

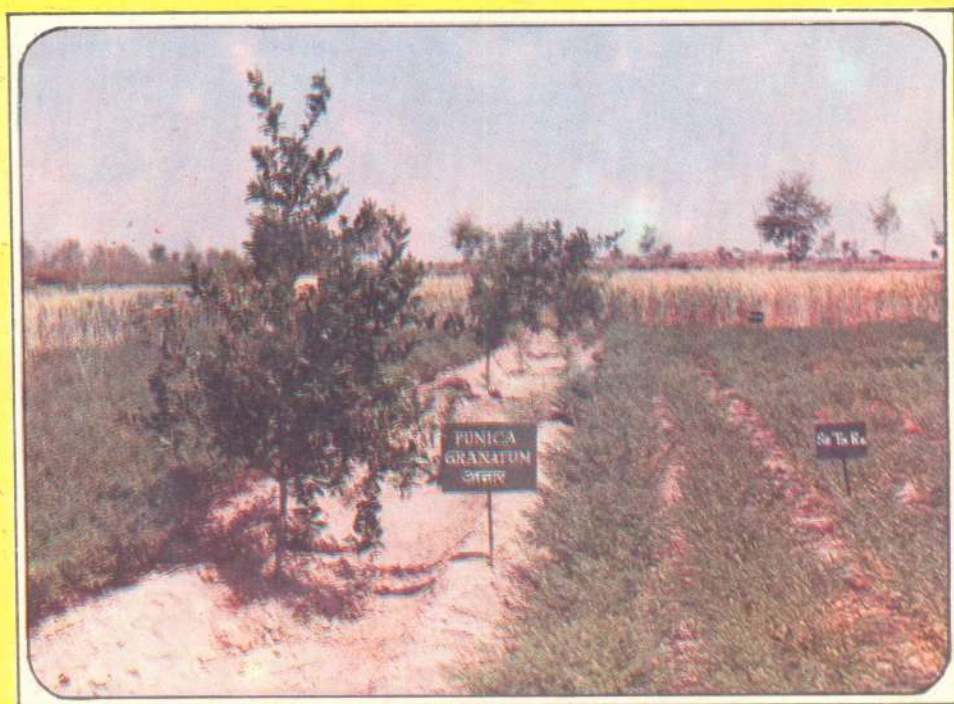


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99 per cent of sunflower, pearl millet and redgram in the third year during the fourth *Kharif* season. This was followed by *Eucalyptus*. In slow growing tree species viz., *Sissoo* (*Dalbergia sissoo*) and *Neem* (*Azadirachta indica*) reduction was less as compared to the exotic tree species. The sunflower was more sensitive crop followed by pearl millet and redgram. Four years mean data indicated that the recovery in grain production irrespective of crops and alley width, in association with *Neem*, *Sissoo*, *Subabul* and *Eucalyptus* was to the tune of 71, 66, 38 and 55%, while recovery in the grain production of arable crops irrespective of tree species and alley width was to the extent of 56 to 59%, respectively. In closer alley width the recovery of grain production was minimum as compared to the wider alley width in all tree species tried and hence, it was clearly indicated that alley planting of tree species either planted for fuel or timber purpose with the arable crops alley width should not be less than 10 m.

D.G. Ramshe
MPAU, Rahuri (M.S.)

Alley cropping with *Subabul* (*Leucaena leucocephala*)

In order to develop suitable alley cropping, the performance of field crops viz., maize, wheat and green gram were studied under the alleys of 2 year old *Subabul*. Among the crops tested, the yield performance of green gram was very poor which was attributed to the allelopathic inhibition by the *Subabul*. The highest grain yield of wheat and maize was realised when the *Subabul* hedge was maintained 3 m apart. However, the spacings within the row had no significant effect on the grain yield. Significantly higher *Subabul* herbage yield



Alley cropping experiment at R.A.U., Pusa (Samastipur)

were obtained under the planting geometry of 2 m x 0.25m.

