

REMARKS OF THE CHAIRMAN

Dr. V.N. Sharda, Director, CSWCRTI, Dehradun and Chairman, Staff Research Council Meeting welcomed all the Heads of Centers / Divisions, members of the SRC and the participants. He welcomed five new scientists, who have recently joined the Institute. He felicitated Dr. S.P. Bhardwaj, Dr. Ram Babu, Dr. G.P. Juyal and Dr. S.K. Dhyani, who were awarded the Rajendra Prasad Award for the book in Hindi entitled “*Bhumi Sarankshan Aur Jal Samet Prabhandh*”.

The Chairman emphasized that the achievements made by the Institute in the past 50 years needs to be assessed and documented by each centre as well as the Institute headquarters. He desired that the compilation and documentation of 50 years’ research by all the Centres and Institute headquarters may be taken up subsequently. There is need for identifying the gaps in research programmes and evaluate the work already done. The future programmes should be in accordance with the changing scenario and the need of the country in view of the globalization requirements. Accountability must be ensured for all the assignments. Hence, periodic monitoring of activity milestones of achievements needs to be done.

Natural resources such as water and soil are not the domain of any region / country. Therefore, environmental degradation needs to be checked to ensure sustainability of production for which the role of CSWCRTI is very crucial. There is a plan in offing for connecting the major rivers of the country for equitable distribution of water and solving the inter-state water conflicts. He appraised the house that climate change is another issue in which CSWCRTI will be a partner alongwith a new global challenge programme on water and food. The extent of pollution knows no boundary, which is evident from the fact that concentration of carbon dioxide, methane and nitrous oxide have increased alarmingly. Temperature too has risen by 0.7°C in the past century and there is prediction that it will rise many folds in the next century. There is a possibility of increase in sea level by almost 50 cm in the next century due to various climatic changes. The climatic changes will affect rainfall, which in turn will influence the crop production. It is estimated that there will be 20 to 30% more rain during the *kharif* season and much lesser rainfall will be received during the *rabi* season. South-east Asia will be the worse affected region due to poor resources and high growth of population.

It should be our endeavor that research efforts are commensurate with the shift in paradigms. It is not the number of publications which is important for a scientist but their quality for dissemination of developed technologies is desired. It may be ensured that the well laid out norms are followed in publications. Papers must be routed through proper channel and discussed thoroughly in the seminar held in this connection.

The assignments given to an individual scientist or a group of scientists should be taken seriously and completed in time. Any assigned task in the interest of Institute should have priority over other jobs.

He informed the house that the format of Annual Assessment Report (AAR) is being revised and it is proposed to give weightage to different activities for overall evaluation. It is desired that the target should be fixed in the very beginning of the assessment year and programmes implemented accordingly.

The Chairman emphasized that data on watershed development programmes undertaken by different agencies may be compiled by the Research Centres for the states being represented by them. It would facilitate preparation of National Atlas of watershed programmes in the country. The information pertaining to the ongoing watershed management programmes may be compiled and submitted to the Headquarters by May, 2003 by all the centers as per state wise coverage given below :

1. Datia – Madhya Pradesh including Bundelkhand region of U.P.
2. Bellary – Andhra Pradesh and Karnataka.
3. Udhagamandalam – Tamil Nadu, Kerala and Goa.
4. Vasad – Gujarat and Maharashtra.
5. Kota – Rajasthan and part of Haryana.
6. Chandigarh – Punjab and part of Haryana and Himachal Pradesh.
7. Agra – Uttar Pradesh, Bihar and Chhattisgarh.
8. Koraput – Orissa, West Bengal and Jharkhand.
9. Dehradun – Uttaranchal, Jammu and Kashmir and part of Himachal Pradesh.

The Chairman desired that the projects may be prioritized according to the needs and utility in different approved programmes. For the sub-programmes where research projects are inadequate, new proposals may be submitted to ensure rational coverage of all the programmes as per mandate of the Institute.

SUMMARY OF IMPORTANT RECOMMENDATIONS OF RAC – 2002

1. Assessment of runoff using simple mathematical model or graphical solution based on common and simple watershed characteristics, landuse and related parameters is not available for field executor of various agro-ecological regions of the country. The Institute should immediately address the problem and develop users friendly runoff prediction equations.
2. Periodical occurrence of floods and droughts has certainly affected the productivity of crops. However the skill of the scientist lies in encountering such adversaries. One of the solutions to solve the problem will be to develop a model which shall anticipate the hydrological behavior of a watershed under varying climatologically conditions. This will help/guide us to prepare contingency plan for any eventuality. Institute may therefore undertake a study on impact of climate changes on watershed hydrology and productivity.
3. Direct and indirect benefit of soil and water conservation measures have been discussed a lot but only qualitatively. The intangible benefit needs to be quantified for proper justification of costly watershed management activities. However, in absence of suitable indices/methodologies it is not possible for a common person to do so. An Institution like CSWCRTI should come out with suitable indices/methodology for quantification of intangible benefits of watershed management programmes. Suitable study may therefore be incorporated on priority in the research programme of the Institute.
4. The farmers of the different agro-ecological regions of the country had developed several low cost ecofriendly soil and water conservation practices to encounter such eventuality (as pointed out under recommendation No.2 above) viz; crop diversification, mixed cropping, *insitu* moisture conservation etc. These low cost ecofriendly soil and water conservation practices for water harvesting are however being lost in the midst of the modern technology. Most of these, if not all, need some refinement to make it popular. Institute may, therefore, initiate a study on identification, evaluation and refinement of these indigenous technical knowledge through its Research Stations covering different agro-ecological regions of the country.
5. The term critical permissible soil limit is being referred while suggesting suitable contingent watershed management plan. The soil loss tolerance limit varies from 4.5 to 11.5 tones per hectare per year. However, the permissible tolerance limit pertaining to a set of given agro-ecological situation is not known. Suitable study may, therefore, be initiated to quantify location specific soil loss tolerance limit. This will help in prioritization of watersheds and watershed based activities.
6. The management of common property resources is one of the several important watershed activities under the new guidelines of watershed management programme. It is commonly observed that degraded and unproductive land is mostly under common property resource with silvipastoral or pastoral land use. The management of common property resources and joint forest management is yet to be properly integrated in participatory watershed management programme. Institute may, therefore, address the problem through case studies in representative locations.
7. Evaluation and monitoring is an integral part of any watershed management programme. It has been experienced that field functionaries face problems in procuring suitable hydrological instruments in absence of proper specifications. RAC is of the view that the

Institute may procure atleast 2 sets of required hydrological instruments manufactured by leading suppliers in the country and test them for their efficiency and cost effectiveness and suggest improvement, if any. The outcome may periodically be upgraded and brought to the notice of all uses in the country alongwith procedure/methodology of installation of these hydrological instruments.

8. RAC was also of the view that presentation/compilation and analysis of data from studies being conducted may be made quantitatively instead of qualitatively by assigning proper reasons or justifications for the conclusion drawn.
9. Institute has conducted several studies in the past 45 years concerning to watershed management programme/soil conservation through its Research Centres located in different agro-ecological regions of the country. The Institute has developed several excellent technologies which is evident from publication of research papers, bulletins etc. However, these technologies needs to be compiled into a single publication.

RAC, therefore, suggests that the Institute may take following initiatives to achieve this:

- i) Publish a bulletin entitled "Technology developed for sustained production through watershed management programmes". Each technology may be documented as Name of the Technology, Region of adaptability, Extent of area under the problem, Resources availability in the problem area, Methodology of application of Technology, Cost involved, Possible benefits, Anticipated reasons for non-adaptability and possible solutions.
 - ii) Technically a technology may be sound, however at times the policy environment, commercial non-availability of the input etc. may not be conducive for its post withdrawal continuity or adoption. Thus, while documenting the positive aspects of adaptability, policy issues for non adaptation of a developed technology need also be documented.
10. It is observed that at times a field functionary is not able to transfer a technology though the technology developed is a sound one. Refinement of extension techniques is, therefore, needed. It becomes more important in transferring a technology concerning watershed management programmes which require high level input. RAC, therefore, suggests that extension methodology of watershed management programmes may be refined by initiating suitable studies in the ongoing research programmes of the Institute.
 11. Soil and site suitability rating for land use planning for different agro-ecological region of the country also needs to be worked out. RAC is of the view that such studies may also be included in the ongoing research programmes of the Institute.

SALIENT RECOMMENDATIONS OF SRC MEETING – 2002

1. Data pertaining to management of natural resources from State Govts. and NGOs may be collected and compiled by all the Research Centres and sent to the Institute by 31st May, 2003.
2. New project proposals should preferably be submitted under the programmes P-3, P-4, P-6 and P-7 as desired by the Research Advisory Committee.
3. The achievements of the research finding for the past 50 years may be compiled in one place by all the centers and submitted by the end of 2003 to the Director. However, information pertaining to the Research Centres, Koraput and Datia may be compiled from the date of their establishment.
4. The house decided that henceforth the year of start of project will be according to the calendar year whereas, the completion will be according to the financial year i.e. March of the next year.
5. It may be ensured that the Annual Reports are submitted by 28th February, 2003 positively except Bellary Centre, which will be submitting the Annual report by 31st March, 2003. Henceforth, only the progress of ongoing approved projects need to be submitted for inclusion in the Annual Report.
6. According to the latest communication received from the ICAR vide letter No. 6(14)/2002-WS dated 11.10.2002, it is compulsory to submit the quarterly progress reports timely in addition to ongoing MPRs due on 15th of every month. The due date for submission of QPRs will be 15th March, 15th June, 15th September and 15th December respectively for the four quarters for the Heads of Centres / Divisions.
7. There is lot of pressure from ICAR and external auditor from A.G. (C.R.) that the RPFs of all the projects in progress/completed should be completed and kept ready for inspection. Hence, all the pending RPFs must be submitted at the earliest. The computerized information on RPFs in MS-ACCESS format may be submitted to the Institute by 30th June, 2003 for onward submission to ICAR.
8. Names of those scientists, who do not contribute in a project during the year should be deleted from the list (SRC meeting proceedings, Annual Report and RPF II).
9. The tillage studies may be carried out for 7 to 8 years and then reviewed for further extension, if required.
10. Studies on biological and mechanical measures may be taken up on natural plots / micro-watersheds in the farmers' field for assessing their performance in terms of resource conservation and production.

11. Alternatives and options are to be given for effective integrated nutrient management. Recommendation from other agencies may be adopted and linked with our mandate in order to evolve combinations for production and protection.
12. In the studies under agri-horti, horti-pastoral and silvi-pastoral systems, data on runoff, soil loss and moisture status alongwith economics on prescribed proforma should be presented in the next SRC meeting.
13. Project on ground water recharge may be taken up at other locations also under one core project already approved for which website has been developed by Vasad Centre. Similar websites may be developed for other core projects.
14. The yield data on agroforestry, agri-horti and similar studies should be reported on the gross plot basis covering trees as well as crops in a given area.
15. In case of NATP projects, the budget on equipments etc. should essentially be utilized by March, 2003. Thereafter, only observations are to be recorded.
16. The Chairman has desired that the periodic review of progress in different projects as well as time bound assignments will be done on quarterly basis i.e. January, April, July and October every year for which meetings should be held a the Research Centres and Headquarters.
17. In order to maintain uniformity and updating of knowledge, interaction among various scientists be carried out by utilizing the facilities of websites especially for core projects.

