A three day workshop under INDO-UK Collaborative Project on forages was organised at this Institute during Dec. 2-4, 1996 with the objective to encourage interactions between various organisations involved in transfer of forage production technologies, to identify new technologies and future needs. The workshop was attended by over 100 delegates including 10 participants from UK and Australia.

**MAJOR RECOMMENDATIONS**

I - Forage Production on Degraded Lands:
* Inventory of degraded lands in all agro-ecological zones of India should get a high priority.
* Popularization of available forage production technologies needs to be done through demonstrations in association with NGOs.
* With a view to strengthen HRD in forage production and wasteland development, IGFRI should start Post Graduate Courses in this specialised area.
* IGFRI should be identified as a training centre for Asia in the field of forage production and wasteland development.

II - Forage Production on Cultivated Lands:
* Area specific suitability of forage production technologies should be established, and deficit areas need to be identified for technological development.
* Client feedback mechanism needs to be strengthened to assess the suitability of technology and gaps, if any.
* Suitable forage crop varieties for problem soils and stress situations need to be developed. Linkage with Thai-Australian Project on forage production on saline soils needs to be established.
* Emphasis needs to be laid on, on-farm trials to popularize new forage varieties/crops.

III - Forage Seeds:
* IGFRI should act as a nodal agency and involve private seed companies, NGOs and Cooperatives for quality seed production.
* IGFRI should make efforts to develop forage seed standards on priority.
* There is a greater need to identify priority forage species and organise related seed industry.
* IGFRI needs to establish links with Seed Companies, Cooperatives, NGOs, and seed producing farmers to share experiences, identify constraints and prioritize technology needs.
* A National Network on Seed Production proposed by IGFRI needs to be established with funding from ICAR or some alternate source.
* Seed production manuals on forage crop varieties found suitable under on-farm trials need to be produced by IGFRI for guidance of farmers.
Identification and development of wastelands using satellite data

Quick and precise matching of landforms with corresponding vegetational covers helped in identification of suitable species and sites in the wastelands located in the catchment area of the Pahuj river, criss-crossing three districts of Bundelkhand region, viz., Datia, Jalaun and Jhansi. Based on IRS-1B, data major land cover units were identified and the relationship between major landforms and vegetation has been established. The study revealed the moderate to heavy degraded stages of vegetation varying in composition, density and distribution. Reseeding of suitable grass species and MPTS like *Sehima nervosum*, *Chrysopogon fulvus* in combination with *Albizzia amara* on rocky surface, hills and pediments and *Dichanthium annulatum*, *Cynodon dactylon* in combination with *Prosopis juliflora* in plains, ravines and river valleys would revegetate this area with ideal forage-fuelwood system.

[J.P. Singh, Scientist (Geography)]

<table>
<thead>
<tr>
<th>Major landuse units of Pahuj catchment</th>
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</thead>
<tbody>
<tr>
<td>Land Use Units Area in (ha)</td>
</tr>
<tr>
<td>Total Geographical Area</td>
</tr>
<tr>
<td>Total Rabi Cropped Area</td>
</tr>
<tr>
<td>Total Forest Area</td>
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<tr>
<td>Total Grassland</td>
</tr>
<tr>
<td>(Including degraded rangelands)</td>
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<tr>
<td>Total Ravines &amp; Gully affected land</td>
</tr>
<tr>
<td>Water Bodies</td>
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<tr>
<td>Built up Area</td>
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<tr>
<td>Others</td>
</tr>
</tbody>
</table>

Satellite Imagery, IRS-1B, LISS-1, FCC, Row 49 & 50, Path 27, Band-2,3 & 4 dated Feb. 5, 1995 showing Pahuj catchment

