



**Ministry of Forestry  
Forest Department  
Forest Research Institute**



## **Survey on Application of Current Research Activities to Support Future Research Program in Forestry Sector**

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အနာဂတ် သစ်တောသုတေသနအစီအစဉ်အပေါ် အထောက်အကူပြုနိုင်ရန်အတွက်  
လက်ရှိသုတေသနလုပ်ငန်းများ၏ အခြေအနေကို စစ်တမ်းကောက်ယူခြင်း

အုန်းလွင်၊ ဒုတိယညွှန်ကြားရေးမှူး  
ခင်ဝင်းမြင့်၊ လက်ထောက်သုတေသနအရာရှိ  
ဟန်မင်းနောင်၊ ဦးစီးအရာရှိ  
ဖြူဖြူလွင်၊ တောအုပ်ကြီး  
ဘီလီနေဝင်း၊ သုတေသနလက်ထောက်-၂  
ခရစ္စတီနေဝင်း၊ သုတေသနလက်ထောက်-၂  
သစ်တောသုတေသနဌာန

စာတမ်းအကျဉ်း

ယခုစာတမ်းသည် သစ်တောကဏ္ဍတွင် တာဝန်ထမ်းဆောင်နေသော လက်ထောက်  
ညွှန်ကြားရေးမှူး၊ ဦးစီးအရာရှိ၊ တောအုပ်ကြီး အဆင့်ဝန်ထမ်းများအား သစ်တောသုတေသန  
ကဏ္ဍနှင့် ပတ်သက်သောဆန်းစစ်လွှာများပေးပို့မေးမြန်းပြီး ခေါင်းစဉ် (၄)ခုအောက်တွင်  
တွေ့ရှိချက်များကို တင်ပြထားပါသည်။ ဆန်းစစ်မေးခွန်းလွှာ တွင် (၁)ကိုယ်ရေးရာဇဝင် ၊(၂)  
သုတေသနနှင့်ဆိုင်သော မေးခွန်းများ ၊(၃) အနာဂတ် သုတေသနနှင့်  
ဆိုင်သောမေးခွန်းများ ၊(၄) မြန်မာနိုင်ငံအတွက် သစ်တော သုတေသန လုပ်ငန်းများ  
နှင့်သက်ဆိုင်သော အထွေထွေအကြံပြုချက်များ ပါဝင်ပါသည်။ သစ်တောဦးစီးဌာနနှင့်  
အပူပိုင်းဒေသ စိမ်းလန်း စိုပြည်ရေးဦးစီးဌာန အောက်ရှိ လက်ထောက် ညွှန်ကြားရေးမှူး  
(၄၉)ဦး၊ ဦးစီးအရာရှိ (၁၇၃)ဦးနှင့် တောအုပ်ကြီး(၁၇၄)ဦး၊ စုစုပေါင်း (၃၉၆)ဦးမှ ဆန်းစစ်  
မေးခွန်းလွှာများ ဖြေဆိုခဲ့ကြပါသည်။

(၁)ကိုယ်ရေးရာဇဝင် မေးခွန်း ခေါင်းစဉ် အောက်တွင် ဖြေဆိုသူများ မှ  
စိုက်ခင်းလုပ်ငန်း ကို ပထမ၊ သဘာဝ တောထိန်းသိမ်းခြင်းလုပ်ငန်းကို ဒုတိယ၊  
ပျိုးဥယျာဉ်လုပ်ငန်း ကို တတိယ အဆင့် စိတ်ဝင်စား ကျွမ်းကျင်ကြောင်းတွေ့ရှိရပါသည်။  
အမှတ်စဉ်(၂) ခေါင်းစဉ်အောက်တွင် လုပ်ငန်း အသစ်အတွက် သုတေသနဆောင်ရွက်ရန်  
အဓိကကျကြောင်း ၈၅% အထက်ဖြေဆိုကြပြီး ၅၀%ခန့်သည်  
ကိုယ်တိုင်သုတေသနဆောင်ရွက်ရန် ဆန္ဒရှိကြောင်း တွေ့ရှိ ရပါသည်။ ဖြေဆိုသူများသည် ၂၄%  
မှ ၃၈% အထိ လက်တွေ့သုတေသန စမ်းသပ်လုပ်ဆောင် ခဲ့ကြောင်း တွေ့ရှိရပါသည်။  
သုတေသန လုပ်ဆောင်ရန် စိတ်ဝင်စားမှုက ပိုမိုအခြေခံ ကျကြောင်း တွေ့ရှိရပါသည်။

အမှတ်စဉ်(၃)ခေါင်းစဉ်အောက်တွင် အနာဂါတ် သုတေသနစီမံကိန်း ရေးဆွဲအသစ်ပြုလုပ်ရာတွင် လူမှုသစ်တော ဘာသာရပ်၊ သစ်တောထိန်းသိမ်းခြင်း၊ တောရိုင်း တိရစ္ဆာန်ထိန်းသိမ်းခြင်း၊ မြေဆီလွှာ၊ လောင်စာစွမ်းအင်၊ သစ်အသုံးချခြင်း အစရှိသည့် ဘာသာရပ်၂၆-မျိုးကို အကြံပြု ခဲ့ကြပါသည်။ သစ်တောသုတေ သန ရလဒ်များကို ဖြေဆိုသူအားလုံး၏ ၃၅% ခန့်သာ သိရှိကြောင်း တွေ့ရှိ ရပါသည်။ ကဏ္ဍအလိုက် ဖွံ့ဖြိုးတိုးတက်စေရန် သုတေသနလိုအပ်ချက်ပျမ်းမျှမှာ ၈၉% ထိ ရှိကြောင်းတွေ့ရှိရပါသည်။ အပူပိုင်းစိမ်းလန်းစိုပြည်ရေးဦးစီးဌာနတွင် ထိန်းသိမ်းခြင်း လုပ်ငန်းတွင် သုတေသန ဆောင်ရွက်ရန် အများဆုံးနယ်ပယ်ဖြစ်ပြီး တိုးချဲ့ပညာပေးရေး လုပ်ငန်းကို အဓိက လုပ်ဆောင်သင့်ကြောင်း အကြံပြုထားပါသည်။ အမှတ်စဉ်(၄)အောက်တွင် လူသုံးနည်းသစ်များ အသုံးချခြင်း၊ တောများပျက်စီးခြင်း၊ တောများတန်ဖိုးမြင့်တက်လာစေခြင်း၊ ရေရှည် သစ်အသုံးချခြင်း၊ ထင်းလောင်စာ သုံးစွဲမှုခြင်း စသည်တို့အပေါ် ဆန်းစစ်လေ့လာထားပါသည်။

လက်ရှိသုတေသနလုပ်ငန်း၏အသုံးဝင်မှုကို အခြေခံကာ ဆန်းစစ်လေ့လာထားပြီး အနာဂါတ် သုတေသနအစီအစဉ် ချမှတ် ရာတွင် ဖြစ်နိုင်ခြေရှိသော သုတေသန လုပ်ငန်းများကို အကြံပြုတင်ပြ ထားသော စာတမ်းဖြစ်ပါသည်။

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**Abstract**

In this study, the questionnaire-based survey was applied for data collection. Three ranks of foresters consisting Assistant Director, Staff Officer and Range Officer working under Ministry of Forestry were selected as respondents to be assessed. The questionnaire format was formulated with five chapters such as (I) personal information, (II) research concern, (III) application of research, (IV) future research programme and (V) General Knowledge. Results from chapter I (personal information) revealed that all together 396 (49 of ADs, 173 of SOs and 174 of ROs) respondents participated in this survey. Their age, services, number of places transferred, educational background relating to their position and interest skillful fields were assessed. Under chapter II (research-concern), all respondents more than 85% shown importance of preliminary experiment essential before doing large scale. Results indicated that willingness to do research by respondent were found out about 53% as strong and about 33% as normal, and the 29.4% of average respondents accomplished the experiments themselves. The 63% of respondents suggested that “Interest” was most fundamental to do research follow by “Budget and “Design”. The result of the survey suggesting for new research was examined that social forestry, forest conservation and plantation were the most followed by in the subject of silviculture, wildlife and soil. Under chapter III, (application of research) the 36.4% of respondents know the output of forestry research while most part of them (60%) said “No” while 89.4% of respondents suggested to have research outputs. Under Chapter IV, (future research programme), under the forest policy, an average of 40.4% of respondent suggested the research in conservation for protection while 39.7% for extension and management under efficiency, 50.0% for sustainability, 67.1% for people awareness, 35.8% for basic need, and 43.0% suggested to do extension for people participation. Among the research activities for four main tasks (planting, conservation, fuelwood and water) of Dry Zone Greening Department (DZGD), the 44.3% of respondent suggested to do research in management for natural forest. Under Chapter V, (General Knowledge) the 63.7% of respondent recommended the extension for using LUS, 45.3% assumed deforestation by the human activities. The 39.1% suggested that the gap planting was the best practices to restore the degraded forest. The 28.5% of respondent suggested that skillful staff and labour were the essential for conservation of old plantation and 25.5% of respondent proposed that using A1 efficient stove was the most possible option for reducing fuelwood. Finally researcher team concluded that the arrays of findings from this study would be constructive for planning future research programme.

Key Words : Research Programme, Questionnaire-based Survey, Forestry Sector, Respondents, Application of Research

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## **1. Introduction**

In Myanmar, Ministry of Forestry (MOF) is one of the major organizations for conserving natural environment including forest genetic resources and biodiversity. Under the Forest Department (FD), Forest Research Institute (FRI) has been playing a vital role for exploring research results in the fields of environmental conservation, sustainable forest management and sustainable utilization of natural resources in order to fulfill the imperatives of Forest Policy.

FRI has been implementing researches and experiments based on the following research policies under the guidance of Ministry of Forestry to support the requirements of the country in addition to linking global issues.

1. Development of natural forests
2. Development of forest plantations
3. Greening of central dry zone in Myanmar
4. Systematic utilization of timber and timber products
5. Exploration and systematic utilization of non-timber forest products
6. Effective and efficient utilization of fuel and energy.

To achieve these objectives, FRI has been attempting to disseminate the effective research outputs which can be applied by people and organizations who are participating in establishing forest plantations, upgrading and improving the forests, conservation of remnant natural forests, sustainable forest management and dry zones greening activities. Since the research institute had been established under Forest Department (FD), Ministry of Forestry (MOF), 146 research papers had been published before 1980 and 205 papers from 1986 to 2008.

In this context, it is now inevitably needed to assess the application, important role of forestry researches in implementing development activities of forestry sector in Myanmar. Therefore the main objective of this survey was how published research papers of Forest Research Institute (FRI) could support sustainable forest management and environmental conservation activities in Myanmar which can lead to planning future programme.

## **2. Objectives**

- (a) To assess the outlook from different levels of foresters in research and development (R&D)
- (b) To investigate how current research programme applicable in forestry sector,
- (c) To explore the experiences and knowledge with their background and requirements in forestry sector in order to support the formulation of future research programme.
- (d) To support formulation of future research programs which are most apt to address the requirements for conservation and sustainable management of natural forests and plantations in Myanmar.

### 3. Materials and Methods

The questionnaire survey was applied for data collection. In order to collect perceptions of respondents had been selected using stratified random sampling method based on factors such as their current position in Forest Department, their places of work, affiliating with forestry works and their different experiences and knowledge in relation with forests and forestry researches.

Among the different ranks of foresters working under Ministry of Forestry, three ranks consisting Assistant Director (AD), Staff Officer (SO) and Range Officer (RO) (Deputy Head of Branch) were selected as respondents in this study.

Regarding to their places and nature of works were selected format of questionnaire was formulated and distributed to mention respondents.

#### 3.1. Data processing and analysis

Data collected has been classified as (I) personal information, (II) research concern, (III) application of research, (IV) future research programme and (V) General Knowledge.

Data collected was processed and accumulated by using Microsoft Office Excel 2007.

