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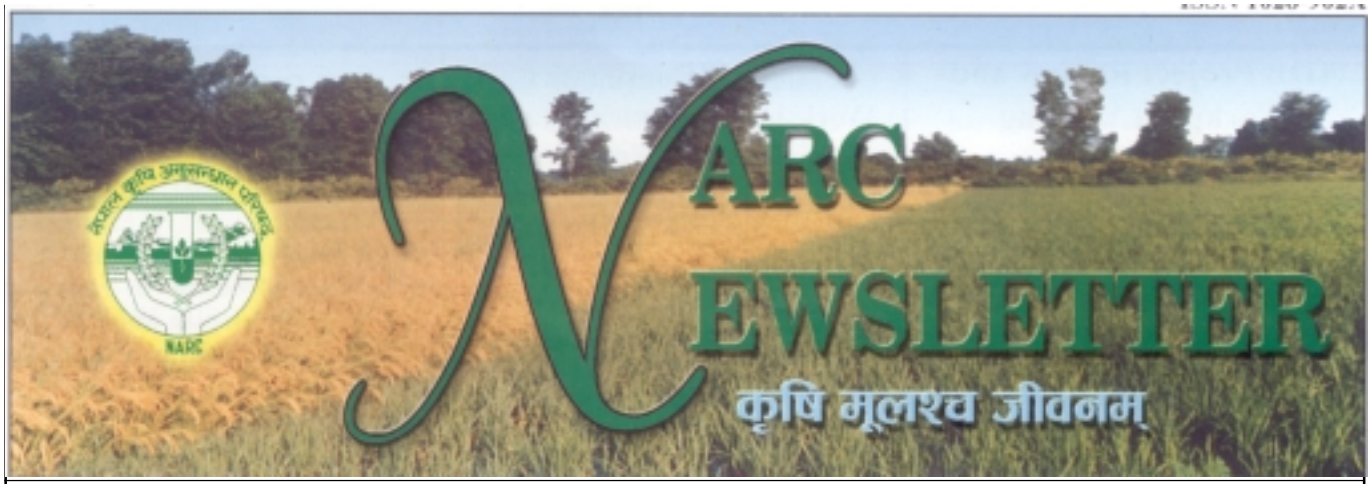

A Quarterly Newsletter of Nepal Agricultural Research Council (NARC)

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RTCC and RSC meetings of Rice-Wheat Consortium Held in Kathmandu

11th meeting of the Regional Technical Co-ordination Committee (RTCC) and 9th Regional Steering Committee (RSC) Executive Meeting of the Rice-Wheat Consortium for the Indo-Gangetic Plains (RWC-IGP) were held in Kathmandu on 4-6 March 2003.

The joint RSC-RTCC meeting was inaugurated by Hon'ble Deputy Prime Minister and Minister for Agriculture Mr. Badri Prasad Mandal in a special session following the RTCC meeting that began the previous day.

The Consortium is a forum composed of partners from the four national programs in South Asia - Bangladesh, India, Nepal and Pakistan that grow wheat after rice . Other members include several international centers including CIMMYT (convening center), IRRI, ICRISAT, CIP and IWMI. There are also a number of advanced institutions including Cornell University, IACR Rothamsted, CABI International, IAC Wageningen and others.

The Consortium is funded through a number of donors including the World Bank, the Dutch, ADB, IFAD, DFID, ACIAR and others. The goal of the consortium is to provide a forum for exchange of ideas and research results related to improving the sustainability and production of the rice-wheat systems of the Indo-Gangetic Plains and Mid-Himalayan hills.

The RTCC meeting covered the presentation of and discussions on reports of the sites in the four countries, project achievements, and technical, financial and other issues. Presentations

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Workshop on Native Cattle and Buffalo

The Animal Breeding Division of Nepal Agricultural Research Council (NARC) organized a workshop on "Native Cattle and Buffalo in Nepal"at Khumaltar on 18 February 2003.

The workshop had the objective to review the past activities on and study of native cattle and buffalo in Nepal and to identify and recommend actions to be taken for their improvement in future.

Following the paper presentations on native cattle and native buffalo, the workshop had an intensive interaction on dairy animal research and development in Nepal with consideration of productivity status, available technologies, constraints and opportunities and recommended actions to be taken in future.