ACTIONS ASSIGNED IN THE SRC MEETING – 2002

1. A standard schedule for collection of livestock data was prepared and presented by Dr. S.K. Verma, Scientist. As suggested by the SRC, revised schedule may be prepared by Dr. S.K. Verma and circulated to all the Heads of Divisions/Centres.
2. Procedure for calculating soil loss tolerance limits may be chalked out. Dr. D. Mandal, Scientist may circulate the proforma to all Heads of Divisions / Centres. All Heads may send the proforma back with their observations to Dr. K.S. Dadhwal, Head, SS&A Division by 31st March, 2003, for compilation and presentation.
3. It was desired by the SRC that all the work done on tillage studies, works in progress and future works on this aspect may be reviewed by Dr. H.C. Nitant, Principal Scientist, Research Centre, Agra, taking in to account the economic aspects in tillage studies. This assignment may be completed by 28th February, 2003.
4. Critical review of ongoing projects on agroforestry for collecting information related to Institutes' mandate at different Centres be taken up under the leadership of Dr. K.S. Dadhwal, Head, SS&A Division. Head, Research Centre, Chandigarh may prepare a map for the Himalayan region showing the extent of area under Aonla as well as other specific agroforestry systems.
5. Although the project entitled "Successional trend in ravine enclosures and line transect" has been completed, yet the observations on this study may be continued and reported after every five years.
6. The project entitled "Effect of supplemental irrigation and mulching on growth, yield and quality behaviour of Kinnow Mandarin in Doon valley" and "Effect of graveliness on growth, yield and quality behaviour of peach" have been completed however, recording of observations may be continued and reported by Dr. A.C. Rathore, Scientist in the year 2003.
7. At Research Centre, Chandigarh, Dr. Ram Prasad, Scientist (S.S.), may calculate vegetation density for the project entitled "Studies on the rates of annual water and sediment yield from denuded Shiwaliks to the reservoirs and ponds". Er. R.C. Bansal, Sr. Scientist, may handover all the data pertaining to this project to Dr. A.K. Tiwari, Principal Scientist, who will take the observations on runoff, soil loss, infiltration etc.
8. In order to quantify the intangible benefits accruing under watershed development programme, Dr. B.L. Dhyani, Sr. Scientist may take test case of Fakot watershed with some parameters by 31st March, 2003. Subsequently, it will be extended to other watersheds. For Dehradun Headquarter, a core team comprising of following scientists has been formed for providing the basic data :
 - (i) Dr. G.P. Juyal (ii) Mr. S.C. Mohan (iii) Dr. S.K. Dhyani and (iv) Dr. O.P.S. Khola

9. Dr. A. S. Mishra, I/c Head, HRD&SS Division, may hold a meeting with state representatives for discussing about syllabus, future programmes etc. for soil and water conservation training programmes by 31st March, 2003.
10. Mr. G.L. Bagdi, Scientist (SS) at Research Centre, Vasad may prepare a proforma for listing of participatory indices and circulate it to all Agril. Extension scientists with a copy to the Director by 31st March, 2003.
11. Dr. S.V. Singh, Sr. Scientist, Research Centre, Kota may do the analysis of the project entitled “Study of adoption behaviour of the farmers for various technologies in integrated watershed management programme in south-eastern Rajasthan” and send the results to the Director by 31st March, 2003.
12. The new project proposal entitled “Utilization of rainfall through in situ moisture conservation by growing cotton in deep alluvial soil region” by Om Prakash and R.C. Yadav was presented by Dr. Om Prakash, Principal Scientist, Research Centre, Agra in the SRC meeting, 2002 and was agreed by the house as **observational trial in farmers’ field**, after thorough review of work done on this aspect.
13. The observational trial entitled “Studies on capacity building of land resources for sustainable productivity in ravine watersheds” by R.C. Agrinhotri, R.C. Yadav and Om Prakash was presented by Dr. R.C. Agnihotri, Principal Scientist, Research Centre, Agra in the SRC meeting, 2002 and the house decided that this study may be further continued as **observational trial** for one more year. Efforts should be made to segregate the effect of external factors such as shade / roots of trees and bushes on the boundary on crop production.

ACTION TAKEN ON RECOMMENDATIONS OF SRC MEETING – 2001

Sr. No.	Action Point	Action Taken
1.	Baseline survey schedule should be standardized for the Institute. For this, the baseline survey schedule being used by the Centres may be submitted to Dr. B.L. Dhyani by 31 st March 2002. Dr. Dhyani will standardize the schedule and send a copy to each Centre by 30 th April 2002. The Centres can follow this schedule after minor modifications as per objectives and local conditions, if necessary.	Action is awaited
2.	Dr. K.S. Dadhwal, Coordinator, Soil Science group may evolve the procedure and the format for finding out the soil tolerance limit for different eco-regions.	Action Taken
3.	For soil sampling and soil analytical works, where soil scientists are not available, help of relevant technical officers/staff at the Centre/Division may be availed and acknowledged in the publication.	Action Taken
4.	Weightage may be assigned to different intangible benefits of watershed management programmes by Dr. B.L. Dhyani, Sr. Scientist and finalized by 30 th April 2002.	Action Taken
5.	It will be mandatory that the findings / results are presented in the SRC Meeting by the leader of the project or by the next associate attending the meeting. In absence of leader / associates of any project, the Head of the Centre/Division may present the progress of the same.	Action Taken
6.	Data regarding livestock population should be presented in terms of livestock/animal units for which Dr. S.K. Verma, Scientist (Animal Nutrition) will send the necessary conversion factors to all the Centres/Divisions by 30 th June 2002.	Action Taken
7.	A standard schedule for collection of livestock data should be prepared by Dr. S.K. Verma, Scientist (Animal Nutrition) and conveyed to all the Heads by 31 st May 2002.	Action Taken

RECOMMENDATIONS OF GROUP DISCUSSIONS ON CORE PROJECTS

Core Project - Tillage and surface cover management for resource conservation and productivity.

Coordinator - Dr. H.C. Nitant

- Consistent results from all centers are reported in favour of deep tillage under rainfed conditions.
- Minimum tillage and zero tillage are found to give poor performance in terms of crop productivity, whereas in terms of conservation efficiency results are location specific.

Observations

Following observations are recorded at all the Centres :

Runoff – (Event wise), Soil loss – (Event wise), Nutrient loss – (Composite sediment), Moisture – (Sowing / dry spell / harvesting), Yield and yield component, Weed biomass, Infiltration – (5 yearly interval), Bulk density – (Ist year / 5 yearly / End of project), Organic carbon and available nutrient – (Ist year / 5 yearly / end of project), Pore size distribution- (End of Project), Duration of the project (may be 10 years)

Core Project - Biological and mechanical measures for resource conservation and crop productivity

Coordinator - Dr. S.N. Prasad

- Evaluation of mechanical and vegetative measures on field size runoff plots (Datia, 1996-2005).
- Evaluation of different conservation practices on steep lands in EGHL zone of Orissa (Koraput, 1994-2002).
- Effect of vegetative barriers on erosion losses and yield of rainfed sorghum and soyabean (Kota, 1998-2002).
- Development of suitable land and crop management practices for the Nilgiris (Ooty, 2002-06).

Achievements

- At Kota, vegetative barrier of vetiver, *Saccharam*, *Cenchrus* and *Dichanthium* were found equally effective in reducing the erosion and improving yield of crops.
- At Koraput, vetiver, hill broom and sambuta with small earthen bund (15 cm ht, 20 cm top width) were effective in reducing erosion at 11% slope but had adverse effect on yield of ragi up to 1-1.5 m dis. from bund.
- Among barriers, sambuta was found best.
- At Datia, calibration of ploplots is in progress; treatments yet to be imposed.
- At Ooty, experimental site has been cleared and it will be started in 2003.

Observations

General slope and soil type

Soil properties

- Bulk density, infiltration study, soil texture, water holding capacity, pH, EC, CEC
- Nutrients content : N, P, K, S and Micronutrients.

Runoff and soil loss

- Runoff
- Soil loss
- Nutrients loss through runoff and sediment (N, P &K)

Soil Moisture Content : Upto 45 cm soil Depth

- U/S and D/S of conservation measure.
- At 0.5, 1.0, 1.5m away from conservation measure and at middle of the plot.
- Sampling at sowing, 15 days intervals during dry period and at harvest.

Conservation Measures

- Loss of area due to conservation measures

Vegetative Barriers (Staggered planting)

- Survival per cent, Height, No. of clumps (tillers), Diameter.
- No. of gaps/opening with their width-per running length of the barrier.
- Soil binding capacity of roots.
- Overall performance index.
- Above ground biomass (Fodder/mulching/other economical use etc.).

Mechanical measures

- Change in cross sectional area with time.
- Natural vegetation cover and its biomass if any.

Soil deposition on U/S of the conservation measure

- By pegs/erosion pins
- Nutrients content in the deposited soil.

Crop growth and yield parameters

- Crop growth and yield parameters on either side of the conservation measures.
- Economic analysis of the system

Future strategies

- Selection of vegetative barriers : Local grasses, exploring possibility of commercial species as barrier of value addition.
- Double row with staggered planting.
- Management of barrier – cutting to reduce negative impact of barrier on crop and other management practices.

Core Project - Integrated nutrient management for rehabilitation and productivity Coordinator - Dr. K.D. Singh

1. Integrated nutrient supply system for rainfed semi arid tropics (Bellary).

Results

Application of 15 kg N through green leaf with 20 kg N through inorganic fertilizer recorded significantly higher grain yield of sorghum, Bengal gram and sorghum grain equivalent in sorghum + Bengal gram Strips.

Observations

- Recommended dose of N to be mentioned in the treatment.
- Source of green leaf with chemical composition of green leaf and compost to be given.
- Before and after soil fertility status to be monitored.

2. **Biofertilizer for integrated nutrient management for rehabilitation of eroded Shiwaliks (Chandigarh)**

Results :

- Grain yield of Moong Bean increased by 15.8, 11.2 and 11.7% over control on inoculation with rhizobium, *Glomus mosseae* and rhizobium + *G. mosseae*, respectively.
- Maximum grain yield of 22.7 q/ha was obtained under rhizobium + P/N treatment.
- An increase of 10 to 30% in the yield of succeeding mustard crop was observed as result of inoculation of preceding green gram.

Observations

- An increase of 20 to 25% in soil organic carbon in one year in green gram + mustard sequence seems to be high.
- Before and after soil fertility status to be monitored.

