Agroforestry
Newsletter
National Research Centre For Agroforestry, Jhansi-284 003

Vol. 24, No. (1) **JANUARY-MARCH, 2012**

NRCAF CELEBRATES AGRICULTURAL EDUCATION DAY & ICAR-INDUSTRY DAY

In accordance with the directions of ICAR HQ, National Research Centre for Agroforestry, Jhansi decided to celebrate ICAR Industry Day and Agricultural Education Day on 28th February of every year. Hundred participants including thirty four graduation and post-graduation students along with two faculty members from Bipin Bihari Post Graduate College, Jhansi, SRF, RA, M.Sc. dissertation students and Ph.D. Scholars participated in the function at the Centre on 28th February, 2012. All scientific, technical, and administrative staff of the Centre actively participated in the event. Lectures and power point presentation on agricultural education scenario in India and status of agri-based industries in Jhansi, were delivered. Healthy discussions on opening of consultancy services using GIS and remote sensing as business module by trained/educated young entrepreneurs was discussed. Possibilities of promoting agri-based and forestry-based enterprises in Bundelkhand region were also discussed. Present scenario of agri-based industries in the region is bleak and mostly confines to sale of produces and agri-inputs. Scope of fruit and vegetable preservation, value addition, creating alternate livelihood support systems through cultivation of lac, gum and resin, medicinal and aromatic plants and floriculture in Bundelkhand region was discussed thoroughly. Bamboo and Date palm based small cottage industry needs to be promoted in the region as they are commonly found in wastelands and under agroforestry system on field bunds. Feedback from the local venders, Forest and State Departments and others was presented. National Research Centre for Agroforestry, Jhansi can contribute in this direction by way of identifying quality germplasm and ensuring availability of mother plants. However, agri-based industry development requires greater input from various State Agencies, NGO and Societies.

Forthcoming Events

1. RAC / Annual IRC Meeting
2. Celebration of NRCAF Foundation Day
3. Institute Joint Staff Council/Women Cell / PME Cell meetings
4. Farmer's Trainings and demonstrations
5. AICRPAF Annual Group Meeting

During the programme students were taken to laboratory and research farm visit. Students were encouraged to opt agriculture as career development activity. It was emphasized that Country needs trained manpower in agriculture to sustain agriculture production, enhance income from available produce/resources. Director of the Centre, Dr. S. K. Dhyani emphasized that agriculture research needs to be reoriented towards employment generation besides sustained production. The students and faculty members were very happy to see the state of art equipments in the laboratories and to know about the future prospects in agriculture and allied subjects. The event was covered by the Press & Media.

Tkyok;q ifjorZu ij dk;Z"kkyk lEiUu

jk'Vªh; d`f'kokfudh vuqla/kku dsUnz] >Wklh ,oa fodkl fodYi] xSj ljdkjh laLFkk ds la;qDr rRok/kku esa ^^**tyok;q ifjorZu**** fo'k; ij fnukad 26 ekpZ] 2012 dks dk;Z"kkyk vk;ksftr dh x;h] ftlesa fofHkUu Lo;a lsoh laLFkkvksa ls tqM+s dk;ZdrkZvksa vkSj vuqla/kku dsUnz ds oSKkfudksa us Hkkx fy;kA dk;Z"kkyk dk mn~ns"; tyok;q ifjorZu ds dkjdksa] izHkkoksa ,oa muls fuiVus ds fy, miyC/k vuqHkoksa] oSKkfud rduhdksa dks le>uk rFkk vfxze j.kuhfr rS;kj djuk FkkA dk;Z"kkyk ds nkSjku tyok;q ifjorZu dh foHkhf'kdk] d`'kdksa dh le>] d`f'kokfudh }kjk tyok;q ifjorZu dh nj de djus] okrkoj.k ls dkcZu vo"kks'k.k rFkk tykxe fodkl dk tyok;q pdz Bhd djus esa ;ksxnku vkfn fo'k;ksa ij oSKkfud okrkZ;sa gqbZ vkSj ys[k i<+s x;sA dk;Z"kkyk dh v/;{krk Mk- ,l- ds- /;kuh] funs"kd] **jk'Vªh;** d`f'kokfudh vuqla/kku