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ISSUE HIGHLIGHTS

Native buffalo (Parkote) found in low to high hills and cattle (Khaila) found in far western region, both suitable for milk and draught

Collaborative Research on Finger-millet

Under the memorandum of understanding (MoU) between M.S. Swaminathan Research Foundation (MSSRF), Chennai, India and Nepal Agricultural Research Council (NARC), the NARC has been implementing the Nepal component of the project on "enhancing the contribution of nutritious but neglected crops to food security and incomes of the rural poor: Asia component-nutritious millets"

The Project is being funded by the International Fund for Agricultural Development (IFAD) through the International Plant Genetic Resources Institute (IPGRI) to MSSRF. The NARC will receive fund from the MSSRF for the implementation of the activities. NARC shall submit to MSSRF six monthly progress reports on program implementation that shall address quantitative and qualitative progress made in implementing activities and achieving its objectives; problems encountered and steps taken to remedy and the proposed program of activities and the statement of expenditure incurred. MSSRF will provide financial and wherever possible technical support in implementing the agreed activities.

For the smooth implementation of Nepal component of the project, NARC has set-up a steering committee (SC) chaired by Executive Director of NARC and consists as members the Directors of Crop and Horticulture; Planning and Coordination; and Finance of NARC; Executive Director of LI-BIRD; Chiefs of Agri-Botany, Agronomy, Outreach Research; and the Coordinator of Hill Crop Research Program of NARC. The Hill Crop Program Coordinator will act as National Coordinator of the project and Member-secretary of the SC and will be responsible for overall coordination of the project. The SC will approve all the work plan, activities and budgets for the project implementation, provide technical back-up on methods and analysis, and monitor project output.

The MSSRF, a non-profit trust was established in 1988 whose major aims are: first, to integrate the principles of ecological sustainability with those of economic efficiency and social equity in the development of farm technologies; second, to undertake the blending of traditional and frontier technologies in a manner opportunities for skilled jobs in the farm and non-farm sectors improve in rural area; and third, to develop and introduce technology and knowledge to derive full benefit from technological progress.

NARC – IPGRI signed MoU

Concerning the Nepal Country Components of the two global projects "Strengthening the Scientific Basis on *In-Situ* Conservation of Agricultural Biodiversity" and the "Genetic Resources Policy Initiative", Nepal Agricultural Research Council (NARC) and International Plant Genetic Resource Institute (IPGRI) signed a memorandum of understanding (MoU) on 24 January 2003 in Kathmandu.

In the MoU signed for a period of four years, it is mutually agreed that NARC and IPGRI will collaborate with respect to the Nepal components of the two projects following the terms and conditions set separately.

The MoU was signed by Executive Director of NARC, Mr Raghunath Prasad Sapkota and Director General of IPGRI, Dr. G.C. Hawtin. IPGRI is an International Agriculture Research Institute with a mandate to advance the conservation and use of plant genetic resources for present and future generation. NARC is an autonomous National Institute responsible for agricultural research and outreach in Nepal, including the conservation of agricultural biodiversity and use of that diversity to improve farmers' well being.

For the *In-situ* Project that began with earlier MoU in 1997, NARC undertakes for a set-up of National Project Steering Committee (NPSC) chaired by the Executive Director of NARC that consists of the Director for Crop and Horticulture Research, Director of Planning and Coordination, Chief of Agriculture Botany Division of NARC, a gender representative, an NGO representative and a representative from IPGRI Regional Office for Asia, the Pacific and Oceania (APO) in Malaysia. Representatives from Ministry of Agriculture and Cooperatives, National Agro-biodiversity Committee (NABC), Department of Agriculture and farmers will also involved as members of the NPSC that will approve all work-plans, activities and budgets for project implementation, provide technical back-up on methods and analysis, and monitor project output. IPGRI will provide global coordination to the project through the inputs of an *In-situ* conservation scientist based at its Headquarters in Rome and technical and administrative support from its Regional office in Malaysia.

For the second project "GRPI" – Nepal component" that is in pilot phase, NARC will coordinate forming a small, multi stakeholder task force that will oversee the completion of a survey of national stakeholders' opinions about what national genetic resources policy issues are most important to address and where they feel resources should be dedicated to research and capacity building activities to address those issues. It will also develop questionnaire conduct interviews analyze the results, organize a national, multi-stakeholder, multi-sectoral workshop to identify key elements to be included in proposal(s) for potential post-pilot phase follow-up work supported GRPI in Nepal. The task force consists of National Project Coordinator as Chairman (NARC) and members represented from NARC, IPGRI Regional Office for Asia, Ministry of Forest and Soil Conservation, Ministry of Agriculture and Cooperatives. Different government and non-government organizations.