O.P. Chaturvedi
Rajendra Agril. University,
Pusa (Bihar)

Orientation effect of *Eucalyptus* on the performance of crops in Doon Valley under rainfed conditions

Studies were carried out on the orientation effect of *Eucalyptus* hybrid (planted 1.25 m apart in a replicated systematic 'L' shaped design in N-S and E-W direction) on the performance of rainfed crops (maize-wheat rotation) in the Doon Valley. The data with respect to height, basal diameter, DBH and crown diameter for the tree showed no significant differences due to orientation effect in first two years. Similarly maize and wheat yields were also not affected significantly. Maximum maize yield (28.1 q/ha) was recorded in planting the tree 8-10 m away in E-W directions, whereas maximum wheat yield (8.1 q/ha) was with a tree distance of 4-6 m in E-W direction (low yield in wheat is due to moisture stress).

K.S. Dadhwal and V.P.S. Tomar
CS&WCR&TI, Dehradun (U.P.)

Tree growth and grain production in the lateritic tracts of West Bengal

To evaluate the seasonal aerial growth and productivity of *Acacia auriculiformis* and *Eucalyptus* hybrid trees planted at three spacings (2 m x 2 m, 1 m x 4 m and 2 m x 4 m) under sole and alley system with 6 different crops viz., black gram, rice, sesame, pigeonpea, groundnut and maize with *Acacia* and 5 different crops viz., black gram, horse gram, cowpea, niger and *S. hamata* with *Eucalyptus* tree. Results indicated better growth in terms of height and girth of *Acacia* and maize recorded highest grain yield (1.02 t/ha) followed by rice (0.70 t/ha). Cowpea and black gram yielded 0.24 t/ha and 0.20 t/ha in the alleys of *Eucalyptus*.

S.K. Majhi, G.B. Roy, S. Pal,
S.Maiti and B.N. Chatterjee
BCKVV, Mohanpur (W.B.)

Growth parameters (plant height, collar diameter and canopy) were also recorded at regular intervals. Plant height was much higher under agroforestry situation as compared to control in guava, anar and kinnow but in ber it was the reverse. Collar diameter in anar was in favour of agroforestry conditions but guava (*P. guajava*) and ber recorded higher canopy under control situation. The canopy data recorded during March 90 showed much higher values in guava and kinnow for agroforestry situations as compared to that of control but it was reversed in ber and anar.

A.S. Gill and R. Deb Roy
NRCAF, Jhansi (U.P.)

Plantation crop based agroforestry system for humid tropics

Coconut with 7.5m x 7.5m spacing has the available space of 56.25 sq.m. of which concentration of roots lies in 12.57 sqm. and thus provide the remaining area for growing arable crops with 56% of light available. Coconut/arecanut-pepper + cocoa + ginger/ turmeric/ pineapple forms a viable multi stored cropping system. This system provides an ecosystem similar to that of forest.

P. Rethinam
ICAR, New Delhi.

Comparative growth performance of MPTS

Performance on growth behaviour of 11 MPTS viz., *Acacia cupressiformis*, *Anilotica*, *Albizia lebbek*, *Dalbergia sissoo*, *Emblia officinalis*, *Eucalyptus tereticornis*, *Hardwickia binata*, *Leucaena leucocephala*, *Melia azedarach*, *Madhuca latifolia* and *Syzygium cumini* grown under intensive agroforestry cropping systems and rangeland conditions with pasture were compared after two and a half years of establishment at NRCAF, Jhansi. All the MPTS grown under intensive cropping system (partially irrigated) showed two times more plant height than the rangeland situations (rainfed). The maximum plant height of 6.71 m was recorded with *Eucalyptus* followed by *Acupressiformis* (5.44 m), *Anilotica* (5.15 m), *Leucocephala* (3.72 m), *D.sissoo* (3.30m) and *M.azedarach* (3.12 m). However, in rangeland situation, the maximum height of 2.11 m was noted

Long duration companion crops such as turmeric, pineapple and lemon grass (*Cymbopogon citratus*) on a seven year average, the yield data revealed that turmeric (2.8 t/ha) proved to be the most ideal companion crop under rainfed conditions in peach orchard for the Doon Valley. This was followed by pineapple (6.2 q/ha). Turmeric and pineapple both are shallow rooted and had no adverse effect on the tree height and crown diameter upto sixth year. Lemon grass adversely affected the tree growth.

