

## INFORM 2003

### Introduction

The apex body at the national level, Council for Agricultural Research Policy (CARP) is charged with the major responsibility of aiding, promoting, and co-ordinating research, related to agriculture and allied areas in the country. The National Agricultural Research System in Sri Lanka (NARS) employs about 526 scientists, working in several research organizations on different disciplines. Eleven research organizations, responsible for research and training activities of different commodities, scattered island wide, are closely linked with the CARP. The effective management of such diverse research institutes poses a formidable challenge to the NARS.

Agricultural research institutions in the country have grown rapidly in size as well as in scope of the activities in the recent years. In the light of increased institutional activities coupled with growing scarcity of resources as well as the complexities of the NARS, the research managers are faced with the problem of effective and efficient management of their research. Precise knowledge about the research programmes and projects that are being carried out by the scientists in their institutions is the first prerequisite of any efforts towards rationalization of research investments. Additionally, relevant information on various research resources, including the efficiency with which these are used, would also be required. The most important resources used for the implementation of research programmes include people, finance, and facilities.

In the absence of detailed information on these three categories of research resources, performance of the essential management functions, such as planning, programming, monitoring, and evaluation would become difficult. Lack of quality information particularly on the availability and utilization of scarce resources, can be a major impediment for the research managers to manage their research effectively at their institutes.

Relevant information is an essential prerequisite for sound decision-making by the research managers because they; provide the basis for effective planning, programming, monitoring and evaluation of research; Strengthening resources; and bringing about organizational reforms and policy level changes.

Although agricultural research institutions in the country are good at record keeping on research programmes and projects along with the associated resources, this information is not readily available with the research managers to take sound decisions. This is because of recording of information at various locations by different people in different forms. This always leads to managerial ineffectiveness.

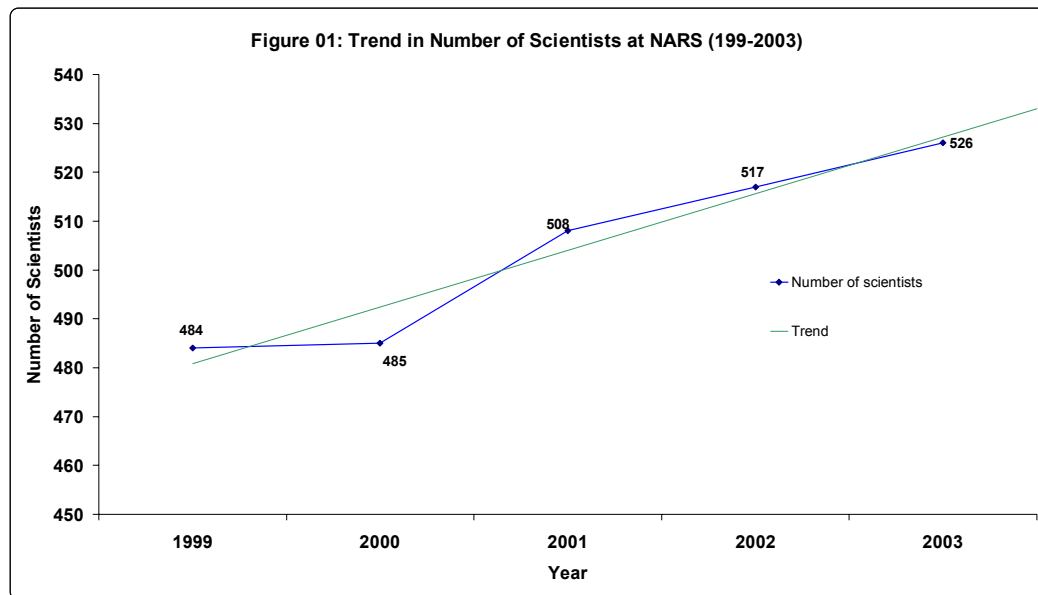
Therefore it becomes necessary to develop an organized Management Information System (MIS) for agricultural research that can generate relevant information. As the research activities increase, the need for an organized MIS becomes more apparent. INFORM is a management information system, which includes a program budgetary system, developed and introduced by ISNAR and CARP to the NARS. This provides necessary information for effective and efficient research management. Information is collected annually by INFORM coordinators of the relevant institutes and then CARP consolidates these Institutional INFORM databases into a National database. Most important information is analysed at national level and a report is published annually. This report presents a brief analysis of the research budgets, projects and personnel of the NARS in 2003, together with Directories of Research Personnel and Research Projects. This information will be very useful for research managers, in effective and efficient research management.

In 2003, CARP collected INFORM data from eleven research organizations, of the National Agricultural Research System in Sri Lanka ( NARS), namely, Department of Agriculture, Department of Export Agriculture, Veterinary Research Institute, Institute of Post Harvest Technology and Hector Kobbekaduwa Agrarian Research & Training Institute, under the Ministry of Agriculture and Livestock, Forest Department, under the Ministry Environment and Natural Resources, National Aquatic Resources Research & Development Agency (NARA) under the Ministry of Fisheries and Aquatic Resources, Coconut Research Institute, Rubber Research Institute, Sugarcane Research Institute and Tea Research Institute under the Ministry of Plantation Industries. There were 15 Research Centers, namely Field Crop Research & Development Institute, Horticultural Crops Research & Development Institute, Rice Research & Development Institute, Fruit Crop Research & Development Centre, National Plant Quarantine Service, Plant Genetic Resources Centre, Natural Resources Management Centre, Socio-economic & Planning Centre, National Botanical Garden and Regional Agricultural Research & Development Centres of Angunakolapellesa, Aralaganwila, Bandarawela, Bombuwela and Makandura under the Department of Agriculture. Information were collected in an electronic form, through INFORM coordinators of the respective research organizations. These data were processed and compiled and finally a national database was built. Because of the wide range of sources and the number of people involved in the data collection process, the standardization of the data to permit valid comparisons was not an easy task, thus, the results, should be regarded as indicative.

The information in the database can be divided mainly into three groups namely, Research personnel, Research Budgets and Research projects. Two groups (Research personnel and research budget) were resources available for the research managers to carry out research and third (Research Projects) were the research activities that can be performed with these resources. This third group provides necessary information on how the resources were used in research activities.

## Human Resources of NARS in 2003

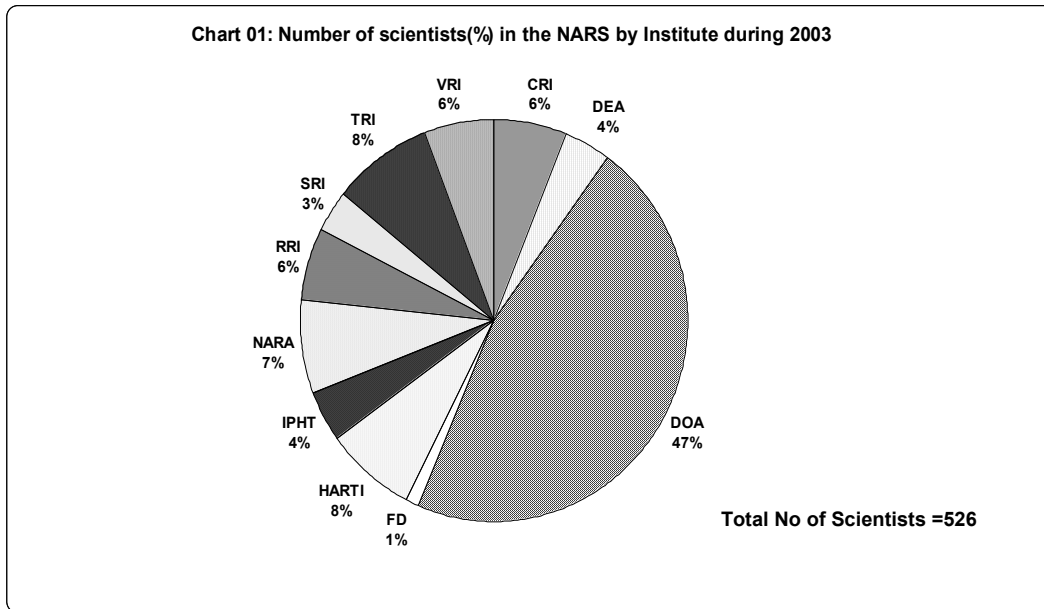
There were 526 scientists in the NARS during the 2003. The designations of scientists varied from institute to institutes. The minimum level of scientists was the staff grade research officers or equivalent posts. These scientists have a basic degree as a minimum qualification except few promoted scientists. They conducted research activities as principle investigators or co-scientists. Most of the scientists conducted research for a specific commodity group especially in the plantation sector and others dealt with more than one commodity group. Chart 1, 2, 3, and Fig 1 shows some important information about the scientists. The number of scientists, in the NARS has gradually and slowly increased. Figure 01 illustrates the positive trend of the number of scientists in NARS.