Suggestions

- Quantification of proportionate contribution of different nutrients sources (organic, inorganic, bio-fertilizers etc.) and their interactions based on initial soil fertility status for MEY of crops and cropping sequences needs to be worked out in a given soil-crop-agro-climatic region.
- Periodic monitoring of soil chemical, physical, biological properties and moisture under different combinations of sources and situations needs to be done for rehabilitation, productivity, soil health and environment.
- Experiments to be planned on a long term basis with appropriate design for crops and cropping sequences of given region.
- Multi-disciplinary team should be involved and economics to be worked out.

Core Project : Agroforestry systems for non-arable and arable lands

Coordinator : Dr. K.S. Dadhwal

Studies on tree crop association with *Acacia nilotica*, *Albizia lebbek* and *Azadiractta indica* (Kota)

- Growth of tree was more in *Albizia lebbek* followed by *Acacia nilotica* and *Albizia lebbek*.
- Growth of tree was found better in east-west direction as compared to north-south.
- Grain yield was recorded more with *Azadiractta indica* followed by *Acacia nilotica* and *Albizia lebbek*.

Evaluation of different field crop under rainfed agri-horticulture system for resource conservation. (Kota)

- Guava grows faster than lime.
- Yield reduction was recorded more in Guava than lime.
- Sesame performed better and was more economical than soybean and greengram.

Management practices for agri-horticulture system in reclaimed ravines (Agra)

The suppression effect of trees are reduced through root management practices.

- The percent increase in grain yield due to planting of tree in drums was 13.8% x 17.8% of wheat x pearl millet, respectively over no root management practices. The per ha yield was also highest in the drum treatment.

- The maximum net return (Rs. 382,64 ha⁻¹ yr⁻¹) was obtained with agri-horti system with drum planting as against Rs. 15,244.
- The root study will be done after *rabi* season.
- Ber growing with Pearl millet-wheat crop was found beneficial in terms of resource conservation and productivity by doing root management through planting ber in bottom less drum.

Aonla based agro-forestry system for moisture conservation and soil productivity in degraded ravine lands (Agra).

The establishment of Aonla is very poor (35%). It is proposed to transplant Aonla again during Feb.2003.

Provenance evaluation study in *Grewia optiva* (Doon valley).

- Observations recorded on provenances for last seven years revealed I.C. Bhaintan, I.C. Malas and I.C. Chamba better with ideal branches/plant (16-17 nos.), litterfall (5-6 t/ha), crown dia : bole dia ratio (57-60).
- Genetic variability analysis in respect of various parameters also revealed the efficacy of these characters for selection.
- Soil analysis after six years of plantation revealed better fertility build up in identified provenances.
- Study on lopping for fodder and fuel wood started in 2001 which needs to be continued.

Compatibility of raising rhizomatores crops with Aonla in Shivalik foothill region

- Colocasia and turmeric planted in the interspaces of Aonla (6m x 6m) and observations being recorded on moisture, light intensity, growth of Aonla and crops.

Effect of supplemental irrigation and mulching on growth, yield and quality behaviour of kinnow mandarin in Doon valley.

- Highest plant height (3.65 m), crown spread (3.53), crown height (3.24), trunk dia (11.32) and yield 88.91 kg/tree were recorded in irrigation at 80 mm CPE.
- In mulching, highest growth parameters and yield were recorded in Sal than Lantana (5-8%).

Evaluation of Mango and Litchi based agri-horti system on degraded lands in Doon valley

- In mango, highest plant height (3.24) and crown height (2.74) were recorded in Sesame-Toria (3.24) but highest crown spread was recorded in Blackgram-Toria (3.63 m). Whereas, highest fruit yield was recorded in Blackgram-Toria (29.5 kg/tree).
- In Litchi, highest plant height (2.56 m) and crown height (2.03 m) were recorded in redgram. Whereas, highest crown spread was in cowpea-Toria (2.75 m).
- Overall Blackgram-Toria system was found highly economical.

Effect of graveliness on growth, yield and quality of peach

- Highest plant height, crown spread, crown height were recorded in 100:0 soil gravel treatment.
- Highest fruit yield was recorded in 100:0 irrigated (47.63 kg/tree) followed by 75:25 (42.6 kg/tree), 50:50 (34.2 kg/tree) and 20:80 over control (28.37 kg/tree)

Evaluation of the agroforestry systems for marginal lands in Doon valley

- *Paulownia fortunei*, *Grewia optiva* and *Embllica officinalis* planted last year recorded a survival of 81.6, 97 and 99 per cent, respectively.

- Uniform crop of Sunnhemp (*Crotalaria juncea*) as a green manure during *kharif* season added an average of 2849 kg ha⁻¹ of dry matter equivalent to 46.43 kg N, 5.12 kg P₂O₅ and 42.73 kg K₂O ha⁻¹ as per the crop analysis.

Silvipastoral systems under various management practices for degraded lands (Doon valley)

- *Grewia optiva* performed satisfactory after imposing the treatments.
- Maximum biomass production was obtained with coppicing (625 kg/ha) followed by lopping (307 kg/ha) and pollarding (306 kg/ha). The same trend continued where grasses have incorporated as under story crop with tree.
- In combination with *Grewia optiva* (tree), *Panicum maximum* performed better than the *Chrysopogon fulvus* on degraded lands. The increase in yield over the last year was highest under lopping and pollarding *Chrysopogon fulvus* and *Panicum maximum*, respectively.
- In all agroforestry experiments the following parameters need to be studied

Observations to be recorded in Agroforestry projects

Trees

- Growth characteristics e.g. height, diameter, canopy spread, volume, above-ground biomass (leaves, twigs, branches, etc.).
- Below-ground biomass – root characteristics, rooting behaviour etc.
- Elemental composition of trees (stems, branches, leaves, fruits and roots etc.).
- Canopy/litter management.
- Influence of management practices in trees such as pruning, lopping, pollarding, cropping etc.
- Effect of trees on crops (tree-crop interface) at different distances.
- Tree root elimination effects under tree crop interface/vice versa effects on trees.

Crop/grasses

- Crop/grass characteristics, growth and yield attributes.
- Elemental composition and uptake.

Soil :

- Initial soil fertility status (physico-chemical/microbiological characteristics).
- Fertility status at an interval of 3-5 years
- Fertility status at the end of experiment
- Moisture status

Economic analysis

- Production aspect : Average costs for site preparation, planting, maintenance, harvesting, transportation, input costs, intermediate yields – trees, grasses, crops etc.
- Intangible : Once parameters are decided values may be assigned, IRR, benefit : cost etc. parameters.

Future researchable strategies/issues in relation to resource conservation

1. To study Environmental parameters/micro-climate variations

- Temperature
- Light
- Relative humidity/moisture
- Carbon sequestration



In agroforestry systems vs. monocropping
vs control

2. Agroforestry in relation to balancing ground water fluctuations/option of use/safe disposal of poor quality ground waters including sewage, industrial heavy metal loaded waters etc.

3. Agroforestry in relation to carbon sequestration e.g. options of release of carbon from arable, silviculture etc. land uses and exploiting waste/degraded lands as a source of carbon sink.
4. Standardization of live fencing/boundary plantation – contour planting in sloppy lands as a soil and water conservation option. Diversification/alternate source of food, fodder, fuel etc. in rainfed areas and soil quality improvement.
5. Role of NFTS in integrated nutrient management e.g. VAM, BNF, litter management, nutrient recycling and dynamics, root turn over etc.
6. Tree-crop-soil-root interface studies/relationships in terms of sharing space, light, water and nutrients.

Core Project - Agri-horticultural, Horti pastoral and Silvi-pastoral systems
Coordinator - Dr. A. Raizada

There a total of 10 such projects running in the Institute (9 as regular research program and one under NATP). In all the studies data on trees, grass and crop component is being regularly collected. These include tree/plant height, CD, dbh, canopy cover (wherever possible), biomass from pruning, woody biomass, grass yields, clump diameter, crop yields etc. Data on soil moisture and changes, if any, brought about due to the interventions applied are also being monitored regularly, depending on site conditions.

However, due to the nature of the sites where these studies are undertaken it is not always possible to measure runoff, soil loss and sediment production from these alternate land use systems, although it was felt by the group that this would be very relevant as per the Institute’s mandate. This information is however being collected in one or two studies where facilities exist to monitor the soil loss etc. This information will be directly useful in watershed programs, specific to a given region, due to the current crop diversification scenarios.

It was also felt by the group that the impact of crop diversification vis a vis vegetable cultivation and soil losses / runoff have been investigated only in Ooty centre and there is a strong need that these be investigated in more centers specially in the Himalayan region, where such type of information is lacking.

In nearly all studies, there is an absence of an economic analysis of the system that is likely to be recommended by the researcher. It is therefore necessary that all such studies should have a detailed analysis carried out every year, instead of getting the system analyzed at the end of the study.

Core Project - Effect of conservation structures on ground water recharge
Coordinator - Dr. R.S. Kurothe

Present Status

The current status of the project at various Centres is as under :

Sl. No.	Works / Items	Vasad	Kota	Datia	Chandigarh	Ooty
1.	Whether w/s area delineated	√	X	√	√	X
2.	Whether landuse quantified ?	√	X	√	√	X
3.	Whether geology of the area known ?	√	√	√	√	√
4.	Aquifer type information known ?	√	√	√	√	√
5.	Soil physical properties quantified and mapped ?	√	√	√	X	X
6.	How many structures ?	5	2+8	3+2	3	4

7.	Whether State ~ Storage / Stage ~ Area developed ?	√	X	X	X	√
8.	Whether stage indicating gauges installed	√	√	√	√	√
9.	No. of observation wells/existing wells	100	14	42	10	31
10.	Whether tube wells numbered with paint? (Number to remain if a well is abandoned)	√	√	√	Some	X
11.	Measurement of rainfall done ?	√	√	√	√	√
12.	Measurement of evaporation ?	√	X	√	X	X
13.	Whether methods on recharge estimation reviewed ?	Y	Not Much	Not Much	No	N
14.	Sediment deposition rate ? (if high Stage ~ Storage relationship to be done every year)	Not Much	Some	No	Some	No
15.	Water quality parameters from the samples ?	√	X	√	X	X
16.	How water table depths are measured ?	Reason	Reason	Tape	Tape	Electric
17.	Software used ?	Excl	Excl	Excl	Excl	Excl
18.	Recharge on watershed basis done ?	√	X	X	X	X
19.	Recharge from individual structures ?	√	X	X	X	√
20.	Information on draft	√	X	X	X	X
21.	Indicators	√	X	X	X	X

Procedure discussed in details

The term members from different centers met at the seminar room, had a rigorous discussion on the methodology to be commonly adopted for quantification of the recharge from conservation structures and their influence on the ground water table. Mr. D.R. Sena, Scientist (Engg.), CSWCRTI, RC, Vasad had presented the methodology adopted by him. It was unanimously decided to follow the procedures with necessary modifications. Excel spreadsheet format has been developed by the Vasad centre will be made available to all the centers for quantifying recharge from water harvesting structures / pond. A schedule of the procedures have been prepared and will be made available to all the centers.

Internet group made

To interact better for adopting new methodologies for taking field observation or bring the members to a common platform as well as faster dissemination of information / literature / programs developed by each of the group incumbents, a group has been created as http://groups.yahoo.com/gwr_cswcrti with email id gwr cswcrti@yahoogroups.com. Mr. Sena is presently a moderator and group owner of the site and will be adding the e-mail id of all the member of the group to the site.

