.com/news>

Seeds from the Moringa tree can be used for water purification: Pure water is a key requirement for good health and alternative cheap, safe methods are required in many countries. In a paper that has been published recently in American Chemical Society journal researchers from Uppsala University in co-

operation with The University of Botswana describe how extracts from seeds of the *Moringa oleifera* tree can be used for water purification. Flocculation of particulate impurities is a common first stage in purification of water. This often uses addition of either aluminium or iron salts. Aluminium, particularly, has undesirable health implications. An alternative procedure that uses a natural extract from seeds of the *Moringa oleifera* tree is used in Africa. The research paper describes how very small amounts of the protein from these seeds can bind strongly to surfaces and thus would cause contaminant particles to aggregate. This can be possible by exploiting a powerful technique known as neutron reflection to measure structure and composition of layers of just a few nanometres (millionths of a millimetre) at the interface between a solid and a liquid. The paper provides important insight in to the way that protein molecules from the *Moringa oleifera* seeds interact, binding strongly both to each other and surfaces so as to cause aggregation in to large lumps that are readily removed from the water. Understanding of the process may lead to further development in water purification with materials that are locally available and environmentally friendly.

<http://www.sciencecentric.com/news/>

Genetically engineered tobacco plant cleans up environmental toxin: Researchers from St. George's University of London, U.K have developed a genetically modified strain of tobacco that helps helping keep water sources safe by damaging effects of toxic pond scum, scientifically known as microcystin-LR (MC-LR), which makes water unsafe for drinking, swimming, or fishing. Researchers believe that it may ultimately lead to a reduction in the exposure of humans, livestock, and wildlife to environmental pollutants. To develop this type of tobacco, research team genetically altered a tobacco plant to produce an antibody to MC-LR, by inserting genes which code for the production of this antibody. With the genes in place, the new strain of tobacco produced the antibody in its leaves and secreted the antibody from its roots into the surrounding hypotonic growth medium. When the toxin from MC-LR was added to the plant's surrounding hypotonic growth medium, the antibody bound to the toxin, rendering it harmless. This is the first example of a transgenic plant expressing an antibody that remediates an environmental toxin. Researchers are also trying to develop the technique in more plants in the future to address different environmental problems.

Source: *FASEB Journal* (<http://www.fasebj.org>)

The quality of the tomato depends more on temperature than on natural light: A team researchers from the Basque Institute for Agricultural Research and Development has questioned the generally held belief that the quality of tomatoes depends primarily on their exposure to natural light and states that the most determining factor is temperature. The research opens up great possibilities for starting new plantations in zones where light intensity is low due to weather conditions. The findings are of particular interest in geographic zones where there is frequent cloud cover with low levels of solar radiation. The study evaluated the different indicators for organoleptic (taste and texture) quality and nutritional quality, such as acidity, soluble solids, phenolic compounds, pH and vitamin C content. To this end, the tomato plants were exposed to photosynthetic radiation between 30 and 50% less than the usual for the sunny zones and other tomato plants were exposed to 100% sunlight. Cultivation was carried out on soil, in a greenhouse without artificial heating and shaded in a small area so that air currents were able to homogenise the temperature within the plantation. The results showed that the organoleptic and nutritional quality was very similar between the plants exposed to greater solar radiation and those with less. Another conclusion of the research opens up the possibility of reducing costs of heating, something that researchers in other European countries such as the Netherlands are working on - through the selection of seed varieties that need less energy. Researchers believe that these findings can also be applied to other kinds of fruit with high nutritional value, such as strawberries, cucumbers, melons and watermelons.

Source: <http://www.sciencedaily.com- /releases/>

Potato Working Group Meeting

National Potato Research Program (PRP) under NARC and National Potato Development Program of DoA jointly organized Potato working group meeting on 14-15 March 2010 (Chaitra 1-2, 2066) at Khumaltar. The meeting was attended by more than 40 horticulturists working at different stations under NARC and DOA. Representatives from agro-industry seed production groups were also present in the meeting. The objective of the meeting was to create a common platform for the scientists, extension people, food processing industries and seed producer group in progress review and program planning. The meeting has identified following issues for undertaking potato research and development in future:

- Development of high yielding varieties that are resistant to late blight, PTM (insect) and drought resistant/tolerant, red skin varieties, long storable, suitable for processing (chips, or other processing etc.)
- Identification and conservation of local/indigenous germplasm
- Introduction of late Blight resistant new progenies of TPS (red skinned)
- Low cost TPS cultivation technology
- Development of low cost seed & ware potato production technology with minimum tillage, mechanization, tuber size management
- Recommendation of location and variety specific fertilizers
- Generation of technologies on water use efficiency, weed management and mitigation of climate change (moisture & temperature stress).
- Organic potato production technology for commercial cultivation.
- Development of integrated disease management system in late blight, common scab, powdery scab, bacterial wilt, wart and viruses
- Management technology of PTM, leaf miner, white grub, red ant, aphid, cutworm
- Organic management of Blister beetle in Jumla and Dailekh.
- Improvement of local storage technology, to increase post-harvest shelf-life and value addition and use of growth inhibitors for long term storage
- Sustainable Pre basic Seed production including hydroponic and aeroponic technology.
- Improvement of PBS distribution and utilization mechanism and establishment of seed certification system.
- Initiation of value chain market and socio-economic research.
- Initiation of research on sweet potato.