Source: INFORM –National Database-2003

## Number of scientists by institutes in the NARS

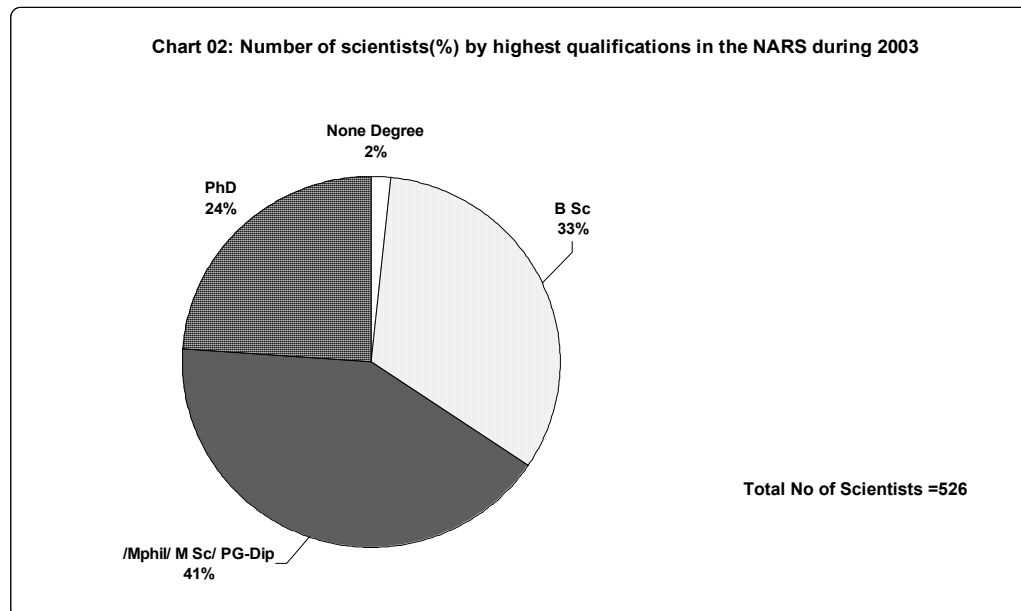
According to Chart 01 47% of the scientists were in the DOA which was the largest islandwide organization in the NARS. TRI and HARTI, each has the second highest number of scientists by employing 8% of the total scientists. NARA has 7% of scientists out of the total. CRI, VRI and RRI have 6% each while 4% were employed in DEA and IPHT. SRI and FD has 3% and 1d% of the scientists. The number of scientists in DOA were increased by 4% while scientists at HARTI increased by 3%. With respect to previous year, the number of scientists at TRI, IPHT, CRI, SRI and RRI were decreased by 1% each. With respect to previous year, the scientists at DEA, VRI, and FD remained same, as in the previous year.



Source: INFORM –National Database-2003

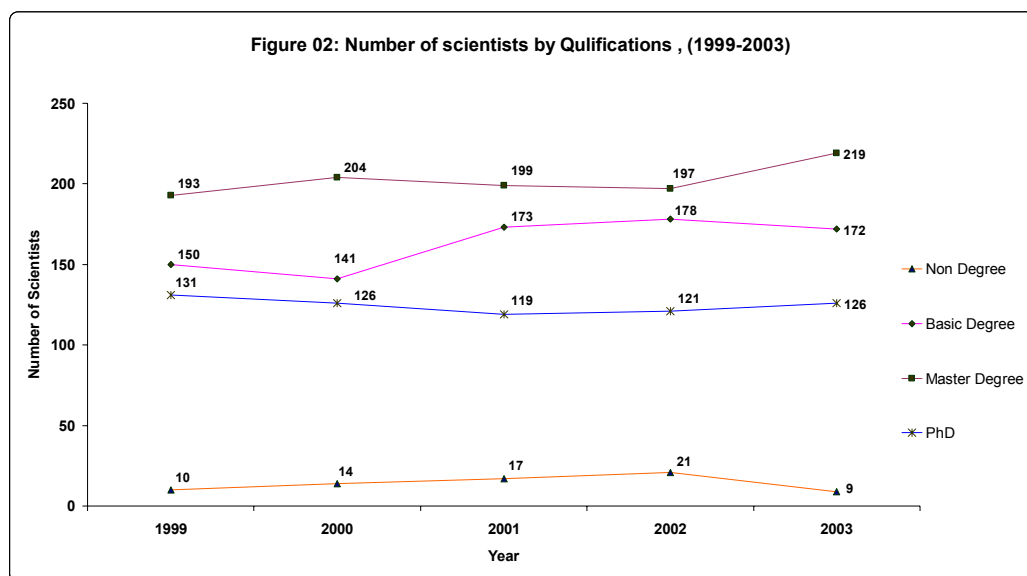
**Numbers of scientists by highest academic qualifications at NARS**

Chart 02 provides information on highest academic qualifications of scientists. It shows that 65% are trained and 24% have obtained PhD and 41% Masters Degrees while 35% of the scientists have not been provided with formal research training. Among the untrained category two percent of scientists, have not obtained, at least a basic degree. Two scientists, out of 219 of Master level training category, have obtained PG-Diploma.



Source: INFORM –National Database-2003

Figure 02 shows the trend of number of scientists with respect to their highest qualifications during the period of 1999-2003. According to the Figure 02, the ratio of trained to untrained scientists and non degree scientists are decreasing.



Source: INFORM –National Database-2003

**Table 1: Scientist Highest qualification by discipline**

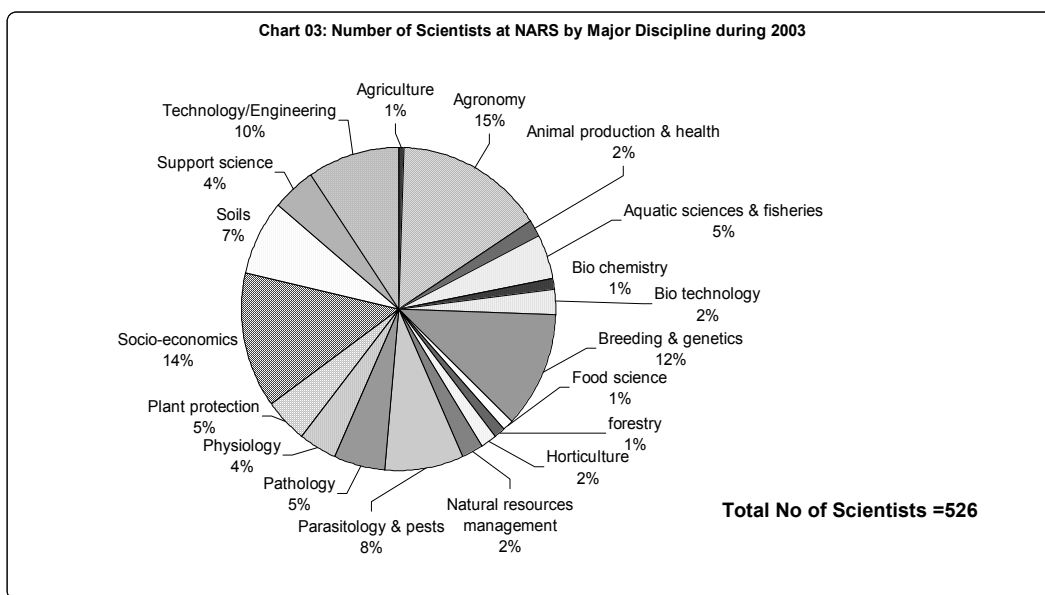
Discipline	Untrained Scientists		Trained Scientists			% Trained	Total no. of Scientists
	No	%	PhD	MPhil	MSc		
Agronomy	30	35	20	20	15	65	85
<b>Animal Production &amp; Health</b>	<b>4</b>	<b>50</b>	1	2	1	50	8
Aquatic Science & Fisheries	6	25	7	6	5	75	24
Biochemistry	2	33	3	0	1	67	6
Biotechnology	4	31	5	2	2	69	13
<b>Breeding &amp; Genetics</b>	<b>22</b>	<b>36</b>	10	8	21	64	61
Food Science	2	33	0	2	2	67	6
<b>Forestry</b>	<b>4</b>	<b>80</b>	1	0	0	20	5
Horticulture	2	22	4	0	3	88	9
<b>Natural Resource</b>	<b>5</b>	<b>42</b>	1	1	5	58	12
<b>Parasitology &amp; Pest</b>	<b>20</b>	<b>43</b>	15	5	6	57	46
Pathology	7	26	11	1	8	74	27
Physiology	2	10	13	3	2	90	20
Plant Protection	5	24	7	3	6	76	21
<b>Socio-economics</b>	<b>27</b>	<b>38</b>	10	9	26	62	72
Soils	9	23	10	6	14	77	39
<b>Support Science</b>	<b>11</b>	<b>48</b>	3	4	5	52	23
<b>Technology/Engineering</b>	<b>19</b>	<b>39</b>	7	6	17	61	49
<b>Total</b>	<b>181</b>	<b>34</b>	<b>128</b>	<b>78</b>	<b>139</b>	<b>66</b>	<b>526</b>
<b>Total</b>	<b>181</b>	<b>34</b>	<b>345</b>			<b>66</b>	<b>526</b>

Source: INFORM –National Database-2003

Table 1 shows the distribution of the highest qualification among the disciplines at NARS. According to this table, there were more than one third of untrained scientists among the disciplines of Animal Production & Health (50%), Breeding & Genetics (36%) Forestry (80%), Natural Resources Management (42%), Parasitology & pest (43%) Support Science (48%), Socio economics (38%), Support Sciences and Technology/Engineering (39%).