Basic requirements

SURFER 8.0 package commonly to be used by all the centers participating in the project.

RESEARCH PROGRAMMES AND SUB-PROGRAMMES

P-1 WATER EROSION APPRAISAL IN DIFFERENT AGRO-ECOLOGICAL REGIONS (P.I. – Dr. K.S. Dadhwal)

- 1.1 Inventory and database of erosion status using modern tools and procedures
- 1.2 On-site and off-site effects of erosion
- 1.3 Soil erosion processes and models

P-2 CONSERVATION MEASURES FOR SUSTAINABLE PRODUCTION SYSTEMS (P.I. – Dr. O.P.S. Khola)

- 2.1 Resource conservation measures for arable lands
- 2.2 Resource conservation measures for non-arable lands

P-3 HYDROLOGICAL BEHAVIOUR OF WATERSHEDS FOR CONSERVATION PLANNING (P.I. – Er. C. Prakash)

- 3.1 Rainfall, runoff, vegetation, soil characteristics and management practices
- 3.2 Effect of conservation measures and landuse on ground water recharge
- 3.3 Water harvesting

P-4 REHABILITATION OF AREAS AFFECTED BY MASS EROSION (P.I. – Er. K.P.Tripathi)

- 4.1 Refinement of technologies for torrent training, landslide control and minespoils rehabilitation

P-5 PARTICIPATORY INTEGRATED WATERSHED MANAGEMENT (P.I. – Dr. S.K. Dhyani)

- 5.1 Methodologies for development of watersheds and decision support systems for interventions
- 5.2 Landuse planning
- 5.3 Impact on production, environment and bio-diversity
- 5.4 Farming system approach.
- 5.5 Watershed technologies (Strategic research)

P-6 SOCIO-ECONOMIC ANALYSIS AND POLICY DEVELOPMENT FOR WATERSHED MANAGEMENT (P.I. – Dr. B.L. Dhyani)

- 6.1 Resource economics
- 6.2 Institute village linkage programme for Technology assessment and refinement
- 6.3 Common property resource management

P-7 HUMAN RESOURCE DEVELOPMENT AND TECHNOLOGY TRANSFER (P.I. – Dr. A.S. Mishra)

- 7.1 Training methodology, need assessment, gender neutrality and evaluation
- 7.2 Organizational infrastructure & motivational parameters
- 7.3 Participatory approaches, dissemination of technology and adoption

STATUS OF PROGRAMME WISE ON-GOING PROJECTS

P-1 : WATER EROSION APPRAISAL IN DIFFERENT AGRO ECOLOGICAL REGIONS

1.1 : INVENTORY AND DATABASE OF EROSION STATUS USING MODERN TOOLS AND PROCEDURES

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
1.	Assessment, monitoring and mapping of erosion hazards and developing a data base for conservation planning.	K.S. Dadhwal S.C. Mohan S.S. Shrimali S.K. Dhyani	Soil Science & Agronomy, Dehradun	2000	2003	To be concluded
2.	Reflectance libraries for development of soil sensors for periodic assessment of soil resources.	CCPI: S.C. Mohan	Soil Science & Agronomy, Dehradun	1999	2003	To be concluded NATP (Mission Mode)
3.	Surface hydrology response estimation using GIS.	S.S. Shrimali	Hydrology & Engineering, Dehradun	2002	2007	To be continued

1.2 : ON-SITE AND OFF-SITE EFFECTS OF EROSION

4.	Impact of landuse pattern on runoff quality vis-à-vis fish production.	M.Muruganandam K.P.Tripathi S.C. Mohan	Hydrology & Engineering, Dehradun	2000	2003	To be concluded
<p>Comment: Economics to be calculated in terms of revenue earned which should be compared with agricultural economics. Species wise economics of fish production should be worked out by February, 2003. Capacity of the pond may be calculated after survey. Water quality samples may be taken at the start and completion of project only. (Action: Mr. M.Muruganandam)</p>						
5.	Soil erosion for prominent medicinal and aromatic plants in Nilgiris.	D.V. Singh V. Selvi M. Madhu Subhash Chand	Udhagamandalam	1997	2004	To be continued
<p>Comments: Ms. V. Selvi will replace Dr. A.K. Sikka in this project. Data of average runoff and soil loss may be checked. (Action : Dr. D.V. Singh)</p>						

1.3: SOIL EROSION PROCESSES AND MODELS

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
6.	Soil erosion studies using simulated rainfall in black soils.	R.N. Adhikari R. Saraswathy (OSL) A.K. Singh	Bellary	2001	2003	To be concluded
Comments: Name of Er. A.K. Singh is included as second associate.						
7.	Assessing crop cover influence on runoff and soil loss for red soils of Bundelkhand.	Brij Lal Dev Narain V.S. Katiyar	Datia	2002	2006	To be continued
Comments: Dr. V.S. Katiyar will replace Dr. A.K. Tiwari in this project.						
8.	Study of rill and inter-rill erosion processes.	P.R. Ojasvi V.N. Sharda D. Mandal	Hydrology & Engineering, Dehradun	2002	2006	To be continued
9.	Development and validation of runoff and erosion prediction models in different agro-ecological regions.	V.N. Sharda P.R. Ojasvi	Hydrology & Engineering, Dehradun	2003	2007	To be continued (New Core Project)
		A.K. Tiwari	Chandigarh			
		V.S. Katiyar	Datia			
		Shakir Ali	Kota			
		R.S. Kurothe	Vasad			
Comments: Similar exercise may be done by the other Research Centres which may join the core project. (Action : Heads of the centres Agra/Bellary/Koraput/Udhagamandalam)						

P-2: CONSERVATION MEASURES FOR SUSTAINABLE PRODUCTION SYSTEMS

2.1: RESOURCE CONSERVATION MEASURES FOR ARABLE LANDS

10.	Tillage and surface cover management for resource conservation and productivity					
(a)	Tillage practices for erosion control and crop productivity.	H.C. Nitant Om Prakash	Agra	1998	2005	To be continued
Comments: Available corrected soil moisture data should be presented. (Action : Dr. H.C. Nitant)						

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
(b)	Tillage and surface cover management.	Dev Narain V.S. Katiyar Brij Lal	Datia	1996	2005	To be continued
Comments: Dr. V.S. Katiyar will replace Dr. A.K. Tiwari in this project.						
(c)	Soil surface management for erosion control.	Ratan Singh S.S. Shrimali N.K. Sharma	Soil Science & Agronomy, Dehradun	1995	2003	To be concluded
Comments: Data should be rechecked and interpretate accordingly. (Action : Dr. Ratan Singh)						
(d)	Conservation tillage and green manure mulching for optimizing productivity in maize wheat cropping system in the sub-mountainous Himalayan region.	PI : Ratan Singh Co-PI : S.K. Dhyani Associate : R.K. Dubey	Soil Science & Agronomy, Dehradun	2001	2003	To be concluded Competitive Grant Programme (CGP)
11.	Biological and mechanical measures for resource conservation and crop productivity					
(a)	Evaluation of mechanical and vegetative measures on field size runoff plots.	M.L. Gaur Dev Narain Brij Lal	Datia	1996	2005	To be continued
Comments: Plots No. 5,6 & 8 to be deleted. Correlation to be developed for runoff and soil loss. The treatment of contour bunding of 0.6m VI to be replaced by grass as suggested. (Action : Dr. M.L. Gaur)						
(b)	Development of suitable land and crop management practices for the Nilgiris.	P. Murlidharan D.C. Sahoo M. Madhu P. Sundarambal	Udhagamandalam	2002	2006	To be continued
Comments: Names of Dr. D.V. Singh and Dr. Subhash Chand are deleted from this project.						
(c)	Vegetative measures for conservation and production on reclaimed land of Mahi ravines.	H.B. Singh R.S. Kurothe S.P. Tiwari V.C. Pande	Vasad	2003	2006	To be continued (New Project)

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
12.	Integrated nutrient management for rehabilitation and productivity					
(a)	Integrated nutrient supply system for rainfed semi-arid tropics.	S.L. Patil	Bellary	2000	2010	To be continued
(b)	Bio-fertilizer for integrated nutrient management for rehabilitation of eroded Shiwaliks.	Pawan Sharma Pratap Singh Ram Prasad	Chandigarh	2000	2004	To be continued
(c)	Effect of landuse manipulation and moisture conservation practices on nutrient dynamics in soil and productivity.	S.P. Tiwari H.B. Singh V.C. Pande	Vasad	2003	2006	To be continued (New Project)
13.	Cropping systems for resource conservation					
(a)	Inter-cropping studies in rainfed maize-wheat cropping system on slopping land in Doon valley.	D.S. Tomar, Ratan Singh B.P.Joshi A.K.Khullar	H.R.D. & S.S., Dehradun	2000	2003	To be concluded
Comments : Soil and plant analysis should be done after appropriate time and data should be presented in the next SRC Meeting. (Action : Mr. D.S. Tomar)						
(b)	Evaluation of some suitable minor millets for production and conservation of resources.	Harsh Mehta P.C. Tyagi	Plant Science, Dehradun	2000	2004	To be continued
(c)	Carbon balance in soil for resource conservation under different crops on 2% slope.	B.N. Ghosh O.P.S. Khola K.S. Dadhwal	Soil Science & Agronomy, Dehradun	2003	2006	To be continued (New project)
Comments : The suggestions given by the SRC may be incorporated and revised RPF I may be submitted for record at the earliest. (Action : Dr. B.N. Ghosh)						
(d)	Evaluation of inter-cropping system for delayed on set of monsoon in south-eastern Rajasthan.	S.N. Prasad R.K. Singh Ashok Kumar	Kota	2003	2006	To be continued (New Project)
(e)	Evaluation of conservation measures with prominent cropping systems for medium black soils.	R.K. Singh S.N. Prasad Ashok Kumar B.K. Sethy	Kota	2003	2007	To be continued (New Project)

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
14.	Agroforestry systems for arable lands					
(a)	Aonla based agro-forestry system for moisture conservation and soil productivity in degraded ravine lands.	B. Balaji H.C. Nitant Om Prakash	Agra	2001	2006	To be continued
Comments: The mortality of Aonla plants be replaced by new plants.						(Action : Dr. B. Balaji)
(b)	Study on runoff and soil loss behaviour of different land configurations.	S.K. Srivastava R.C. Yadav	Agra	2002	2004	To be continued
Comments : Title of the project has been modified.						
(c)	Compatibility of raising rhizomatic crops with Aonla in Shiwalik foothill region.	Pratap Singh Ram Prasad Y. Agnihotri Pratap Bhattaharya	Chandigarh	2002	2005	To be continued
Comments : Name of Dr. Pratap Bhattacharya is included as third associate. Title of the project has been modified.						
(d)	Provenances evaluation study in <i>Grewia optiva</i> .	P.C. Tyagi Harsh Mehta	Soil Science & Agronomy, Dehradun	1995	2003	To be concluded
Comments: Name of Dr. V.P.S. Tomar is deleted from this project.						
(e)	Studies on tree crop association with <i>Acacia nilotica</i> , <i>Azadirachta indica</i> and <i>Albizia lebbek</i> .	A.K. Parandiyal (OSL) K.D. Singh Arjun Prasad	Kota	1993	2003	To be concluded
(f)	Evaluation of different field crops under rainfed agri-horticulture system for resource conservation.	Arjun Prasad A.K. Parandiyal (OSL) K.D. Singh	Kota	2001	2003	To be concluded
Comments : Economics to be worked out and presented in the next SRC Meeting.						(Action : Dr. Arjun Prasad)
(g)	Crop diversification through agro-forestry for productivity and sustainability on reclaimed land of Mahi ravines.	H.B. Singh S.P. Tiwari V.C. Pande	Vasad	2003	2006	To be continued (New Project)