### 4. Results and Discussions

#### 4.1. Personnel Information

##### 4.1.1 Summary of AD, SO and RO Working in States, Divisions and Institutes

This study was carried out distributing questionnaire to ADs, SOs and ROs levels of staff working for FD and Dry Zone Greening Department (DZGD) under MOF. Upon receiving questionnaires, altogether 396 respondents (49 ADs, 173 SOs and 174 ROs consisting 61 from DZGD) were analyzed. ADs from Kachin, Chin states and Yangon Division, and ROs from Yangon Division were not found out in received list shown in table 1(a).

**Table 1(a). Summary of AD, SO and RO working in States, Divisions and Institutes**

Current Position	State and Divisions																		Total
	Kachin	Kayah	Kayin	Chin	Sagaing	Sagaing (DZDG)	Tanintharyi	Bago	Magway	Magway(DZDG)	Mandalay	Mandalay (DZDG)	Mon	Rakhine	Yangon	Shan	Ayeyarwaddy	FD& FRI	
AD	0	2	3	0	4	2	3	2	3	1	2	3	3	1	0	4	3	13	49
SO	1	2	4	1	11	14	10	20	17	5	10	8	2	6	3	15	11	33	173
RO	2	1	5	2	12	10	12	24	10	8	13	10	3	5	0	16	6	35	174
	3	5	12	3	27	26	25	46	30	14	25	21	8	12	3	35	20	81	396

#### 4.1.2. Service Year

Regarding to their service working for FD and DZGD, all respondents were classified into 4 groups such as 1 to 10 year (group 1), 11 to 20 years (group 2), 21 to 30 years (group 3), and 31 to 42 years (group 4). Among all, there were no ADs under the service years of 21. And 81.6% of ADs were unpredictably fallen in group 3, service between 21 and 30. The result revealed that the young ADs were found in group 3 than groups 4. The 35% and 32.4% of SOs were observed in group 2 and 3 respectively while 39.7% of ROs in group 3 in table 1(b).

**Table 1(b). Frequencies and Percentage of Service Years**

Current Position	Service Year								Total
	1-10	%	11-20	%	21-30	%	31-42	%	
AD					40	81.6	9	18.4	49
SO	36	20.8	61	35.3	56	32.4	20	11.6	173
RO	52	29.9	22	12.6	69	39.7	31	17.8	174
<b>Total</b>									<b>396</b>

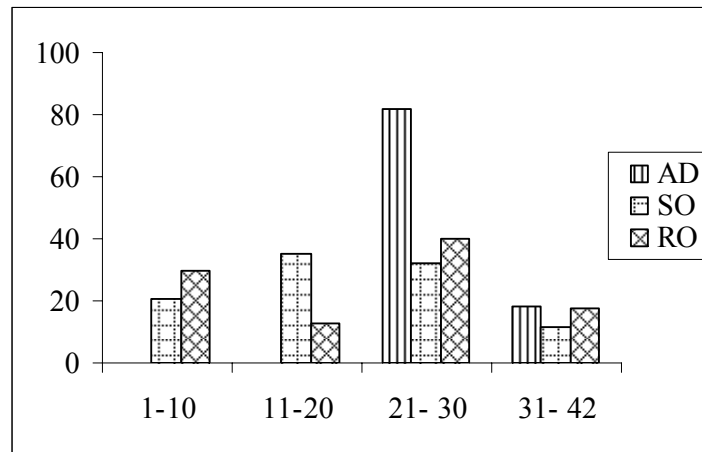


Fig (1). The Percentage of Service Year

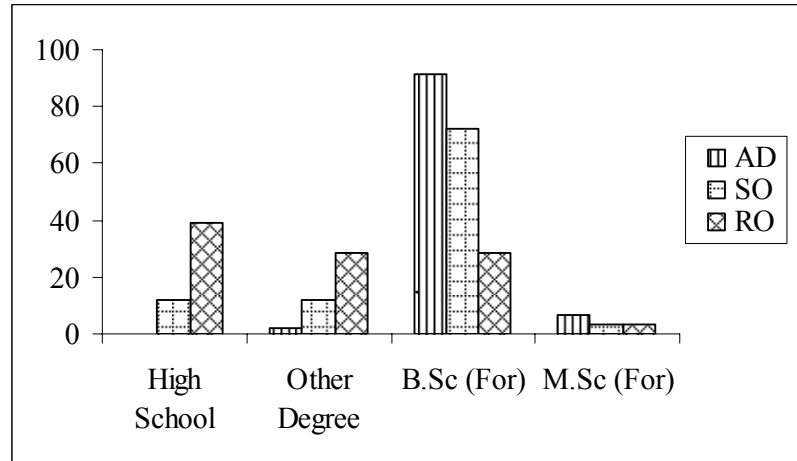
#### 4.1.3. Educational Background

Concerning the educational background, respondents were categorized into 4 groups such as (i) high school, (ii) other degree, (iii) B.Sc. forestry, and (iv) M.Sc. degree in forestry. The survey showed that no AD was found in high school group. 91.7 % of ADs and 72.1% of SOs were mostly observed in B.Sc. (Forestry) groups while 39.4% of ROs were found in high school group, and only one other degree holder was AD as shown in table 1(c).

**Table 1(c). Frequencies and Percentage of Educational Background**

Current Position	Education								Total
	High School	%	Other Degree	%	B.Sc (For)	%	M.Sc (For)	%	
AD			1	2.1	44	91.7	3	6.3	48
SO	21	12.2	22	12.2	124	72.1	6	3.5	173
RO	67	39.4	53	30.4	48	28.2	6	3.5	174
<b>Total</b>									<b>395</b>





Fig(2). The Percentage of Educational Background

#### 4.1.4. Different Age Class

Regarding their ages, all respondents were classified into 4 groups such as 22 to 30, 31 to 40, 41 to 50 and 51 to 59. Among all levels, no ADs and SOs were found out less than the age of 25, and no ADs found out under the age of 41. And 83.7% of ADs were mostly observed in group 4 as shown in the table 1(d).

Table 1(d). Frequencies and Percentage of People in Different Age Class

Current Position	Age Class								Total
	22 - 30	%	31 - 40	%	41 - 50	%	51 - 59	%	
AD	0	0	0	0	8	16.3	41	83.7	49
SO	0	0	50	28.9	80	46.2	43	24.9	173
RO	18	10.3	39	22.4	65	37.3	52	29.9	174
<b>Total</b>									<b>396</b>

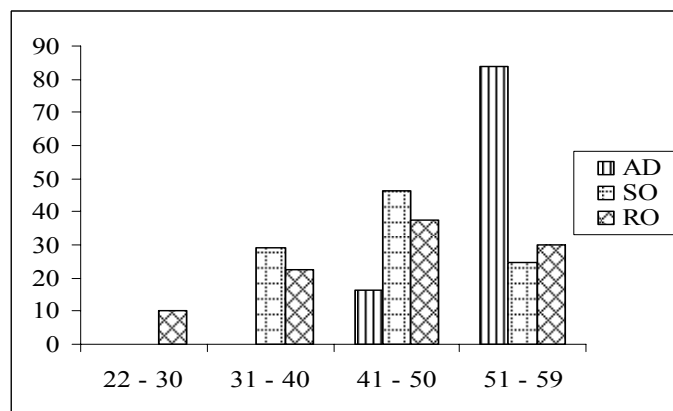


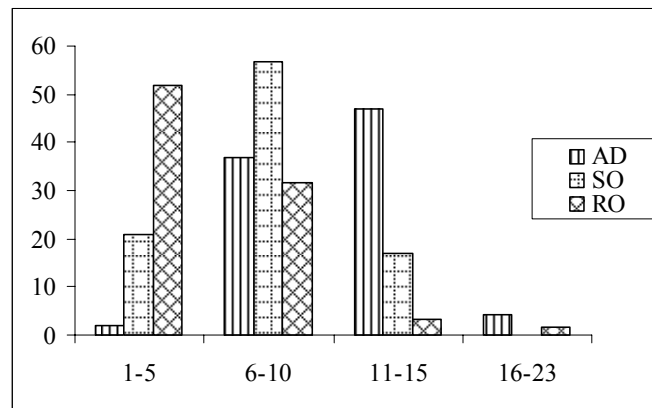
Fig (3). The Percentage of Different Age Class

#### 4.1.5. Transferred Places

The number of transferred places of all respondents was classified into 4 groups such as (i) 1-5, (ii) 6-10, (iii) 11-15 and (iv) 16-23. This survey showed that only one AD was found in group 1 while 98 (56.6%) of SOs were found in group 2, whereas no SO was found in group 4 of more than 16 places as shown in table 1(e).

**Table 1(e). Frequencies and Percentage of Transferred Places**

Current Position	Place								Total
	1-5	%	6-10	%	11-15	%	16-23	%	
AD	1	2.0	18	36.7	23	46.9	2	4.1	49
SO	36	20.8	98	56.6	29	16.8	0	0.0	173
RO	90	51.7	55	31.6	6	3.4	3	1.7	174
<b>Total</b>									<b>396</b>



Fig(4). The Percentage of Transferred Places

#### 4.1.6. Interest Subjects

Regarding respondent's interest and skill subjects, there were four main subjects observed according to their answers such as plantation establishment, natural forest management, nursery and others. Other subjects mainly mentioned in this survey were computer applications, community forestry, research, extension and educational activities etc. The most interest and skill subject answered by 49.0% of ADs, 38.2% of SOs and 36.8% of ROs were plantation establishment followed by natural forest management as shown in table 1(f).

**Table 1(f). Frequencies and Percentage of Interest and Skill Subjects**

Current position	Plantation	%	Management	%	Nursery	%	Others	%	No answer	Total
AD	24	49.0	14	28.6	6	12.2	4	8.2	1	49
SO	66	38.2	51	29.5	22	12.7	34	19.7	0	173
RO	64	36.8	54	31.0	34	19.5	17	9.8	5	174
<b>Total</b>										<b>396</b>

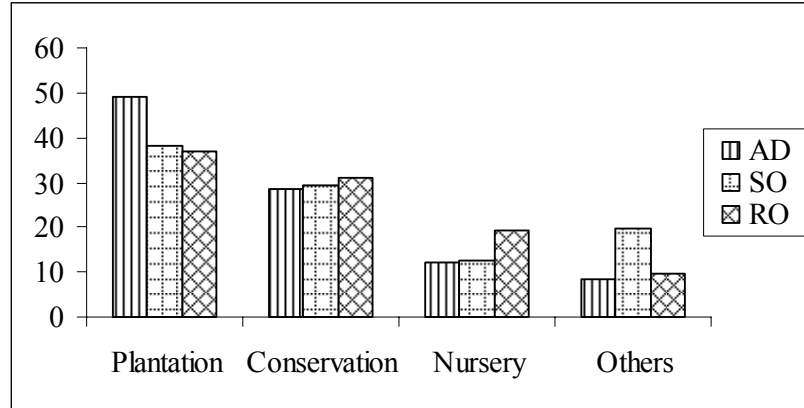


Fig (5). The Percentage of Interest Subjects

#### 4.1.7. Difficult Subjects

In the case of most difficult field works among others, respondent's accumulated answers were divided into four categories such as staff administration, management, computer application and others. Other activities mentioned under this topic were forest law, establishment of community forest, plantation establishment, financing and skill staff etc. As the result of survey, 36.7% of ADs, 31.8% of SOs and 32.2% of ROs were engaged with other activities as presented in table 1(g).

