Agroforestry
NEWSLETTER
National Research Centre for Agroforestry, Jhansi

Vol. 10, No. 2 & 3

APRIL-SEPTEMBER, 1998

NATIONAL SYMPOSIUM ON MULTIPURPOSE TREE SPECIES FOR AGROFORESTRY SYSTEMS

In India agroforestry has been a way of life. Our social, religious and cultural ethos has been closely linked with the planting and protection of various trees. Tree worship is still continued in many societies of our country. Trees serve triple role of protection, production and amelioration for farming system. Tree biodiversity has preserved in many areas because of this realization in a multipurpose land use system. The trees served diverse function and thus are known as multipurpose trees. Agroforestry systems are one of the best examples of land use systems.

Keeping in view the manifold importance of multipurpose tree species and their roles, the National

Research Centre for Agroforestry, Jhansi organised a National Symposium on Multipurpose Tree Species for Agroforestry Systems under the patronage of Dr. G.B. Singh, Deputy Director General (Natural Resource Management), Indian Council of Agricultural Research, New Delhi, on 11-13 July, 1998 during the Golden Jubilee year of the country's independence with following themes :

1. MPTS Inventory and identification in relation to agroforestry.
2. Improvement of MPTS for agroforestry

3. Biotechnology and biodiversity related to MPTS.
4. Nursery, clonal propagation and seed orchards of agroforestry trees species.
5. Management of MPTS for problematic soils in agroforestry systems.
6. MPTS specific agroforestry system for different agroclimatic zones.
7. Social, economic, marketing and policy aspects.
8. MPTS based industrial plantation and their prospects.
9. Non-woody products and their post harvest technology.

The National Symposium on Multipurpose Tree Species for Agroforestry Systems was inaugurated by Hon'ble Dr. G.B. Singh, DDG (NRM), ICAR, New Delhi and the Chief Guest of the Symposium. In his inaugural remarks he emphasised that

Data based inventory of multipurpose tree species for agroforestry systems may be prepared by the scientists of ICAR, State Agricultural Universities and forest departments.

Selected multipurpose tree species should be planted to check magnitude of degradation/ deterioration of waste land.

Package for the rehabilitation of degraded lands may be prepared and circulated among the users, so that selected multipurpose tree species could be grown for better productivity, protection of soil from erosion and remedy of environment.

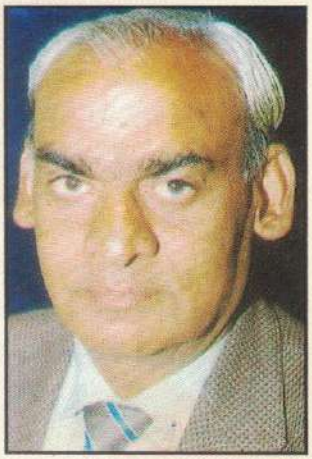
The Chief guest appreciated NRCAF for organising the symposium during the Golden Jubilee of Independence.

Dr. K.G. Tejwani, Ex. Director, CSWCRTI, Dehradun and Chairman of Symposium enumerated both protection and production roles of multipurpose trees. He pointed out that apparent roles of tree species are well known and many of them had recently been quantified. He elucidated that a single tree estimated to provide Rupees. 2.77 million through service role in sequence of oxygen (Rs. 0.55 m), air pollution control (Rs. 1.05 m), soil fertility and water conservation (Rs. 0.64 m), shelter (Rs. 0.53 m) besides flowers, fruits, medicines, fodder, fuel and timber (Rs. 0.43 m). Dr. Tejwani suggested that the already completed work should be documented immediately.

He congratulated Dr. K.R. Solanki and his team for organising the symposium.

Dr. J.C. Kalla, Former Director, NAARM, Hyderabad enumerated the role of multipurpose tree species in