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
15.	Evaluation and improvement of indigenous methods of moisture conservation and run-off management.	CCPI: R.C. Yadav Co-CCPI : Om Prakash Associates: H.C. Nitant Bhanwar Singh	Agra	2000	2003	To be concluded NATP (Rainfed)
		CCPI: Shakir Ali Associates: K.D. Singh S.N. Prasad Ashok Kumar	Kota			
16.	Management strategies for improving <i>rabi</i> sorghum productivity.	CCPI: S.K.N. Math Associates: S.L. Patil R.Saraswathy (OSL)	Bellary	2000	2003	To be concluded NATP (Rainfed)
Comments : Dr. S.K.N. Math will be the CCPI in place of Dr. M.S. Rama Mohan Rao. Economics to be worked out and presented in the next SRC Meeting. (Action : Dr. S.K.N. Math)						
17.	Developing live fencing systems for soil and water conservation, crop diversification and sustaining productivity in rainfed regions.	CCPI: S.K.N.Math Associates: S.L. Patil, R.N. Adhikari	Bellary	2000	2003	To be concluded NATP (Rainfed)
		CCPI: P.R. Choudhary Associates: Anchal Das U.S. Patnaik, N.K. Paikaray	Koraput			
Comments : Name of Dr. M.S. Rama Mohan Rao is deleted in the project at Bellary centre. Mr. P.R. Choudhary is advised to make sure that the progress report is submitted to the PI well in time. (Action : Mr. P.R. Choudhary)						
18.	Development and evaluation of soil and water conservation measures and landuse systems for sustainable crop production in western ghats of coastal region.	PI: M. Madhu Co-PI: P. Murlidharan Associates: D.C. Sahoo, Subhash Chand	Udhagamandalam	2000	2003	To be concluded NATP (Coastal)
Comments : Dr. M. Madhu will be the PI in place of Dr. A.K. Sikka and Dr. P. Murlidharan will be the Co-PI.						

2.2: RESOURCE CONSERVATION MEASURES FOR NON-ARABLE LANDS

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
19.	Agroforestry systems for non-arable lands					
(a)	Production potential of several leguminous and non-leguminous tree species under different management practices.	S.K.N. Math A.K. Singh	Bellary	1994	2003	To be concluded
Comments: Names of Dr. K. Ilango and Dr. M.S. Rama Mohan Rao are deleted. Dr. S.K.N. Math will be the leader and Er. A.K. Singh will be the associate in this project. The data related to soil salinity with all growth parameter should be presented in the next SRC Meeting. (Action : Dr. S.K.N. Math)						
(b)	Fuelwood and fodder production from densified plantations on old riverbed land.	Anurag Raizada Charan Singh B.N. Ghosh	Plant Science, Dehradun	1997	2016	To be continued
(c)	Evaluation of the agro-forestry systems for marginal lands in Doon valley.	S.K. Dhyani, N.K.Sharma Ratan Singh Pradeep Dogra	Plant Science, Dehradun	2001	2010	To be continued
Comments: Name of Dr. A.C. Rathore is deleted from this project.						
20.	Agri-horticultural systems					
(a)	Evaluation of mango and litchi based agri-horti systems on degraded lands in Doon Valley.	A.C. Rathore N.K. Sharma	Plant Science, Dehradun	1995	2005	To be continued
(b)	Evaluation of comparative performance of Aonla based agri-horti systems at 2% slope in Doon Valley.	R.K. Dubey K.S. Dadhwal A.C. Rathore	Soil Science & Agronomy, Dehradun	2002	2012	To be continued
Comments : Name of Dr. A.C. Rathore is included as second associate and the title of project has been modified.						

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
21.	Horti-pastoral systems					
(a)	Development of horti-pastoral land use system for degraded lands.	Ram Prasad R.K. Aggarwal Y. Agnihotri R.P. Yadav	Chandigarh	1995	2003	To be concluded
Comments : Name of Mr. S.P. Mittal is deleted from this project.						
22.	Silvi-pastoral systems					
(a)	Silvipastoral systems under various management practices for degraded lands.	Charan Singh Anurag Raizada	Plant Science, Dehradun	1996	2012	To be continued
(b)	Silvipastoral approach to improve productivity of native pastures for livestock production in the hills.	C.C.P.I.: O.P.S. Khola	Soil Science & Agronomy, Dehradun	1999	2003	To be concluded NATP (H&M)
Comments: The hydrograph data needs to be rechecked with the help of Dr. P.R. Ojasvi / Er. S.S. Srimali and presented by the end of January, 2003. The installation of gauging devices should also be completed by January, 2003. (Action: Dr. O.P.S. Khola)						

P-3: HYDROLOGICAL BEHAVIOUR OF WATERSHEDS FOR CONSERVATION PLANNING

3.1: RAINFALL, RUNOFF, VEGETATION, SOIL CHARACTERISTICS AND MANAGEMENT PRACTICES

23.	Soil conservation measures in red arable soils.	M.L. Gaur Dev Narain	Datia	2001	2005	To be continued
Comments: Name of Dr. A.K. Tiwari is deleted from this project.						
24.	Hydrological behaviour of small watersheds and sustainability of production systems.	PI: V.N. Sharda Co-PI: C. Prakash Associates: A.Raizada N.K.Sharma	Hydrology & Engineering, Dehradun	1999	2003	To be concluded NATP (H&M)

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
25.	Water balance studies of tea (<i>Thea sinensis</i>) crop (lysimetric studies).	V. Selvi M. Madhu	Udhagamandalam	1996	2005	To be continued
Comments: Name of Dr. A.K. Sikka is deleted and Ms. V. Selvi will be the leader of this project. The data of water budgeting needs to be checked with special emphasis on measurement of runoff component. (Action : Ms. V. Selvi)						

3.2 : EFFECT OF CONSERVATION MEASURES AND LANDUSE ON GROUND WATER RECHARGE

26.	Effect of conservation structures on ground water recharge.	D.R. Sena R.S. Kurothe S.P. Tiwari V.C. Pande	Vasad	2001	2006	To be continued (CORE Project)
		A.K. Tiwari R.P. Yadav R.K. Aggarwal	Chandigarh			
		V.S. Katiyar M.L. Gaur	Datia			
		Shakir Ali K.D. Singh R.K. Singh B.K. Sethy	Kota			
Comments: Name of Dr. Virendra Kumar is deleted and name of Dr. V.C. Pande is included as third associate at Vasad Centre. Dr. A.K. Tiwari will be the leader in place of Er. R.C. Bansal, name of Dr. V.S. Katiyar is deleted and Dr. R.P. Yadav will be the second associate at Chandigarh Centre. Dr. V.S. Katiyar will be the leader in place of Dr. A.K. Tiwari at Datia Centre.						

3.3: WATER HARVESTING

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
27.	Rainwater management on watershed (micro) basis in sub-montane region.	PI: R.P. Yadav Co-PI: R.K. Aggarwal Associates: Pratap Singh, Ram Prasad, A.K. Tiwari, S.L. Arya, Pratap Bhattacharya	Chandigarh	2000	2003	To be concluded NATP (Rainfed)
Comments : Dr. A.K. Tiwari will replace Dr. V.S. Katiyar and Dr. Pratap Bhattacharya will replace Mr. S.P. Mittal in this project.						
28.	Effect of interventions on small watershed hydrology.	M.L. Gaur Brij Lal Dev Narain	Datia	2001	2006	To be continued
Comments: Correlation should be developed for ten years data of different watersheds keeping one watershed un-disturbed. (Action : Dr. M.L. Gaur)						
29.	Water harvesting and recycling for sustainable production in red arable soils in Bundelkhand.	Dev Narain V.S. Katiyar H. Biswas	Datia	2002	2005	To be continued
Comments : Name of Dr. A.K. Tiwari is deleted. Names of Dr. V.S. Katiyar and Dr. H. Biswas are included as first and second associates.						
30.	Hydrological evaluation of recommended conservation measures on mildly sloping lands.	V.N. Sharda S.S. Shrimali O.P.S. Khola	Hydrology & Engineering, Dehradun	1995	2004	To be continued
31.	Effective utilization of waterways for conservation and production.	B.P. Joshi B.N. Ghosh Harsh Mehta Charan Singh	Hydrology & Engineering, Dehradun	2002	2006	To be continued
Comments : Observations of soil parameters to be recorded for the side slopes after shaping and earthwork to tractors to be completed by April, 2003. (Action : Er. B.P. Joshi)						

P-4 REHABILITATION OF AREAS AFFECTED BY MASS EROSION

4.1 REFINEMENT OF TECHNOLOGIES FOR TORRENT TRAINING, LANDSLIDE CONTROL AND MINESPOILS REHABILITATION

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
32.	Development of cost – effective technology for treatment of choes (rainy season torrents).	PI : A.K. Tiwari Co-PI : R.K. Aggarwal Associates : S.L. Arya, Ram Prasad, Pawan Sharma	Chandigarh	2001	2004	To be continued NATP (H&M)
		CCPI : G.P. Juyal Associate : Bankey Bihari, B.N. Ghosh, A.C. Rathore	Hydrology & Engineering, Dehradun			
Comments : Dr. A.K. Tiwari will replace Dr. V.S. Katiyar as PI and name of Dr. Pawan Sharma is included as third associate at Chandigarh Centre. Name of Dr. A.C. Rathore is included as third associate at Dehradun.						
33.	Effectiveness study of the torrent training structures in outer Himalayas and Shiwalik foot hills of Doon valley.	G.P.Juyal, K.P. Tripathi	Hydrology & Engineering, Dehradun	2000	2003	To be concluded
34.	Development of geo-natural with its blend and large scale field trials for soil conservation and agro-horticulture applications.	G.P. Juyal, S.K. Dhyani	Hydrology & Engineering, Dehradun	2001	2003	To be concluded (AP Cess Fund)
Comments : Different materials to be compared at three different sites alongwith soil moisture availability, soil nutrient status and soil depth. (Action : Dr. G.P. Juyal)						
35.	Evaluation of efficacy of full scale models of stone jetty along river Yamuna.	R.C. Yadav	Agra	2003	2004	To be continued (New Project)