### Numbers of Scientists by Major Disciplines in the NARS

Chart 03 shows the distribution of scientists among different major disciplines. Eighteen percent of the scientists were in the discipline of Plant protection. These scientists carried out research in Parasitology and pest (8%), Pathology (5%). Rest of the scientists in the Plant Protection carried out research in both Parasitology and & Pathology. The percentage of scientists carried out research, in Agronomy, Socio economics and Breeding and genetics are 15%, 14% and 12% respectively. There were 10% of the scientists are engaged in research in Technology/ Engineering. Seven percent of scientists were in the soils. Fisheries and aquaculture was handled by 5%. Four percent of the scientists were involved with research on each Support sciences and Physiology. It was followed by the Horticulture (2%). Each Biochemistry, Environmental science, Livestock, and Plant protection research was carried out by 1% of the scientists.

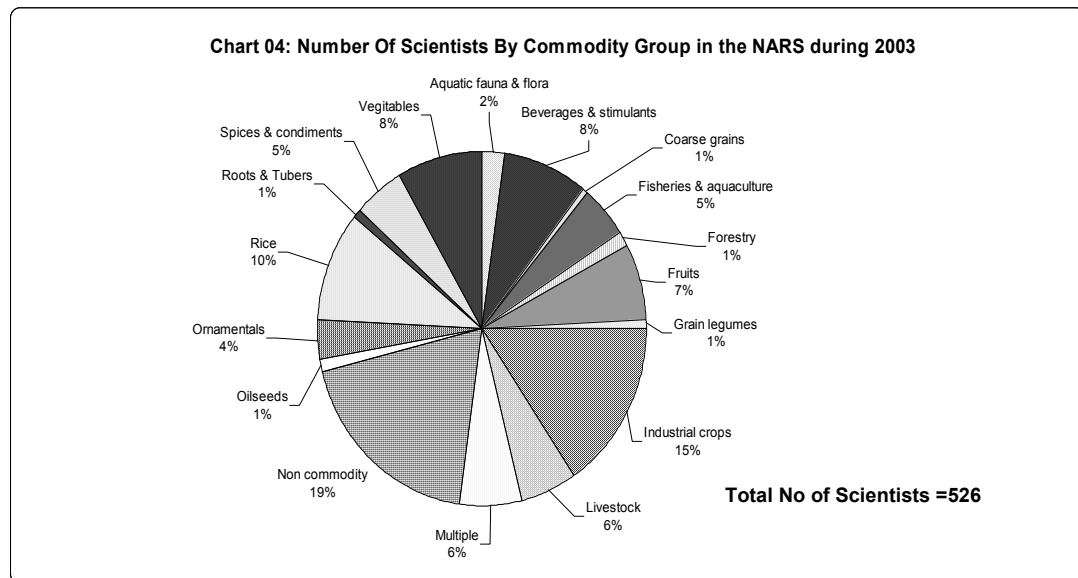


Source: INFORM –National Database-2003

### Numbers of Scientists by Commodity Group in the NARS

Chart 04 shows the distribution of scientists among different commodities. Eighty one percent (81%) of scientists carried out commodity based research while 19% were engaged in factor (non-commodity) research activities. The highest number of scientists (15%) carried

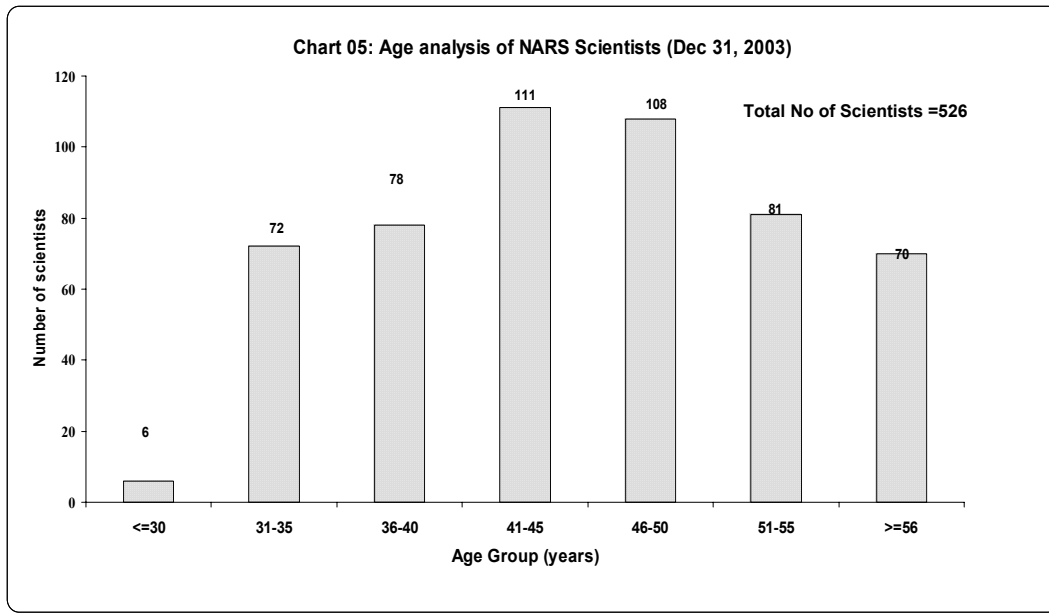
out research on industrial crops; rubber, coconut, sugar. About 11% of scientists were in cereals and 10% of them were on research related to rice. Eight percent of each scientist was in Beverages and stimulants group (tea, cocoa. Coffee) and Vegetables .Seven percent (7%) of the scientists were in the commodity group Fruits. There were 6% of scientists in the commodity group Livestock; dairy, buffalo, poultry, swine, sheep and others. 6% of scientists have done research on more than two crops hence it was named as multiple commodities. Each of Fisheries and aquaculture and Spices and condiments has 5% of the scientists. There were about 4% of scientists in Ornamentals while 2% were in the Aquatic flora and fauna. Root and tubers, Oil crops, Coarse grains and Forestry have 1% scientists each.



Source: INFORM –National Database-2003

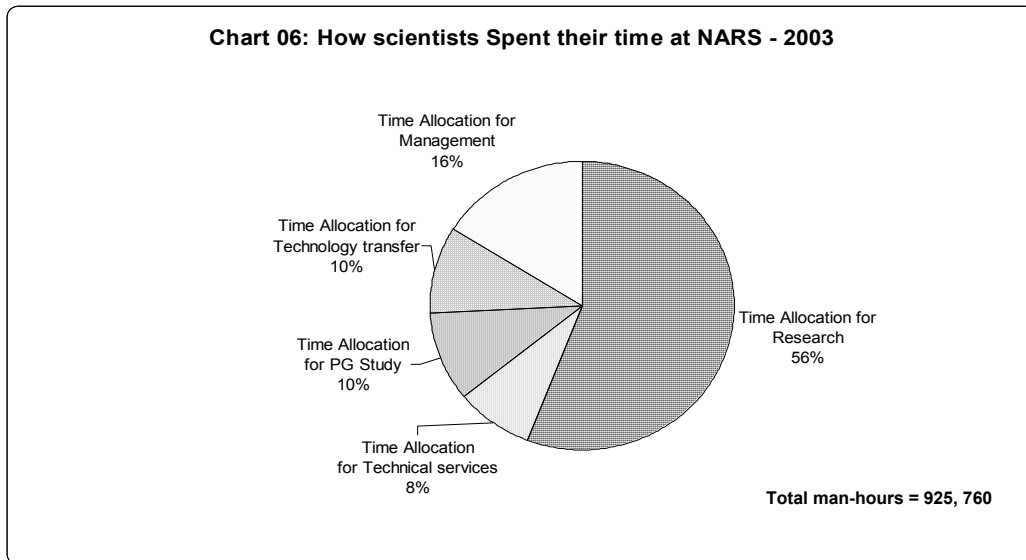
### Numbers of scientists by age in the NARS

Chart 05 illustrates the information about the scientist's age distribution in NARS in 2003. There were 6 scientists in the age group under 30 years. There were 72, 78, 111, 108, and 81, scientists in the age groups of 31-35, 36-40, 41-45, 46-50 and 51-55 respectively. 70 scientists were in the age group of over 55 years.