Workshop on Lentil held in Kathmandu

The Workshop on Lentil Improvement in South Asia was held in Kathmandu on 24-28 February 2003 to review the progress in lentil research and development and recommend for future research work.

The workshop was jointly organized by Nepal Agricultural Research Council (NARC) and Australian Centre for International Agriculture Research/ Center for Legumes in Mediterrian Agriculture (ACIAR/CLIMA). The workshop was participated by about forty scientists/researchers from Nepal, India, Bangladesh, Pakistan, Syria and the international institutes: ACIAR/ CLIMA, International Crop Research Institute for Semi Arid Tropics/Cereals Asia Network (ICRISAT/CLAN); International Centre for Agricultural Research in the Dry Areas (ICARDA); and Asia Pacific Association of Agricultural Research Institutes (APAARI).

The five-day workshop was divided in sessions for presentation and discussions on the first two days and the participants had field visits of lentil research sites at Nepalgunj and Chitwan on the last three days. A total of 23 papers on different aspects and issues of lentil improvement were presented in consecutive sessions, namely, In country adoption and impact of lentil research; Genetic enhancement; Disease management; Cropping system, Research on special features; and Technology transfer.

The workshop reviewed the activities and achievements in lentil research and development and had deliberate discussions on major issues. At the opening of the workshop Mr. Raghunath Prasad Sapkota, Executive Director of NARC, Dr. Ram Pratap Sah, Director for Crop and Horticulture Research/ NARC. Dr. Masood Ali, Indian Scientist, Dr. Ashutosh Sarker, Syrian Scientist, Prof. Clive Francis, Australia and Mr. Bhola Man Singh Basnet, Chief of Communication, Publication and Documentation Division spoke on the importance and contribution of lentil and research endeavor and achievements.

Lentil is a protein rich pulse that is grown throughout the country and also help improve soil health through biological nitrogen fixation. It is very important for rainfed farming system. The lentil area, production and productivity of Nepal in Fiscal Year 2001/2002 were 178,706 ha; 143,084 mt; and 0.801 t/ha. The lentil area and production is over 65 percent of the total grain legumes production.

In collaboration with the ICARDA and ICRISAT, a project: Lentil and Lathyrus in the cropping systems of Nepal" is in operation since 2001. The project has the objectives of identification of wilt resistant HYV lentils, selection of acid tolerant lentil genotypes, improvement in agronomic management, improvement in seed increase and dissemination, selection of low ODAP Lathyrus lines, capacity building of NARC Scientists. Different wilt resistant varieties have been identified so far and selection of acid tolerant lines is in progress. Farmer participatory varietal selection at different locations have been initiated.

From the agricultural research in Nepal, 7 lentil varieties have been recommended with full package of practices to farmers for cultivation. The package includes sowing time, seed rate, intercropping, mix cropping, fertilizer application, Rhizobium inoculation etc.

Major problems in lentil identified were: disease (wilt complex, stemphyllium blight botrytis gray mold, rust); poor agronomy (sub-optimal plant population, weeds); moisture stress (terminal drought); excess moisture (early water logging); small seeds of local varieties, nutritional deficiencies, soil acidity (low pH) etc.

Field Day on Maize Research

With the view to observe and evaluate the performance of different hybrid maize varieties, National Maize Research Program of NARC at Rampur, Chitwan organized a Field Day Program on 7 January 2003.

The Maize Research Program, after many years' constant research and experiment, has succeeded to develop a new hybrid maize that is ready for release. The variety developed from (NML-1 x NML-2) has been proposed with the name "Gaurav Hybrid Maize" for formal release along with a complete package of practices for farmers to commercially cultivate in terai, inner-terai and foot-hills of Nepal. This is the first hybrid maize developed in Nepal.

The Field Day Program was participated by about 50 persons from NARC Headquarters, different NARC divisions, Department of Agriculture, Seed Quality Control Centre, Institute of Agriculture and Animal Science (IAAS), District Agricultural Development Officers of Chitwan, Bara and Sarlahi, Pakhribas and Lumle Agriculture Research Stations, NGOs, INGOs, Seed producers, farmers and journalists

International Conference on "Women, Science and Technology"

The International Conference on "Women, Science and Technology for Poverty Alleviation" was held in Kathmandu on 31 March – 2 April 2003.

Scientists from different institutions and countries had participated in the Conference. NARC Sceintists also participated in the conference.