P-5: PARTICIPATORY INTEGRATED WATERSHED MANAGEMENT

5.1 : METHODOLOGIES FOR DEVELOPMENT OF WATERSHEDS AND DECISION SUPPORT SYSTEMS FOR INTERVENTIONS

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
36.	Methodologies for development and analysis of watersheds and decision support systems for interventions.	PI: B.L. Dhyani Co-PI: A. Raizada Associate: Pradeep Dogra	H.R.D. & S.S., Dehradun	1999	2003	To be concluded NATP (H&M)
		CCPI: Y.Agnihotri	Chandigarh			
Comments: The required software should be obtained at the earliest. Vegetation data from Udhagamandalam centre may be utilized and progress to be reported by the end of January, 2003. (Action : Dr. B.L. Dhyani / Dr. Y. Agnihotri)						
37.	Development of regional scale watershed plans and methodologies for identification of critical areas for prioritized land treatment in the watersheds.	CCPI: S. Sudhishiri Co-CCPI: Anchal Das Associates: U.S. Patnaik N.K. Paikaray	Koraput	2000	2003	To be concluded NATP (Rainfed)

5.2 : LANDUSE PLANNING

38.	Landuse planning for management of agricultural resources.	PI: Ratan Singh Co-PI: S.K. Dhyani Associate: B.L. Dhyani	Soil Science & Agronomy, Dehradun	2001	2003	To be concluded NATP (H&M)
		CCPI : S.K.N. Math Associates : S.L. Patil A.K. Singh	Bellary			
		CCPI : D.V. Singh Co-CCPI : P. Murlidharan Associates : V. Selvi, M. Madhu, Subhash Chand,	Udhagamandalam			
Comments : The objectives of the project should be recasted for future landuse planning over large areas instead of limited micro-watersheds taken up at present. Dr. S.K.N. Math will be the CCPI in place of Dr. M.S. Rama Mohan Rao and name of Dr. K. Ilango is deleted at Bellary centre. Name of Dr. A.K. Sikka is deleted at Udhagamandalam centre. (Action : Dr. Ratan Singh)						

5.3: IMPACT ON PRODUCTION, ENVIRONMENT AND BIODIVERSITY

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
39.	Integrated land and rainwater management for sustainable production in Shiwalik foothills in Mandhala village, Distt. Solan (H.P.).	A.K. Tiwari Pratap Singh R.K. Aggarwal Y. Agnihotri Pawan Sharma Ram Prasad Pratap Bhattacharya	Chandigarh	2003	2006	To be continued (New Project) TDET (MoRD)

5.4 FARMING SYSTEM APPROACH

40.	Improvement of productivity of migratory buffalo herds.	CCPI : S.K. Verma Associate : P. Dogra	Soil Science & Agronomy, Dehradun	2001	2003	To be concluded NATP (H&M)
41.	Development and evaluation of integrated farming system in middle Himalayas.	M. Muruganandam V.N. Sharda, C. Prakash S.K. Verma	Hydrology & Engineering, Dehradun	2001	2004	To be continued
42.	Participatory assessment and refinement of traditional ragi cropping.	Anchal Das Susama Sudhishri	Koraput	2000	2003	To be concluded
Comments: Project is extended till the year 2003.						

5.5 : WATERSHED TECHNOLOGIES (STRATEGIC RESEARCH)

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
43.	Watershed Technology (Mission Mode).	PI: K.P. Tripathi Co-PI: S.K. Dhyani Associates: O.P.S.Khola, Pradeep Dogra	Hydrology & Engineering, Dehradun	1999	2003	To be concluded NATP (H&M)
		CCPI: V.Selvi Associates: M.Madhu D.V. Singh, P. Sundarambal, Subhash Chand	Udhagamandalam			
<p>Comments: The compliance of last year's action is still awaited. Hydrological data should be presented at the earliest preferably in the supplementary SRC Meeting in January, 2003. Name of Dr. P.R. Ojasvi is deleted at Dehradun as suggested by the P.I. Ms. V.Selvi will be the CCPI in place of Dr. A.K. Sikka at Udhagamandalam Centre. (Action : Er. K.P. Tripathi)</p>						

P-6: SOCIO-ECONOMIC ANALYSIS AND POLICY DEVELOPMENT FOR WATERSHED MANAGEMENT

6.1: RESOURCE ECONOMICS

44.	Impact of soil and water conservation measures on productivity and socio-economic conditions of Kuberpur ravine watershed.	Bhanwar Singh R.C. Yadav Om Prakash	Agra	2002	2004	To be continued
<p>Comments : Compliance of action assigned in the previous year is yet to be reported. Observations to be recorded on various soil parameters affecting the increase in yield in terrace land. (Action : Mr. Bhanwar Singh)</p>						
45.	Economic evaluation and people's participation in watershed projects in Coimbatore and Nilgiri districts.	Subhash Chand P.Sundarambal M.Madhu	Udhagamandalam	2000	2003	To be concluded
<p>Comments : Name of Dr. A.K. Sikka is deleted. Project is extended till the year 2003.</p>						
46.	Market and policy incentives for soil and water conservation : A study in Mahi ravine of Gujarat.	V.C. Pande R.S. Kurothe H.B. Singh S.P. Tiwari	Vasad	2002	2004	To be continued

6.2 : INSTITUTE VILLAGE LINKAGE PROGRAMME FOR TECHNOLOGY ASSESSMENT AND REFINEMENT

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
47.	Institute Village Linkage Programme. (Technology Assessment and Refinement – for Hill and Mountain Agro-Eco-System).	Leader: A.S.Mishra Associates: S.C.Mohan, D.S.Tomar, B.L.Dhyani, S.K.Verma	H.R.D. & S.S., Dehradun	1999	2003	To be concluded NATP (H&M)

6.3 : COMMON PROPERTY RESOURCE MANAGEMENT

48.	Impact analysis of joint forest management on sharing and management of common property resources in Shiwalik foothill region.	S.L. Arya	Chandigarh	2002	2004	To be continued
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P-7 HUMAN RESOURCE DEVELOPMENT AND TECHNOLOGY TRANSFER**7.1 TRAINING METHODOLOGY, NEED ASSESSMENT, GENDER NEUTRALITY AND EVALUATION**

49.	An action research project of informal training programme on soil and water conservation for ravine reclamation for farmers of Mahi ravine area.	G.L. Bagdi R.S. Kurothe H.B. Singh V.C. Pande	Vasad	2002	2006	To be continued
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7.3 PARTICIPATORY APPROACHES, DESSEMINATION OF TECHNOLOGY AND ADOPTION

Sl. No.	Title of the Project	Leader and Associates	Centre/Division	Start	Completion	Remarks
50.	Impact assessment and communication behaviour of farmers of already managed watershed and adjoining areas of Bundelkhand region.	OM Prakash	Datia	2002	2004	To be continued
Comments : Name of Dr. A.K. Tiwari is deleted from this project.						
51.	Assessment of diffusion of Institute Village Linkage Programme (IVLP) interventions.	Bankey Bihari S.K. Verma	H.R.D. & S.S., Dehradun	2000	2003	To be concluded
Comments : Project is extended till the year 2003. Proper interpretation should be done for adoption in non-adopted areas. (Action : Mr. Bankey Bihari)						
52.	Participatory and integrated assessment of natural resources and evaluation of alternate sustainable land management options for tribal dominant watersheds.	PI: U.S. Patnaik Co-PI: P.R. Chaudhary Associates: Susama Sudhishri, Anchal Das, N. K.Paikaray	Koraput	2000	2003	To be concluded NATP (Rainfed)
Comments : Name of Dr. C. Prehraj is deleted from this project.						

PROJECTS CONCLUDED IN 2002

Sl. No.	Progra- mme No.	Sl.No. of SRC Meeting Proc. 2001	Title of the Project	Centre/Division
1.	1.1	4	Status of coastal erosion and control studies in coastal belt of India.	Udhagamandalam
2.	1.3	7	Development and validation of process based runoff and soil erosion simulation models.	Hydrology & Engineering, Dehradun
3.	2.1	13(b)	Evaluation of different conservation practices on steep lands in Eastern Ghats Highland Zone.	Koraput
4.	2.1	13(c)	Effect of vegetative barriers on erosion losses and yield of rainfed sorghum and soybean.	Kota
5.	2.1	16(a)	Management practices for agri-horticulture system in reclaimed ravines.	Agra
6.	2.1	16(d)	Effect of supplemental irrigation and mulching on growth, yield and quality behaviour of Kinnow Mandarin in Doon valley.	Plant Science, Dehradun
7.	2.2	23(b)	Effect of graveliness on growth, yield and quality behaviour of peach.	Plant Science, Dehradun
8.	2.2	23(c)	Land and cover management in tea plantation.	Udhagamandalam
9.	3.1	28	Studies on the rates of annual water and sediment yield from denuded Shiwaliks to the reservoirs and ponds.	Chandigarh
10.	3.1	29	Comparative study of the compatibility of <i>Cenchrus ciliaris</i> with <i>Acacia tortilis</i> and <i>Acacia senegal</i> under silvi-pastoral system in Chambal ravines and their impact on hydrological behaviour of the watershed.	Kota
11.	3.1	31	Production potential of <i>Cenchrus ciliaris</i> and <i>Dendrocalamus strictus</i> system in degraded Mahi ravines and its effect on hydrology and sedimentation.	Vasad
12.	5.3	46	Successional trend in ravine enclosures and line transect.	Agra
13.	5.3	47	Resource conservation through watershed management in Shiwalik foothills of Punjab. (Relmajra Project).	Chandigarh
14.	5.3	48	Assessment of various indices of environmental rehabilitation in response to wasteland development (Aganpur-Bhagwasi watershed).	Chandigarh

Sl. No.	Programme No.	Sl.No. of SRC Meeting Proc. 2001	Title of the Project	Centre/Division
15.	5.3	49	Research and development model under TDET. (Bajni Watershed)	Datia
16	5.3	50	An economic evaluation of Kokriguda Watershed Project, Koraput (Orissa).	Koraput
17.	5.3	51	Evaluation of management techniques in ravineous watersheds. (Badakhera Watershed)	Kota
18.	5.3	52	Development and evaluation of conservation measures for rehabilitation of wastelands on a sustainable basis in Western Ghats. (Salaiyur Watershed)	Udhagamandalam
19.	5.3	53	Impact of participatory watershed management on resource conservation, hydrology, bio-diversity and production. (Antisar Watershed).	Vasad
20.	6.1	58	Economic analysis of watershed management programmes in south-eastern Rajasthan.	Kota
21.	6.3	63	Impact of watershed management of sustainability of land productivity and socio-economic status.	Datia
22	7.1	65	Study of soil and water conservation training programme for Human Resource Development.	HRD & SS, Dehradun
23.	7.3	68	Study of adoption behaviour of the farmers for various technologies in integrated watershed management programme in south-eastern Rajasthan.	Kota