Source: INFORM –National Database-2003

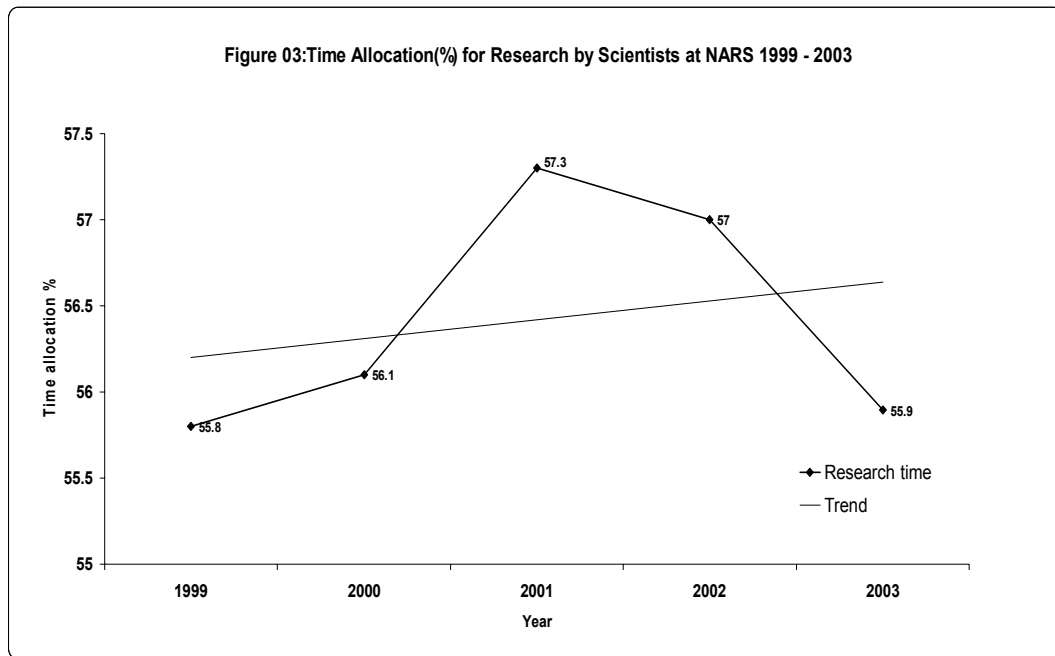
**How scientists spent their time in the institute**



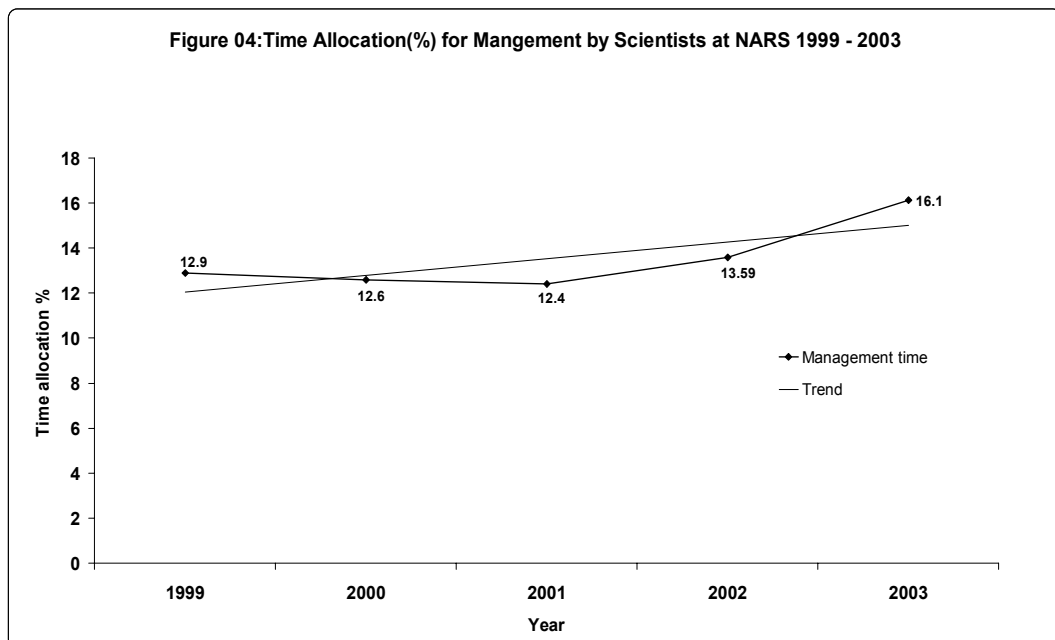
Source: INFORM –National Database-2003

Researcher’s \*total time has been classified according to the type of work as Research, Management, Technology transfer, Technology service and Study. Chart 06 shows how scientists spent their time in 2003. During the year, 56% of their time has been spent for research. 16% for Management while Technology Transfer and PG study activities each had 10% of scientist’s time allocated. 8% of time was allocated for the technical service activities.

Figures 03 to 05 shows the trend in scientist's time allocation for some major activities; Research, Management, and Post Graduate studies.

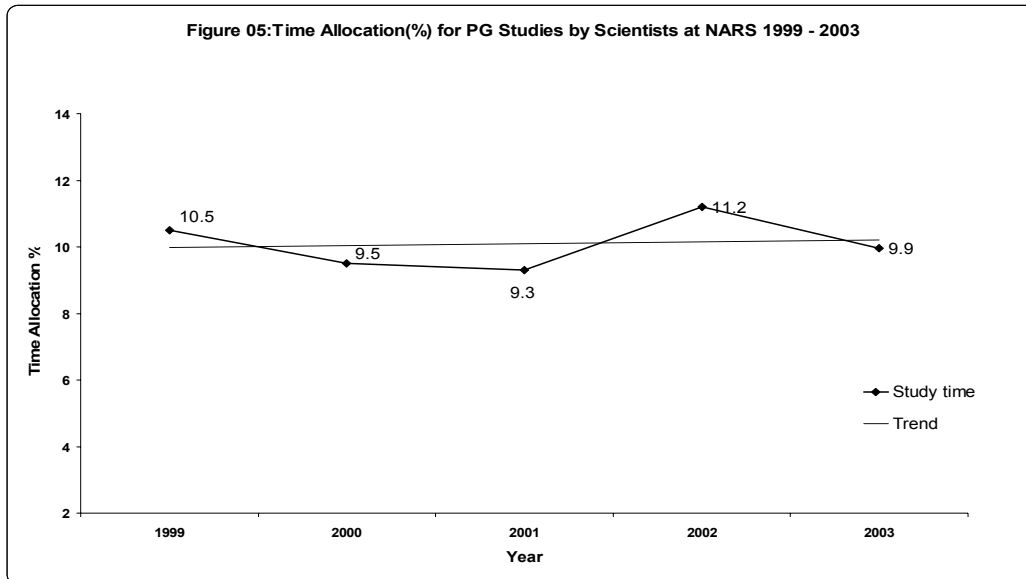


Source: INFORM –National Database-2003



Source: INFORM –National Database-2003

**Total man hrs = (No. of working days/yr) \* (No. of working hours/day) \* (No. of scientists)**

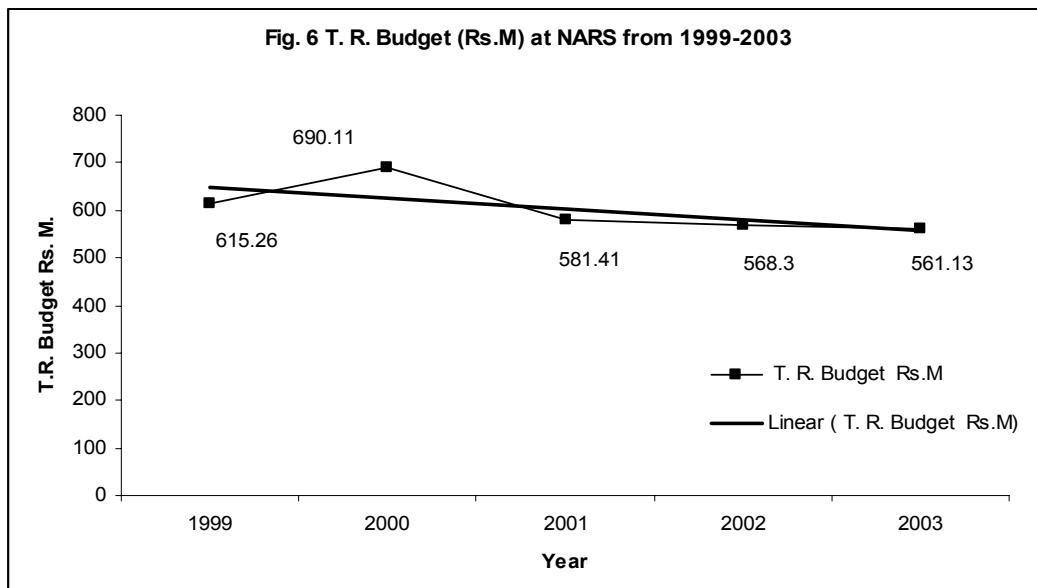


Source: INFORM –National Database-2003

## Total Recurrent Budget at NARS

### NARS Recurrent Budget

The total national budget for agricultural research has been defined as the total allocated money for recurrent expenditure. The capital budget was not included. In the analysis, recurrent budget was broken down to percentage terms, with respect to organizational units, disciplines functions/activities and commodities.



Source: INFORM –National Database-20

In 2003, Rs. 561.13 Million (Constant Factor price 1996) was spent on agricultural research, by research organizations in the NARS. It was a 1.26% decrease (Rs. 7.18 M) compared to the previous year's research expenditure of Rs. 568.32 M. During the past five years total recurrent expenditure had a decreasing trend as illustrated by Fig.6. The charts 7, 8, 9, and 10 show the distribution of the research budget among different institutes, Activities Sectors and Disciplines,.