From the Director's Desk



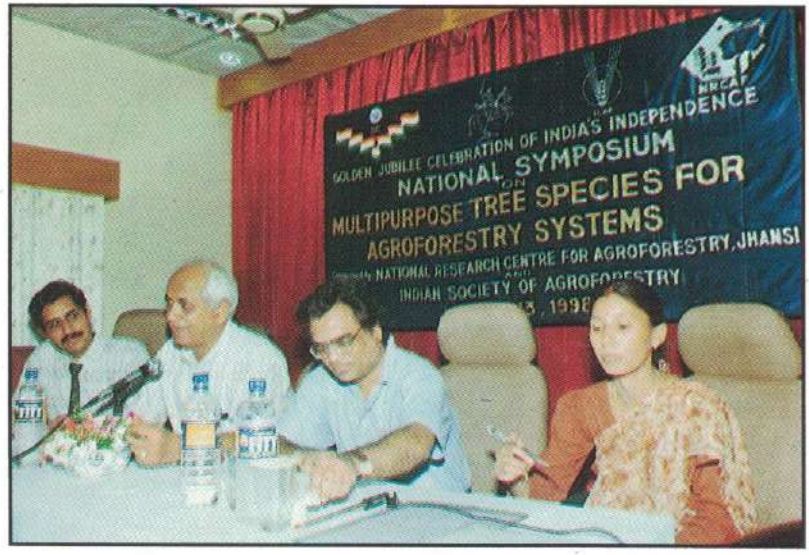
Agroforestry has been nicely woven in the fabric of life in the country since epic era. Many tree species are worshipped by various religious societies in different states of our country. Trees serve triple role of production, protection and amelioration. Now-a-days numerous multipurpose tree species are grown in association of field crops under various agroforestry systems.

In view of manifold paramount importance of multipurpose tree species, National Research Centre for Agroforestry, Jhansi, organised a National Symposium on Multipurpose Tree Species for Agroforestry Systems during 11-13 July, 1998 under the patronage of Dr. G.B. Singh, Deputy Director General (NRM), ICAR, New Delhi during the Golden Jubilee Year of country's independence. Scientists, Professors from ICAR Institutes, State Agricultural Universities, Officers from Forest Department and NGO's participated in the symposium. It was gala scientific function which yielded many recommendation of both academic and applied value.

KR So Lanki

(DR. K.R. SOLANKI)

socio- economic aspects of rural population. He emphasised that tree species should be selected in view of climate, acceptable to farmers and availability of market for the final products, so that the socio economic status of farmers could be uplifted to a considerable extent. The government and financial institutes should come forward to provide financial support for establishment of an agroforestry system.



Dr. P.S. Pathak, ADG (AF), ICAR suggested that inventory for multipurpose tree species to be prepared. He described the role of agroforestry in conservation of biodiversity. Dr. Pathak provided statistics of degradation of land and depletion in forest area in the country.

Dr. R. Deb Roy, Former Director of NRCAF, elucidated the importance of neem in agroforestry system to bring prosperity to farmers. He invited the attention of scientists and farmers to grow 10-15 trees/ha in rainfed agricultural land which would provide fodder, fuel wood through lopping. Seeds of neem would further offer additional income to farmers. Dr. Deb Roy expressed his pleasure for the organisation of the symposium by NRCAF.

Dr. K.R. Solanki focused on the research achievement of the Centre.

In agrisilviculture system under partial irrigation cereal crops like wheat showed less reduction in yield as compared to legume crops like gram in rabi season.

* In *Hardwickia binata* (Anjan) based agroforestry system one can increase the population of trees upto 800 trees/ ha without significantly affecting the yield of understorey crops.
* Vegetative propagation techniques of neem, kardhai and kala Siris have been standarised.
* Based on the results obtained so far neem appears to be self pollinated tree.
* Ber variety Banarasi Karaka is better variety in agri-horticulture systems. It does not affect the yield of intercrops.
* Agrotechniques for aonla based agri- horticulture system have been standardised for poor soils under rainfed conditions. The promising varieties of aonla are Kanchan, NA-7 and Krishna. In situ budding of aonla increased survival percentage of plants in the field.
* Nutan and kardhai has been identified as shrub and tree respectively for degraded land.
* Comparison of natural grassland and silvipastoral system through sheep and goat revealed an increase in body weight of sheep and goat @ 33 and 44% higher in silvipastoral system as compared to natural grassland in a total grazing of 478 days.

NRCAF, Jhansi has been nominated as lead institution by Government of India, Ministry of Environment and Forests for establishment of thematic network on Agroforestry Management and Soil Conservation in Arid, Semi- arid and Dry sub- humid areas for the Asian region.