The Conference was organized by Women in Science and Technology (WIST), Nepal

Statistical Software used by NARC Scientists

- Bal K Joshi and Nanda P Shrestha, NARC Khumaltar

Now, a functional biometrical unit is considered one of the most important components in research institutes that develop software and support in making inferences from data generated by researchers. But Nepal Agricultural Research Council (NARC) has not yet such system and the scientists/researchers have been using, in limited access, different types of statistical methods and means for statistical analysis. Statistical analysis is most necessary to make inference from data generated by researchers, as data are often imperfect due to randomness or measurement error or other source. We can think of statistics the art of making inferences from imperfect data by searching for the message hidden in the noise. There are many statistical methods whose sole purpose is to help understand data. Care should be taken during walking in the road from the experimentation to publication. A bad design and field plan can't be corrected and so, may result in the death of the experiment. If, however, an experiment is well designed and executed, a subsequent bad analysis can be corrected. Statistical softwares and computer help to speed up the analysis procedure giving correct results. To strengthen the analysis procedure, it is necessary to provide training and software to the NARC scientists and to have knowledge on existing situation of statistical software. Therefore, a preliminary survey on analytical software used by NARC scientists was conducted to help in developing the guidelines for software management and expert development.

Questionnaire about analytical software was developed consulting with Bimal K Baniya and Madhusudhan P Upadhyaya. Five questions were asked to fill in. These were list of three statistical software, three most commonly used packages and command menus, most likely package and sufficiency of software with associated problems. Questionnaires were sent to 23 disciplinary divisions, 15 research programs, 4 regional agricultural research stations and 21 agricultural research stations of NARC. Only 22 offices out of 57 (38.6) sent the filled up questionnaire. On the basis of this information, software status at NARC are reported here.

Number of offices with access to software and their priority list are given in Table 1. All offices have MS Excel, but only 8 offices used it to analyze the data. Altogether there are 17 analytical software available. MSTAT is most commonly used package followed by GenStat. On the basis of priority, MSTAT, GenStat and Excel were most important software. Seventeen offices used ANOVA command menu indicating common feature of experiment at NARC ie use of RCBD. Result indicates that 3 types of experiment ie single factor, two factors experiments and regression dominate the research methodologies at NARC. One office had not any statistical software except Excel. In some cases computer is just for typing. Software is enough only for 12 offices to analyze their data.

Most of the scientists are used to MSTAT. Due to its easiness in operation, installation and availability, MSTAT got the popularity at NARC offices. But data importing, graphical and printing problems were reported on MSTAT. SPSS was reported to be the simple, designed for social, soil survey and field experiment. It had many options. MINITAB and GenStat were also found to be simple and efficient packages among researchers. They had also online help and inbuilt examples. Most of offices had lower version and illegal copy of software. Lack of training, software, manual and computer are the major problems reported on the survey. Some offices mentioned the need of software suitable for livestock, tree and lab related experiments, modeling, multiple regression, econometrics, linear programming and alpha lattice. It seems that training, manual distribution and software installation are the most urgent needs to most of the offices. If we can develop software as per the needs of NARC scientists; it could be great help for researchers. On line help about statistics and software can also solve some problems. Some of the important Internet URL about statistics and statistical software are given below. Some software can be downloaded free and some should be paid upto $3000. Demo can be obtained free in most of the cases.

1. http://www.okstabe.edu/artsci/botany/ordinate/motivate.htm for an excellent overview of definitions and statistical packages for ordination and classification techniques and their use in explanatory and hypotheses driven data analysis tests.
2. http://wbar.uta.edu/software:software.htm for evolution and population genetics educational database.
3. http://darwin.eeb.uconn.edu/evolution-sites.html for evolutionary biology software.
4. http://wwwvet.murdoch.edu.au/vetschl/imgad/GSLinks.htm for phylogenetic and population genetics links.
5. http://www.statistics.com/vendors/index.html for information on and links to many statistical analysis software packages.
6. http://www.statsoft.com for electronic statistical textbook for training in the understanding and application of statistics.

For interpretation of the results, there are a number of statistical tools and software (Table 2) those can help for getting logical inference. The ease and similarity of use of different statistical packages has two important consequences. The first is that little time needs to be devoted to instruction in any particular package. The second is that more than one package can be used in a complementary way. To correctly analyze an experiment, all terms must be accounted for because most computer software packages automatically pool any unaccounted source of variation with the error term. Appropriate statistical procedures depending on the objectives, treatments structure, and experimental design, which can also be studied online should be selected for analyzing data.