### **NARS Recurrent Budget (%) by Institutes -2003**

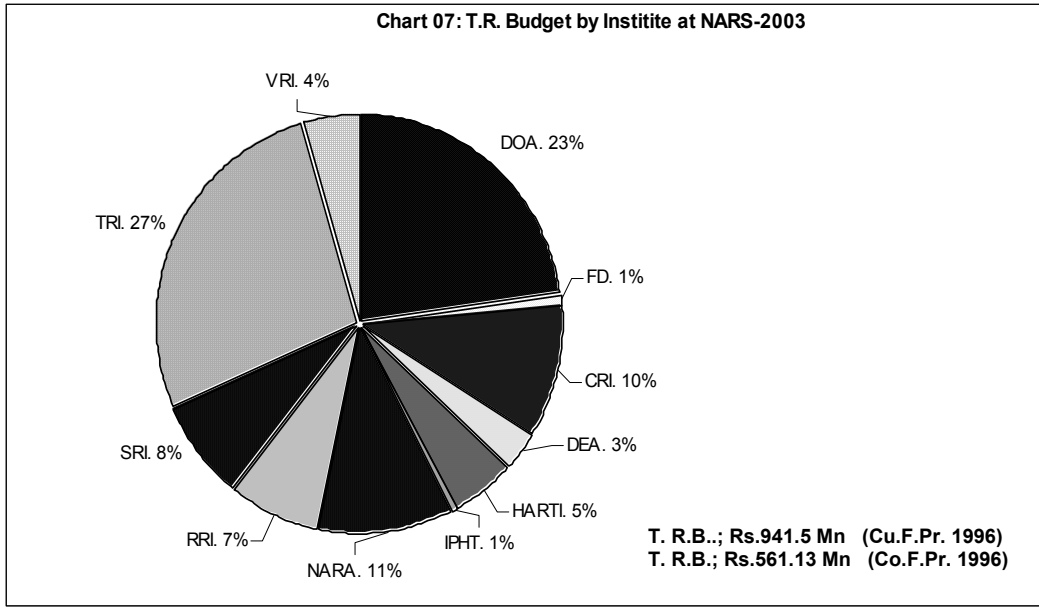
There are eleven research organizations under different Ministries, in the NARS. Most of them (DOA, DEA, FD, & VRI) are government departments, which, depend on Treasury funds. Others are semi governmental organizations or statutory bodies. Excluding HARTI, these semi government organizations are not fully depended on the Treasury funds. Table 2 shows the recurrent budget allocation for agricultural research during 1999-2003.

**Table 2: Recurrent Budget Allocation within NARS (1999-2003)**

INSTITUTE CENTRE	Recurrent Budget Rs. Million (Constant Factor-				
	1999	2000	2001	2002	2003
Coconut Research Institute	86.14	82.81	72.03	59.83	57.49
Dept. of Export Agriculture	18.46	48.31	22.95	15.56	16.78
Dept. of Agriculture	147.66	200.13	146.67	132.72	128.57
Forest Department	6.15	6.9	5.82	4.34	4.54
Hector Kobbakaduwa Agricultural R &T	43.07	34.51	29.48	25.3	28.31
Institute of Post Harvest Technology	0	0	17.42	23.9	3.49
National Aquatic Resources R & D Agency	67.68	82.81	65.76	55.61	60.76
Rubber Research Institute	73.83	48.31	36.82	29.63	40.04
Sugarcane Research Institute	36.92	41.41	37.45	40.73	42.72
Tea Research Institute	110.75	117.32	124.52	160.27	153.87
Veterinary Research Institute	24.61	27.6	22.49	20.41	24.55
<b>Total</b>	<b>615.26</b>	<b>690.11</b>	<b>581.41</b>	<b>568.32</b>	<b>561.13</b>

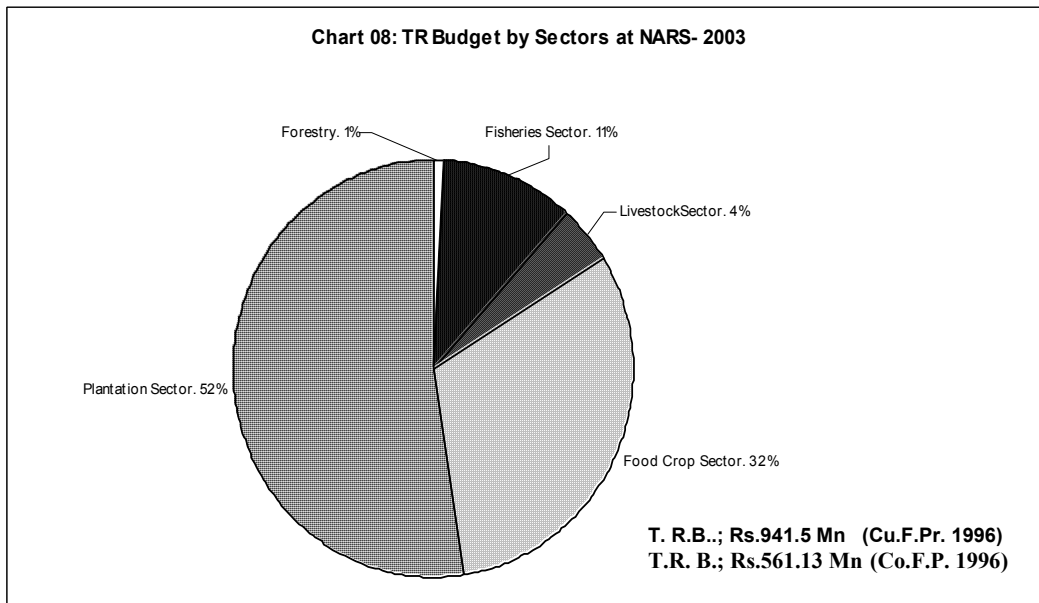
Source: INFORM –National Database-2003

Chart 07 shows the distribution of the recurrent budget, among the research organizations at NARS. The highest proportion of the total recurrent budget was allocated to Tea Research Institute, (27%) and followed by Department of Agriculture (23 %), National Aquatic Resources Research & Development Agency (11 %), Coconut Research Institute (10 %), Sugarcane Research Institute (8 %), Rubber Research Institute (7 %), Hector Kobbakaduwa Agrarian Research and Training Institute (5%) Veterinary Research Institute (4 %) Department of Export Agriculture (3 %), and Institute of Post Harvest Technology and Forest Department (1 %) each



Source: INFORM –National Database-2003

Research organizations in the plantation sector received their budget through the CESS funds. Therefore despite their numbers of the employees, Plantation sector accounted a large percentage (52%) of the National budget compared with other sectors (48%). 32% Budget was allocated for the Food crop sector which includes DOA, DEA, HARTI and IPHT. Eleven percent of the National budget was accounted by the NARA; a statutory body, under the Ministry of Fisheries, which gets funds from other sources in addition to the Treasury funds. Livestock sector had only 4% of the allocations while the Forestry research had 1%. (Chart 08).



Source: INFORM –National Database-2003

## NARS Recurrent Budget by Functions/Activities

Using the Program Budgetary System (PBS), INFORM Budget was prepared by relating the budget, with personnel and projects into one system. In the INFORM budget, there are 8 cost categories according to the types of activities of a research organization. Table 3 shows the distribution of the budget among these categories.

**Table 3: NARS Recurrent Budget (%) by Activity**

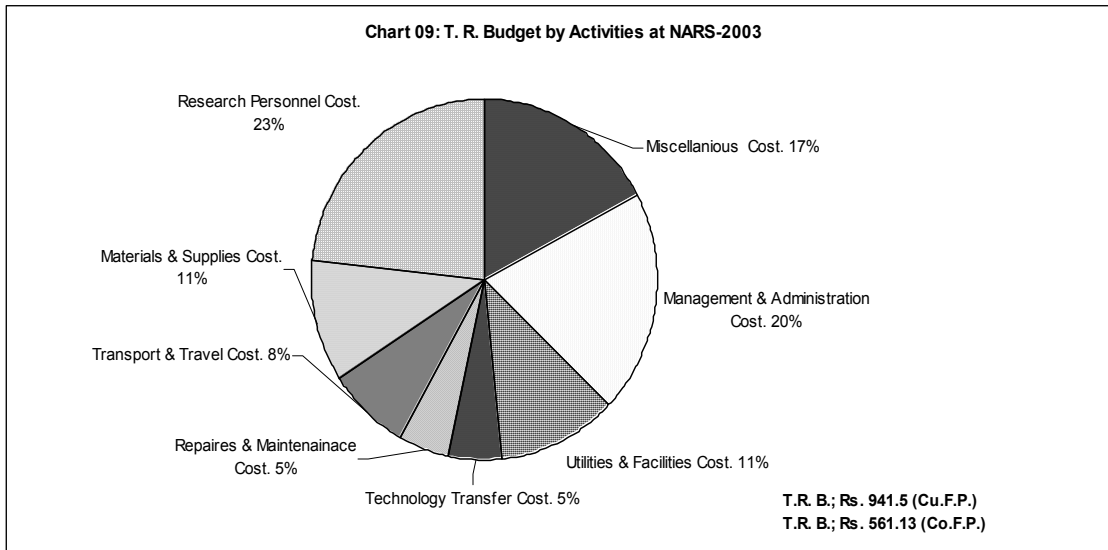
Activity	Recurrent Budget Rs. Million (Constant Factor-1996)				
	1999	2000	2001	2002	2003
Research Personnel Cost	166.12	234.64	144.76	163.89	130.47
Material & Supplies Cost	61.53	69.01	64.62	54.76	61.68
Transport & Travel Cost	43.07	55.21	37.55	30.55	42.74
Technology Transfer Cost	30.76	34.51	31.06	34.43	28.06
Utility & Facilities Cost	36.92	34.51	53.15	78.49	62.81
Repairs & Maintenance Cost	49.22	48.31	31.85	36.78	26.61
Management & Administration Cost	92.29	55.21	95.33	80.14	112.66
Miscellaneous Cost	135.36	158.73	123.08	89.27	96.22
<b>Grand Total</b>	<b>615.25</b>	<b>690.11</b>	<b>581.41</b>	<b>568.32</b>	<b>561.13</b>