Table 1(g). Frequencies and Percentage of Difficult Subjects

Current Position	Staff Administration	%	Management	%	Computer	%	Others	%	No ans	%	Total
AD	10	20.4	9	18.4	9	18.4	18	36.7	3	6.1	49
SO	55	31.8	20	11.6	28	16.2	55	31.8	15	8.7	173
RO	53	30.5	22	12.6	29	16.7	56	32.2	14	8.0	174
<b>Total</b>											396

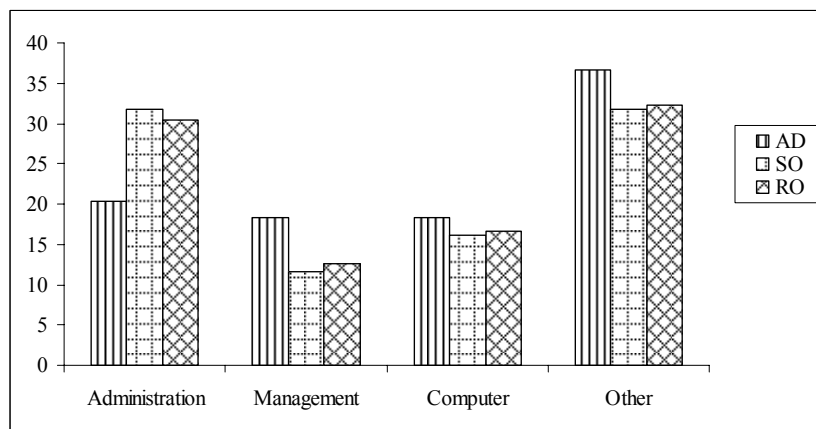


Fig (6). The Percentage of Difficult Subjects

## 4.2. Research Concern

### 4.2.1. Research and Development

Concerning the research and development, the result found out that 89.8% of AD, 90.2% of SO and 85.6% of RO were similarly observed to know R & D while 10.2% of AD, 9.8% of SO and 14.4% of RO were found no answer as presented in table 2(a).

**Table 2(a). Frequencies and Percentage of Respondents in Research and Development**

Position	Know	%	unknown	%	Total
AD	44	89.8	5	10.2	49
SO	156	90.2	17	9.8	173
RO	149	85.6	25	14.4	174
<b>Total</b>					<b>396</b>

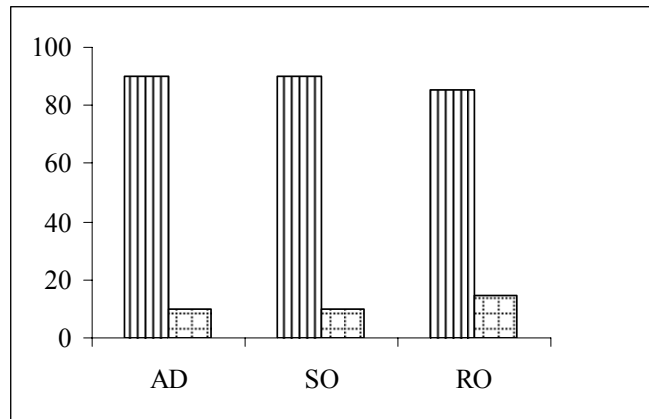


Fig (7). The Percentage of Research and Development

### 4.2.2. Preliminary Research Necessary for New Task

Concerning the preliminary research necessary for new work, there were four options such as essential, normal, some extent and no need mentioned in questionnaire to be chosen only one. The result found out that 42 (85.7%) of ADs, 154 (89.0%) of SOs and 161 (92.5%) of ROs suggested the preliminary experiment as the essential before doing a new work in order to get the best method as presented in table 2(b).

**Table 2(b). Frequencies and Percentage of Preliminary Research Necessary for New Task**

Current Position	Compulsory	%	Normal	%	Some extent	%	No Need	%	No Answer	%	Total
AD	42	85.7	6	85.7	1	2.04	0	0	0	0	49
SO	154	89.0	11	89.0	4	2.31	1	0.6	3	1.7	173
RO	161	92.5	7	92.5	2	1.15	0	0	4	2.3	174
<b>Total</b>											<b>396</b>

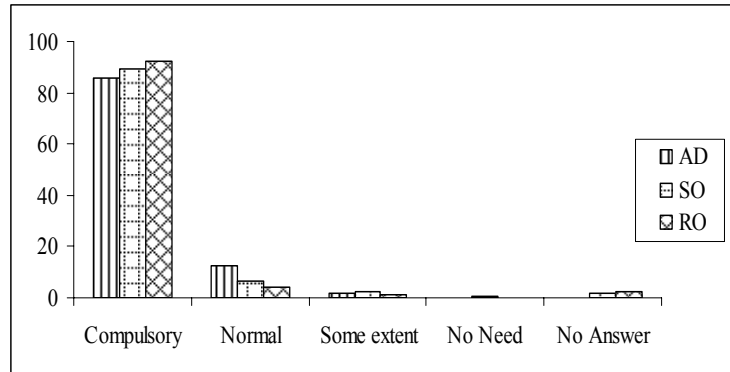


Fig (8). The Percentage of Preliminary Research Necessary for New Task

#### 4.2.3. Willingness to do Research

For willingness to do research by the respondents themselves, four options such as (i) strong desire, (ii) normal, (iii) some extent and (iv) no willingness were outlined in questionnaire. The result indicated that the 25 (51%) of ADs, 82 (47.4%) of SOs and 110 (63.2%) of ROs were willingness to do research, and ROs were more desirous than ADs and SOs as shown in table 2(c).

Table 2(c). Frequencies and Percentage of Willingness to do Research

Current Position	Strong	%	Normal	%	Some extent	%	No-willingness	%	No Answer	%	Total
AD	25	51.0	18	36.7	6	12.2	0	0.0	0	0.0	49
SO	82	47.4	68	39.3	15	8.7	3	1.7	5	2.9	173
RO	110	63.2	46	26.4	12	6.9	4	2.3	2	1.1	174
<b>Total</b>											<b>396</b>

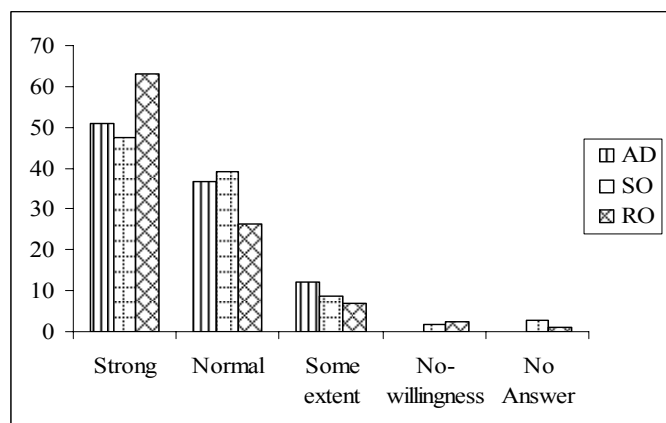


Fig (9). The Percentage of Willingness to do Research

#### 4.2.4. Research Experiment Accomplished by Respondents

Concerning the research experiment accomplished in the field by respondents, a few had experienced for research works. The result found out that 30 (61.2%) of ADs, 124 (71.7%) of SOs and 120 (69.0%) of ROs had no experiences for doing any research/test/and experiments by themselves as presented in table 2(d)

**Table 2(d). Frequencies and Percentage of Research Experiment Accomplished by Respondents**

Current Position	Yes	%	No	%	No Answer	%	Total
AD	19	38.8	30	61.2	0	0.0	49
SO	44	25.4	124	71.7	5	2.9	173
RO	42	24.1	120	69.0	12	6.9	174
<b>Total</b>							<b>396</b>

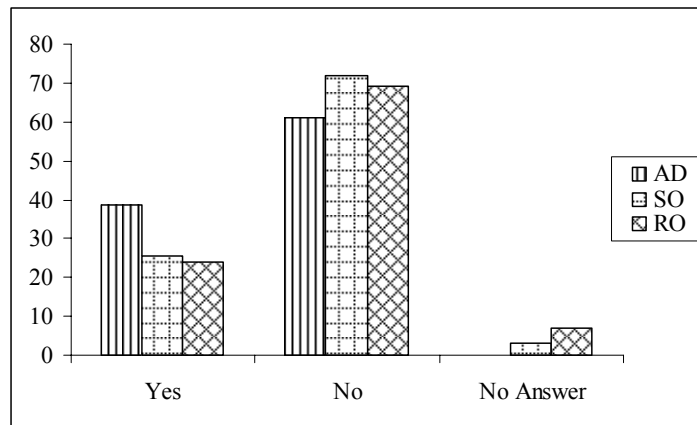


Fig (10). The Percentage of Research Experiment Accomplished by respondents

#### 4.2.5. Helping Others to Research

Concerning helping others to do research, the result found out that 69.4% of AD, 65.9% of SO and 56.9% of RO had encouraged other staff to do research work during their service. But the 26.5% of AD, 29.9% of SO and 40.2% of RO were observed no encouraged for the other staff to do research work and the rest have no answer as shown in table 2 (e).

**Table 2(e). Frequencies and Percentage of Helping Others to Research**

Current Position	Yes	%	No	%	No Answer	%	Total
AD	34	69.4	13	26.5	2	4.1	49
SO	114	65.9	51	29.5	8	4.6	173
RO	99	56.9	70	40.2	5	2.9	174
<b>Total</b>							<b>396</b>

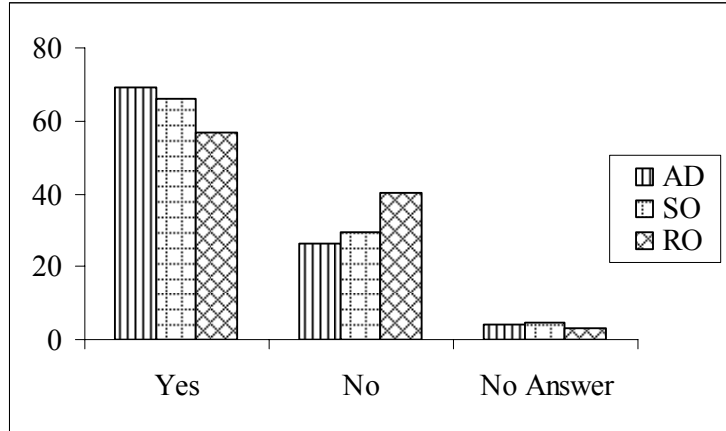


Fig (11). The Percentage of Helping Others to Research

**4.2.6. Basic Requirement to Research**

Question on basic requirement to do research, 61.2% of AD, 63.6% of SO and 66.6% of RO answered the interest in research, while 24.5% of AD, 24.9% of SO and 20.3% of RO answer the suggested money although the rest of respondents answered for design and others.

**Table 2(f). Frequencies and Percentage of Basic Requirement to Research**

Current Position	Interest	%	Money	%	Design	%	Others	%	No Answer	%	Total
AD	30	61.2	12	24.5	2	4.1	5	10.2	0	0.0	49
SO	110	63.6	43	24.9	5	2.9	15	8.7	0	0.0	173
RO	114	66.3	35	20.3	11	6.4	4	2.3	10	4.7	174
<b>Total</b>											<b>396</b>

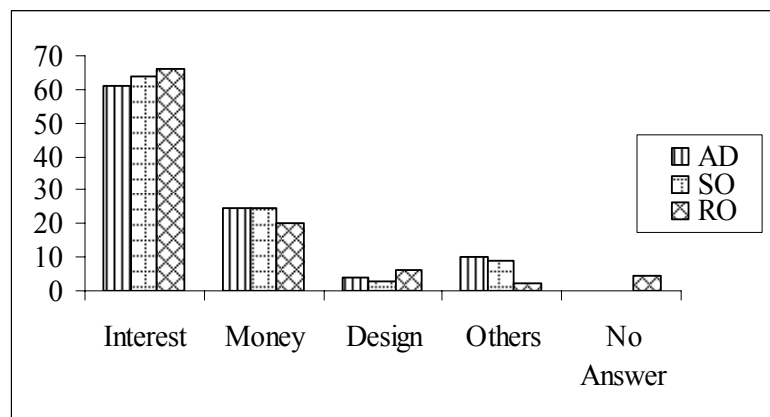


Fig (12). The Percentage of Basic Requirement to Research

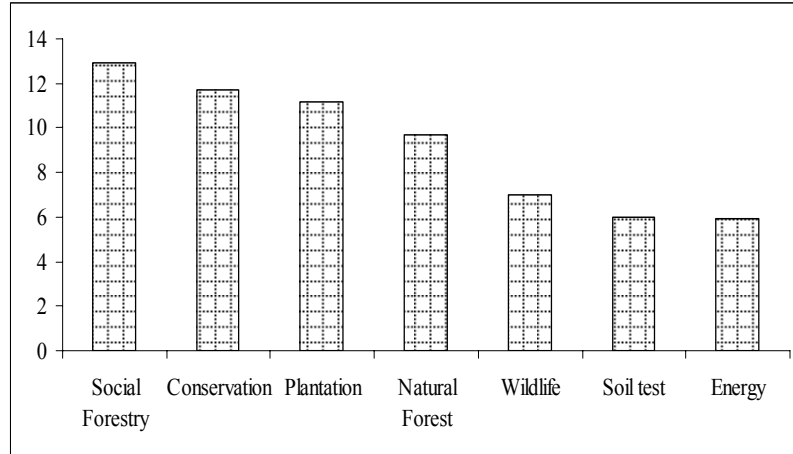
#### 4.2.7. Research Area to support SFM

For suggestions to do research to support SFM, there were 20 different areas in forestry with appropriate research to be done as shown in table 2 (g). The interest subjects to do research suggested from most respondents were social forestry 12.2% and establishment of plantation 11.2% followed by conservation and utilization of forest resources.