The conference was full of galaxy of the Scientists, Teachers and Officers of ICAR Institutes, NGOs, State Agriculture Universities. Some of the prominent scientists were namely Dr. K.G. Tejwani, Ex. Director, CSWCRTI, Dehradun, Dr. J.C. Kalla, Ex. Director, NAARM,

Hyderabad, Dr. P.S. Pathak, ADG (AF), ICAR, New Delhi, Dr. R.Deb Roy, Ex. Director, NRCAF, Jhansi, Dr. D.K. Marothia, Member CACP, New Delhi, Dr. Braham Singh, Director, DRDO, New Delhi, Prof. N.P. Melkania, NEH Institute of Sciences & Technology, Nirjuli, Arunachal Pradesh, Dr. M.S. Haque, Deputy General Manager, NABARD, Mumbai, Dr. P.S. Tomar, Director, IGFRI and many more, it is not possible to mention all names here. About 100 delegates from different corners of the country attended the symposium besides the scientists of IGFRI, NRCAF and officer of State Forest Department. The symposium continued for three days and 104 paper were presented and discussed critically.

Recommendations

Recommendation of the symposium are as follows :

Policy

1. Patenting rights of agroforestry products and technologies need to be strengthened and popularise among scientists and other professionals.
2. Multipurpose trees species (MPTS) present in the farm lands should be free from the application of forest laws. Farmers should be allowed to take their own decisions on choice of species for planting and felling according to their needs.
3. Transparency in the implementation of legislative measures for production and marketing of agroforestry products specially tree and shrub based group.
4. Human resource development in agroforestry should be strengthened by establishing close linkages of SAUs with the Ministry of Environment & Forest, ICRAF and other International Organisations.
5. Participation of women in plantation, care and production of MPTS under agroforestry systems should be encourged.
6. There should be close linkage of producers with tree based industries particularly paper and pulp industries to ensure the marketing and realise the benefits.
7. Activities related to plantation of MPTS in degraded lands, range lands, problematic soils etc. should be strengthened for reclamation of these lands as well as for fulfilling the fuel wood need of the villagers.
8. Close linkages between R & D institutions farmers and tree based industries should be strengthened for efficient transfer of technology and quick marketing.
9. Establishment and strengthening of infrastructure for mass multiplication of MPTS through NSC and State Seed Corporations.
10. Mechanism for releasing varieties in MPTS should be developed at Government level.
11. Teaching on tree farming principles in to environmental conservation should begin at primary school level and continue up to the college level to popularise tree based farming systems.
12. Views and suggestions of experienced farmers in the field of agroforestry should be invited before planning agroforestry programme for adaptation.

Scientific and Technical

1. Inventories of MPTS should be made based on farming system preference, tree-crop association, farm holding size, suitability, edaphic preferences and socio- cultural and economic suitability.
2. The data and information generated on the work done on MPTS for agroforestry including the bench mark/ diagnostic and design surveys conducted must be secured, compiled and updated on 15 years of work must be brought.
3. A separate inventory of unexploited indigenous fruit and medicinal trees should be prepared. Their domestication as future MPTS resource possibilities should be explored.
4. Plantation of neem trees in farm lands should be encouraged because it has good economic and environmental value at global level.
5. *Acacia nilotica* based agroforestry system is quite successful particularly in rice growing area. Extension activities to popularise this system should be strengthen.
6. Plantation of tree species namely *Dalbergia sissoo*, *Ficus religiosa*, *Ailanthus excelsa*, *Cassia fistula*, *Calotropis procera*, *Moringa oleifera*, *Ficus benghalensis*, *Azdirachta indica*, *Pithecolobium dulce*, *Mangifera indica*, *Tectona grandis* and *Ficus infectoria* in polluted area should be encouraged since these species are resistant to the automobile exhaust pollutants, air pollutants and work as dust filtering agents.
7. Research is needed on optimum tree density including its geometry.
8. There is urgent need to conserve bio-diversity of MPTS in situ and ex-situ.
9. Silvicultural and management aspects (below ground & above ground) need to be worked out to reduce competitive effect between components of a tree crop system.
10. Intensified research should be initiated to reduce competition for nutrients and soil moisture and develop more knowledge on tree behaviour and functions as well as on shading effect on under storey crops.
11. Economic and socio-economic analysis of MPTS in agroforestry systems should be done on priority basis.
12. Collection and evaluation of promising MPTS should be done under various agroforestry systems rather than in isolation.
13. Analysis of social, anthropological and economic relations of MPTS with particular reference to women, children, tribals and landless farmers and small holders should be done.
14. National network should be established for exploration, collection, multiplication, distribution and conservation of germplasm of MPTS for agroforestry species.
15. In first, genetic improvement work should be started at national level in *Populous deltoids*, *Alnus nepalensis*, *Ailanthus excelsa*, *Azadirachta indica*, *Dalbergia sissoo*, *Prosopis cineraria*, *Tamarindus indica*, *Emblica officinalis*, *Anthocephlus cadamba*, *Tamarindus indica* and *Acacia nilotica*.