**Y.K. Arora, Gurmel Singh and
S.C. Mohan,**
CS&WCRA&TI, Dehradun (U.P.)

Agri-horti-silvicultural studies

Studies on crop production in the interspaces of fruit trees and MPTS continued during the second/third year. Results indicated that high crop productivity could be maintained at the initial growth stages of the fruit trees and MPTS with 400 plants/ha. Highest grain productivity (35.01 q/ha/annum) was registered with *Punica granatum* (anar) followed by (34.53 q/ha/annum) in *Citrus reticulata* (Kinnow) and (34.04 q/ha/annum) in *Zizyphus mauritiana* (ber).

Among the four intensive crop rotations maximum grain productivity (48.43 q/ha/annum) was registered with sorghum - wheat rotation followed by groundnut - wheat (39.06 q/ha/annum) and sorghum - chickpea (30.60 q/ha/annum) rotations grown in the interspaces of the fruit trees.

Maximum grain productivity (52.95 q/ha/annum) was recorded with sorghum-wheat rotation in association with anar followed by 45.81 q/ha/annum in association with ber fruit tree.

Taking into consideration the grain productivity recorded under control it was maximum (55.13 q/ha/annum) with sorghum-wheat rotation giving a gross return of Rs. 10,356 per ha/annum as compared to Rs. 9,109 per ha/annum through the same rotation in association with the fruit trees.

All the four fruit tree species tried in the investigation maintained more than 90% survival till during March 90.

with *Leucaena* followed by *A.cupressiformis* (2.06 m), *A.nilotica* (1.66 m) and *M.azedarach* (1.63 m).

As regards to collar diameter (C.D.) also, all the MPTS grown under intensive cropping system gave 2-3 times more C.D. as compared to rangeland conditions. The highest C.D. was recorded with *Eucalyptus* (11.12 cm) followed by *A.nilotica* (8.77 cm). In case of rangeland conditions the maximum C.D. of 3.83 cm was recorded with *A.cupressiformis* followed by *M.azedarach* (3.39 cm), *Leucaena* (3.20 cm) and *A.nilotica* (2.83 cm).

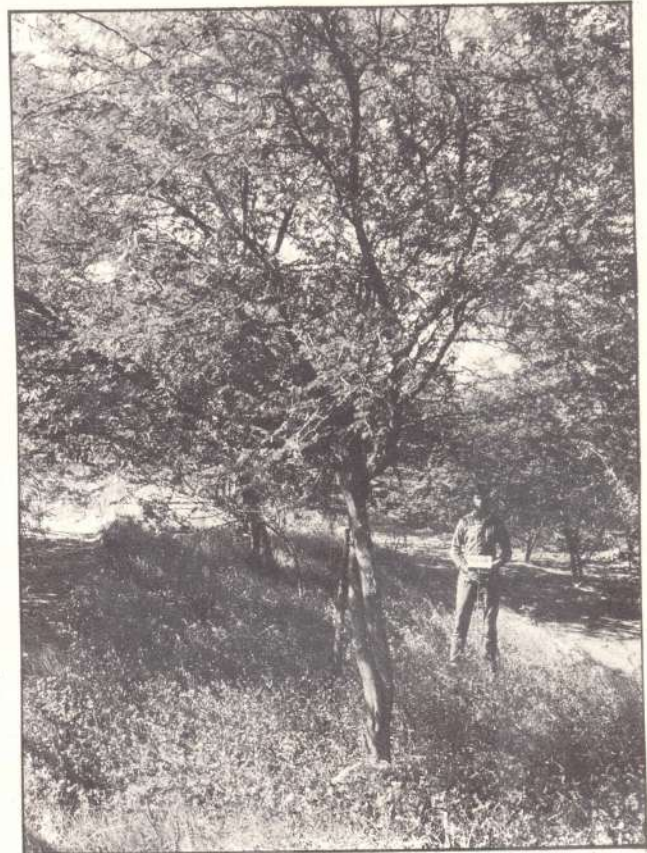
Thus, the growth performance of MPTS grown under intensive agroforestry cropping systems was much superior than grown under rangeland conditions.