**Table 2(g). Accumulated Frequency and Percentage on Research Area to Support SFM**

No	Title	Sub Title	AD	SO	RO	Total	%
1	Social Forestry	People, Community, Agro-forestry, Local, Extension, Education, Village, Rural, Cooperation, Religion, Participation	54	192	140	386	12.9
2	Biodiversity	Conservation, Endanger	54	157	138	349	11.7
3	Plantation	Spacing, Planting, Weeding, Thinning, Growth, Site	62	183	89	334	11.2
4	Natural Forest	Allowable, Spp, Natural Forest, Regeneration, Resource	52	133	104	289	9.7
5	Wildlife	Wild, Habitat, Animal, Bird	29	96	83	208	7.0
6	Soil test	Soil, Moisture, Fertilizer	31	72	76	179	6.0
7	Energy	Fuel, Charcoal, Efficient Stove	28	84	63	175	5.9
8	Utilization	Products, Utilization, Timber	35	110	28	173	5.8
9	Biology	Plant	7	17	112	136	4.6
10	Lesser Used Species	LUS, Value-added	21	52	56	129	4.3
11	Nursery	Germination, Seed Handling, Nursery	21	49	54	124	4.1
12	Climate change	Climate, Environment, Ozone, Carbon, Weather, Gas pollution, Climatologically	20	37	40	97	3.2
13	Mangrove	Mangrove	14	45	34	93	3.1
14	Wood Technology	Timber seasoning, strength	18	43	30	91	3.0
15	Socioeconomic	Socio, Eco	10	45	6	61	2.0
16	Policy	Law, Institutional, Collaboration	8	8	13	29	1.0
17	Market	Market, Cost	4	12	12	28	0.9
18	Private	Private	3	9	13	25	0.8
19	Forest Protection	Human, Fire, Pest, Insect, Disease	5	12	7	24	0.8
20	Genetic	Gene, Tree Improvement, Provenance, Clonal Seed Orchard	7	15	1	23	0.8
21	Logging	Logging	2	4	3	9	0.3
22	Non-wood Forest Products	Bamboo	3		4	7	0.2
23	Forest Product	Teak	3	0	4	7	0.2
24	Inventory	Inventory	5	0	0	5	0.2
25	Hardwood	Hardwood, Pyinkado	3	0	1	4	0.1
26	Sustainable Forest Management	SFM	2	0	1	3	0.1





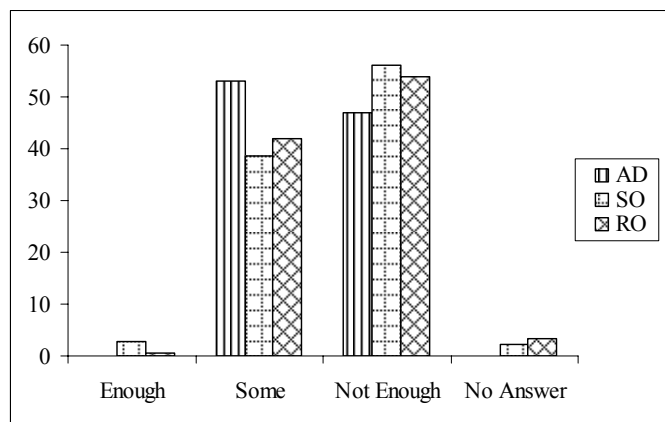
**Fig. (13)** The Percentage of Research Area to support SFM

**4.2.8. Forestry Related Books and References in Respondent’s Office**

Concerning the reference books in respondent’s office to support their works, 0.0% of AD, 2.9% of SO and 0.6% of RO answered enough reference for research while 53.1% of AD, 38.7% of SO and 42.0% of RO have some reference in their office. The result indicated that an average of 44.6% respondents said “some” and 52% said “no enough” reference books in their office.

**Table 2(h). Frequencies and Percentage of Reference Books in Respondent’s Office**

Current Position	Enough	%	Some	%	Not Enough	%	No Answer	%	Total
AD	0	0	26	53.1	23	46.9	0	0.0	49
SO	5	2.9	67	38.7	97	56.1	4	2.3	173
RO	1	0.6	73	42.0	94	54.0	6	3.4	174
<b>Total</b>									<b>396</b>



**Fig (14).** The Percentage of Forestry Related Books and References in Respondent’s Office

#### 4.2.9. Status of Learning Forestry Subjects

Concerning to status of respondent's learning forestry subject to support in their field work, the result revealed that 4.1% of AD, 1.8% of SO and 4.0% of RO study most of the time while 26.5% of AD, 34.5% of SO and 31.0% of RO study frequently and 67.3% of AD, 61.3% of SO and 55.2% of RO study based on requirement as presented in table 2(i) and fig(15) .

**Table 2(i). Frequencies and Percentage of Respondents Learning Forestry Subjects**

Current Position	Always	%	Frequent	%	Require	%	Others	%	No Answer	%	Total
AD	2	4.1	13	26.5	33	67.3	1	2.0	0	0.0	49
SO	3	1.8	58	34.5	103	61.3	1	0.6	5	1.8	173
RO	7	4.0	54	31.0	96	55.2	6	3.4	11	6.3	174
<b>Total</b>											<b>396</b>

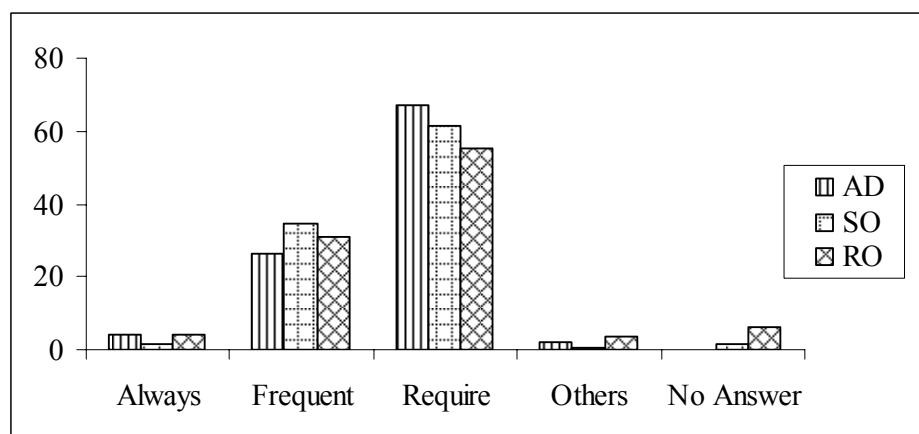


Fig (15). The Percentage of Status of Learning Forestry Subjects

#### 4.2.10. Cooperation with FRI

In the case of cooperation with FRI to support respondent's requirements in field operations the result was found out that 27 (55.1%) of ADs cooperate with FRI followed by 40 (23.8%) of SOs and 34(19.5%) of ROs, and 265 (61.41%) of respondents answered no cooperation with FRI while 101 (31.8%) said "yes" and 30 (20.2%) of respondents didn't respond under this topic as presented in table 2(j). Based on their replies, five main subjects were classified such as (i) soil testing, (ii) tree/ species identification, (iii) seed technology, (iv) references and technical documentation and (v) pest and disease. Among all, soil testing was mainly found followed by species & tree identification and seed technology.

**Table 2(j). Frequencies and Percentage of Cooperation with FRI**

Current Position	Yes	%	No	%	No answer	%	If yes, which field					
							soil	Species	tree	Seed	Ref:	Pest, Disease
AD	27	55.1	20	40.8	2	4.1	17	4	0	3	4	2
SO	40	23.8	121	72.0	12	7.1	23	6	0	3	0	0
RO	34	19.5	124	71.3	16	9.2	16	3	9	13	0	0
Sub-Total	101		265		30		51	13	9	17	4	2
Total	396						101					

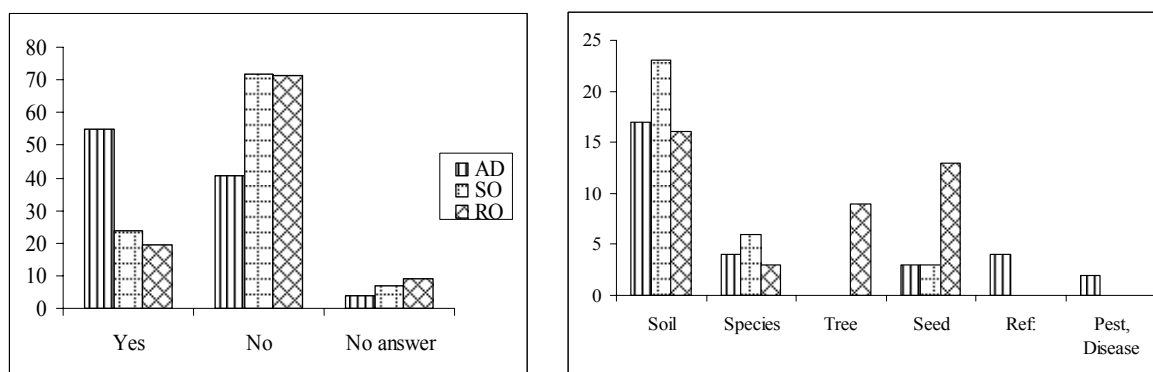


Fig (16). The percentage of Cooperation with FRI

#### 4.2.11. Implementation of Work

Depending on their way to implement fieldworks through their service, 16.3% of AD, 6.9% of SO and 13.2% of RO were observed taking by technical reference books, while 65.3% of AD, 74.0% of SO and 67.2% of RO were taking by the instructions and guidelines from Forest Department and as 14.3% of AD, 13.9% of SO and 16.1% of RO were taking by their own experience, local people, co-workers, superior officers as shown in table 2(k).