PROGRAMME-WISE LIST OF PROJECTS

P-1 : WATER EROSION APPRAISAL IN DIFFERENT AGRO-ECOLOGICAL REGIONS

1.1: Inventory and database of erosion status using modern tools and procedures

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
1	1	Soil Sci. & Agronomy, Dehra Dun
2	2	Soil Sci. & Agronomy, Dehra Dun
3	3	Hydrology & Engg., Dehra Dun

TOTAL = 3

1.2: On-site and off-site effects of erosion

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
4	5	Hydrology & Engg., Dehra Dun
5	6	Udhagamandalam

TOTAL = 2

1.3: Soil erosion processes and models

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
6	8	Bellary
7	10	Datia
8	11	Hydrology & Engg., Dehra Dun
9	New	Hydrology & Engg., Dehra Dun /Chandigarh/Datia/Kota/Vasad

TOTAL = 4

P-2: CONSERVATION MEASURES FOR SUSTAINABLE PRODUCTION SYSTEMS

2.1: Resource conservation measures for arable lands

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
10 (a)	12(a)	Agra
10(b)	12(b)	Datia
10(c)	12(c)	Soil Sci. & Agronomy, Dehra Dun
10(d)	21	Soil Sci. & Agronomy, Dehra Dun
11(a)	13(a)	Datia
11(b)	13(d)	Udhagamandalam
11(c)	New	Vasad
12(a)	14(a)	Bellary
12(b)	14(b)	Chandigarh
12(c)	New	Vasad
13(a)	15(a)	HRD & SS, Dehra Dun
13(b)	15(b)	Plant Science, Dehra Dun
13(c)	New	Soil Sci. & Agronomy, Dehra Dun
13(d)	New	Kota
13(e)	New	Kota
14(a)	16(b)	Agra
14(b)	9	Agra
14(c)	16(g)	Chandigarh
14(d)	16(c)	Soil Sci. & Agronomy, Dehra Dun

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
14(e)	16(e)	Kota
14(f)	16(f)	Kota
14(g)	New	Vasad
15	17	Agra / Kota
16	18	Bellary
17	20	Bellary / Koraput
18	19	Udhagamandalam

TOTAL = 26

2.2: Resource conservation measures for non-arable lands

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
19(a)	22(a)	Bellary
19(b)	22(b)	Plant Science, Dehra Dun
19(c)	22(c)	Plant Science, Dehra Dun
20(a)	23(a)	Plant Science, Dehra Dun
20(b)	27	Soil Sci. & Agronomy, Dehra Dun
21(a)	24(a)	Chandigarh
22(a)	25(a)	Plant Science, Dehra Dun
22(b)	26	Soil Sci. & Agronomy, Dehra Dun

TOTAL = 8

P-3: HYDROLOGICAL BEHAVIOUR OF WATERSHEDS FOR CONSERVATION PLANNING

3.1: Rainfall, runoff, vegetation, soil characteristics and management practices

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
23	32	Datia
24	33	Hydrology & Engg., Dehra Dun
25	30	Udhagamandalam

TOTAL = 3

3.2: Effect of conservation measures and landuse on ground water recharge

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
26	34	Vasad/Chandigarh/Datia/Kota

TOTAL = 1

3.3: Water harvesting

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
27	37	Chandigarh
28	36	Datia
29	38	Datia
30	35	Hydrology & Engg., Dehra Dun
31	39	Hydrology & Engg., Dehra Dun

TOTAL = 5

P-4: REHABILITATION OF AREAS AFFECTED BY MASS EROSION

4.1: Refinement of technologies for torrent training, landslide control and minespoils rehabilitation

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
32	41	Chandigarh / Hydrology & Engg., Dehra Dun
33	40	Hydrology & Engg., Dehra Dun
34	42	Hydrology & Engg., Dehra Dun
35	New	Agra

TOTAL = 4

P-5: PARTICIPATORY INTEGRATED WATERSHED MANAGEMENT

5.1: Methodologies for development of watersheds and decision support systems for interventions

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
36	43	HRD & SS, Dehra Dun/Chandigarh
37	44	Koraput

TOTAL = 2

5.2: Landuse Planning

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
38	45	Soil Sci. & Agronomy, Dehra Dun /Bellary/Udhagamandalam

TOTAL = 1

5.3: Impact on Production, environment and biodiversity

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
39	New	Chandigarh

TOTAL = 1

5.4: Farming system approach

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
40	55	Soil Sci. & Agronomy, Dehra Dun
41	56	Hydrology & Engg., Dehra Dun
42	54	Koraput

TOTAL = 3

5.5: Watershed technologies (Strategic research)

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
43	57	Hydrology & Engg., Dehra Dun/ Udhagamandalam

TOTAL = 1

P-6 : SOCIO-ECONOMIC ANALYSIS AND POLICY DEVELOPMENT FOR WATERSHED MANAGEMENT

6.1: Resource economics

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
44	60	Agra
45	59	Udhagamandalam
46	61	Vasad

TOTAL = 3

6.2: Institute Village Linkage Programme for Technology assessment and refinement

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
47	62	HRD & SS, Dehraun

TOTAL = 1

6.3: Common property resource management

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
48	64	Chandigarh

TOTAL = 1

P-7: HUMAN RESOURCE DEVELOPMENT AND TECHNOLOGY TRANSFER

7.1: Training methodology, need assessment, gender neutrality and evaluation

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
49	66	Vasad

TOTAL = 1

7.2: Organizational infrastructure and motivational parameters

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
Nil	Nil	Nil

TOTAL = Nil

7.3: Participatory approaches for dissemination of technology and adoption

Sl. No. of SRC Proc., 2002	Sl No. of SRC Proc., 2001	Centre/Division
50	70	Datia
51	67	HRD&SS, Dehra Dun
52	69	Koraput

TOTAL = 3

GRAND TOTAL = 73

CENTRE/DIVISION-WISE NUMBER OF ON-GOING PROJECTS

S. No.	CENTRE/DIVISION	SL. NO. OF ON-GOING PROJECTS	TOTAL
1.	Agra	10(a),14(a),14(b),15,35,44	6
2.	Bellary	6,12(a),16,17,19(a),38	6
3.	Chandigarh	9,12(b),14(c),21(a),26,27,32,36,39,48	10
4.	Datia	7,9,10(b),11(a),23,26,28,29,50	9
5.	Dehra Dun		
	• Hydrology & Engineering	3,4,8,9,24,30,31,32,33,34,41,43	12
	• Soil Science & Agronomy	1,2,10(c),10(d),13(c),14(d),20(b),22(b),38, 40	10
	• HRD & SS	13(a),36,47,51	4
	• Plant Science	13(b),19(b),19(c),20(a),22(a)	5
6.	Koraput	17,37,42,52	4
7.	Kota	9,13(d),13(e),14(e),14(f),15,26	7
8.	Udhagamandalam	5,11(b),18,25,38,43,45	7
9.	Vasad	9,11(c),12(c),14(g),26,46,49	7

CENTRE/DIVISION-WISE NUMBER OF NATP / TDET / CGP / AP CESS FUNDED PROJECTS

S. No.	CENTRE/DIVISION	SL. NO. OF PROJECTS	TOTAL
1.	Agra	15	1
2.	Bellary	16,17,38	3
3.	Chandigarh	27,32,36,39	4
4.	Dehra Dun		
	• Hydrology & Engineering	24,32,34,43	4
	• Soil Science & Agronomy	2,10(d),22(b),38,40	5
	• HRD & SS	36,47	2
5.	Koraput	17,37,52	3
6.	Kota	15	1
7.	Udhagamandalam	18,38,43	3

NUMBER OF NEW PROJECTS (CENTRE/DIVISION-WISE) APPROVED IN THE SRC MEETING, 2002

S. No.	CENTRE/DIVISION	SL. NO. OF PROJECTS	TOTAL
1.	Agra	35	1
2.	Chandigarh	9,39	2
3.	Datia	9	1
4.	Dehra Dun		
	• Hydrology & Engineering	9	1
	• Soil Science & Agronomy	13(c)	1
5.	Kota	9,13(d),13(e)	3
6.	Vasad	9,11(c),12(c),14(g)	4

NUMBER OF PROJECTS WITH INDIVIDUAL SCIENTISTS

In the Staff Research Council Meeting of 1995, certain norms regarding **maximum** number of projects that any scientist of CSWCRTI may hold, were decided as mentioned below:

- A. Leadership in one projects with association in other four projects (1+4)**
or
B. Leadership in two projects with association in other two projects (2+2)
or
C. Leadership in three projects without association in any other projects (3+0)

In the Staff Research Council Meeting of 2000, certain norms regarding **minimum** number of projects that any scientist of CSWCRTI may hold, were decided as mentioned below:

- A. Leadership in one project with association in other one project (1+1)**
or
B. Association in two projects (0+2).

The number of projects with each individual scientist of the Institute, after the SRC Meeting of 2002 is as follows:

Name	Designation	Leader	Associate	Total
Dr. V.N. Sharda	Director & Head (H&E Division)	3	2	5
Soil Science and Agronomy Division				
Dr. K.S. Dadhwal	Head of the Division	1	2	3
Dr. P.C. Tyagi	Principal Scientist (Plant Breeding)	1	1	2
Mr. S.C. Mohan	Principal Scientist (Soil Fertility)	1	3	4
Dr. Ratan Singh	Principal Scientist (Soils)	3	2	5
Dr. O.P.S. Khola	Senior Scientist (Agronomy)	1	3	4
Dr. N.K. Sharma	Senior Scientist (Agronomy)	--	4	4
Dr. B.N. Ghosh	Senior Scientist (Soils)	1	3	4
Dr.. R.K. Dubey	Scientist (S.S.) (Agronomy)	1	1	2
Dr.. S.K. Verma	Scientist (Animal Nutrition)	1	3	4
Dr. D. Mandal	Scientist (Soils)	--	1	1
Hydrology and Engineering Division				
Er. K.P. Tripathi	Principal Scientist (Engineering)	1	2	3
Dr. G.P. Juyal	Principal Scientist (Engineering)	3	--	3
Dr. P.R. Ojasvi	Senior Scientist (Engineering)	1	1	2
Er. S.S. Shrimali	Senior Scientist (Computer Application)	1	3	4
Er. P.K. Goel (OSL)	Scientist (Engineering)	--	--	NIL
Mr. M. Muruganandam	Scientist (Fisheries)	2	--	2
Er. B.S. Naik	Scientist (Engineering)	--	--	NIL
Plant Science Division				
Dr. S.K. Dhyani	I/c Head of the Division	1	5	6
Dr. Anurag Raizada	Senior Scientist (Forestry)	1	3	4
Dr. Harsh Mehta	Senior Scientist (Plant Breeding)	1	2	3
Mr. Charan Singh	Scientist (SS) (Forestry)	1	2	3
Dr. A.C. Rathore	Scientist (Horticulture)	1	2	3
Mr. K.P. Mohapatra	Scientist (Forestry)	--	--	NIL