<table>
<thead>
<tr>
<th>Landforms</th>
<th>Slope Category/ Slope (%)</th>
<th>Grasses</th>
<th>Vegetation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hilly area</td>
<td>Xe, E, D, C, Fr (45%)</td>
<td>Eragrostis</td>
<td>Indigofera</td>
</tr>
<tr>
<td>Upland dissected</td>
<td>B, C (15-30%)</td>
<td>Cynodon</td>
<td>Tephrosa</td>
</tr>
<tr>
<td>plateau</td>
<td></td>
<td>Aristida</td>
<td>Zizyphus</td>
</tr>
<tr>
<td>Monadrocks</td>
<td></td>
<td>Heteropogon</td>
<td>Carissa</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Isilema</td>
<td>Adhatoda</td>
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<tr>
<td>Pediments</td>
<td></td>
<td>Apluda</td>
<td>Flaccourtia</td>
</tr>
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<td></td>
<td></td>
<td>Conchris</td>
<td>Carissa</td>
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<td></td>
<td></td>
<td>Cynodon</td>
<td>Zizyphus</td>
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<td></td>
<td></td>
<td>Aristida</td>
<td>Acacia</td>
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<td></td>
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<td>Heteropogon</td>
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<td></td>
<td></td>
<td>Cynodon</td>
<td>Acacia</td>
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<tr>
<td></td>
<td></td>
<td>Isilema</td>
<td>Acacia</td>
</tr>
<tr>
<td>Undulating terrain</td>
<td>B, A, R (10-35%)</td>
<td>Arista</td>
<td>Acacia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heteropogon</td>
<td>Acacia</td>
</tr>
<tr>
<td>Rocky surface</td>
<td>B, C, A (0-8%)</td>
<td>Cynodon</td>
<td>Acacia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Isilema</td>
<td>Acacia</td>
</tr>
<tr>
<td>Gentle sloping</td>
<td>A, F (up to 5%)</td>
<td>Chrysopogon</td>
<td>Acacia</td>
</tr>
<tr>
<td>plain</td>
<td></td>
<td>Aristida</td>
<td>Acacia</td>
</tr>
<tr>
<td>Ravines &amp; Gully</td>
<td>Xe, C, D, Fr, (10-30%)</td>
<td>Dichanthium</td>
<td>Acacia</td>
</tr>
<tr>
<td>River Valley</td>
<td>A, F</td>
<td>Cynodon</td>
<td>Acacia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Isilema</td>
<td>Acacia</td>
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<td></td>
<td></td>
<td>Cynodon</td>
<td>Acacia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tephrosa</td>
<td>Acacia</td>
</tr>
</tbody>
</table>

Landform-vegetation cover relationships in the Pahuj catchment
Dear Readers,

True to the words of first Prime Minister of independent India, Shri Jawahar Lal Nehru that "Every thing else can wait, but not agriculture", our policy makers are committed to accord the highest priority to agriculture sector. The attitude and commitment at the highest political level, sublime imagination of policy makers and dedicated implementation of the decisions, has provided a right mix of policy and research in boosting food grain production in our country.

The world over, agriculture has changed from a resource-based to science-based system. The judicious harnessing of our natural resources through emerging technologies for different resource levels holds great promise for increasing productivity and maintaining sustainability.

Despite sizeable gains in agricultural production, the vast agricultural production potential still remains untapped. This is mainly due to serious gaps in harnessing yield potential and technology transfer. Well planned and well executed research and development strategy is bound to bridge the gaps and bring about social and economic justice. The need of the day, therefore, is to shift our attitude in technology generation and technology transfer. The top down technology delivery system needs to be changed to participatory approach for technology generation and utilization. Having inherited real farm experiences through generations, the farmers can play a pivotal role in agricultural production system. Farmers' participation in research planning can help in integrating the traditional technologies with modern innovations in real farm situations.

The association of researchers with farmers by conducting experiments on farmers' fields will lead in to a two way communication. The researchers will have a feedback on the potential of the technology developed especially in terms of the management situations at the farmers' level and the first hand information on requirement in terms of better understanding of the technological issues by the users. This mutually beneficial association between the two-the researcher and the farmer would help in a big way in fine tuning of the technologies available on the shelf to the actual requirements of the users.

In this noble endeavour, I call upon the researchers, and extension workers to follow a participatory approach with farmers in problem identification, resource based research planning and technology transfer and work with them and assist them in gaining requisite skills and knowledge necessary for successful adoption of sustainable technologies.

(BHAG MAL)
Screening of exotic *Cenchrus* germplasm

World collection of *Cenchrus* germplasm (410 accessions) from 32 countries comprising of eight species, viz., *C. ciliaris, C. setigerus, C. pennisetiformis, C. prieurii*, *C. glaucus, C. biflorus, C. myosuroides* and *C. echinatus* along with some hybrids have been obtained from IGER, Aberystwyth(U.K.) for evaluation at this Institute. Out of this material, 372 lines have been successfully established at IGFRI Central Research Farm.