**Table 2(k). Frequencies and Percentage of Way of Implementing Work**

Current Position	Reference book	%	Order of FD, State, Division	%	Experience	%	No Answer	%	Total
AD	8	16.3	32	65.3	7	14.3	1	2.0	49
SO	12	6.9	128	74.0	24	13.9	9	5.2	173
RO	23	13.2	117	67.2	28	16.1	6	3.4	174
<b>Total</b>	<b>43</b>	<b>36.4</b>	<b>277</b>	<b>206.5</b>	<b>59</b>	<b>44.3</b>	<b>16</b>		<b>395</b>
		12.1%		68.8%		14.8%			

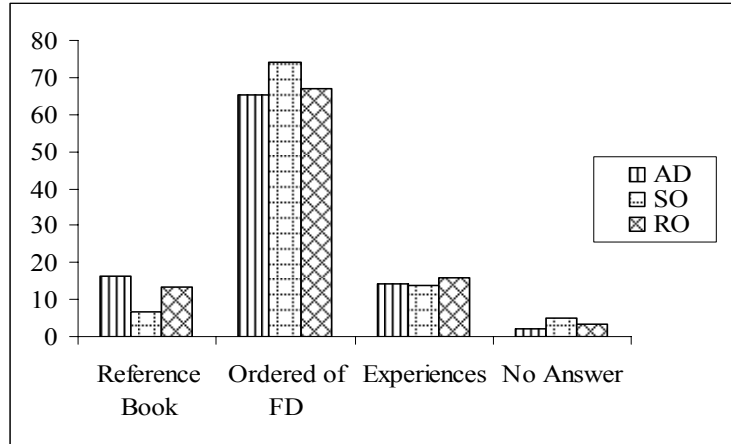


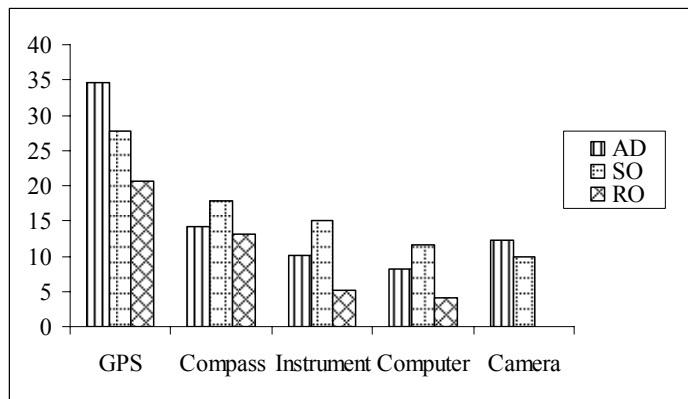
Fig (17). The Percentage of Implementation of Work

**4.2.12. Necessary Equipment of Field Work**

Some equipment were essential and frequently used for doing several kind of field works. The study therefore explored their requirements. The result indicated that the 37.4% of AD, 27.2% of SO and 20.7% of RO needed GPS while 14.3% of AD, 17.9% of SO and 13.2% of RO for compass and 10.2% of AD, 15.0% of SO and 5.2% of RO need survey instrument, and the others required computer and camera for their field work as shown in table 2(1).

**Table 2(1). Frequencies and Percentage of Necessary Equipment of Field Work**

Current Position	GPS	%	Com pass	%	Instru- ment	%	Comp- uter	%	Came- ra	%	Total
AD	17	34.7	7	14.3	5	10.2	4	8.2	6	12.2	49
SO	48	27.7	31	17.9	26	15.0	20	11.6	17	9.8	173
RO	36	20.7	23	13.2	9	5.2	7	4.0	0	0.0	174
<b>Total</b>	<b>101</b>		<b>61</b>		<b>40</b>		<b>31</b>		<b>23</b>		



Fig(18). The Percentage of Necessary Equipment of Field Work

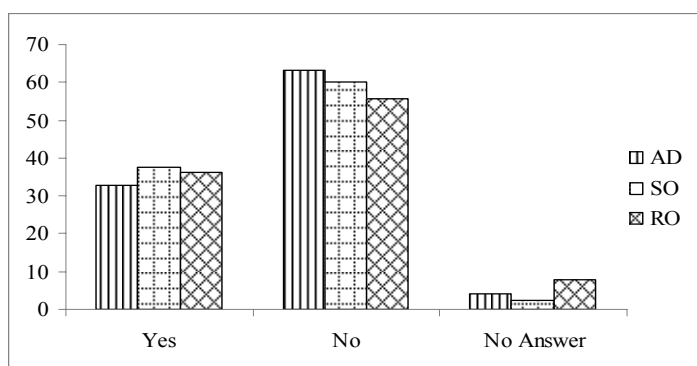
### 4.3. Application of Research

#### 4.3.1. Information on Research Outputs

Concerning the research output in forestry sector for every year, two options (Yes, No) were mentioned in questionnaire. The result revealed that about one third of all levels of respondents (32.65%, 37.57%, and 36.21%) were similarly known research outputs produced in every year and most of respondent (59.81 ) don't know as presented in table 3(a).

**Table 3(a). Frequencies and Percentage of Information on Research Outputs**

Current Position	Yes	%	No	%	No Answer	%	Total
AD	16	32.7	31	63.3	2	4.1	49
SO	65	37.6	104	60.1	4	2.3	173
RO	63	36.2	97	55.7	14	8	174
<b>Total</b>	<b>144</b>	<b>36.4</b>	<b>232</b>	<b>7.8</b>	<b>20</b>	<b>5.1</b>	<b>396</b>



Fig(19). The Percentage of Knowing the Result/output of Forestry Research

#### 4.3.2. Necessary for Research Results

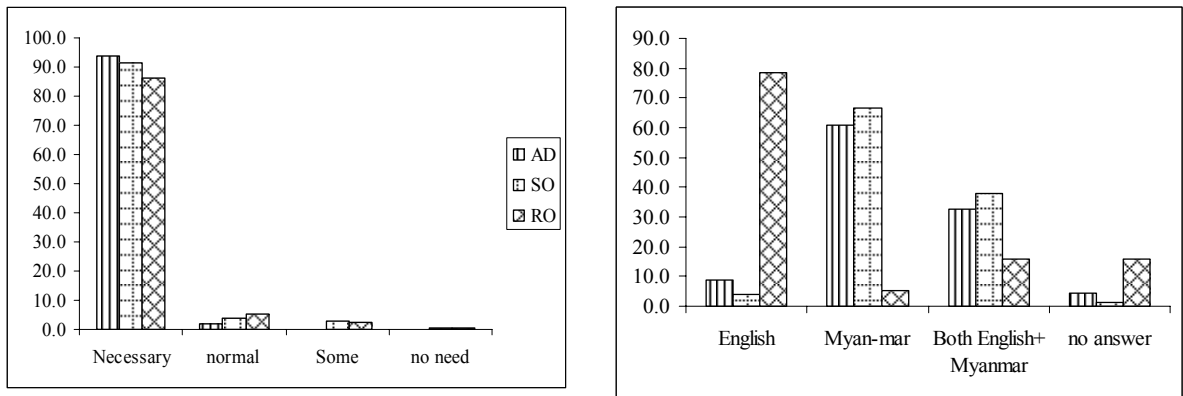
Regarding the willingness to receive the results of research which are written by English or Myanmar language to support for their job, results indicated that the 93.9% of AD, 91.3% of SO and 86.2% of RO were necessary, and the 60.9% of AD and 66.5 of SO were necessary research output in Myanmar Language while 78.7 % of RO in English.

**Table 3(b-1). Frequencies and Percentage of Research and Development**

Current Position	Necessary for Research Result									
	Necessary	%	normal	%	Some	%	no need	%	no answer	%
AD	46	93.9	1	2.0	0	0.0	0	0	2	4.1
SO	158	91.3	7	4.0	5	10.2	1	2.0	2	4.1
RO	150	86.2	9	5.2	4	8.2	1	2.0	10	20.4
	354	89.4	17	4.3	9	18.4	2	4.1	14	28.6

**Table 3(b-2). Frequencies and Percentage of Language for Research Outputs**

Current Position	If Necessary (English + Myanmar)								Total
	English	%	Myanmar	%	Both English+ Myanmar	%	no answer	%	
AD	4	8.7	28	60.9	15	32.6	2	4.3	46
SO	6	3.8	105	66.5	60	38.0	2	1.3	158
RO	118	78.7	8	5.3	24	16	24	16.0	150



Fig(20). The Percentage of Necessary for Research Results

#### 4.3.3. Cooperation in Subjects between Field and FRI

Normally territorial forestry offices contact FRI when they had difficulties in their work, overall 45.2% are cooperated with FRI in soil classification, fertilizer application and 44.7% are cooperation with FRI in species identification and the rest are tree classification, seed collection, etc.,.

**Table 3(c). Frequencies and Percentage of Cooperation in Subjects Between Field and FRI**

No	Subjects	AD	SO	RO	Total	%
1	Soil Classification, Fertilizer Application	25	81	73	179	45.2
2	Species Identification	29	97	51	177	44.7
3	Seed	13	53	63	129	32.6
4	Wood Classification	15	3	53	71	17.9
5	Timber Utilization, LUS Utilization, Wood Technology, Strength of Timber	2	27	4	33	8.3
6	Tissue Culture	2	9	13	24	6.1
7	Spacing Trial , Bamboo Enrichment Planting,	4	12	3	19	4.8
8	Disease	7	8		15	3.8
9	Genetically Qualified Teak, Seed Production Area, Tree Improvement, Seed Orchard, in-situ Conservation	1	13	1	15	3.8

No	Subjects	AD	SO	RO	Total	%
10	Thinning	1	3	-	4	1
11	Plantation Establishment	-	-	3	3	0.8
12	Characteristic of Tama	1			1	0.3
13	Dryzone Greening activities	1	-	-	1	0.3
14	Environmental Conservation	1	-	-	1	0.3
15	Pathology	-	1	-	1	0.3
16	Fuelwood Production	-	1	-	1	0.3
17	Community Forestry	-	1	-	1	0.3
<b>Total</b>		<b>102</b>	<b>31</b>	<b>7</b>	<b>675</b>	

#### 4.3.4. Remarkable Research Activities in Forest Sector

In the case of the information concerning the remarkable and successful research outputs in forestry sector, overall 24.2% know the information in tissue culture and genetically improved seed in forestry sector, 10.4% know Timber utilization, LUS utilization and market and the other know A1 stove, plantation establishment seed collection etc.,

**Table 3(d). Frequencies and Percentage of Remarkable Research Activities in Forest Sector**

No	Subjects	AD	SO	RO	Total	%
1	Tissue Culture, Genetically Improved Teak	11	40	45	96	24.2
2	Timber Utilization, LUS Utilization, Market	6	25	10	41	10.4
3	A1 Stove	9	8	9	26	6.6
4	Plantation Establishment	1	7	14	22	5.6
5	Seed Collection	3	5	6	14	3.5
6	Strength of Timber, Wood technology	1	7	5	13	3.3
7	Seed Production Area	0	12	0	12	3.0
8	Species Identification	4	1	2	7	1.8
9	Soil Type	1	3	3	7	1.8
10	Utilization of Bamboo	0	0	7	7	1.8
11	Conservation of Bamboo Species	1	0	4	5	1.3
12	Insect	0	2	3	5	1.3
13	Community Forestry	0	2	3	5	1.3
14	Vegetative Propagation	0	4	0	4	1.0
15	Biogas Energy	0	2	0	2	0.5
16	LUS Book	0	0	1	1	0.3
<b>Total</b>		<b>37</b>	<b>118</b>	<b>112</b>	<b>267</b>	

#### 4.4 . Future Research Programme

##### 4.4.1. The Percentage of Protection in Forest policy

In the case of the research works, it should be taken as long-term priority to support the Myanmar Forest Policy, for the first case of protection, the respondents were 40.4% in case of conservation, 15.7% in case of management, 12.7% in case of extension and the other describe in the case of law, research, plantation, energy and utilization as shown in table 4(a).