dsUnz] >Wklh us fd;kA Mk- /;kuh us vius mn~cks/ku esa crk;k fd tyok;q ifjorZu fdlh {ks= fo"ks'k dh otg ls ugha vfirq iwjs fo"o ds ekuoh; fdz;kdykiksa dh nsu gS vkSj blds fy, fodflr ns"k vf/kd ftEesnkj gSaA bldk izHkko O;kid gS] vr% lHkh ns"kksa dks vius Lrj ij tyok;q ifjorZu dh nj de djus ds fy, iz;kl djuk gksxkA tyok;q ifjorZu ds vPNs rFkk cqjs nksuksa izHkkoksa ij ppkZ dh x;hA miyC/k rduhfd tkudkjh dk fo"ys'k.k fd;k x;k vkSj fu'd'kZ fudkyk x;k fd d`f'kokfudh dks dsUnz esa j[krs gq, tykxe fodkl ij tksj nsuk gksxk] rHkh bls jksdk tk ldrk gSA

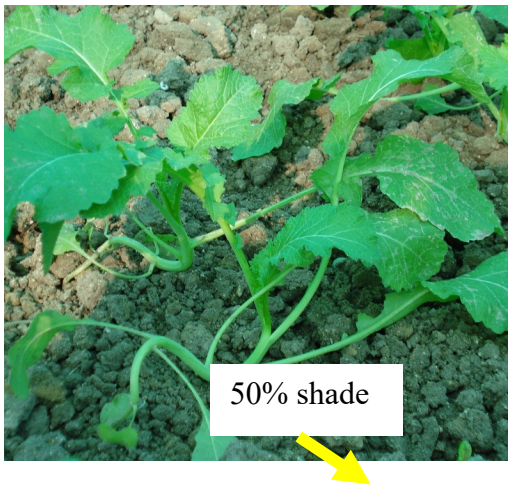
dk;Z"kkyk esa lg funs"kd Mk- ,l-,u- ik.Ms;] Mh-Mh-,e-ukckMZ] Mk- lqjsUnz ckcw] Mk- d`'.k xkW/kh] Mk- vkj- ds-frokjh] Mk- jktsUnz izlkn] Mk- jkeusokt vkfn us Hkh vius fopkj j[ks vkSj Hkfo'; dh j.kuhfr cukus esa lg;ksx fn;kA Mk-vkj-,p- fjtoh] dk;Z"kkyk leUo;d us Hkkjr ljdkj rFkk bl fn"kk esa iz;kljr cgq**jk'Vªh;** /ku iznkrk izfr'Bkuksa dks foRrh; lgk;rk miyC/k djkus gsrq laLrqfr;ksa dk ladyu fd;kA tyok;q ifjorZu ds izHkkoksa dk vkWdyu djus] mUgsa de djus rFkk tu ekul dks bl fn"kk esa tkx:d djus ds fy, bl rjg ds vk;kstu dh vko";drk eglwl dh x;h vksj fu.kZ; fy;k x;k fd Hkfo'; esa bl izdkj ds vkSj Hkh vk;kstu fd;s tk;saxs ftlesa fdlkuksa dh Hkh Hkkxhnkjh lqfuf"pr dh tk;sxhA Kkr gS fd Hkkjrh; d`f'k izkd`frd lalk/kuksa ij fuHkZj djrh gS vkSj tyok;q ifjorZu ls d`f'k lokZf/kd izHkkfor gksrh gS tks gekjs vkgkj ij lh/kk vlj Mkyrh gSA bl rjg dh dk;Z"kkyk cqUnsy[k.M Kku eap ds ek/;e ls ,l-Mh-lh- ds foRrh; lg;ksx ls leLr cqUnsy[k.M esa lapkfyr dh tk jgh gSA dk;Zdze esa 70 ls vf/kd oSKkfudksa

rFkk izksQsluYl us Hkkx fy;kA /kU;okn Kkiu Mk- vkj- ih- f}osnh] ofj'B oSKkfud us fd;kA