16. Mode of pollination and reproductive biology of important MPTS should be studied.
17. Simple and feasible techniques should be standardised for vegetative propagation.
18. Seed productive zone should be identified to supply quality seeds for immediate needs of farmers.
19. Clonal seed orchards of important MPTS should be established for agroforestry systems.
20. Seed standards should be prepared for MPTS.
21. Nursery techniques for MPTS should be developed to reduce the cost of seedlings.
22. Research on tree physiology including nutritional requirements, biochemistry of nitrogen fixation of trees, mycorrhizal association and prolonging seed viability should be investigated to increase production.
23. Research on nutrient cycling in relation to the retention/ uptake ratio, redistribution and nutrients use efficiency in respect of MPTS is required.
24. More emphasis should be given to silvipastoral system for livestock farming on degraded lands.

GROWTH BEHAVIOUR OF MPTS UNDER SODIC SOILS OF CENTRAL UTTAR PRADESH

To explore the possibility of MPTS

Survival under sodic soils of Central Uttar Pradesh with the objective to fulfil the need of timber, fuel fodder and rehabilitate sodic soil of the area, a project of ten MPTS species were taken up at Regional Research Station, Daleep Nagar, C.S. Azad University of Agriculture & Technology, Kanpur during the year 1989. For this purposes ten multipurpose tree species

viz. Azadirachta indica, Dalbergia sissoo, Albizia procera, Terminalia arjuna, Eucalyptus hybrid, Leucaena leucocephala, Acacia nilotica, Acacia catechu, Morus alba and *Cassia*

siamea were planted in randomized block design and replicated four times. Planting was done in pits (60x60x90 cu cm) and filled with 3 kg. Pyrite+ 5 kg compost+10 kg sand and soil of the same field. The initial pH and EC of the soils was 10.5 and 0.73 mhos/cm, respectively.

Growth parameters

It is observed that among the 10 MPTS tested, the *Eucalyptus hybrid* attained the highest plant height (995.5 cm) followed by *Leucaena leucocephala* (800.0 cm), *Acacia nilotica* (780.0 cm) *Albizia procera* (705.0 cm) and *Azadirachta indica* (685.0 cm) while the plant girth was maximum with *Azadirachta indica* (64.5 cm) followed by *Acacia nilotica* (54.0 cm) and *Albizia procera* (53.5 cm).

Change is soil pH and EC

At the time of plantation the soil pH and EC were very high i.e. 10.5 and 0.73 mmhos/cm, respectively. Under such high pH condition, the survival of crops was poor. By the adoption of agroforestry models the pH and Ec came down up to 8.10 and 0.31 mmhos/cm, respectively and inter-cropping of cereal, oil seeds and pulses (Barley, mustard and black gram) were done. Now the full experimental area reclaimed and fit for crop production. The tree species like *Leucaena leucocephala* (pH7.7), *Acacia nilotica* (pH 7.7), *Cassia semea* (pH 7.7) proved better in respect of pH control followed by *Acacia catechu* (pH 7.9), *Albizia procera* (pH 8.0), *Dalbergia sissoo* (pH8.1) and *Azadirachta indica* (pH 8.1) and less improvement in pH were reported by *Eucalyptus hybrid* (pH 8.4), *Terminalia Arjuna* (pH 8.4) and *Morus alba* (pH 8.4) during the year 1996.

By overall observation it can be concluded that under sodic soil condition out of ten species evaluated *Acacia nilotica* followed by *Azadirachta indica*, *Eucalyptus hybrid* and *Leucaena leucocephala* were found most suitable tree species for Central Plain Zone in term of growth and soil rehabilitation.