**Table 4(a) Frequencies and Percentage of Protection under Forest Policy**

Sr. No.	Protection	AD	SO	RO	Total	%
1	Conservation	11	25	31	67	40.4
2	Management	6	15	5	26	15.7
3	Extension	2	11	8	21	12.7
4	Law	3	8	5	16	9.6
5	Research	1	6	4	11	6.6
6	Plantation	1	2	6	9	5.4
7	Energy	0	5	2	7	4.2
8	Utilization	2	2	3	7	4.2
<b>Sub-Total</b>		<b>26</b>	<b>74</b>	<b>66</b>	<b>166</b>	<b>100.0</b>
<b>No Answer</b>		<b>23</b>	<b>99</b>	<b>108</b>	230	138.6
<b>Total</b>		<b>49</b>	<b>173</b>	<b>174</b>	396	

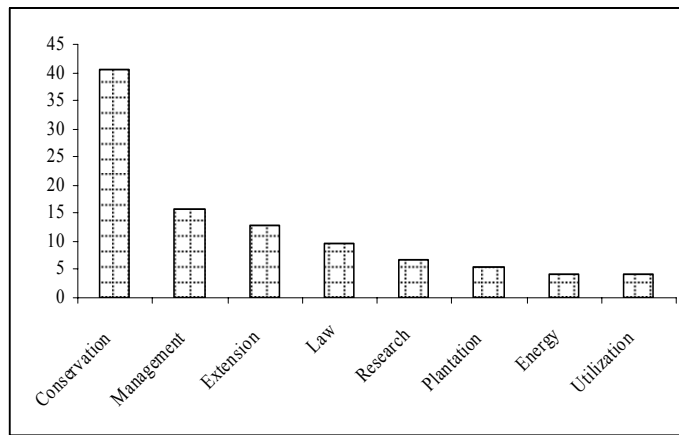


Fig (21) The Percentage of Protection in Forest policy

#### 4.4.2. Efficiency in Forest Policy

The result shows that extension and management (39.7%) were the most important for the second sector of efficiency, 11.0% for research, and the other describe in the case of plantation, conservation, utilization and interest as shown in table 4(b).

**Table 4(b) Frequencies and Percentage of Efficiency under Forest Policy**

Sr. No.	Efficiency	AD	SO	RO	Total	%
1	Extension	13	26	15	54	39.7
3	Management	6	22	26	54	39.7
5	Research	0	9	6	15	11.0
4	Plantation	1	0	3	4	2.9
6	Conservation	0	1	3	4	2.9
7	Utilization	0	3	1	4	2.9
2	Interest	0	0	1	1	0.7
<b>Total</b>		<b>20</b>	<b>61</b>	<b>55</b>	136	100.0
<b>No answer</b>		<b>29</b>	<b>112</b>	<b>119</b>	260	191.2
<b>Total</b>		<b>49</b>	<b>173</b>	<b>174</b>	396	



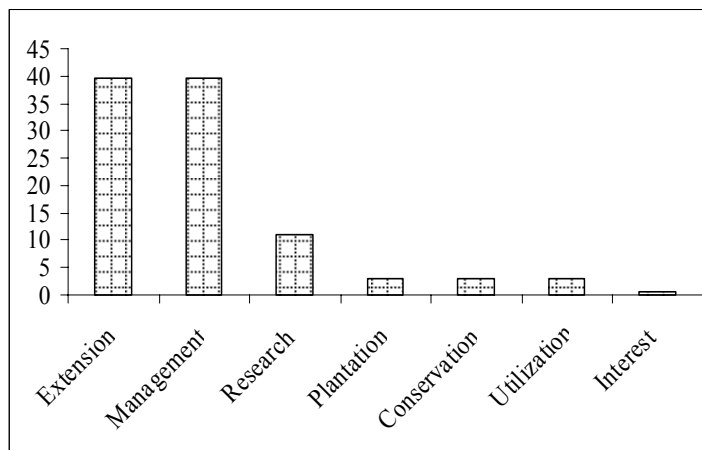


Fig (22) The Percentage of Efficiency in Forest Policy

#### 4.4.3. Sustainability in Forest policy

For the third item of sustainability, the respondents were 50.0% in case of Management, 19.1% for conservation, 10.3% in research and the other describe in the case of extension plantation, utilization, law and energy.

**Table 4(c) Frequencies and Percentage of Sustainability under Forest Policy**

Sr. No.	Sustainability	AD	SO	RO	Total	%
1	Management	8	40	20	68	50.0
2	Conservation	5	7	14	26	19.1
3	Research	4	5	5	14	10.3
4	Extension	0	4	4	8	5.9
5	Plantation	0	4	4	8	5.9
6	Utilization	1	1	4	6	4.4
7	Law	2	1	2	5	3.7
8	Energy	0	1	0	1	0.7
<b>Total</b>		<b>20</b>	<b>63</b>	<b>53</b>	136	100.0
<b>No answer</b>		<b>29</b>	<b>110</b>	<b>121</b>	260	191.2
<b>Total</b>		<b>49</b>	<b>173</b>	<b>174</b>	396	

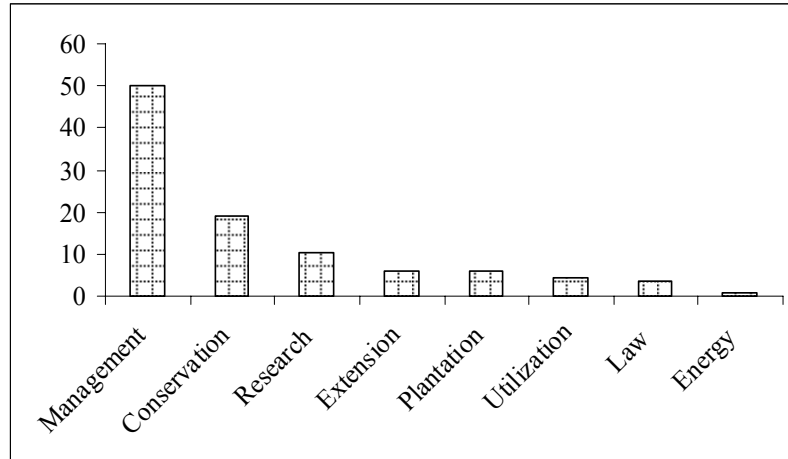


Fig (23) The Percentage of Sustainability in Forest policy

#### 4.4.4. People Awareness in Forest policy

For the fourth item of people awareness, the respondents were 67.1% in case of extension, 18.6% for management, and the other were equally described in the case of research, utilization, conservation, interest and plantation.

Table 4(d) Frequencies and Percentage of People Awareness under Forest Policy

Sr. No.	People awareness	AD	SO	RO	Total	%
1	Extension	14	45	35	94	67.1
2	Management	5	12	9	26	18.6
3	Research	0	3	2	5	3.6
4	Utilization	0	3	2	5	3.6
5	Conservation	0	1	3	4	2.9
6	Interest	0	1	2	3	2.1
7	Plantation	0	2	1	3	2.1
<b>Total</b>		<b>19</b>	<b>67</b>	<b>54</b>	140	100.0
<b>No answer</b>		<b>30</b>	<b>106</b>	<b>120</b>	256	175.7
	<b>Total</b>	<b>49</b>	<b>173</b>	<b>174</b>	396	

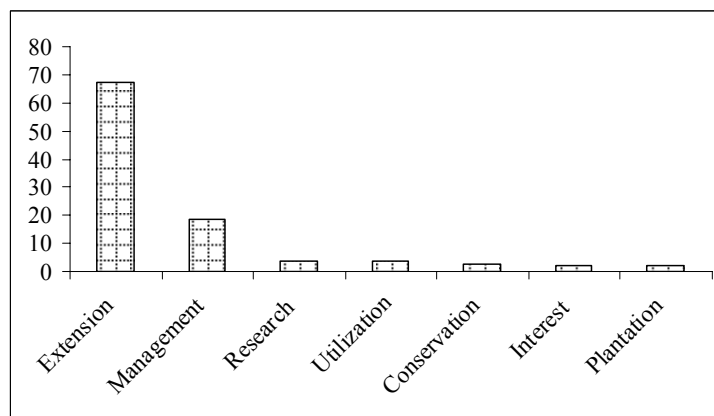


Fig (24) The Percentage of People Awareness in Forest policy

#### 4.4.5. Basic Need in Forest policy

For the fifth item of basic need, the respondents were 35.8% in case of management, 16.6% for plantation, 13.9% for extension and the other describe in the case of research, utilization, energy, law and conservation.

**Table 4(e) Frequencies and Percentage of Basic Need under Forest Policy**

Sr. No.	Basic need	AD	SO	RO	Total	%
1	Management	5	34	15	54	35.8
2	Plantation	8	5	12	25	16.6
3	Extension	4	6	11	21	13.9
4	Research	1	8	9	18	11.9
5	Utilization	2	9	7	18	11.9
6	Energy	1	2	6	9	6.0
7	Law	0	0	3	3	2.0
8	Conservation	0	1	2	3	2.0
<b>Total</b>		<b>21</b>	<b>65</b>	<b>65</b>	151	100.0
<b>No answer</b>		<b>28</b>	<b>108</b>	<b>109</b>	245	162.3
<b>Total</b>		<b>49</b>	<b>173</b>	<b>174</b>	396	

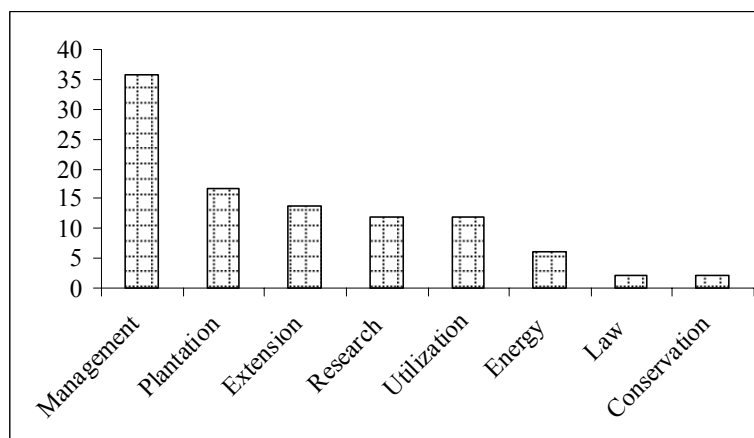


Fig (25) The Percentage of Basic Need in Forest policy

#### 4.4.6. People Participation in Forest policy

For the sixth item of basic need, the respondents were 43.0% in case of extension, 36.6% for management plantation, 6.3% for research and the other were describe in the case of plantation, utilization, law conservation and interest.

**Table 4(f) Frequencies and Percentage of People Participation under Forest Policy**

Sr. No.	People Participation	AD	SO	RO	Total	%
1	Extension	10	27	24	61	43.0
2	Management	7	32	13	52	36.6
3	Research	0	5	4	9	6.3
4	Plantation	2	1	5	8	5.6
5	Utilization	0	2	3	5	3.5
6	Law	0	2	2	4	2.8
7	Conservation	2	0	0	2	1.4
8	Interest	0	0	1	1	0.7
<b>Total</b>		<b>21</b>	<b>69</b>	<b>52</b>	<b>142</b>	<b>100</b>
<b>No Answer</b>		<b>28</b>	<b>104</b>	<b>122</b>	<b>254</b>	<b>178.9</b>

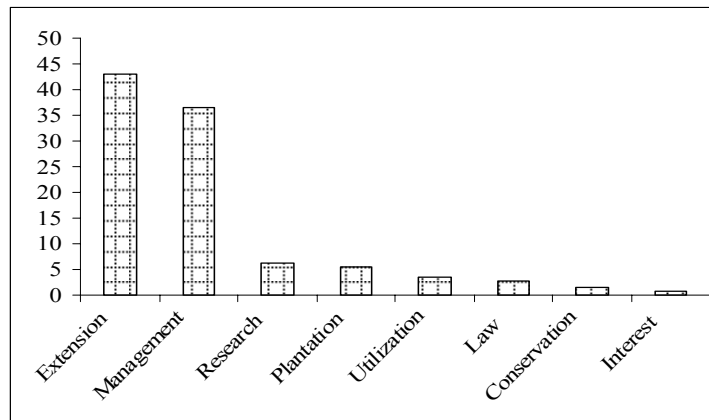


Fig (26) The Percentage of People Participation in Forest policy

#### 4.4.7. Four Main Tasks for Dry Zone Greening Department

In the case of the research activities that should be taken for the sustainable development of the four main tasks (planting, conserving, fuel wood, water) of Dry Zone Greening Department, overall 44.3% need to do research in management for natural forest, while 27.0% need to do research in establishment of plantation, as 22.0% need to do research concerning fuel wood and the other describe for extension.