6th National Horticulture Conference Held

Nepal Horticulture Society (NHS) organized Sixth National Horticulture Conference on 11-12 March, 2009 (27-28 Phalgun, 2066) at Kirtipur. The theme of the conference was “Reformation of horticulture sector for food security in Nepal”. The conference was inaugurated by Hon. Minister for Agriculture and Cooperatives Mr. Mrigendra Kumar Singh Yadav. Addressing the gathering of the conference Minister Yadav stressed the need of best utilizing the agro-ecological and climatic diversity of the country for commercial production of high value

horticultural crops which can contribute to a great extent to achieve government’s development goals of rapid economic growth and poverty reduction in rural area. He expressed satisfaction on the success so far achieved by nation on vegetables, tea, cardamom, ginger and potato production for domestic and export market. However, Minister Yadav showed his concern over heavy dependency of the country on imports of many horticultural commodities such as fruits, spices, onion and garlic and urged the horticulturists to come up with valuable recommendations to increase the production of such commodities. There was active participation of more than 150 horticulturists working in government, non-government and private sector organizations. A total of 12 thematic papers on organizational reform, marketing and development models in horticulture sector were presented in the conference. In the last day of the conference, general assembly meeting of NHS was also organized. The meeting elected nine-member new executive committee for three years period in the chairmanship of Prof. Dr. Gyan Kumar Shrestha.

6th Agronomy Society Workshop Held

The sixth workshop of Agronomy Society of Nepal with the theme “Agronomy for food security” was organized in Kathmandu from 10-11 March, 2010. The objectives of the workshop were (i) to present technical papers related to the agronomic works done across the country (ii) to publish those articles in the first Agronomy Journal of Nepal and (iii) to make policy related recommendations to solve food security problems in the country.

The workshop was inaugurated by the chief guest Mr. Bishnu Prasad Aryal, Deputy Director General, Department of Agriculture. The agronomists affiliated to NARC, DoA and other agencies participated in the workshop. The workshop has identified following reasons for food insecurity in Nepal:

- Low priority of government on agriculture
- Under funded agriculture research
- Very poor functional coordination between research and extension
- Subsidy removal in agriculture inputs
- Inadequate campaign based programs on food crops

- Encroachment of agriculture land for non agricultural purposes
- Muscle drain of agricultural worker
- Inadequate seed management and regulation system for food crops
- Over dependency on donor driven program
- Lack of small farmer friendly agriculture equipments

Participants of the workshop have also come up with the following recommendations:

- Priority should be given to location specific food crops (rice, maize, wheat, finger millet, potato, amaranths, proso millet, oat and buckwheat).
- Emphasis should be given to conserve and promote rain-fed technologies and C₄ food crops.
- Formation of high level food security commission
- Implementation of national seed sufficiency program
- Emphasis of Public Private Partnership program to meet food security regionally and locally.
- Climate change context should be addressed in R & D
- Allocation of at least 5% budget of AGDP for agricultural research and development.
- Urgent revival of minikits and Participatory Variety Selection program by NARC.
- Regularization of source seed production program in NARC with priority.
- Adopt of seed multiplication in generic cycle in package.
- Incorporation of Hybrid seed research and development program in Agriculture policy.

Training on Proposal Writing

Society of Agricultural Scientists (SAS-Nepal), under the MoU between Nepal Agricultural Research Council (NARC) and SAS, has carried out one-day Refresher Training Workshop on Proposal Writing with emphasis on Project Logical framework for NARC researchers. The training workshop was held at Regional Agricultural Research Stations at Tarahara, Khajura and Lumle, and at National Maize Research program, Rampur during February-March, 2010. With objective to study on the current research proposal, to assess present knowledge of researchers and to identify needs of upgrading researchers' knowledge, the training was held right after program planning workshop for fiscal year 2010/11. As

resource persons, two senior NARC scientists had contributed the training through theoretical and practical classes in interactive way.