Source: INFORM –National Database-2003

The eight cost categories are Research personnel, which include all the salaries and benefit allowances of research staff, Materials and Supplies that include all the supplies used in the research activities, Transport and Travel, including fuel and subsistence, Management and Administration, which includes the expenses incurred for the non-research staff and management and administration. Repairs and Maintenance that includes all the expenses on repairs and maintenance of vehicles, machines and buildings, Technology Transfer that includes the expenses incurred on technology transfer activities and services, the expenses incurred on the overheads comes under the Utilities and facilities and the Miscellaneous costs which include all the expenses which cannot be categorised in other seven activities.

Chart 9 shows the distribution of the NARS recurrent budget, among these eight activities. The highest proportion of the total recurrent budget was spent for Research Personnel (23%) followed by Management and Administration (20%) and Miscellaneous (17%) which includes expenditure on communication, rate and taxes, post graduate studies, other direct costs of research excluding costs of research personnel, transport and travel and Materials and supplies etc. With reference to previous year Research Personnel Cost was reduced by 8% while the Management & Administration cost was increased by (9 %). Eleven percent of the total budget was spent on Materials and Supplies and Utilities and Facilities each. Both Material and Supplies cost and Miscellaneous cost were increased by 2% with respect to the previous year. While Utilities & Facilities cost was reduced by 3%. The Technology Transfer cost was 5% and it was remained same as the previous year. The allocated amount for the Repairs and maintenance was about 5% it also has 1% reduction

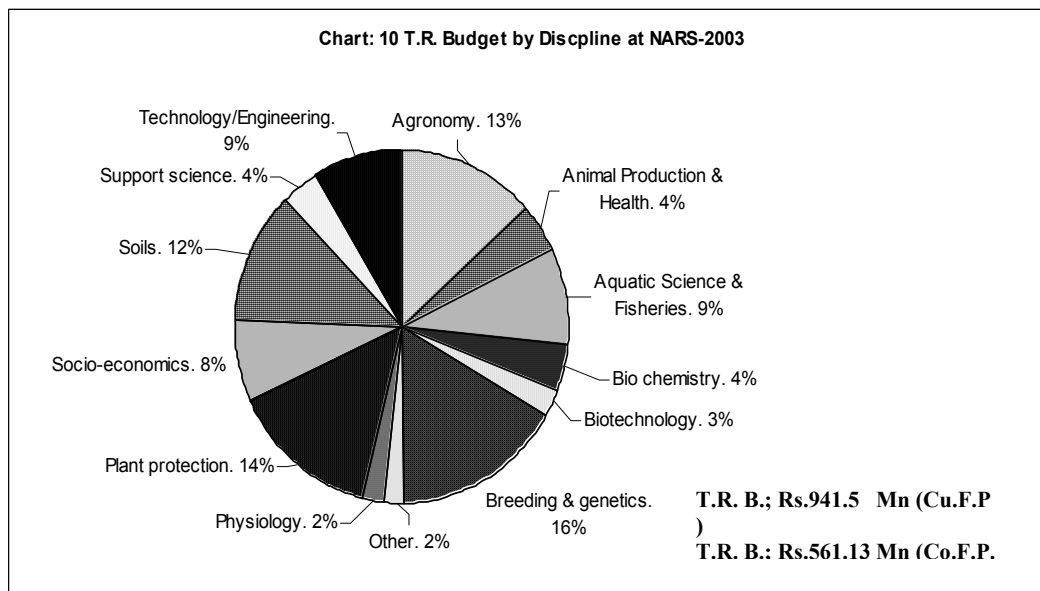
compared to the previous year. Forty-three of the total recurrent budget was spent on personnel expenditure



Source: INFORM –National Database-2003

### NARS Recurrent Budget by Discipline

Research projects were classified into 13 major disciplines, as Agronomy, Animal Production & Health, Biochemistry, Biotechnology, Breeding and Genetics, Fisheries and Aquaculture, Plant Protection, Physiology, Socio-economics, Soils, Support sciences, Other (Forestry and Natural Resources Management) and Technology/Engineering. Chart 10 illustrates how recurrent budget was distributed among these disciplines.



Source: INFORM –National Database-2003

Research projects in Breeding and genetics accounted for 16% of the total budget, followed by Plant Protection (14%), Agronomy (13%) and Soils (12%). With respect to previous year, there was 1% increase in Breeding and genetics and 3% decrease in Agronomy while Plant protection remained as the same. There was a 1% decrease in the allocation for the soils with respect to the last year. Technology/Engineering and Fisheries & aquaculture, each has 9% of the total recurrent research budget. Socio economics was allocated 8% of the total budget and this was similar to last year. Four percent (4%) of the total recurrent budget was allocated to each of the disciplines Biochemistry, Support Science and Animal Production & Health. Research Projects in Physiology accounted 2% followed by 2% of the budget by Biotechnology and others (Natural Resources management and Forestry Research).

#### **NARS Recurrent Budget by Commodity Group**

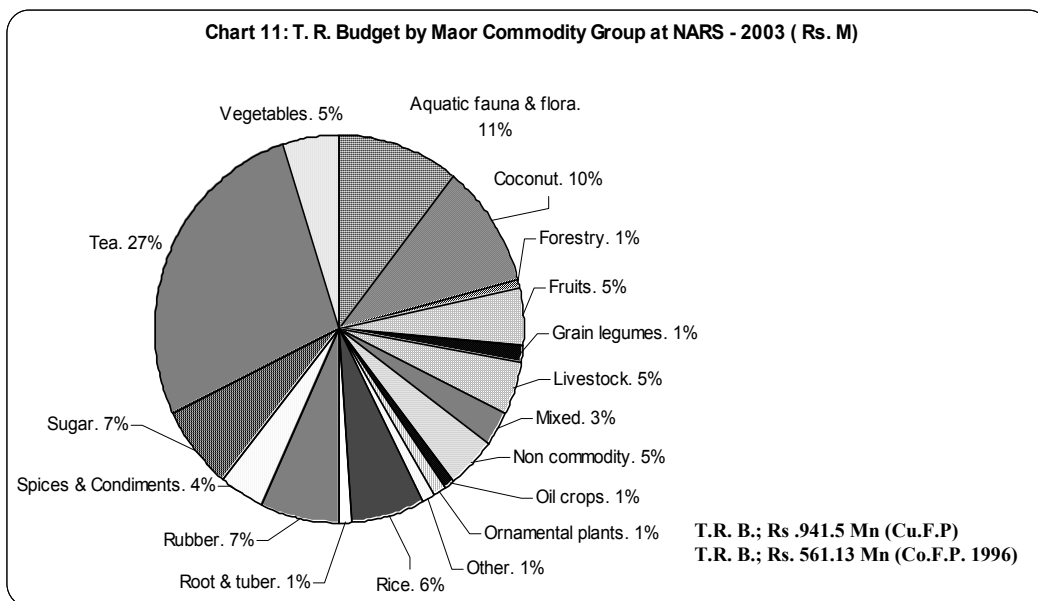
Research projects were classified into 18 major commodity groups namely; Aquatic fauna & flora, Coconut, Forestry, Fruits, Grain legumes, Livestock, Mixed, None commodity, Oil crops, Ornamental plants, Other, Rice, Roots & tubers, Rubber, Spices & condiments, Sugar, Tea and Vegetables. The projects which have more than one commodity groups were classified into Mixed. All the commodity groups which have about less than 1% of the total allocation was taken together and named as “others” for better illustration. This “Others” include coffee, cocoa, arecanut, medicinal plants and garcinia. The Table 4 shows how the Total Recurrent Budget was allocated among the commodity groups.