R. Deb Roy and P. Rai
NRCAF, Jhansi (U.P.)

Agroforestry in alkali soils

Long term field studies initiated in 1984 on an abandoned Panchayat alkali land (pH 10.4, ESP 90) belonging to Gudha village of Karnal district in Haryana indicated that these can be improved by growing *Prosopis juliflora* and *Leptochloa fusca* (Karnal grass) together in a unified agroforestry system. Growing of *Leptochloa* in association with *prosopis* for 50 months gave 46.5 t/ha green fodder in 15 cuttings without incurring expenditure on amendments and fertilizers. Raising of *Prosopis* and *Leptochloa* together on an alkali soil for a period of little more than 4 years improved the soil to the extent that comparatively less tolerant but more palatable fodders like *Trifolium resupinatum*, *Trifolium alexandrinum* and *Medicago denticulata* were grown successfully. The green forage yields of these crops were comparable to their yield levels in normal cultivated soils. The much needed firewood was obtained with cutting side branches of *Prosopis* at 16, 40 and 52 months after planting. The total firewood yield in 52 months growth period was 7.7 t/ha when *Prosopis* was planted at 5 m x 3 m spacing.

Gurbachan Singh
CSSRI, Karnal (Haryana)



Barseem can be grown under prosopis canopy after reclaiming sodic soils by growing Leptochloa grass

Leucaena and hybrid napier based forage forestry system

The effect of stand geometry of hybrid napier (IGFRI-3) and *Leucaena leucocephala* (K-8) was studied in relation to their perenniality and productivity. The results revealed that paired row (2:2) planting system not only registered the maximum total green forage (1293 q/ha) and drymatter (354 q/ha) yields but also enhanced the productivity of individual component. The highest relative crowding coefficient (RCC) and land equivalent ratio (LER) values obtained with this system demonstrated the fact that planting of hybrid napier (dominant) and leucaena (dominated) in paired rows gave maximum advantage of the association as compared to their pure plantings.

A.S. Gill and K.S. Gangwar
IGFRI, Jhansi (U.P.)

AGROFORESTRY CALENDER

National :

National Seminar on Watershed Management, PKV, Akola (M.S.). To be held during 1991 (dates not finalised).

National Seminar on Resource Management for Hill Agriculture. ICAR Research Complex for NEH Region, Shillong. To be held during 1991 (dates not finalised).

Workshop on NGO's and Forestry. Sometime in October 1991 at BAIF, Urlikanchan, Pune. Org: IDRC Regional Centre, Singapore. Contact Dr. N.G. Hegde, Vice President, BAIF, Pune.

National Seminar on "Agriculture in nineties: challenges and Research needs" organised by Dr. M.N. Sinha, Indian Society of Agricultural Science, New Delhi, Oct. 23-25, 1991.

National seminar on resource management for hill agriculture to be held at shillong from 28-30th Oct. 1991. Contact point Dr. R.N. Prasad, Organising Secretary & Director, ICAR Research Complex for NEH Region, Barapani (Meghalaya) -793103.

National Symposium on farming systems to be held at Port Blair from 16-17 Dec., 1991. Write to Organising Secretary, CARI, P.B.No.181, Port Blair 744 101 ANDAMAN.

Interntional :

Training Course on Agroforestry Research for Development, ICRAF, Nairobi, Kenya, 14th Oct. to 1st Nov. 1991. Contact Dr. Ester Zulberti, ICRAF & Information Director.

International Symposium on Nutrient Management for Sustained Productivity to be held at PAU, Ludhiana (India): Feb. 10-12, 1992 (Contact point : Dr. N.S. Pasricha, Dept. of Soils).

First International Crop Science Congress, to be held at Ames, Iowa, USA, July 14-22, 1992. Contact Dr. Kenneth Frey, Chairman, International Science Congress C/o Agronomy Dept., Iowa State Univ., Ames, IA-50011, USA

The XVII International Grassland Congress, to be held at New Zealand/Australia in Feb. 1993. Write to Executive Secretary XVII Grassland Congress, Organising Committee, Agronomy department, Massey University, Palmerston, North, NEW ZEALND.

Training course/workshop on socio-economic research for agroforestry technology development Sept. 2-6, 1991, Nairobi, Kenya.



InaUguration function of the indo-US cum training in agroforestry on models using systems analysis methodologies. Seated from left are Dr. C. R. Hatch, Dr. S. Chinnamani, Assistant Director General (AF), Dr. Maharaj Singh and Dr. Panjab Singh, Director, IGFRI, Jhansi. Dr. R. Deb Roy, Director, NRCAF, Jhansi welcoming the participants.