An Adaptive Mechanism in Mustard (*Brassica juncea*) for Stress Tolerance, Some Preliminary Results

Response to environmental stimuli decides the adaptive strength of species to sustain the changing climate. Only prominent and macro level changes are noted and attract attention through there may be many minor but important in adaptive features expressed by the species which could decipher or help in understanding their inherent or intrinsic characteristics of coping with the changed environment. Such characteristics will be of great significance in the search for abiotic stress tolerant genotypes or cultivars. Low light is also categorized under abiotic stress as it potentially affects the crop growth, biomass and yield. An interesting consistent varied morphological feature of mustard (*Brassica juncea* var. Varuna) has been observed while conducting comprehensive studies under diffrent shades in simulated shade houses at the Research farm of the Centre. Mustard is an upright and classically indeterminately branched oil seed crop. During the experimental trial at diffrent regimes of simulated shades *viz.* 33, 50 and 75% and open field control, it was observed that the basal portion of the stem of mustard plant was not able to come upright at the initial stage mainly under deep shade (50 or 75% shade). However, after 30-40 DAS (days after sowing), the plants under the extremely deep shade exhibited an upward movement of the stem showing a peculiar bending at the ground justifying its efforts to climb high (Plate 1). This clearly indicates about the modified characteristic of the crop to cope with light limiting environment as it was receiving the light of about 25% only of the incident sun light throughout the day. The characteristics are invariably attributed to the shade-adaptability as they were not observed with the plants grown under other light conditions (33% shade or open). The peculiar weak and bending traits of the mustard stem under deep shade could be linked with the low biomass index as noted (Fig.1). This indicates that biomass index would determine the degree of strength of the growing shoot during active phases of crop growth. Therefore, high biomass index could be considered as an adaptive trait or marker for low light tolerance of crops which holds much importance in agroforestry perspectives under semi-arid climate.

33% shade



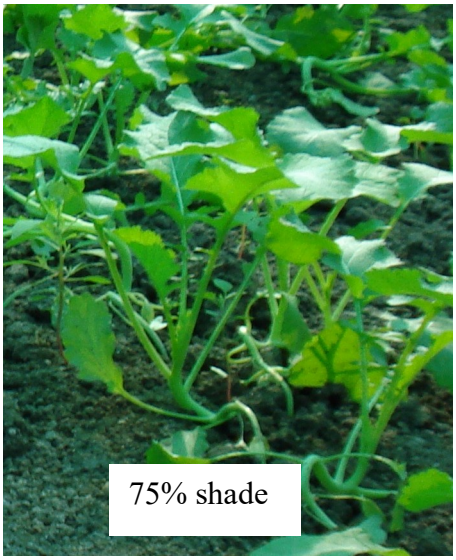


Plate 1: Rare shade-adaptive trait as reflected in peculiar stem bending under deep shade grown mustard (*Brassica juncea*).

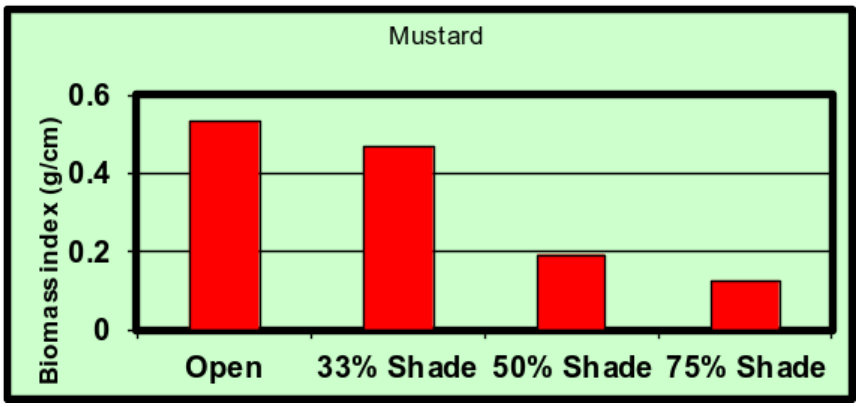


Fig.1.: Shade-adaptive trait as reflected in differential biomass index in mustard.