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MYCORRHIZA AND ITS INFLUENCE ON GROWTH OF SUBABUL

A pot culture study was conducted to evaluate the growth performance of *Leucaena leucocephala* by inoculating with Vascular Arbuscular Mycorrhiza (VAM). The pots used were of the size of 25 kg capacity. The treatments included in the study were :

T1 Control (without N P K, without VAM)

T2 Soil inoculation with VAM

T3 Seed inoculation withVAM

T4 Soil and seed inoculation withVAM

T5 Soil inoculation with VAM + 30 kg P_2O_5

T6 Seed inoculation with VAM + 30 kg P_2O_5

T7 Soil inoculation with VAM + 60 kg N + 30 kg K_2O ha-1

T8 Seed inoculation with VAM+60 kg N+ 30 kg K_2O ha-1

T9 60 kg N+ 30 kg P_2O_5+ 30 kg K_2O ha with VAM

The result of the study revealed that due to inoculation of VAM to both soil and seed, there was increase in height of subabul plants as compared to control (12 months after planting). Among seed and soil inoculation treatments, the later proved to be superior for height. When VAM inoculated in the presence of phosphorus, growth recorded was inferior in both T5 (106 cms) and T6 (87.30 cms) as compared to T7 (155.4 cms). These results clearly indicated that in the presence of applied phosphorus, VAM does not work efficiently. It was also interesting to note that even the combined treatment of seed and soil inoculation, the growth performance of subabul was inferior compared to individual treatments of soil and seed inoculation. The reason for such a trend will have to be studied. These results were an indication that in drought effected P- deficient soils, *Leucaena leucocephala* can be conveniently grown without any hindrance to growth as it was proved that VAM imparts drought tolerance to many of the tree species.

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INTERCROPPING OF TORIA IN MANGO ORCHARD

The investigation was carried out at CSWCRTI, Research Farm, Selakui, Dehradun during 1996-97 under gravely rainfed conditions. The profile characteristics of gravely land was very poor having high gravel content (68.66% by weight) owing to high infiltration rate and poor water holding capacity. The top soil depth was less than one ft. and nutritional status of soil fraction was also very poor.

After modification pit profile (1 m^3) by filling with good soil+ 20 kg FYM, mango variety 'Mallika' was planted at 8m apart during July, 1995. The drip system has been installed to provide irrigation to mango plants only during peak summer (April-June). The recommended does of fertilizers were given every year. Almost all the plants induced flowering in second year of planting but inflorescence were removed to provide strength to the plants. It was observed that the overall vigour of plants was better with intercrop than of without intercrop due to interculture operation, though the differences were very meager.

In order to utilize inter spaces during *kharif* season any crop suited to edaphoclimatic conditions can be grown with mango but in *rabi* season under gravely rainfed conditions. It is difficult to grow long duration crop as low moisture is the main limiting factor. Therefore, a short duration crop 'toria' variety T-9 *Brassica campestris* var. toria) was raised during *rabi* 1996 and 1997. The yield and yield attributing characters of toria indicated that about 3.68 q/ha grain yield of toria can be obtained under gravely rainfed conditions. The yield of toria was higher during 1997 (4.12 q/ha) as compared to 1996 (3.15 q/ha) because rain was received during crop season of 1997.

The present study suggested that with proper management hybrid mango orchard can be raised under gravely land. The intercropping showed positive influence on the vigour of mango plants. About 3.68 q/ha grain yield of toria can be harvested under gravely rainfed conditions. Integration of toria in the system promoted double cropping and about Rs. 3000/ha net return can be obtained by growing short duration toria crop in mango orchard.

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STUDIES ON SEED GERMINATION IN AONLA (*Emblica Officinalis* Gaertn)

Aonla, the Indian gooseberry is an important crop of Indian origin and is grown throughout the country except in high hills. Aonla fruit is very rich in vitamin-C content and is valued high among indigenous medicines in India. It is an important ingredient of several Ayurvedic medicines. It can be exploited for obtaining higher economic returns from salt affected (usar), rocky and gravelly soils. Considering the varied uses of fruits and hardy nature of tree, aonla seems to be a potential fruit in the years to come, especially for the utilization of degraded lands, alkaline and barren patches in arid and semi-arid regions of our country.