**Tabl 4(g). Frequencies and Percentage of Four Main Tasks for Dry Zone Greening Department**

Tasks	Total	%
Management	218	44.3
Plantation	133	27.0
Fuel	108	22.0
Extension	19	3.9
Water	1	0.2
<b>Total</b>	<b>492</b>	<b>100.0</b>

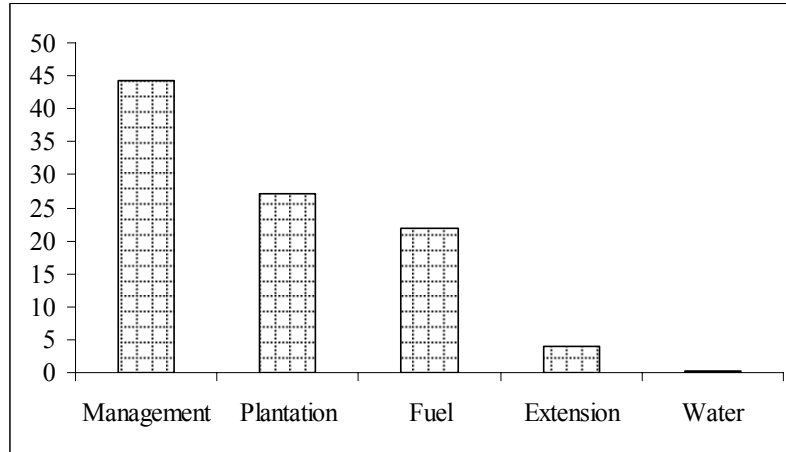


Fig (27) The Percentage of Percentage of Four Main Tasks

**4.4.8. Implementing Future R&D**

Concerning the suggestion for implementation future R & D, a few had experienced for research and development and they suggested that only FRI can emphasize on research, adequate equipment, budget, skillful staff. The result found out that 38 (77.6%) of ADs, 150 (86.7%) of SOs and 145 (83.3%) of ROs had no experiences as shown in table 4 (c).

**Table 4(c). Frequencies and Percentage of Implementing Future R&D**

Current Position	only FRI					Requirements
	Answer	%	No Answer	%	Total	
AD	11	22.4	38	77.6	49	FRI can emphasize on research, adequate equipment, budget, skillful staff
SO	23	13.3	150	86.7	173	
RO	29	16.7	145	83.3	174	

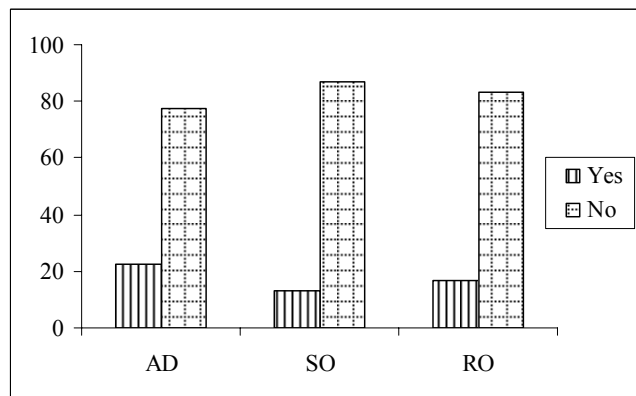


Fig (28) The Percentage of Implementing Future R&D

#### 4.4.9. Willingness to do Research by Staff

For the staff who are working in forestry sector, two options such as (i) necessary, (ii) not necessary, were outlined in questionnaire. The result was shown that 15.4% were needed to create the research themselves, while 0.5 were no need as 84.1 were no answer as shown in table 4(d)

**Table 4(d). Frequencies and Percentage of Willingness to do Research by Staff**

Current Position	Necessary	%	Not Necessary	%	No Answer	%	Total
AD	4	8.2	0	0.0	45	91.8	49
SO	28	16.2	1	0.6	144	83.2	173
RO	29	16.7	1	0.6	144	82.8	174
Total	61		2		333		396

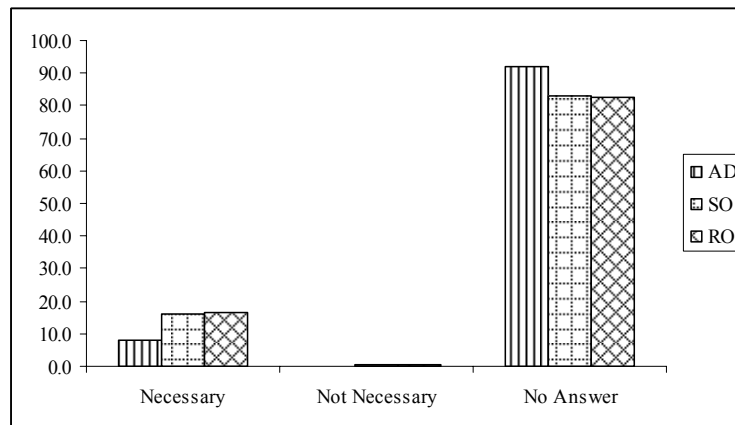


Fig (29) The Percentage of Percentage of Willingness to do Research by Staff

#### If necessary,

The result showed that practical in field was the most important factor to do research. Moreover, technique and laboratory were also examined important factor after that statistics.

Requirements	Total
Practical in Field	36
Technique	12
Laboratory	8
Statistics	5
<b>Total</b>	<b>61</b>

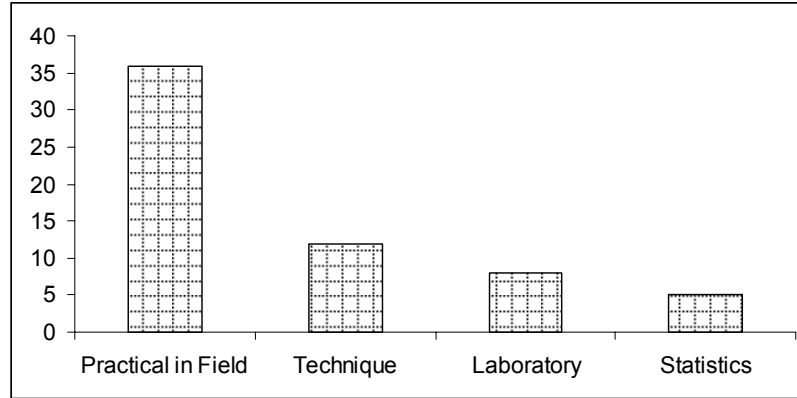


Fig (30). The Percentage of Status of Requirements

## 4. 5. General Knowledge

### 4.5.1. Promote/ Develop to Substitute with LUS More

In this matter, all suggestions for more utilizing LUS were divided into four groups such as (i) extension and education for LUS, (ii) market accessibility, (iii) developing new technologies for LUS, and (iv) to encourage for LUS wood-based industries as shown in table 5(a) The 33 (67.3%) of ADs, 105 (60.7%) of SOs and 95 (54.6%) of ROs recommended that the extension and education for using LUS.

**Table 5(a). Frequencies and Percentage of Substitute to LUS**

Causes	AD	%	SO	%	RO	%	Total
Extension and education	33	67.3	105	60.7	95	54.6	<b>233</b>
Market	11	22.4	41	23.7	35	20.1	<b>87</b>
Uses of LUS	2	4.1	13	7.5	12	6.9	<b>27</b>
Technology	0	0.0	5	2.9	6	3.4	11
Wood-Based Industry	2	4.1	1	0.6	0	0.0	3
Building	0	0.0	0	0.0	2	1.1	<b>2</b>
Usage Permit	0	0.0	1	0.6	0	0.0	<b>1</b>
Implementing Home Garden	0	0.0	0	0.0	1	0.6	1
Overexploitation Forest Products	0	0.0	1	0.6	0	0.0	1
<b>No Answer</b>	<b>1</b>	2.0	<b>6</b>	3.5	<b>23</b>	13.2	<b>30</b>
<b>Total</b>	<b>49</b>		<b>173</b>		<b>174</b>		<b>396</b>

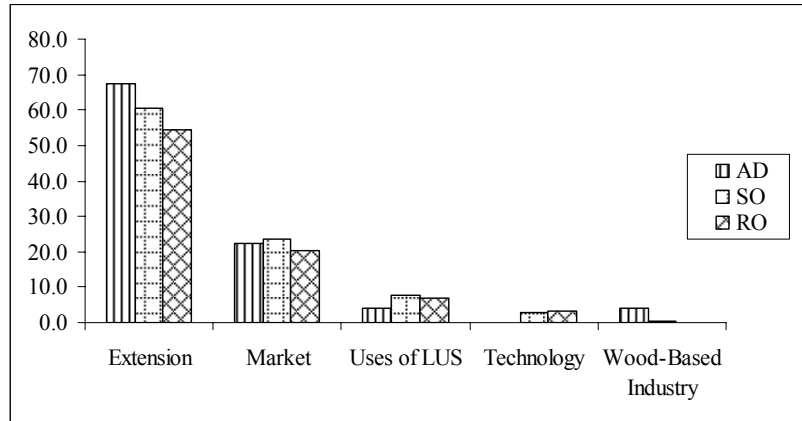


Fig (31) The Percentage of Promote/ Develop to Substitute with LUS More

**4.5.2. Deforestation Causes**

In the case of the causes of deforestation in the forest area, most of respondents showed their suggestions to cause of deforestation in their places. There were eight major methods suggested for restoring degraded forest as shown in table 5(b). The result pointed out that 45.3% were by human activities while 17.3% were by shifting cultivation as 12.6% by illegal logging.

**Table 5 (b). Frequencies and Percentage of Deforestation Causes**

Causes	AD	%	SO	%	RO	%	Total	Total %
Human Activities	18	36.7	70	40.5	77	44.3	<b>165</b>	45.3
Shifting Cultivation	8	16.3	29	16.8	26	14.9	<b>63</b>	17.3
Illegal logging	7	14.3	21	12.1	18	10.3	46	12.6
Fuelwood Collection	1	2.0	20	11.6	14	8.0	<b>35</b>	9.6
Control	8	16.3	11	6.4	10	5.7	<b>29</b>	8
Landuse Conflict	4	8.2	8	4.6	8	4.6	<b>20</b>	5.5
Lack of Education	1	2.0	2	1.2	2	1.1	5	1.4
Extension	0	0.0	1	0.6	0	0.0	1	0.3
No Answer	2		11		19		<b>32</b>	
<b>Total</b>	<b>49</b>		<b>173</b>		<b>174</b>		<b>396</b>	

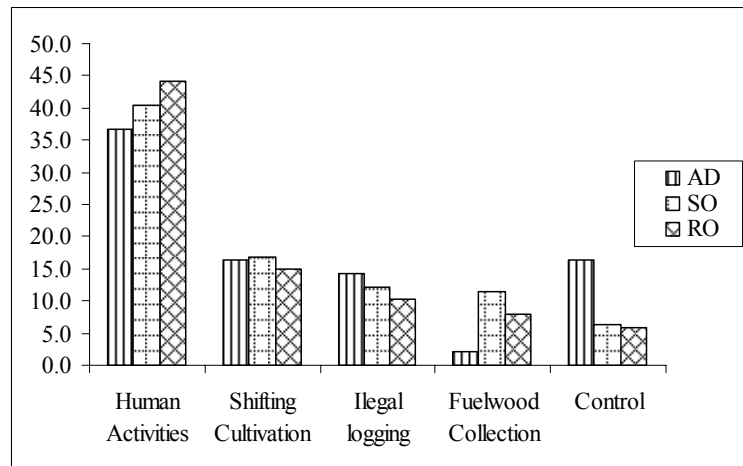


Fig (32) The Percentage of Deforestation Causes



#### 4.5.3. Restoration in the Degraded Forest

Most of the respondents showed their suggestions to restore the degraded forest in their places. There were ten major methods suggested for restoring degraded forest as shown in table 5(c). The result pointed out that gap/enrichment planting among others were found the most suitable methods to restore the degraded forest after that plantation and CF establishment.