Frequently, more time is required to create properly formatted input files than to perform any particular analysis on a set of data. Some of the programs may be more attractive than others on this basis. For analysis, if just one package were obtained then we would suggest Genestat as being most appropriate all rounder for experimental data. It is user extendable and hence could also be made simpler for any designs or analysis. Consideration should also be given to MSTAT, SPSS, MINITAB and Agrobase if more than one package is to be obtained. Our main conclusion from a brief survey of the software is that there is no ideal package for the design and analysis of traits. However, we are not necessarily searching for a single winning package. Organizations may have a strategy that increases a range of packages. One scenario

would be to use Excel for data entry and possibly for some graphics. Then some combination of Genestat, MSTAT, SPSS, MINITAB and Agrobase could be used for the randomization of the traits and for the analysis. Functional biometrical unit should be established with the strategy to provide guidelines to the researchers considering the certain statistical software at first.

Table 1a . Software status and its uses at NARC offices (total offices 22)

SN	Software	No. of offices with access
1.	MS EXCEL	22
2.	MSTAT	13
3.	GENSTAT	11
4.	SPSS	10
5.	MINITAB	10
6.	STATISTIX	6
7.	IRRISTAT	4
8.	STATISTICA	4
9.	INSTAT	3
10.	SAS	2
11.	TER-DES	2
12.	CYCDESIGN	1
13.	NTSYS	1
14.	GENESTAT	1
15.	GDA	1
16.	AGROBASE	1
17.	ALPHAGEN	1

Table 1 b . Packages given priority by offices

Package	No. of offices giving priority		
	1st	2nd	3rd
MSTAT	7	2	4
GENSTAT	5	4	2
MS EXCEL	5	3	-
STATISTICA	-	2	1
SPSS	-	2	2
NTSYS	-	3	-
MINITAB	-	1	3
INSTAT	-	-	-
SAS	-	-	1
STATISTIX	-	-	2
IRRISTAT	-	-	2

Table 1 c . Use of command menu by offices

Most commonly used Command menu	No. of offices
ANOVA	17
REG	13
FACTOR	11
RANGE	7
CORR	4
DESCRIPTIVE	4
MULTIVAR	3

Table 2. Software for analyzing biological and social research data in the world

SN	Software	Feature	Address
1.	Agrobase	Software solution for plant breeder	http://www.agronomics.mb.ca
2.	Arlequin	Population genetic analysis of molecular marker data	http://anthropologie.uniqe-ch/arlequin, <arlequin@scza.unige.ch>
3.	ASREML	For large unbalanced designs and some spatial designs	ftp://ftp.res.bbsrc.ac.uk/pub/aar, <asreml@chiswick.anprod.csiro.au>
4.	ChartRunner	For statistical analysis and graphics	http://www..chartrunner.com
5.	ChiCalc	Chi-square calculator	<plewis@uconnvm.uconn.edu>
6.	CycDesigN	For designing and randomizing a wide range of alpha and related designs	http://www.ffp.csiro.au/software
7.	GB-STAT	For general statistical analysis	http://www.gbstat.com
8.	GDA arker data	Population genetic analysis of molecular m <paul.lewis@uconn.edu>	http://lewis.eeb.uconn.edu/lewishome/gda.html
9.	GDID	For phylogenetic and genetic data analysis	Dr Kermit Ritland, Dept. of Botany, University of British Columbia, Canada
10.	GENEPOP	Population genetic analysis of molecular marker data	http://www.cefe.cnrs-mop.fr <raymond@isem.univ-montp2.fr>
11.	GENESTAT	For genetic data analysis	http://alleyn.eeb.uconn.edu/gda/
12.	GenQuan	For analyzing balanced and unbalanced data of quantitative traits and diallel analyses	Zhejiang Agricultural University Hangzhou 310029, China
13.	Genstat	With excellent general facilities for the analysis of experimental data	http://www.nag.co.uk/stats/tt-soft.asp
14.	GREGOR	For genetic simulation	<tinker@gnome.agrenv.mcgill.ca>
15.	INSTAT+	An interactive statistical package	http://www.rdg.ac.uk/ssc/ <instat@reading.ac.uk>
16.	IRRISTAT	Fro data management and basic statistical analysis of experimental data	http://cgiar.org/irri/irristat.htm, <biometrics@irri.cgiar.org
17.	JMP	Fast explanatory data analysis/statistics package, Highly graphical and intuitive	http://www.jmpdiscovery.com
18.	KIN	For computing Kinship coefficient	<mather@agradm.lan.mcgill.ca>
19.	MEGA	Distance and clustering programme	<imeg@psuvm.psu.edu>
20.	MINITAB	For univariate and multivariate analysis, very easy to use	http://www.minitab.com
21.	ML Calc	For the substitution models used for phylogenetic analysis with nucleotide sequence data	<lewisp@unm.edu>
22.	MS Excel	For data entry, management and graphics	http://www.microsoft.com
23.	MSTAT	A popular package for experimental designs and analysis	http://www.msu.edu/user/bricker/mstat.htm
24.	NTSYS	Specialized genetic data analysis	http://evolution.genetics.washington.edu
25.	PHYLIP	Distance and clustering programme	http://evolution.genetics.washington.edu/ phylip.html <joe@genetics.washington.genetics.edu>
26.	POPGENE	Population genetic analysis of molecular marker data	http://www.ualberta.cu/~fyeh/index.htm, francis.yeh@ualberta.ca>
27.	RAPDistance	General statistical genetics package	ftp://life.anu.edu.au/pub/molecular-biology/ software/rapd103.zip
28.	SAS	General purpose statistical software, The giant among statistical packages	http://www.sas.com
29.	S-PLUS	Package with the best graphics facilities for the display of experimental and other data	http://www.splus.mathsoft.com
30.	SPSS	Statistical software For analysis of survey data	http://www.spss.com
31.	STABLE	For stability and yield stability analysis	Department of Agronomy, Louisiana Agricultural Exp. Stn. Baton Rouge LA 70503-2110 USA
32.	STATA	For statistics, graphics and data management	stata@stata.com, http://www.stata.com
33.	StatGraphics	Statistical analysis tool designed for experts and non experts	http://www.statgraphics.com
34.	Statistica	General purpose statistical software	http://www.statsoftinc.com
35.	Statistix	An intuitive easy statistical program for researches	http://www.statistix.com, <sales@statistix.com>
36.	Statius	Statistical tables	<nocera@promail1.ee.net>
37.	SYSTAT	For scientists, engineers and statisticians	http://www.systat.com