The improved cultivars of aonla are commercially propagated by patch budding . Rootstocks are raised from seed which often gives poor germination. In the present study, efforts have been made to know the appropriate time of harvesting aonla fruits in order to get optimum seed germination. In this study, fruits of local aonla were harvested at different dates i.e. from November 27, 1996 to the end of January 1997 at 15 days interval. Seeds extracted from the fruits were stored in airtight containers. The studies on seed germination and seed vigour were conducted after one year, as one year old aonla seed gives better germination as compared to fresh seed. Seeds were soaked in water for 24 hours and kept in rolled sheets of moist filter paper. Each treatment was replicated three times and 200 seeds were examined per replicate. Data were recorded on germination percentage of seeds. Seed vigour was determined as :

Seed vigour = Percentage germination X Total length (Root+Shoot)

Duncan's Multiple Range Test of the data pertaining to germination and vigour of seed clearly revealed significant increase in germination percentage and vigour of seeds extracted from fruits harvested in the month of December and January as compared to the seed harvested on November 27, 1996. Maximum germination was recorded in seed harvested on January 11, 1997 (56 %) followed by December 12, 1996 (51.3 %), December 27, 1996 (47.3 %), January 26, 1997 (44.7 %). Minimum germination was recorded in seed extracted from aonla fruits harvested on November 27, 1996 (20 %). Similar trend was exhibited by seed vigour. Maximum seed vigour was observed when fruits were harvested on January 11, 1997 (176.3) followed by Dec. 12, 1996 (173.7), Dec. 27, 1996 (147.6), Jan. 26, 1997 (131.4) and Nov. 27, 1996 (21.2). Seed extracted from fruits harvested at different dates in December and January showed non-significant differences.

It is suggested that fruits of local aonla may be used for seed extraction for raising rootstocks should be harvested from December to January. In any case, the fruits should not be harvested in November.

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EFFECT OF PHALSA (Grewia asiatica) ROOT EXTRACTS ON SEED GERMINATION

Roots of G.asiatica were blanded and 100 gm powder was soaked in 500 ml of distilled water and allowed to soak for 24 hours. It was filtered and extract with different concentrations was prepared by diluting with distilled water. 10 seeds of each crop (sunflower, sorghum, caster, and redgram) was placed on a germination paper kept in a petridish and extracts (5 - 10 ml.) of different concentrations was poured in the petridish. All the petridishes were placed in BOD incubator to test the germination. After 24 hours, the extracts were added, so as to allow the germination paper in wet condition. A control was also run with distilled water. After 24 hours, seed germination was noted and the seeds were allowed to be inside BOD for measuring radicle elongation.

The results indicated that with the application of root extracts, the germination of seeds were significantly influenced. It was noticed that at 100 per cent extract concentration germination of redgram and sunflower was impaired largely due to interference of phenolic compounds, whereas in case of castor and sorghum the germination was highly satisfactory sowing 85 and 100 per cent germination respectively. The germination of sorghum in 100 per cent extract is on par with control.

Radicle elongation in different treatments was noted at 5 and 10 days after germination. The results showed that after 5 days of germination, the radicle length in case of redgram and sunflower was significantly lower than in control. While in control the radicle length recorded in case of redgram, sunflower was 16.5 and 17 cm respectively in 25, 50 and 100 per cent concentration, the radicle length was 10 and 13, 13 and 11, 6 and 4 respectively, and this impaired growth of radicle continued even upto 15 days after germination. However, in case of sorghum and castor this type of growth depression was not observed. At 15 days after germination the radicles in case of sunflower and redgram died in all the treatments except in control.

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INDIAN SOCIETY OF AGROFORESTRY

The Indian Society of Agroforestry (ISAF) was founded during the Golden Jubilee year of India's independence in 1998 with headquarters at National Research Centre for Agroforestry, Jhansi. The society is dedicated to encourage wise and sustainable land use planning and promote and disseminate the knowledge, practice and research in science and technology of agroforestry. It also itself through its members serve as a forum of Scientists, Agroforesters, Conservationists, Administrators and Policy makers in assessing the need for sustainable land use planning and management. Society also encourage free exchange of ideas amongst those contributing to the advancement of agroforestry by organising symposia, lectures and by bringing out suitable literature. Recently in July 1998, society successfully organised a National Symposium on MPTS for Agroforestry Systems in collaboration with NRCAF, Jhansi

The affairs of the society are managed by an Executive Council in accordance with constitution of the society. The newly constituted Executive Council of society for 1998-99 is as under :