Since research planning process for coming fiscal year has been already started, the trainees perceived the training program as relevant and useful event. Researchers had got opportunity for improving their research proposal with the help of resource persons at the same time. The participants expressed the need for conducting such refresher courses annually for enhancing the efficiency of NARC research proposal preparation even at the central level.

Participation in Expo

Nepal Agricultural Research Council participated in three different exhibitions organized by various organizations during this period. Publication and technologies developed by NARC were displayed in the exhibitions. Among these exhibitions first was "Birat Expo-2010" organized by *Udhyog Sangathan, Morang* (Chamber of Industries, Morang) from Jan 20-26 at Biratnagar. Regional Agriculture Research Station, Tarahara and other research station of Eastern Development Region had displayed their technological outputs in the Expo.

International Centre for Integrated Mountain Development (ICIMOD) organized "Nepal Day" event from 5-6 March, 2010. As a part of the celebration, ICIMOD organized a knowledge Fare/Exhibition at ICIMOD Complex, Khumaltar on 6th March, 2010. Being a national partner of ICIMOD, Communication, Publication and Documentation Division (CPDD) of NARC joined this exhibition and displayed, disseminated and distributed its products such as technologies, equipments and publication.

CPDD also displayed its technologies in an exhibition organized by All Nepal Women Association (*Akhil Nepal Mahila Sangh*) from 6-8 March, 2010 (Falgun 22-24) at Brikhuti Mandap, Kathmandu. The exhibition was organized on the occasion of 100th International Labor Day.

Training, Workshop/Seminar, Study and Tours

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Improvement Project (DCIP) is being implemented jointly by Nepal Agricultural Research Council and Department of Livestock Services (DLS) with the technical and financial support of FAO in 14 districts of Nepal. The project started in July 2008 and will be completed in June 2010.

The project has initiated monthly milk production records keeping scheme on 5658 improved cows (Jersey, Holstein and Crossbreed) at research stations and farmers' herds. A total of 871 herds were included in the study. Based on milk production



Participatory selection of elite cattle at farmer's herd

capacity a wide range of variation (1-33 liters/day) was noted among the evaluated cows. Average productivity of evaluated cows was 3000 liters per lactation and highest productivity was found as high as 8262 liters. About 15 percent of evaluated cows were high yielding i.e. producing more than 4000 liters of milk in a lactation period of 300 days. A total 2500 such high yielding milking cows have been selected for bull mother. Planned mating (artificial insemination) has been done in selected cows using top bull semen imported from Newzealand. The bulls produced from the planned mating will be maintained in government farms and used for quality semen source for AI programs. The gap in production level of highest producing cows (8200 liters in 300 days) in DCIP herds compared with the national averages of 438 liters/lactation shows the tremendous scope for increasing the productivity of cattle in the country. The average productivity of milk in Asia is 670 liters while world's average productivity is 1000 liters/lactation. According to national statistics there are seven millions cows in Nepal of which only 10 percent are improved/crossbreed.

In the workshop, representatives of dairy industries presented milk demand and supply situation in the

industries. Accordingly, Dairy Development Corporation (DDC) needs 300,000 liters of milk every day but in dry season the corporation is able to collect only 70 percent of its requirements. Likewise Chitawan Dairy requires 150,000 liters of milk per day to run its plant in full capacity but at present the industry is getting hardly 70,000 liters milk a day. Likewise, Sujan Dairy, based in Pokhara has running its factory only in 60 percent capacity due to inadequate supply of milk. In totality, about 300,000 liters less milk is being produced in the country than the national requirement. Based on the lessons learnt from DCIP following recommendations are made for future undertakings:

- All stakeholders have been convinced on important of DCIP to increase milk production.
- For the sustainability of the program NARC and DLS should develop regular projects in line with DCIP from FY 2067/68.
- Two years of project duration is very short for such type of breeding work
- Commitment from all stakeholders is essential for long term breeding project.
- Sincerity of recorders and farmers cooperation is very essential for reliable data development
- Strong and functional linkage between research and extension is an absolute necessary for such work
- Potential genetic resources (mother cows) exit within the country for cattle improvement; top bull semen import may be needed for few years
- Important services like vaccination, drenching fodder and pasture and road improvement should also be provided to the farmers along with breed improvement program
- Private dairy industries and farmers' cooperatives are ready to join hands with government in such endeavor.
- Breed establishment and genetic improvement should be focused on Holstein derivatives (Nepalese Holstein) and Jersey derivatives (Nepalese Jersey)
- Special program is needed for saving potential male calves for semen source
- Market facilities should be created for breeding heifers and young bulls
- Future bulls should be evaluated on the basis of growth, conformity, reproductive disease free status and chromosomal aberration
- Extensive AI in non descript breed (mission upgrading program) should be launched

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