Other software are Alphagen, BIOSYS-1, BMDP, CLUSTAL, DIALLEL, DMRT, DNASIS, EPISTAT, GENESTRUT, MAPMAKER, TER-DES, UPGMA, WINBOOT, TFPGA etc.

Training on Pasture and Fodder

Pasture and Fodder Research Division of NARC organized a training program on "Pasture and Fodder Crop Production" from 20 - 24 January 2003 at Khumaltar.

In the five-day training, 40 men and women farmers from Makwanpur, Kavre, Sindhupalchok, Dhading, Ramechhap, Dolakha, Tanhu and Sindhuli participated. In the training the farmers were given training on the knowledge about the pasture and fodder production and other different aspects of livestock farming.

In joint collaboration of Nepal Agricultural Research Council (NARC), Department of Livestock Services, Agricultural Development Bank, Department of Forestry and in farmers' active participation, the project "Hill Lease-hold forestry and pasture development program" has been in operation for last ten years and various technologies on agro-forestry and pasture fodder development have been brought forth with considerable impact for soil conservation and land improvement in different places of mid hills.

At the conclusion of the training, Director of Livestock Research, Hari Ram Shrestha; Chief of Pasture and Fodder Research Division, Dinesh Pariyar; Coordinator of the Hill Lease-hold Forestry and Pasture and Fodder Program, Badri Raj Joshi; Program Director of Department of Livestock Services, Dr. Braj Kishor Sah; Technical Officer, Ram Nath Kandel and farmer, Ms. Mandira Shrestha spoke on the importance and usefulness of the training.

Pasture and Fodder Research Division (PFRD) is a unit under National Animal Science Research Institute (NASRI) of the Nepal Agricultural Research Council (NARC) that is mandated to develop pasture and fodder technologies.

Talk on Aromatic Rice

A talk program on the topic " Quality characterization and validation of moleculer markers linked to fragrance gene (*fgr*) in aromatic rices" was organized on 18 March 2003 at Khunaltar. The speaker was Mr. Uma Shanker Shah, Senior Scientist, NARC.

The aromatic rices are special group of rices grown and known for their quality. Among all the quality characters, the aroma is is considered most important which determines the price in the domestic as well as international market. There are several methods for detecting aroma in rices as chemical and sensory but with some serious limitation in determining the aroma. Some molecular markers are found to be linked to the fragrance gene *(fgr)* which can be easily and efficiently used in detecting the aroma. Among. Among the molecular markers the RM 42 (Rice Microsatellite) and RM 223 are found to be linked to the fragrance gene *(fgr)*. The molecular marker RM 223 is found to be most effective in distinguishing the aromatic rices from non aromatic rice breeding program.