**Table 4. Total Recurrent Budget by Commodity Group**

<b>Major Commodity Group</b>	<b>T. R. Budget Rs. M</b>	<b>%</b>
Aquatic fauna & flora	99.14	11
Coconut	5.40	10
Forestry	4.82	1
Fruits	96.46	5
Grain legumes	7.62	1
Livestock	44.13	5
Mixed	13.00	3
Non commodity	43.04	5
Oil crops	25.51	1
Ornamental plants	43.22	1
Other	8.19	1
Rice	10.61	6
Root & tuber	58.19	1
Rubber	10.12	7
Spices & Condiments	66.60	4
Sugar	36.71	7
Tea	66.32	27
Vegetables	255.77	5
<b>All</b>	<b>941.5</b>	<b>100</b>

Source: INFORM –National Database-2003

Chart 11 also depicts the distribution of budget allocation among major commodity groups. Commodity-based research accounted for 95% of the total recurrent budget while remaining 5% was accounted for non-commodity research.



Source: INFORM –National Database-2003

The highest percentage (27%) of the total budget was allocated for Tea. This was followed by Aquatic Flora and Fauna (11%) and Coconut (10%). Rubber and Sugar was allocated 7% each of the total budget. The staple food Rice was allocated only about 6%. Five percent (5%) of the total budget was allocated for each Fruits, Vegetables, livestock and Non commodity. Spices & condiments and Mixed groups were allocated 4% and 3% respectively. Forestry, Grain legumes, Oil crops, Ornamentals, Root & tuber and other each was allocated for 1%.

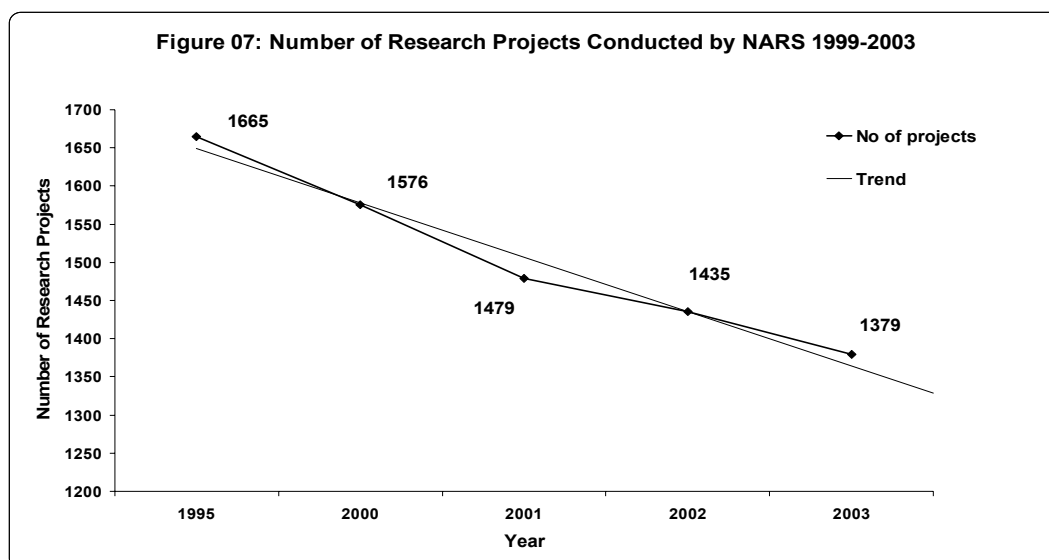
### Research Projects conducted at NARS in 2003

During the 2003 1,379 research projects were conducted by the eleven research organizations, at NARS under different disciplines and commodities. With respect to the last year the total projects were reduced by 56 numbers. Table 5 shows the Number of projects conducted by NARS institutes during the period from 1999 to 2003. Figure 07 shows a negative trend for the number of projects during the past four years.

**Table 5: Number of Projects Conducted by Institutes/Departments**

Institutes/Departments	# of Projects				
	1999	2000	2001	2002	2003
Coconut Research Institute	118	126	92	76	89
Department of Export Agriculture	128	156	146	117	108
Department of Agriculture	925	864	843	814	768
Forest Department	26	43	30	35	24
Hecktor Kobbekaduwa Agrarian R and T	27	17	11	13	20
Institute of Post Harvest Technology	n.a.	n.a.	17	27	24
National Aquatic Resources R and Agency	53	51	53	45	34
Rubber Research Institute	117	98	89	93	92
Sugarcane Research Institute	66	65	54	69	70
Tea Research Institute	188	135	126	131	127
Veterinary Research Institute	17	21	18	15	23
<b>Total</b>	<b>1,665</b>	<b>1,576</b>	<b>1,479</b>	<b>1,435</b>	<b>1,379</b>

Source: INFORM –National Database-2003

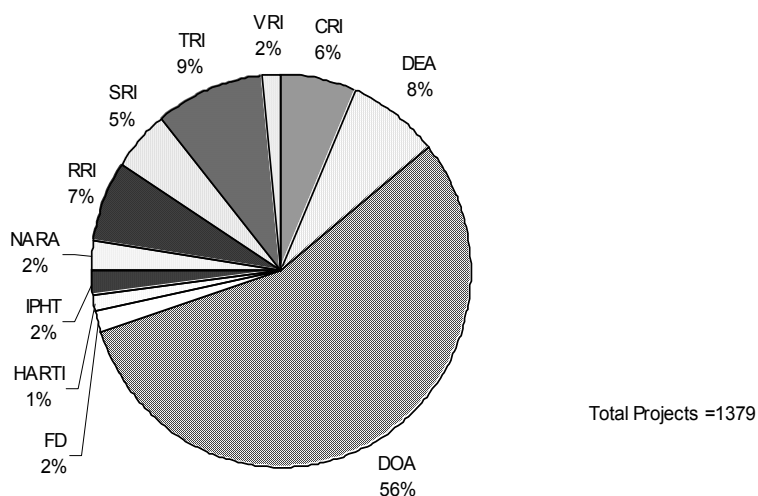


Source: INFORM –National Database-2003

### Numbers of Projects Conducted by Institutes/Departments

Chart 12 shows the distribution of the research projects of NARS among different institutes. DOA was responsible for 56% of the total number of research projects, followed by TRI (9%) and DEA (8%) while RRI, CRI and SRI were responsible for 7%, 6% and 5% of the total number respectively. Other institutes such as VRI, FD, NARA and IPHT each accumulated for 2% of the total projects. The number of projects of DOA was reduced by 1% compared to the previous year. Number of projects remained at the same level as in the previous year, in several institutes/departments such as TRI, FD, RRI, SRI, VRI and IPHT.

**Chart 12: Number of Research projects by Institute in NARS during 2003**

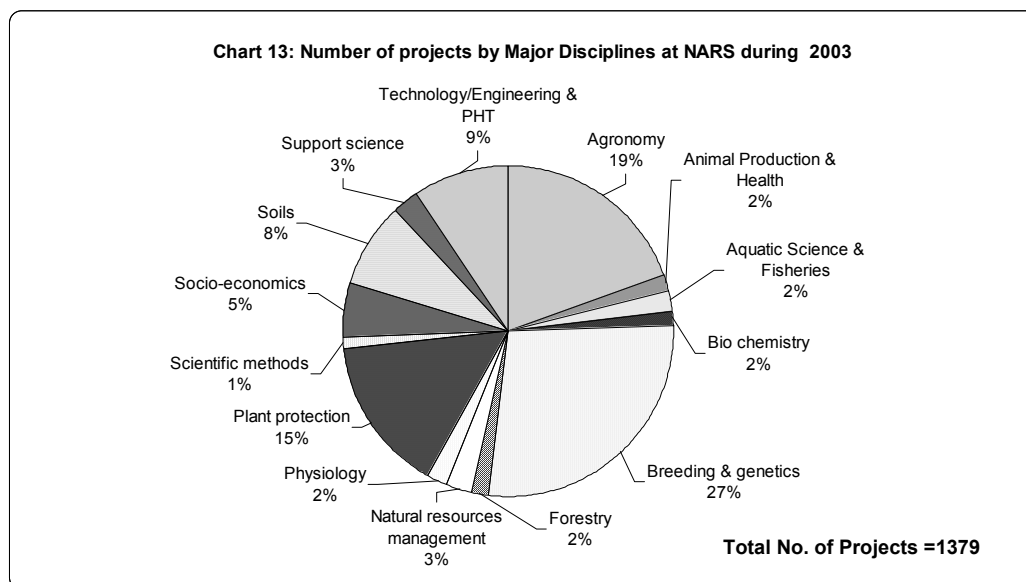


Source: INFORM –National Database-2003

### Numbers of Projects by Disciplines

**Table 6; Numbers of Projects by Disciplines**

Discipline	No of Projects	%
Breeding & genetics	377	27
Agronomy	268	19
Plant protection	211	15
Technology/Engineering	129	9
Soils	116	8
Socio-economics	71	5
Support science	36	3
Natural resources management	36	3
Physiology	27	2
Aquatic Science & Fisheries	27	2
Forestry	23	2
Animal Production & Health	22	2
Bio chemistry	21	2
Scientific methods	15	1
<b>Total</b>	<b>1379</b>	<b>100</b>