Badre Alam, Ram Newaj, Munna Ram and S.K.Dhyani
National Research Centre for Agroforestry, Jhansi

KISAN GOSHTI & FIELD DAYS

Centre organized four Field Days/Kisan Goshthies in following villages under FPARP

programme during January to March, 2012. More than 100 farmers, farm women and members of NGOs participated in the programme.

Date	Place	Coordinators
23rd January,2012	Sakuli- Tikamgarh(M.P.)	Dr. R. K. Tewari, Pr. Scientist & PI of the Project; Dr. Ramesh Singh, Sr. Scientist; Dr. D. R. Palsaniya, Scientist and Sh. S.P.S. Yadav, Tech. Officer
14th February,2012	Asati,-Tikamgarh(M.P.)	
17th March, 2012	Ganeshgarh- Jhansi(U.P.)	
29th March,2012	Kundar- Tikamgarh(M.P.)	

NEW SCIENTIST

Dr. Inder Dev, Pr. Scientist (Agronomy) joined the Centre on 24th Feb.2012.

TRAINING PROGRAMMES

Three Training programmes (7th to 9th January; 11th to 13th January and 17th to 19th January, 2012) on Various Components of Watershed Development under IWMP were organized. BSA, Jr. Engineers, ASCI & WDT members from Department of Land Development &Water Resources Development of Lalitpur (32), Jalaun (31) and Jhansi (32) participated in the training.

ICAR INTERZONAL SPORT'S MEET

Sh. Attar Singh, SSS of the Centre participated in the ICAR Inter-zonal Sport's Meet from 16th to 19th January, 2012 held at CRIJAF, Barrakpore (W.B.).

ICAR ZONAL SPORT'S MEET

A contingent of 19 participants from the Centre participated in ICAR Zonal Sports Meet at ICAR Research Complex for Eastern Region, Patna (Bihar) from 16th -19th February, 2012.

HUMAN RESOURCE DEVELOPMENT

- Dr. A. K. Handa, Pr. Scientist; Dr. Ajit & Dr. Badre Alam, Sr. Scientists of the Centre participated in the 3rd International Conference on "Climate Change & Sustainable Management of Natural Resources" during 5th -7th February, 2012 at ITM Universe, Sithouli, Gwalior and delivered the lectures.

- Dr. S. K. Dhyani, Director; Dr. R. P. Dwivedi; Dr. Ajit and Dr. Badre Alam, Sr. Scientists participated in the International Conference on "Climate Change, Sustainable Agriculture and Public Leadership" during 7th -9th February 2012,

NASC, New Delhi and presented research papers. Dr. Badre Alam, Sr. Scientist shared the "Best Poster Presentation Award" conferred for the paper entitled "Breeding in *Acacia nilotica* for abiotic stress" authored by S. P. Ahlawat and Badre Alam in the International Conference. The paper was based on studies conducted at NRCAF, Jhansi.