Evaluation of the germplasm for agro-botanical traits, namely, early vigour, growth habit, date of flowering, plant/leaf colour, No. of tillers/plant, leaf length, leaf width, peduncle length and length & breadth of spikes are in progress. Two hundred and fifty three lines flowered by the end of Dec., 1996. The data indicated a wide range of variation between the lines for all the characters. Seventy two lines have been initially identified as promising on the basis of early vigour and other visual observations.

( U.S. Mishra, D.S. Katiyar and V. Bhatt )

FORAGE SEED SYSTEMS : MEETING FUTURE NEEDS?

Catheryn Turton and Pari Baumann of Overseas Development Institute (ODI), London in a collaborative programme with this Institute studied the existing system for procurement and distribution of fodder seeds by contacting farmers, NDDB, Government Extension Agencies, Forest Department, NGOs and local user groups to ascertain how seed systems are meeting the needs of the users.

It was found that the system in operation is informal one and relatively well developed linking the major seed producing areas to fodder producing areas. The unlabelled seed of local varieties is obtained by farmers from neighbouring farmers or from unregulated local agents and dealers. Only a small percentage of farmers use seed of new varieties, which they obtain through Government Extension Agencies, the NDDB or in case of hybrid varieties through National/Multinational Seed Companies.

The structure of seed system in operation for production and distribution is predominantly decentralised and unregulated but has responded to meet the challenges. There is a need to identify the ways to strengthen the system for introducing newer varieties. The IGFRI can play an important role in developing closer relationship with its intended clients-farmers and Wasteland Development Agencies. It is hoped that in the near future a business liaison unit will be set up at IGFRI in order to improve the understanding of farmers and end users practices and needs, strengthening links between seed producers and users through its publications, other communications, and through interaction between technology generation groups and extension and user groups.

Joining/Postings

* Dr. Atar Singh, Principal Scientist (Agronomy), joined IGFRI on transfer from Water Technology centre for Eastern Region, Bhubneshwar.
* Mr. D.D. Verma joined this Institute as Sr. Finance & Accounts Officer on transfer from Central Potato Research Institute, Shimla.
* Dr. B.K. Misri, Senior Scientist, Dr. R.K. Jain, Senior Scientist and Dr. C.R. Ramesh, Principal Scientist have taken over as Incharge, IGFRI Regional Stations at Palampur (H.P.), Avikanagar (Rajasthan) and Dharwar (Karnataka), respectively.
INDO-UK FORAGE PRODUCTION PROJECT

This 5 year ODA funded project links the Indian Grassland and Fodder Research Institute (IGFRI) at Jhansi and the Institute of Grassland and Environmental Research (IGER) at Aberystwyth. The project aims at strengthening training and research leading to the development of better fodder production technologies suited to wasteland rehabilitation and rainfed farming systems in India.

The Institute of Grassland and Environmental Research at Aberystwyth, U.K.

Training:

To date, nine IGFRI scientists have undergone six months training at IGER acquiring knowledge about advanced research techniques in the following areas:

* Molecular biology and tissue culture aimed at increasing genetic variability in tropical grasses.
* Characterization and exploitation of genetic variation in Cenchrus ciliaris, with particular reference to forage quality and seed production.
* Nitrogen fixation and nutrient dynamics, including the development of modelling approaches to reduce nutrient losses in degraded soils.
* Legume agronomy, to improve persistency of forage legumes under grazing.
* Forage quality evaluation, to provide rapid methods of measuring the nutritive value of indigenous fodder and newly bred forage varieties.
* Modelling silvopasture systems, to optimise spacing of multi-purpose trees on non-cropped areas at the farm.
* Collection, evaluation and conservation of plant biodiversity.

Equipment:

Scientific equipment form a major component of the project. After first acquiring a large stand-by generator of 160 KVA to provide uninterrupted power supply to the laboratories, major items of equipment installed at IGFRI include a freeze drier (to facilitate the transfer of plant material between the two centres), automatic analysers for measuring the chemical composition of feeds, microscopes, camera, electrophoresis equipment for characterizing germplasm and computing equipment.