Name	Designation	Leader	Associate	Total
Research Coordination & Management Unit				
Er. B.P. Joshi	Principal Scientist (Engineering)	1	1	2
Dr. Pradeep Dogra	Senior Scientist (Agril. Eco.)	--	4	4
Mr. A.K. Khullar	Scientist (S.S.) (Agril. Stat.)	--	1	1
Human Resource Development and Social Science Division				
Dr. A.S. Mishra	I/c Head of the Division	1	--	1
Er. C. Prakash	Principal Scientist (Engineering)	--	2	2
Mr. D.S. Tomar	Senior Scientist (Agronomy)	1	1	2
Dr. B.L. Dhyani	Senior Scientist (Agril. Eco.)	1	2	3
Mr. Bankey Bihari	Scientist (Agril. Extn.)	1	1	2
Research Centre, Agra				
Dr. R.C. Yadav	Head of the Centre	2	2	4
Dr. H.C. Nitant	Principal Scientist (Soils)	1	2	3
Dr. Om Prakash	Principal Scientist (Agronomy)	--	4	4
Dr. R.C. Agnihotri	Principal Scientist (Soils)	--	--	NIL
Mr. Bhanwar Singh	Scientist (SS) (Agril. Eco.)	1	1	2
Er. S.K. Srivastava	Scientist (Engineering)	1	--	1
Dr. B. Balaji	Scientist (Forestry)	1	--	1
Research Centre, Bellary				
Er. R.N. Adhikari	I/c Head of the Centre	1	1	2
Dr. S.K.N. Math	Principal Scientist (Soils)	4	--	4
Dr. S.L. Patil	Scientist (SS) (Agronomy)	1	3	4
Er. A.K. Singh	Scientist (Engineering)	--	3	3
Ms. R. Saraswathy (O.S.L.)	Scientist (Soil Pedology)	--	2	2
Mr. B. Mondal	Scientist (Agril. Eco.)	--	--	NIL
Dr. N. Loganandam	Scientist (Agril. Extension)	--	--	NIL
Research Centre, Chandigarh				
Dr. R.K. Aggarwal	Head of the Centre	--	5	5
Dr. Y.K. Agnihotri	Principal Scientist (Agril. Stat.)	1	3	4
Dr. A.K. Tiwari	Principal Scientist (Engineering)	4	1	5
Er. R.C. Bansal	Senior Scientist (Engineering)	--	--	NIL
Dr. (Ms.) Pawan Sharma	Senior Scientist (Soil Micro-bio.)	1	2	3
Dr. R.P. Yadav	Senior Scientist (Soils)	1	2	3
Dr. Pratap Singh	Senior Scientist (Agronomy)	1	3	4
Dr. (Ms.) S.L. Arya	Senior Scientist (Agril. Eco.)	1	2	3
Dr. Ram Prasad	Scientist (S.S.) (Horticulture)	1	5	6
Dr. Parikshit Bansal	Scientist (S.S.) (Animal Bio-chemistry)	--	--	NIL
Dr. Pratap Bhattacharya	Scientist (Soil Physics)	--	3	3
Research Centre Datia				
Dr. V.S. Katiyar	Head of the Centre	2	3	5
Dr. Dev Narain	Senior Scientist (Agronomy)	2	4	6
Dr. M.L. Gaur	Senior Scientist (Engineering)	3	1	4
Er. V.K. Bhatt (O.S.L.)	Senior Scientist (Engineering)	--	--	NIL
Dr. Om Prakash	Scientist (SS) (Agril. Extn.)	1	--	1
Dr. Brij Lal	Scientist (Soil Fertility)	1	3	4
Dr. Hritik Biswas	Scientist (Soils)	--	1	1

Name	Designation	Leader	Associate	Total
Research Centre, Koraput				
Dr. U.S. Patnaik	Head of the Centre	1	2	3
Dr. R.K. Panda	Senior Scientist (Engineering)	--	--	NIL
Mr. P.R. Chaudhary	Scientist (SS) (Forestry)	1	1	2
Mr. Anchal Dass	Scientist (Agronomy)	1	3	4
Er. (Ms.) Susama Sudhishri	Scientist (Engineering)	1	2	3
Dr. N.K. Paikaray	Scientist (Soil Science)	--	3	3
Research Centre, Kota				
Dr. K.D. Singh	Head of the Centre	--	4	4
Dr. S.N. Prasad	Principal Scientist (Agronomy)	1	2	3
Dr. Arjun Prasad	Principal Scientist (Agronomy)	1	1	2
Dr. R.K. Singh	Senior Scientist (Soil Fertility)	1	2	3
Dr. S.V. Singh	Senior Scientist (Agril. Extn.)	--	--	NIL
Mr. A.K. Parandiyal	Scientist (SS) (Forestry)	1	1	2
Dr. Ashok Kumar	Scientist (SS) (Agril. Eco.)	--	3	3
Er. Shakir Ali	Scientist (Engineering)	3	--	3
Er. B.K. Sathy	Scientist (Engineering)	-	2	2
Dr. J. Somasundaram	Scientist (Soils)	-	--	NIL
Research Centre, Udhagamandalam				
Dr. M. Madhu	I/c Head of the Centre	1	6	7
Mr. R. Ragupathy	Scientist(SS) (Forestry)	--	--	NIL
Dr. D.V. Singh	Scientist (S.S.) (Soil Fertility)	2	1	3
Dr. Subhash Chand	Scientist (S.S.) (Agril. Eco.)	1	4	5
Er. (Ms.) V. Selvi	Scientist (Engineering)	2	2	4
Dr.(Ms.) P.Sundarambal	Scientist (Agril. Extn.)	--	3	3
Dr. P. Murlidharan	Scientist (Soils)	1	2	3
Er. D.C. Sahoo	Scientist (Engineering)	-	2	2
Research Centre, Vasad				
Dr. R.S. Kurothe	I/c Head of the Centre	1	4	5
Dr. H.B. Singh	Principal Scientist (Agronomy)	2	3	5
Dr. S.P. Tiwari	Senior Scientist (Soil Fertility)	1	4	5
Mr. G.L. Bagdi	Scientist (SS) (Agril. Extn.)	1	--	1
Mr. V.C. Pande	Scientist (S.S.) (Agril. Eco.)	1	5	6
Er. D.R. Sena	Scientist (Engineering)	1	--	1

LIST OF PARTICIPANTS

1.	Dr. V.N. Sharda	Director	Chairman
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2.	Dr. K.S. Dadhwal	Head (SS&A Division) & PI (P-1)	Member
3.	Er. K.P. Tripathi	Principal Scientist (Engg.) & PI (P-4)	Member
4.	Dr. A.S. Mishra	I/c Head (HRD & SS Division) & PI (P-7)	Member
5.	Dr. P.C. Tyagi	Principal Scientist (Plant Breeding)	
6.	Er. B.P. Joshi	Officer-in-charge (RCM Unit)	Member Secretary
7.	Mr. S.C. Mohan	Principal Scientist (Soils)	
8.	Dr. G.P. Juyal	Principal Scientist (Engineering)	
9.	Er. C. Prakash	Principal Scientist (Engineering) & PI (P-3)	Member
10.	Dr. Ratan Singh	Principal Scientist (Soils)	
11.	Dr. S.K. Dhyani	I/c Head (Pl.Sc. Division) & PI (P-5)	Member
12.	Mr. D.S. Tomar	Senior Scientist (Agronomy)	
13.	Dr. A. Raizada	Senior Scientist (Forestry)	
14.	Dr. O.P.S. Khola	Senior Scientist (Agronomy) & PI (P-2)	Member
15.	Dr. Harsh Mehta	Senior Scientist (Plant Breeding)	
16.	Dr. P.R. Ojasvi	Senior Scientist (Engineering)	
17.	Dr. B.L. Dhyani	Senior Scientist (Agril. Eco.) & PI (P-6)	Member
18.	Dr. N.K. Sharma	Senior Scientist (Agronomy)	
19.	Dr. B.N. Ghosh	Senior Scientist (Soils)	
20.	Mr. A.K. Khullar	Scientist (S.S.) (Agril. Stat.)	Rapporteur
21.	Mr. Charan Singh	Scientist (S.S.) (Forestry)	
22.	Dr. R.K. Dubey	Scientis (S.S.) (Agronomy)	
23.	Mr. Bankey Bihari	Scientist (Agril.Extn.)	
24.	Mr. M. Muruganandam	Scientist (Fisheries)	
25.	Dr. S.K. Verma	Scientist (Animal Nutrition)	
26.	Dr. A.C. Rathore	Scientist (Horticulture)	
27.	Dr. D. Mandal	Scientist (Soils)	
28.	Mr. K.P. Mohapartra	Scientist (Forestry)	
29.	Er. B.S. Naik	Scientist (Engineering)	
30.	Mr. S.K. Sinha	Sr. Technical Assistant (T-4)	Rapporteur
RESEARCH CENTRE, AGRA			
31.	Dr. R.C. Yadav	Head of the Centre	Member
32.	Dr. H.C. Nitant	Principal Scientist (Soils)	
33.	Dr. Om Prakash	Principal Scientist (Agronomy)	
34.	Dr. R.C. Agnihotri	Principal Scientist (Soils)	
35.	Mr. Bhanwar Singh	Scientist (S.S.) (Agril. Eco.)	
RESEARCH CENTRE, BELLARY			
36.	Er. R.K. Adhikari	Principal Scientist (Engineering)	
37.	Dr. S.K. Nalatwadmath	Principal Scientist (Soils)	

RESEARCH CENTRE, CHANDIGARH			
38.	Dr. Y. Agnihotri	Principal Scientist (Ag. Stat.)	
39.	Dr. A.K. Tiwari	Principal Scientist (Engineering)	
40.	Er. R.C. Bansal	Senior Scientist (Engineering)	
41.	Dr. Pratap Singh	Senior Scientist (Agronomy)	
42.	Dr. (Ms.) Pawan Sharma	Senior Scientist (Soil Micro-bio)	
43.	Dr. R.P. Yadav	Senior Scientist (Soils)	
44.	Dr. Ram Prasad	Scientist (S.S.) (Horticulture)	
45.	Dr. Parikshit Bansal	Scientist (S.S.) (Animal Bio-Chemistry)	
46.	Dr. Pratap Bhattacharya	Scientist (Soil Physics)	
RESEARCH CENTRE, DATIA			
47.	Dr. V.S. Katiyar	Head of the Centre	Member
48.	Dr. M.L. Gaur	Senior Scientist (Engineering)	
49.	Dr. Brij Lal	Scientist (Soils)	
RESEARCH CENTRE, KORAPUT			
50.	Dr. U.S. Patnaik	Head of the Centre	Member
51.	Dr. R.K. Panda	Senior Scientist (Engineering)	
52.	Mr. Anchal Dass	Scientist (Agronomy)	
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53.	Dr. K.D. Singh	Head of the Centre	Member
54.	Dr. S.N. Prasad	Principal Scientist (Agronomy)	
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RESEARCH CENTRE, UDHAGAMANDALAM			
60.	Dr. M. Madhu	I/c Head of the Centre	Member
61.	Dr. D.V. Singh	Scientist (S.S.) (Soils)	
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66.	Mr. V.C. Pande	Scientist (S.S.) (Agril. Eco.)	
67.	Er. D.R. Sena	Scientist (Engineering)	