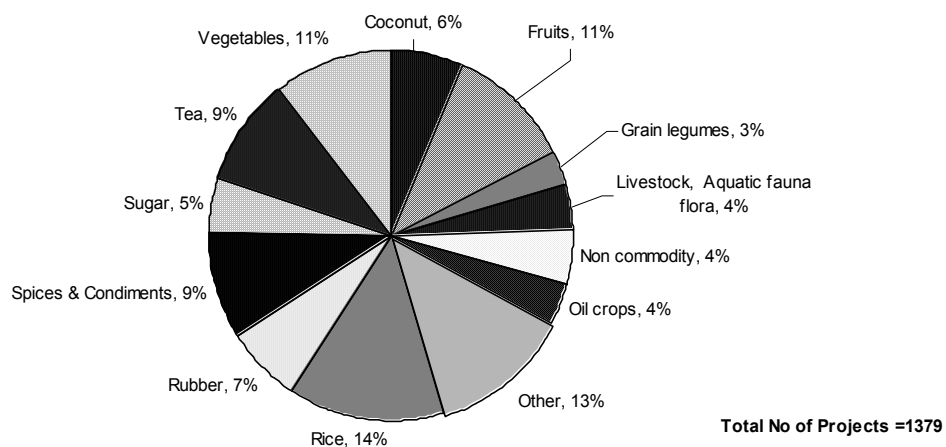
Source: INFORM –National Database-2003

Table 6 shows the distribution of 1,379 research projects among different disciplines. According to the Table, about 377 of the research projects were on the disciplines of Breeding & genetics (27%) and Agronomy 19%). Fifteen percent of the total projects were in Plant Protection while 9% projects were in Technology and Engineering. There were 8% of the projects in soils. Disciplines of Socioeconomics, Support Science and Natural resources management had 5%, 3% and 3% projects respectively. Chart 13 also depicts the distribution of projects among major disciplines.

### Number of Projects by Commodity Group

Total projects were classified into 21 major commodity groups. Table 7 provide information on number of research projects within the NARS by commodity Group. Chart 14 also shows the distribution of research projects among commodity Groups. Ninety five percent (96%) of the total number of projects was Commodity-based research and remaining 4% was on Factor research (Non commodity). The highest proportion of research projects was conducted on rice (14%) and followed by Fruits (11%), Vegetables (11%), Tea (9%), spices and condiments (9%). Rubber, Coconut and sugarcane were responsible for 7%, 6% and 5% projects while each Oil crops and non commodity was responsible for 4% of the total projects. Three percent of the total number of projects was on Grain legumes while each Aquatic fauna and flora, Coarse grains, Forestry, Livestock, Mixed, Ornamental plants, Root & Tuber, and other was responsible for only 2% of the projects. Chart 14 depicts the distribution of major commodities among the NARS.

**Chart 14: No of Projects by Major commodity group at NARS-2003**



Source: INFORM –National Database-2003

**Table 7: Number of Projects (%) by Commodity Group**

Commodity Group	No of Projects	%
Medicinal Plants	2	0
Forestry	24	2
Livestock	24	2
Beverages & Stimulants	26	2
Coarse Grains	28	2
Root & tuber	28	2
Mixed	32	2
Aquatic fauna & flora	33	2
Ornamental plants	33	2
Grain legumes	40	3
Oil crops	50	4
Non commodity	62	4
Sugar	68	5
Coconut	89	6
Rubber	90	7
Tea	127	9
Spices & Condiments	131	9
Vegetables	147	11
Fruits	153	11
Rice	192	14
<b>All</b>	<b>1379</b>	<b>100</b>

Source: INFORM –National Database-2003

## Conclusions

### Human Resources

In 2003 the total scientists in the NARS were 526 and with respect to last year this has increased by ten. However the 44% of time of these scientists were spent on non research activities. Only 56% of the time was spent on research activities. This means that out of 526 scientists half of them are involved in research. Hence one scientist has to carry out about 5 projects. Therefore, the number of scientists, in the NARS is not sufficient for effective research management. Only 10% of the time was allocated for the technology transfer activities that means only about 50 scientists' time is involved in technology transfer. This situation is also not favorable since the to get the benefit of research it must go to the users. If the technology transfer time is small, dissemination of the technology is also very low. Therefore the recruitment of new scientists is a must.

This report also showed that 35% of the scientists have not received formal training to undertake research. With respect to previous year this was a decrease by 3%. The trained scientists were increased by 3%. This may be due to the CARP-India Human Resources Development Programme. According to the Table 1, more than one third of scientists are untrained in the discipline of Animal Production & Health, Forestry, Natural Resources Management, Support Science, Technology /Engineering. Most of these disciplines are priority disciplines. Therefore when training programmes are planned policy makers must consider these things. However, the training capacity is not sufficient. Hence the policy makers should seriously consider human resource development, as a priority need.

The age pyramid is also unsatisfactory as there are only a few researchers in the lower age categories. The NARS had a staffing strength of 545 research personnel in 1995; this figure decreased to 505 in 1997 including four scientists from Food Research Unit. It further decreased to 484 in 1999 inclusive of 30 scientists in the HARTI. This figure remained static during the year 2000 (485) and in 2001, the number increased to 508 even after adding of 23 scientists from NPQS, NBG of DOA and IPHT. In 2002 this number increased up to 517. This year the total research personnel were increased up to 526. This was a favorable situation. However the number of scientist is not sufficient for effective and efficient research. Therefore policy makers should consider immediate recruitment of researchers, as a priority need. According to the chart the researchers were recruited to the NARS when they were over thirties. Hence their effective research time was limited to about 25 years). This condition was further worsened by long length of untrained period. Therefore, policy makers should consider providing early training opportunities to them. Policy makers should also consider the replacement of these scientists according to the retired scientist's discipline.

## Recurrent Budget

The total allocation of research for this year was Rs. 561.13 Million (Constant Factor Price-1996) based on the National INFORM database. Compared to last year allocation of Rs. 568.32 Millions (Constant Factor Price-1996), there was a 1.26% (Rs. 7.18 M) decrease. During the period of past four years the research allocation has decreased and this negative trend is clearly seen in Figure 1. This negative trend of research allocation may be due to the budgetary cuts by the Treasury and high inflation of the rupee value.

The research investment as the proportion of agricultural GDP was about 0.19%. This showed a 0.13 % decrease when compared to previous year (0.32 %.). The proportion of the research investment on the agricultural GDP in developed countries is about 5%. In the case of the other developing countries also, this proportion was very low (0.6%). Therefore the research investment for the Year 2003 was not sufficient to carry out effective research in Sri Lanka.

The largest share (23%) of this research allocation was for research personnel expenditure, to pay the salaries and other personnel expenditures. The money allocated for the administration and management, the salaries and other personnel expenditure for the non- research staff, was the second largest share (20%). Therefore 43% of the total allocation was for salaries and other personnel expenditure. This indicates that even in the limited research money allocated, larger share was spent on salaries. The allocation for materials and supplies and transport were about 11% and 8% respectively. The money allocated for the miscellaneous activities were about 17%. Part of the miscellaneous allocation was again for the salaries of scientists, those who were engaged in post graduate studies. Fourteen percent (11%) of the total money goes to the utilities which were for cost of electricity and water. This was followed by repairs and maintenance (5%). The allocation for the technology transfer activities of the researchers was only 5%, and this was a 3% increase with respect to last year. This also mainly the part of the salary of the scientists, those who were engaged in technology transfer and technical service activities.

This prioritization not favorable for effective research for development in agriculture in Sri Lanka. Therefore, increase of the research funding should be considered. The money allocated for research institutes were spent mainly for the salaries of the research and non research staff. The money allocated for materials and supplies and travel was very low. Hence there was no sufficient money allocation for the research activities. The money allocated for the technology transfer was also very low. Each institute has a separate budget for the technology transfer (extension) under the development vote. This allocation was very large and it was not included in this database. The technology transfer allocation for this

database was mainly for scientist's salaries and other small purchasing of scientific books and journal publishing and workshops etc.

The distribution of funds was also not satisfactory for effective research. The Tea Research Institute that obtained CESS money has a larger budget allocation (27%) than Treasury-funded institutes. This situation should be considered at the time of fund allocation for research.

Breeding & genetics, Plant protection and Socio- economics have been identified as most important priority areas by the CARP. According to the expenditure incurred on research, except for Breeding and genetics, including Biotechnology (19%), and Plant Protection (14%), it does not align with the National priorities. Research in Socio- economics (8%), other national research priority, has lower allocations than Agronomy (13%). With respect to last year the funds allocated for the Socio- economic research remained the same. Therefore reallocation of funds according to the national priorities should be considered by Research Managers of the NARS.

## **Research Projects**

During the 2003 1,379 research projects were conducted by the eleven research organizations, at NARS under different disciplines and commodities. With respect to the last year the total projects were reduced by 56 numbers. During the past four years there was a negative trend with respect to the number of projects conducted. This may be due to the decrease of recurrent research budget and the insufficient scientists in the NARS.

Out of 1,379 research projects, only 56% of the projects were carried out by the DOA. According to the Table more than 1101 projects were distributed among the disciplines of Breeding and genetics including Biotechnology, Plant protection and technology / Engineering and Soils. Out of these disciplines Agronomy, Plant Protection, Technology /Engineering are priority disciplines. But one of the important disciplines, Socio economics had only 71 projects. Therefore there should be proper rearrangement of the projects in future.