fgUnh dk;Z"kkyk

dsUnz esa frekgh dk;Z"kkyk fnukad 28 ekpZ] 2012 dks dsUnz funs"kd Mk- ,l- ds- /;kuh dh v/;{krk esa lEiUu gqbZA dk;Zdze dh v/;{krk djrs gq, Mk- /;kuh us vius mn~cks/ku esa dgk fd Hkkjr ljdkj ds xtV esa bl dsUnz dk uke ^^d** {ks= esa gS] blfy, ge yksxksa dks viuk iz"kklfud dk;Z "krizfr"kr fgUnh esa djuk gSA mUgksus leLr oSKkfudksa] vf/kdkfj;ksa ,oa deZpkfj;ksa dk vkg~oku fd;k fd /kkjk 3(3) ds mij fo"ks'k /;ku fn;k tk,] D;ksafd /kkjk dk mYya?ku djus okys vf/kdkjh dk uke ekuuh; lalnh; jktHkk'kk lfefr }kjk ekaxk tkrk gSA mUgksus ljdkjh dkedkt esa i=kpkj dks c<+kok nsus ds fy, dsUnz ds leLr oSKkfudkas ,oa vf/kdkfj;ksa dks funsZf"kr fd;k fd os i=kpkj dks c<kus esa viuk lg;ksx iznku djsa ftlls i=kpkj ds y{; dks iwjk fd;k tk ldsA mUgksus lHkh vuqHkkxk/;{kksa ls vihy fd os Qkbyksa ij fVIi.kh "kr&izfr"kr fgUnh esa fy[kssa ftlls ljdkjh dkedkt esa fgUnh dks c<+kok fey ldsA dk;Z"kkyk esa dsUnz ds leLr oSKkfud] vf/kdkjh rFkk deZpkjh mifLFkr FksA

dk;Z"kkyk ds eq[; oDrk Mk- lh- ds- cktis;h] ofj'B rduhdh vf/kdkjh us ^^**jktHkk'kk dk;kZUo;u] laoS/kkfud izko/kku % gekjk mRrjnkf;Ro ,oa vis{kk;sa**** fo'k; ij viuk foLr`r O;k[;ku fn;kA mUgksus crk;k fd jktHkk'kk foHkkx }kjk jktHkk'kk fodkl ds fy, vusd izko/kku cuk;s x;s gS ftlesa laoS/kkfud izko/kku] jk'Vªifr dk vkns"k] 1960] jktHkk'kk vf/kfu;e] 1963] jktHkk'kk ladYi] 1968 ,o jktHkk'kk fu;e] 1976 vkfn izeq[k :Ik ls gSA mUgksus laoS/kkfud izko/kku ds vUrxZr Hkkx 5 vuqPNsn 120] Hkkx 6 vuqPNsn 210 dh Hkh tkudkjh

nh xbZA mUgksus crk;k fd laln esa dk;Z fgUnh ;k vaxzsth esa fd;k tk ldrk gSA ijUrq yksdlHkk ;k jkT; lHkk dk v/;{k fdlh lnL; dks tks fgUnh ;k vaxzsth esa vius fopkjksa dh vfHkO;fDr ugha dj ldrk mldks viuh ekr`Hkk'kk esa lnu dks lEcksf/kr djus dh vkKk ns ldrk gSA

mUgksus egkefge jk'Vifr ds 27 vizSy] 1960 ds vkns"k dk ftdz djrs gq, crk;k fd dsUnzh; ljdkjh foHkkxksa ds LFkkuh; dk;kZy; vius vkUrfjd dkedkt ds fy, fgUnh dk iz;ksx djsa vkSj turk ds lkFk i= O;ogkj esa mu izns"kksa dh izknsf"kd Hkk'kkvksa dk iz;ksx djasAvius LFkkuh; dk;kZy;ksa esa vaxzsth ds vfrfjDr fgUnh dk mRrjksRrj vf/kd iz;ksx djus ds okLrs ;kstuk rS;kj djus esa dsUnzh; ljdkjh foHkkx bl vko";drk dks /;ku esa j[ksa fd ;FkklEHko vf/kd ls vf/kd ek=k esa izknsf"kd Hkk'kkvksa esa dk;Z vkSj foHkkxh; lkfgR; miyC/k djkdj ogk¡ dh turk dks iwjh lqfo/kk;sa iznku dh tkuh pkfg;sA mUgksus crk;k fd jktHkk'kk vf/kfu;e 1963 /kkjk 3(3) ds vUrZxr fuEu iz;kstuksa ds fy, fgUnh rFkk vaxzsth nksuksa dk iz;ksx fd;k tk;sxk %