Collaborative Research:

On completion of their training, and the installation of the equipment, IGFRI scientists are expected to develop multidisciplinary programmes, in conjunction with their IGER collaborators, covering broad areas of research, such as molecular biology and forage breeding, soil nutrient dynamics, forage agronomy and silvopasture systems, collection conservation and exploitation of germplasm. It is anticipated that training in setting up multidisciplinary projects will be provided via the International Centre for Development oriented Research in Agriculture.

Meanwhile, a start has been made on a collaborative survey of the current and future needs for fodder seeds in India. In addition, some underpinning research is being carried out at IGER, Aberystwyth. For instance, over 400 accessions of Cenchrus ciliaris and other species from world wide sources have been collected and assessed at Aberystwyth for breeding purposes. The important germplasm have been brought to India, planted at Jhansi, and currently being evaluated agronomically.

In addition, using specialised analytical equipment at Aberystwyth, IGER has identified and isolated new biologically active alkaloids from under exploited native species growing in India.

Technology Transfer:

Since the inception of the scientific and technical training aspects of the programme, greater emphasis has been placed on need-based approaches to the prioritisation of forage research at IGFRI for rainfed farming systems. To this end, the Overseas Development Institute in London (working closely with NGOs involved in supporting Indian village development) has been sub-contracted to train IGFRI scientists in participatory rural appraisal (PRA) approaches to identify farmer needs and priorities. This would greatly facilitate and improve the screening and adoption of appropriate fodder production technologies for rainfed farming systems.
Other important aspects of the technology transfer part of the programme include (i) increasing the interactive and feedback content of the current IGFRI Newsletter (ii) a purpose-built vehicle for facilitating PRA work in areas remote from Jhansi and (iii) workshop on Technology Transfer of Forages.

This programme is funded by the UK Overseas Development Administration and the Government of India. Financial and travel arrangements are managed by British Council. Technical coordination is carried out jointly by Dr. Bhag Mal, Director, IGFRI and Prof. R.J. Haggar, IGER.

Dr. P. Morris visited during Nov. 23-27, 1996 to discuss current status of research on grass biotechnology, acquired equipment under the project, future equipment needs and issues in integration of tissue culture, plant breeding and animal nutrition studies.

Dr. M.S. Dhanoo, paid a consultancy visit during Nov. 26 to Dec. 5, 1996 to review relevant research application of statistics, evaluate state of kinetics and models in the field of ruminant nutrition and feed evaluation, participate in IGFRI-PRA training programme and attend the technology transfer workshop.

Dr. A. Longland visited IGFRI during Nov. 26 to Dec. 5, 1996 to assess the state of current & future research plans, operational aspects of the equipment supplied and outline a future training programme on plant cell wall carbohydrates in relation to animal nutrition.

Dr. A. Marshall visited during Dec. 1-4, 1996, to discuss and review current and future research plans, outline a training programme in legume seed development & production and participate in the technology transfer workshop.

Drs. John Farrington, Tom Farrington, Neville Bark, Don Loch, Peter G. Bezkorowajnyj, Mike Wilson and Tim Hatton participated in the transfer of forage production technology workshop during Dec. 2-4, 1996.

Ten scientists from IGFRI, Shri D.S. Katiyar, Dr. K.S. Kohli, Dr. B.K. Trivedi, Dr. K.P. Singh, Shri G.S. Dwivedi, Dr. R. Kumar, Shri K.C. Sharma, Dr. (Mrs.) Manju Suman, Dr. V. Rama Murthy and Dr. (Mrs.) D.H. Sukanya, attended the Participatory Rural Appraisal (PRA) training at Dahod (Gujarat) during Nov. 24-29, 1996 under this collaborative programme.

Consultancy/Visits

Professor C.J. Pollock, Research Director, IGER, visited the Institute during Nov., 26-29, 1996 as consultant on project management, HRD and management structure to support the mission to tailor the research to the needs of a range of beneficiaries.

Professor R.J. Haggar, UK Technical Coordinator of the programme visited this Institute during Nov. 26 to Dec., 5, 1996 to discuss the work plan for 1997-98, review the progress of project activities and to participate in the technology transfer workshop.

Professor M.D. Hayward, on a consultancy visit during Nov. 22-23, 1996 assessed the progress in application of techniques, and procedures for crop improvement acquired by IGFRI study fellows and evaluation of world collection of Cenchrus germplasm acquired by IGFRI from IGER.