**Table 5(c). Frequencies and Percentage of Restore the Degraded Forest**

Tasks	AD	%	SO	%	RO	%	Total	Total %
Gap/Enrichment Planting	19	38.8	68	39.31	68	39.1	155	39.1
Plantation	11	22.4	36	20.81	30	17.2	77	19.4
CF, Social Forestry	6	12.2	22	12.72	36	20.7	64	16.2
Private Forestry	5	10.2	24	13.87	13	7.5	42	10.6
Law & Admin	4	8.2	7	4.05	6	3.4	17	4.3
Alternative Energy for Fuel	0	0.0	0	0.00	2	1.1	2	0.5
Research/Demonstration Plot	0	0.0	0	0.00	1	0.6	1	0.3
Extension & Education	0	0.0	0	0.00	1	0.6	1	0.3
Fire Protection	0	0.0	1	0.58	0	0.0	1	0.3
No answer	4	8.2	15	8.67	17	9.8	36	9.1
Total	49		173		174		396	

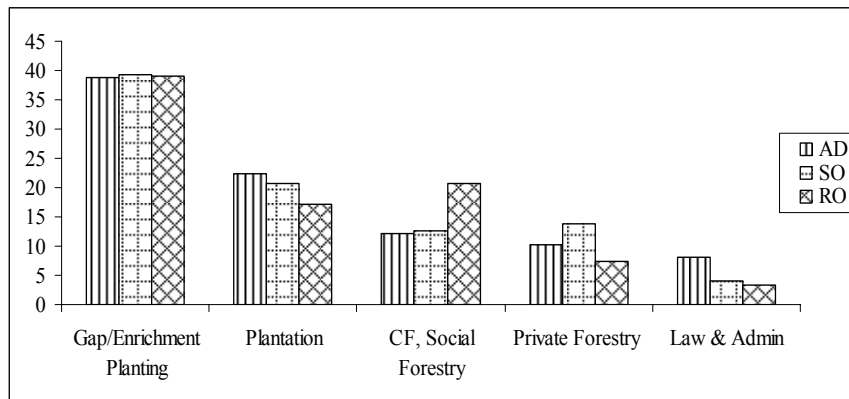


Fig (33) The Percentage of Restoration in the Degraded Forest

#### 4.5.4. Conservation & Establishment of Old Plantation

Survey was made to explore successful maintenance of old forest plantation in order to ensure sustainable timber production in Myanmar. The result showed that skill staff and labour were the most important factor affecting successful maintenance of old plantation followed by replanting or patching operations to be done. Moreover, budget and financing were also observed important factor after that fire protection as shown in table 5(d).

**Table 5 (d). Frequencies and Percentage of Main Requirements to do Conservation & Establishment of Old Plantation**

Causes	AD	%	SO	%	RO	%	Total	Total %
Skill Staff +Labour	10	20.4	49	28.3	42	24.1	<b>101</b>	28.5
Replant	13	26.5	33	19.1	38	21.8	<b>84</b>	23.7
Money	11	22.4	30	17.3	19	10.9	<b>60</b>	16.9
Fire Protection	4	8.2	17	9.8	21	12.1	42	11.9
Protect to Human Activities	3	6.1	12	6.9	8	4.6	<b>23</b>	6.5
Extension	2	4.1	5	2.9	8	4.6	<b>15</b>	4.2
Animal/Cattle Protect	0	0.0	3	1.7	4	2.3	7	2
Permit to Local People	1	2.0	2	1.2	3	1.7	<b>6</b>	1.7
Awareness	0	0.0	4	2.3	2	1.1	<b>6</b>	1.7
Private Forestry	1	2.0	4	2.3	1	0.6	<b>6</b>	1.7
Landuse Conflict	0	0.0	2	1.2	1	0.6	<b>3</b>	0.8
Transportation	1	2.0	0	0.0	0	0.0	<b>1</b>	0.3
Counting + Maintenance		0.0		0.0		0.0		0
No Answer	<b>3</b>	6.1	<b>12</b>	6.9	<b>27</b>	15.5	<b>42</b>	
<b>Total</b>	<b>49</b>		<b>173</b>		<b>174</b>		<b>396</b>	

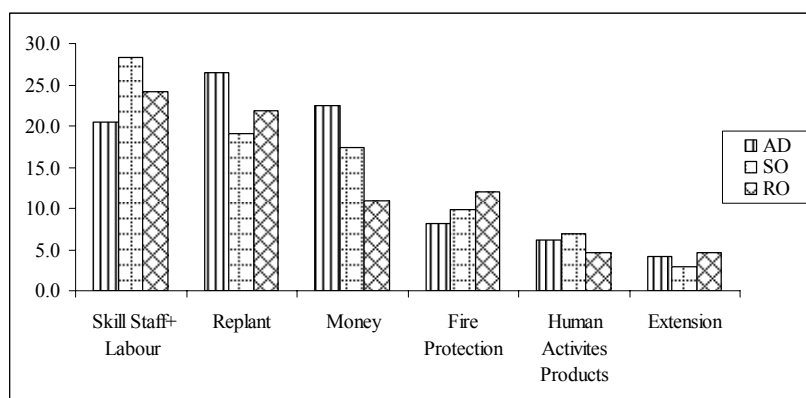


Fig (34) The Percentage of Conservation & Establishment of Old Plantation

#### 4.5.5. Long term plan to supply timber demand for increasing population by forestry sector

In the case of the long term plan to supply timber demand for increasing population in forestry sector, the result showed that the most important cause is establishment of plantation (45.3%) while (8.3%) answered the need of protection the natural forest as 8.1% answered the need of extension and use in properly as shown in table 5(e).

**Table 5(e) Frequencies and Percentage of Long Term Plan to Supply Timber Demand for Increasing Population**

Causes	AD	%	SO	%	RO	%	Total	Total %
Plantation	17	34.7	79	45.7	78	44.8	174	45.3
Protection of Natural forest	2	4.1	16	9.2	14	8.0	32	8.3
Extension	3	6.1	15	8.7	13	7.5	31	8.1
Use in Properly	7	14.3	13	7.5	11	6.3	31	8.1
Treatment in LUS	5	10.2	11	6.4	13	7.5	29	7.6
Law	6	12.2	6	3.5	9	5.2	21	5.5
Unexport & Sell in Local	2	4.1	8	4.6	5	2.9	15	3.9
Local Need	2	4.1	6	3.5	4	2.3	12	3.1
Cooperation	0	0.0	0	0.0	1	0.6	1	0.3
Wood Based Industry	0	0.0	1	0.6	0	0.0	1	0.3
SF Techniques	0	0.0	1	0.6	0	0.0	1	0.3
<b>No Answer</b>	<b>5</b>		<b>17</b>		<b>26</b>		<b>48</b>	
<b>Total</b>	<b>49</b>		<b>173</b>		<b>174</b>		<b>396</b>	

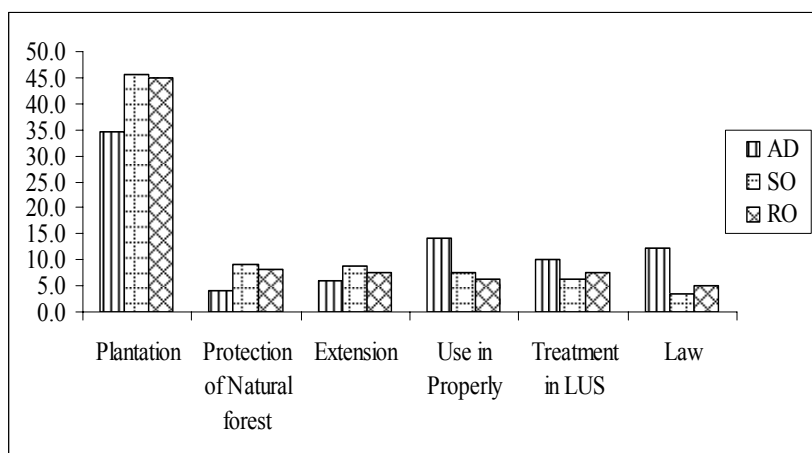


Fig (35) The Percentage of Long term plan to supply timber demand for increasing population by forestry sector

#### 4.5.6. Reducing Fuel Wood

Concerning the how to reduce fuel wood utilization for cooking, there were ten different levels respondents. The summary of accumulated result showed that "using A<sub>1</sub> stove" was the highest options followed by using "bio gas" after that electricity as presented in table 5(f).

**Table 5(f). Frequencies and Percentage of Reducing Fuelwood**

No.	Requirements	AD	%	SO	%	RO	%	Total	Total %
1.	A <sub>1</sub> (efficient stove)	14	28.6	37	21.4	50	28.7	101	25.5
2.	Bio-gas	6	12.2	43	24.9	35	20.1	84	21.2
3.	Electricity	11	22.4	31	17.9	26	14.9	68	17.2
4.	Briquette	5	10.2	21	12.1	22	12.6	48	12.1
5.	Natural Gas	7	14.3	17	9.8	8	4.6	32	8.1
6.	Other Fuel Source	0	0	7	4	6	3.4	13	3.3
7.	Fuel from Agri Waste	1	2	5	2.9	2	1.1	8	2
8.	Waste Material	2	4.1	1	0.6	4	2.3	7	1.8
9.	Solar	0	0	3	1.7	1	0.6	4	1
10.	Research	1	2	0	0	1	0.6	2	0.5
	No Answer	2	4.1	8	4.6	19	10.9	2	0.5
	<b>Total</b>	<b>49</b>		<b>173</b>		<b>174</b>		<b>369</b>	

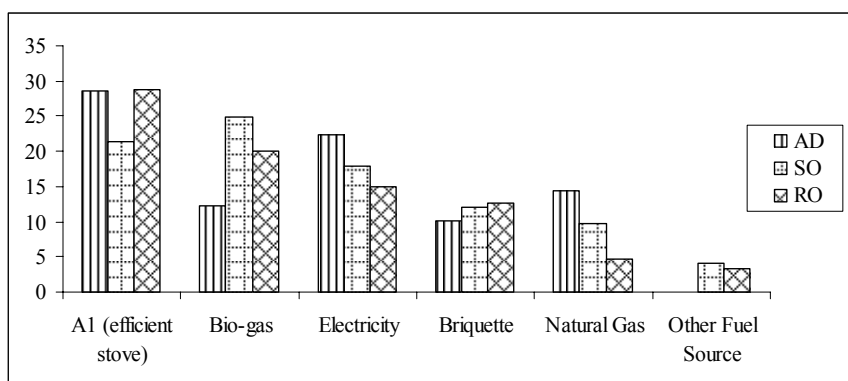


Fig (36) The Percentage of Reducing Fuel Wood

## 5. Conclusion

In this study on questionnaire based survey in forestry sector, respondents of AD, SO and RO from FD and DZGD participated for major five questions. All results summarized and indicated as follows.

- (1) However suggestions from different levels of respondents were mostly found out similar trend.
- (2) They were observed understanding in research and development and its prior and essential role in development of every sector.
- (3) Most of respondents were found out having efficient knowledge and basic concept for doing researches.
- (4) Based on their long experience working in different places, their suggestions for new research area were categorized in line with current situation in forestry sector.
- (5) Lastly suggestions and comments from all levels of respondents were confidently assumed to be used in development of future research programme.

## **6. Recommendation**

1. Regarding to their suggestion, research findings in any way of materials should be disseminated for levels of field managers and operators.
2. The similar survey should be applied for planning future research programme in all in forestry sector.
3. More questions should be designed so as to get more information to cover forestry issues.
4. Suggestions and recommendation should be reviewed again and fulfill their needs to overcome limitations.