1- ladYi] lkekU; vkns"k] ifji=] lwpuk] Kkiu] fu;e] vf/klwpuk] izsl foKfIr RkFkk dsUnzh; ljdkjh dk;Zky;kssa }kjk tkjh dh tkus okyh iz"kklfud rFkk vU; fjiksVZ
2- laln ds fdlh lnu ;k lnuksa ds le{k j[kh tkus okyh iz"kklfud rFkk vU; fjiksVZ
3- VsUMj] dqVs"ku vkfnA

jktHkk'kk fu;e] 28 twu] 1976 ds fu;e 5 esa fgUnh esa izkIr i=ksa ds mRrj dsUnzh; dk;kZy;ksa dks fgUnh esa gh nsuk gksxk] bldk mRrjnkf;Ro gLrk{kjdrkZ dk gksxkA fu;e 7 % dksbZ deZpkjh vkosnu] vH;kosnu ;k vihy fgUnh ;k vaxzsth esa dj ldrk gSA fu;e 8 %dsUnzh; ljdkj ds dk;kZy;ksa esa fVIif.k;ksa dk fy[kk tkukA fu;e 9 % fgUnh eas izoh.krk] fu;e 11 %eSU;qvy] lkfgR; vkfn f}Hkk'kh gksuk pkfg,A fu;e 12 % fu;eksa ds vuqikyu dk mRrjnkf;Ro dk;kZy; izeq[k dk gksxkA mUgksus crk;k fd fgUnh dks c<kok nsus ds fy,

vusd lfefr;ksa dk Hkh xBu fd;k x;k gS ftlesa dsUnzh; fgUnh lfefr] fgUnh lykgdkj lfefr] Ukxj jktHkk'kk dk;kZUo;u lfefr] jktHkk'kk dk;kZUo;u lfefr izeq[k :Ik ls gSA

mUgksus {ks= ds vk/kkj ij jkT;ksa dk oxhZdj.k ds ckjs esa lHkh dks tkudkfj;ka Hkh nh tks fd fuEuor gS %

^d* {ks= % fcgkj] gfj;k.kk] fgekapy izns"k] e/;izns"k] jktLFkku] fnYyh] mRrj izns"k vkSj v.Meku&fudksckj }hi lewg
^[k* {ks= % xqtjkr] egkjk'Va] iatkc vkSj p.M+hx<+
^x* {ks= % mijksDr ds vykok vU; lHkh

blds vykok mUgksus crk;k fd ^^d** {ks= esa fLFkr dsUnzh; dk;kZy;ksa ds fy, fuEu mRrjnkf;Ro gS %

1- fgUnh esa izkIr ;k fgUnh esa gLrk{kfjr i= dk tcko fgUnh essa nsa
2- fVIIk.kh ,oa elkSnk ys[ku dk dk;Z dsoy fgUnh esa djsaA
3- fu;e] eSU;qvy] ladYi] fufonk] izsl foKfIr] djkj ,oa lHkh rjg ds izk:Ik f}Hkk'kh gksA
4- jftLVjkssa ds "kh'kZd] ukeiV~V] lwpukiV~V] i= "kh'kZ] yksxks] laln ds le{k j[kh tkus okyh fjiksVZ vkfn f}Hkk'kh gksA

Farmers Participatory Action Research Programme – Phase II Concluded

Farmer's participatory action research programme in its second phase was started at National Research Centre for Agroforestry, Jhansi during 2010-11. The programme was sponsored by Ministry of Water Resources, Govt. of India for 2010-12 with a total outlay of Rs. 50 lakhs. Under this programme, 100 farmers in five villages of Jhansi, Uttar Pradesh (Hastinapur, Domagor, Dhikauli, Nayakhera and Ganeshgarh) and five villages of Tikamgarh Madhya Pradesh (Dabar, Garhkundar, Rautiana, Sakuli, Ubaura and Asati) were selected. Two technologies namely agroforestry with micro-irrigation and soil and water conservation were demonstrated on farmer's field. Agroforestry techniques were developed on 56 farmer's field while 12 farmers were selected for micro-irrigation. Each demonstration was conducted on one acre area. Agroforestry system included field plantation of aonla, guava, citrus along with kharif and rabi crops.