Chief Patron	:	Dr. R.S. Paroda
Patron	:	Dr. G.B. Singh
President	:	Dr. K.R. Solanki
Vice President (s)	:	Dr. P.S. Pathak
	:	Dr. R. Deb Roy
	:	Dr. P. Rai
Secretary	:	Dr. K.S. Dadhwal
Joint Secretaries	:	Dr. A.K. Bisaria
	:	Dr. S.K. Shukla
Chief Editor	:	Dr. V.K. Gupta
Treasurer & Business Manager	:	Mr. Ajit
Members	:	Dr. N.P. Melkania
	:	Dr. M.S. Malik
	:	Mr. S.S. Chitwadgi
	:	Dr. H.S. Hanama Shetli
	:	Smt. Chitra Shankar

Membership fee of society is as under :

Individuals	India (Rs.)	Foreign (US $)
Annual	100.00	30.00
Life	600.00	160.00
	upto December 1998 (900.00 w.e.f. Jan.., 1999)	upto December, 1998 (200.00 w.e.f. Jan., 1999)

Libraries and Institutions :

Annual	500.00	40.00
10 Years	5000.00	400.00

Indian Society of Agroforestry is going to start its journal namely **Indian Journal of Agroforestry** (IJAF) and hopefully the first issue of the journal is likely to come out by December, 1998. Author(s) who wish to contribute in society journal must be an active member of society. Persons/Libraries and Institutions intending to become the member of society may send their duly filled application forms along with subscription to the Secretary, Indian Society of Agroforestry, C/o National Research Centre for Agroforestry, Near Pahuj Dam, Gwalior Road, Jhansi- 284003 (U.P.), India. Application forms may be requested from Secretary, ISAF, Jhansi. Those who become member (s) upto 31st December, 1998 shall be the founder member (s) of the society and life membership for them will be Rs. 600/- (Rupees Six hundred only) upto December, 1998 and from January, 1999 onward the life membership subscription would be Rs. 900/- (Rupees Nine hundred only).

K.S. DADHWAL
Secretary

Distinguished Visitors :

1. Dr. G.B. Singh, DDG (NRM), ICAR, Krishi Bhawan, New Delhi.
2. Dr. P.S. Pathak. ADG (AF), ICAR, Krishi Bhawan, New Delhi.
3. Dr. K.G. Tejwani, Ex. Director, CSWCR&TI, Dehradun.
4. Dr. R. Deb Roy, Ex. Director, NRCAF, Jhansi.
5. Dr. J.C. Kalla, Ex. Director, NAARM, Hyderabad.
6. Dr. M.S. Haque, Deputy General Manager, NABARD, Mumbai
7. Dr. D.K. Marothia, Member, Commission For Agriculture Cost & Prices, Govt. of India, New Delhi.
8. Dr. P.S. Tomar, Director, IGFRI, Jhansi.
9. Dr. N.P. Melkania, Professor & Dean Sponsored Res. & Industrial Consultant, North Eastern Regional Instt. of S &T, Nirjuli, Arunachal Pradesh.
10. Dr. Braham Singh, Director, DRDO, New Delhi.
11. Dr. Manjit Singh, Principal Scientist, CAZRI, Jodhpur.
12. Dr. Pratap Narain, Principal Scientist, CSWCR&TI, Dehradun.
13. Dr. R.K. Pathak, Technical Coordinator, U.P. Diversified Agriculture Support, Lucknow, along with World Bank Team.
14. Dr. Jai Singh, Ex. Director, Central Institute of Post- harvest Engineering and Technology, Ludhiana.
15. Mr. Jacab Thomas, Project Coordinator, U.P. Diversified Agriculture Support Project, Govt. of U.P., Lucknow.
16. Dr. M.M. Sinha, Additional Auditor Project Horticulture Dept., Lucknow (U.P.).

Other Functions :

1. World Environment Day was celebrated on 5th June, 1998.
2. The centre organised National Symposium on Multipurpose Tree Species for Agroforestry Systems during 11-13 July, 1998.
3. Independence day (15 th August) was celebrated and various out door games were organised for children and staff.
4. Hindi week was organised at centre during 14-20 September, 1998. Debate was organised at this occasion.
5. Kisan Goshthi was organised on 24th September, 1998 in Village Palinda, Jhansi more than eighty farmers participates.

Supervision and Guidance : Dr. K.R. Solanki, Director, NRCAF, Jhansi

Compiled & Edited by :	Published by :	Printed at :
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