Workshop delegates during farm visits

Prof. C.J. Pollock and Prof. R.J. Haggar at technology demonstration site

Prof. C.J. Pollock and Prof. R.J. Haggar at Institute Research Farm
IGFRI HOSTS ICAR INTER-INSTITUTIONAL SPORTS MEET

This Institute was entrusted the responsibility to organize the Inter-Institutional Sports Meet for Zone-II, which was successfully organised during Oct. 24-29, 1996.

Out of 21 ICAR Institutes scheduled to participate in this sports meet, 412 participants from sixteen Institutes participated. Shri G.S. Sahni, IAS, Secretary, ICAR and Joint Secretary was the chief guest and Dr. Bhag Mal, Director, IGFRI presided over the inaugural function on Oct. 24, 1996.

The chief guest and the chairman while emphasising the need of dedication, discipline and brotherhood among all sections of council employees, wished the participants as well as the organizers for the success of the tournament. The colourful field shows by the young boys and girls of various schools of Jhansi city following the impressive march past by the various contingents led by Dr. Pankaj Kaushal, IGFRI representing Zone-II, was highly appreciated by the large gathering of invitees. Shri Kapil Kumar of IGFRI took oath on behalf of all the participants of the Sports Meet.

Various events were organised during Oct., 24-29, 1996 at IGFRI Sports Complex and Dhyan Chand Stadium at Jhansi city. An important feature of this year’s Sport Meet was the participation by the women employees and to begin with one field event (100 M race) and two team events (Badminton and Table Tennis) were organised for them. An impressive cultural evening was organised on Oct. 28, 1996 by Institute Recreation and Welfare Club at the Institute Community Centre.

The closing ceremony of this grand Meet was graced by Shri N. Parthasarthy, Financial Advisor, DARE, and chaired by Dr. Bhag Mal, Director, IGFRI, Jhansi on Oct., 29, 1996. On the basis of the highest points scored, IGFRI, Jhansi was adjudged the Champion for Zone-II. Shri Hardev Singh, CIPHET, Ludhiana and Shri Satya Deo Singh, IGFRI, Jhansi were identified as the Best Athlete and Best All-rounder of the meet, respectively.

The chief guest Shri Parthasarthy was highly appreciative of the efforts made by IGFRI in successful organization of this important event and he congratulated the Director, IGFRI and his staff for the grand success of the programme. Dr. Bhag Mal, while congratulating the winners in his concluding remarks, praised the participants for their active participation, cooperation and support.

IGFRI ACHIEVEMENTS IN THE SPORTS MEET

Volley Ball (Smashing) : Winner
Badminton (Women) : Winner
 Relay race (4 x 100 M) : Winner
Foot Ball : Runner
Table Tennis (Women) : Runner
Race 800 M : First
Race 400 M : Third
Race 100 M : Third
Race 100 M (Women) : Second & Third

Zonal Championship and Best All Rounder Award
They discussed their problems on technological and developmental issues with the Institute Scientists and Development Officers from the District.

Quami Ekta Week was organised at this Institute during Nov. 19-25, 1996. As part of the programme, National Integration Day, Welfare of Minorities Day, Linguistic Harmony Day, Weaker Section Day, Cultural Unity Day, Women’s Day and Conservation Day were organised.

Women in Agriculture Day (Mahila Diwas) was celebrated on Dec. 4, 1996. The programme organised at Village Karari was inaugurated by Dr. (Mrs.) Satyavati Rahgeer, Vice Chancellor, Bundelkhand University, Jhansi, and Dr. A.S. Faroda, Director, C.A.Z.R.I., Jodhpur, presided. The function was attended and the issues related to role of women in agriculture were discussed.

For any further information, you can reach us in person or through mail at:

Indian Grassland and Fodder Research Institute, Gwalior Road, Jhansi - 284003,
Telephones: (0517)440908, 444385, 444771 Fax: (0517) 440833, E-mail: igfri@x400.nic.in

| Supervision and Guidance: Dr. Bhag Mal, Director, IGFRI, Jhansi |
|-------------------|-------------------|
| Editors: | Compilation: |
| S.A. Faruqui | G.P. Nigam |
| S.N. Zadoo | K.P. Rao |
| A.K. Shrivastava | |

Assistant: M.C. Jetwani
Prem Chand
Ashok Singh

Published by: Director, IGFRI, Jhansi
Printed at: Mini Printers, Jhansi