Workshop on Intellectual Property Rights

A one –day workshop on "Intellectual Property Rights and its Economic Implication on Rural Livelihoods in Nepal" was organized on 11 February 2003 at NARC Ramshah Path, Kathmandu.

The workshop was organized by Agriculture Concern Society – Nepal (AcoS-Nepal) with an objective to discuss and create awareness about the issues of Intellectual Property rights to be addressed for the benefit of agricultural sector in Nepal.

The AcoS-Nepal is an association of agriculture specialists, technicians, entrepreneurs and farmers concerned for the growth and development of agriculture sector.

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Available technologies

BREEDING

- Identification and characterization of indigenous breeds of cattle and buffaloes suitable for different domain
- Murrah buffalo cross (50 or up to 100%)
- Jersey recommended
- Holstein-Friesian for intensive management
- Suitable hormone protocol
- Suitable production, freezing semen technology established for cattle and buffaloes

MANAGEMENT

Early weaning (3months) for improving production and discouraging male buffalo calf disposal

Milk replacer after 21 days in cattle

Male buffalo fattening

ANIMAL NUTRITION

- Important nutrition and husbandry technology in buffaloes
- Ration formulation
- Utilization of agri-byproduct for cattle and buffalo feeding during dry season

PASTURE AND FODDER

- Forage cultivars and their cultivation practices
- Green Forage during dry season

ANIMAL HEALTH

- Identification of economic diseases including both parasitic and infectious diseases
- Development of control strategy against diseases
- Strategic parasitic control-Season and location specific
- Mastitis control: Teat dipping
- Infertility treatment against some noninfectious and infectious causes
- Vaccine and their application

Future Research Direction

- Development of low cost feeding for milk production
- Development of simple and cost effective technology for milk and milk products
- Reduction/elimination of infertility problems in cattle and buffaloes
- Promotion of milk products and product diversification
- Promotion of value addition to the products
- Use of biotech tools for improved production
- Establishment of elite herds of cattle and buffaloes
- Commercialization of dairy products
- Hygienic milk production

TRAINING WORKSHOP/SEMINARS, STUDY & TOURS PARTICIPATED ABROAD
(January - March 2003)

S.N.	Name	Position/Faculty	Subject	Duration	Country
	SEMINAR/WORKSHOP/MEETING				
1.	Mr. Thaneswor Prasad Pokharel	S-4/Agronomy	Reaping the Benifits: Workshop	18-21 January	Bangladesh
2.	Dr. Ram Pratap Sah	S-4/Director/Crops	1st Project Steering Committee Meeting (ICRISAT/IFAD Project)	4-6 February	India
3.	Mr. Ram Krishna Neupane	S-3/Agronomy	1st Project Steering Committee Meeting (ICRISAT/IFAD Project)	4-6 February	India
4.	Mr. Ram Narayan Chaudhary	S-3/Agronomy	1st Project Steering Committee Meeting (ICRISAT/IFAD Project)	4-6 February	India
5.	Mr. Shrikrishna Adhikari	S-4/Agri-Engg.	1st Kick-off workshop of challenge Programme (CP) on water	23-24 Jan	Thailand
6.	Dr. Ash Kumar Rai	S-4/Fisheries	Financial Support to attend the second International Large rivers Symposium	11-14 Feb	Combodia
7.	Mr. Subashananda Vaidya	S-3/Soil Science	Accelerating Technology Adoption to Improve Rural Livelihoods on the Rainfed Gangetic Plains	8-9 March	India
8.	Dr. Hira Kaji Manandhar	S-3/Pathology	Preparation of a Project Document on the New Phase	18 March-3 June	Denmark
9.	Dr. Kedar Budhathoki	S-4/Horticulture	3rd Annual Meeting of ADB-TFT Project	25-28 March	China
10.	Dr. Krishna Prasad Poudel	S-3/Horticulture	ICUC-UTFANET Meeting	2-4 April	Vietnam
	OBSERVATION				
11.	Dr. Nanda Prasad Shrestha	Director	Study Visit/Observation Tour on Fisheries	15-28 January	Thailand, Indonesia & Myanmar
12.	Dr. Tek Bahadur Gurung	S-3/Fisheries	Study Visit/Observation Tour on Fisheries	15-28 January	
13.	Dr. Ash Kumar Rai	S-4/Fisheries	Study Visit/Observation Tour on Fisheries	15-28 January	
14.	Mr. Jaya Dev Bista	S-3/Fisheries	Study Visit/Observation Tour on Fisheries	15-28 January	
15.	Dr. Ram P. Sah	Director/Crop&Hort.	Study & Observation Tour	18-28 January	Philippines
16.	Mr. Janmejay Tripathi	S-3/Agronomy	Study & Observation Tour	25 Jan-5 Feb.	India &
17.	Mr. Ganesh Sah	S-3/Ag. Engg.	Study & Observation Tour	25 Jan-5 Feb.	Bangladesh
18.	Mr. Ashok Mudwari	S-3/Agronomy	Study & Observation Tour	24-31 March	India
19.	Mr. Keshav Babu Koirala	S-2/Agronomy	Study & Observation Tour	24-31 March	India
20.	Mr. Sudarsan Bista	T-6/Agronomy	Study & Observation Tour	24-31 March	India
21.	Mr. Mukunda Bhattarai	T-5	Study & Observation Tour	24-31 March	India
22.	Mr. Aftar Hussain Khan	T-5	Study & Observation Tour	24-31 March	India
	TRAINING				
23.	Mr. Tul Bahadur Pun	S-3/Agronomy	Regional Training Course on Geographic Survey on Diversity of TFT Species and Use of GIS Tools	24 Feb-1 March	Malaysia
24.	Mr. Laxman Lal Shrestha	T-6/Agronomy	Training Course on Development of Integrated Nutrient Management Option for Delivery	24 Feb-7 March	Philippines
25.	Mr. Tulsi Prasad Kharel	T-6/Agronomy	Training Course on Development of Integrated Nutrient Management Option for Delivery	24 Feb-7 March	Philippines
26.	Mr. Ram Chandra Ghimire	T-6/Agronomy	Crop Management Research Training Course	12 March-6 June	Kenya
27.	Mr. Parmanand Sharma	T-5	Crop Management Research Training Course	12 March-6 June	Kenya
	STUDY				
28.	Dr. Krishna Bahadur Karki	S-3/Soil Science	Soil Classification Research Work Study	7 Nov '02.-29 Jan '03	Germany