The farmers were also asked to plant trees especially teak on their field's boundary. During the project period 696 aonla, 730 guava, 1400 citrus, 1675 teak, 200 papaya, 50 bamboo and 10 bael plants were planted under agroforestry. Average survival of aonla (68%), guava (51%) citrus (32%), teak (87%) and bamboo (82%) was satisfactory in October. Teak and bamboo (*Bambusa vulgaris*) are in great demands by farmers for planting on field bunds and along water courses (nallah). In light of Anna pratha of rearing cattle in the region which happens to be major bottleneck in survival of trees, barbed wire fencing was provided to the farmers adopting agroforestry landuse.

Micro-irrigation systems under study were rain port (6 numbers), rain gun (2 numbers), drip (1 number) and sprinkler (3 numbers). These systems were largely uncommon in this area and most required. Drip irrigation was laid down in (4 year old) guava orchard while sprinkler and rain guns were used for irrigation of crops like wheat, gram, mustard and groundnut. Rain port was used to promote vegetable cultivation with limited water resource. Soil and water conservation techniques like land leveling, field bunding construction of khadins were targeted on 32 farmers field. Improved package of practices for crops included improved crop varieties and proper nutrition of crops. During kharif new crop varieties of til (shekhar, JTS-8), urd bean (T-9, uttara), ground nut (Kaushal), maize (Azad uttam) were introduced amongst farmers. In rabi, most of the farmers opted for wheat where in varieties Lok-1, WH 147 and GW 322 were introduced. Fertilizer use to the crops in this region is grossly imbalanced and inadequate. Tropicultor was demonstrated for various tilling, sowing and other field operations. Efforts were made to bring down the existing wheat seed rate to 125 kg/ha from 200-250 kg/ha without any yield loss through field demonstrations. Nine field days were organized during the project period in order to ensure exposure visit of participating farmers to field trials and benefit by each other's experience. Expert lectures on improved package of practices under agroforestry system, crop management and livelihood alternatives were also arranged for benefit of farmers.

The project activities received overwhelming response and support from farmers and produced encouraging results. There was 5-37% increase in crop yields across the crops and varieties during Kharif season. However, the response was less in field where land leveling was done due to exposure of sub soil in very first year of leveling while agroforestry interventions with improved varieties increased crop yields from 15.1% to 37.3%. Similarly, soil and water conservation practices (leveling + bunding) showed 9.93% to 20.97% increase in production in the very first season. Moreover, the micro-irrigation systems particularly rain port and rain gun are enthusiastically being discussed by farmers. Rain port is highly suitable for vegetables like brinjal. Use of rain port not only minimized labour requirement but also reduced drudgery of insecticide and fertilizer application and improved quality of the fruits. It also prolonged the brinjal production by more than one and half month and produced 1.5 times more yield than the brinjal grown

without rain port in the same field. The power consumption was also less in brinjal with rain port than the traditional basin irrigation. Similarly, rain gun was also proved power, labour and water saving in wheat, pea and gram.

FPARP phase II was concluded on March 31, 2012 and proved a boon to the farmers and its impact in terms of expansion and acceptability of agroforestry system is eye-opener. This is likely to have far reaching consequences in years to come because all the components included here have long lasting effects and actual results/impacts will start after initial few years of their imposition. Therefore, the impact of new varieties, micro irrigation systems, land leveling and bunding, Khadins and multipurpose tree species introduced will be more in the coming seasons.

Sprinkler

Rain port

Rain gun

Guava based agroforestry

D. R. Palsaniya, R. K. Tewari, Ramesh Singh, S. K. Dhyani and S. P. S. Yadav
National Research Centre for Agroforestry, Jhansi