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were also held on the RWC-PRISM and database management, GIS-initiative of the RWC-Technology targeting, Seed priming and DFID initiatives, APN and climate change, Weed management in Zero till RW systems in China, development of zero-till for residue management and ACIAR/PAU permanent beds, Impact analysis-New initiatives for socioeconomic research in the region, report on Cornell studies and Progress report of NZODA-Nepal and Pakistan. In the RTCC meeting respective Rice-Wheat National Coordinators presented Country Coordinators' concerns and new opportunities and made out suggestion. The meeting was focused on addressing to emerging issues through reorganizing research-emerging scenarios.

In the joint RSC-RTCC meeting RWC Facilitator's report: A synthesis and an update on new initiatives and opportunities was presented. Presentations were also held on Comprehensive Water Assessment Projects, CIMMYT and IRRI with partners; Challenge Program for Water and Food; IRRI Projects with ADB and IFAD; DFID, CABI, RWC projects on "Reaping the Benefits"; DFID-ICRISAT-RWC project on crop diversification; Genotype-tillage interactions in wheat in SA; Mungbean in the RWCS: a reality; and RWC Review-preliminary outcomes.

At the conclusion in a joint RSC-RTCC Session chaired by Mr. Raghunath Prasad Sapkota, Executive Director of NARC, recommendations of both the RTCC and the RSC Executive were presented.

In the meeting Director Generals of International Rice Research Institute (IRRI), International Maize and Wheat Improvement Centre (CIMMYT), Asian Vegetable Research and Development Centre (AVRDC) and Executive Chairman of Bangladesh Agriculture Research Council (BARC) were present.

The participants of the RSC-RTCC meeting observing the wheat farms in Rupandehi

NARC Management Reformed

Management of the Nepal Agricultural Research Council (NARC) has been reformed with new appointments to the positions of Directors. Currently the management consists of:

Mr. Raghunath Prasad Sapkota	-	Executive Director
Mr. Surya Prasad Pandey,	-	Director, Planning and Coordination
Dr. Ram Pratap Sah	-	Director, Crop and Horticulture Research
Mr. Hari Ram Shrestha	-	Director, Livestock and Fisheries Research
Dr. Nanda Prasad Shrestha	-	Director , Administration
Mr. Govinda Prasad Koirala	-	Director, Finance

The Executive Director is the administrative head of the NARC and the Directors, apart from their responsibilities of respectives lines/disciplines, assist the ExecutiveDirector in the administrative and management functions of the organization.

Patron:
Raghunath Prasad Sapkota
Executive Director

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