

Vote:142 National Agricultural Research Organisation

V1: Vote Overview

I. Vote Mission Statement

To generate and disseminate appropriate, safe and cost effective technologies.

II. Strategic Objective

- a. Client and impact-oriented, market responsive agricultural sector research agenda developed and implemented
- b. Capacity and efficiency of public and private agricultural sector research service provider teams to respond to client needs and market opportunities improved.
- c. Infrastructural and financial sustainability capacities to support and facilitate agricultural research enhanced and strengthened
- d. Mechanisms for contributing to agricultural research sector policy formulation and development strengthened.
- e. Quality assurance procedures in the NARS established and implemented.

III. Major Achievements in 2016/17

Rice

- A disease map for rice blast developed
- A new pest threatening rice production in eastern and west Nile region has been identified as hispa beetle. Damaging effect of Hispa beetles on lowland rice reported.
- Conducted field selection of Green Super Rice through PVS by local farmers, and 2 varieties: 1052 and SUA-3 were selected
- Established 1 ha of rice foundation seed varieties Nerica 4 and Nerica 6 and new rice varieties Wita 9.

Maize

- Nurseries for forming Striga resistant hybrids were established. 20 Striga resistant hybrid maize varieties are being evaluated at 4 Striga infested sites. 10 promising IR hybrids striga resistant selected
- Nursery of 18 MLN resistant inbreds and Promising MLN resistant 3-way maize trials on established
- Modification of shelling unit of the motorized maize sheller completed. Preliminary results show a reduction in breakage level from 11- 6%.
- 4 maize on farm trials at half an acre have been established in the Eastern zone for validation of on-station results on plant performance and effect of biochar on soil properties.
- 30 segregating populations of F4 stage advanced for development of highland inbred maize lines at Kyembogo. 173 highland maize hybrids evaluated for PYT.
- Surveyed 6 districts. 2 species of stem borers found damaging maize in all the locations Most worrying are the new pests are Spodoptera spp And Helicoverpa spp

Cassava

- 9 acres planted with 6 cassava varieties established in 3 locations.
- Established 2 ha of cassava multiplication field.
- Conducted one community outreach activity around Namulonge with distribution of 30 bags of cassava and sweet potato planting materials
- 06 ha CFT established in Kasese
- 3,040 tissue culture plantlets of the improved cassava varieties planted in Serere
- 2 pre basic, 2 basic and 46 cassava seed entrepreneur fields inspected
- 24 ha of 3 elite cassava varieties: NASE19, NASE14 and NAROCASS1 established in 6 sites in Oyam and Pader for clean seed production
- First soil mapping conducted in 5 districts (Masaka, Mpigi, Mityana, Kibale& Kyenjojo),

Fruits

- 8ha of apple orchards established and maintained on station 250 seedlings of 5 apple rootstocks.
- 17 high yielding disease resistant entries out of 50 entries from 26ISEPTON, 42 out of 208 entries from 10STEMRRSN and 14 out of 100 entries from 36ESWYT selected and harvested 33 entries of PYT and 29 entries of AYT harvested for yield analysis
- Fruit fly survey conducted in the districts of Kyagwegwa, Kamwenge and Kyenjojo and Kasese Damage found significant on Water melon and mango

Beans

- On farm trials and demonstrations on bruchids management in common beans conducted at 30 sites with farmers in Isingiro

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district, Sheema district and Ibanda district In conducting mycotoxin contamination assessment in legumes grains, four mycotoxin producing moulds noted on Ugandan dried common beans

- Evaluating efficacy botanicals on common diseases and pest of beans and on farm trials planted. Preliminary results show that NABE 21 showing the least damage level by beetles
- Protocols for development of Tool Kit for food safety and traceability to address health risks along pre-cooked value chain developed
- 739 farmers (276 males, 463 females) trained on strategic gender interventions in bean production and marketing
- NPT of 5 high iron and drought tolerant bean varieties conducted in 10 districts
- 87 NABE 14/G 2333, multiple resistant lines subjected to Anthracnose evaluation: 5 participatory evaluation trials established in 3 hotspot sites: Bushenyi, Kabale, Kisoro
- 2 ha established on-station and 4 ha established on-farm for foundation seed production of climber bean varieties

Seed systems

- A system for enhancing seed production and managing seed quality of maize, beans and sorghum was developed for Karamoja. 47 (71%) seed grower members from two groups (Loblio and Kokere) were trained in general aspects of seed production
- Harvested seed of 2342Kg of maize, 1001Kg of beans and 1665Kg of sorghum

Banana

- Improved banana diploids established in a field for nematode evaluation 5 transgenic lines of banana sukali Ndizi initiated invitro for bulking
- 15 acre On farm banana decapitation experiment maintained in Kyenjojo 3 acres On farm banana evaluation trials maintained in Kamwenge and Ntoroko; One acre cover crop experiment in bananas maintained on station
- 5,246 suckers produced and distributed to uptake pathways; Site characterization and matching conducted in Kabarole, Kyegegwa and Kasese
- Held 2 stakeholder meetings in Nakaseke and 2 meetings in Masaka as a follow up on the BBW control trainings conducted in 2015 Farmers are implementing the recommended control practices and the level of BBW in the four sub-counties has reduced

Coffee

- Established that coffee ring mulched with Calliandra recorded the highest percentage increment in stem girth, canopy, bearing head, number of primaries, length of primaries and number of primary internodes when compared to coffee ring mulched with Leuceana leucocephala and non mulched coffee
- Conducted performance evaluation of 64 hybrid progenies of crosses between CWD-r and CWD-s Robusta coffee parents of desired traits, at different growth stage 74 Individual trees with yields of above 1000kg/ha selected for replicated variety;
- Conducted agronomic and quality performance of CWD-r Robusta genotypes in the year-2 of their 2nd cropping cycle 296 genotypes evaluated Yield ranged from 0-2911kg/ha;

Cocoa

- Consultative meetings with local leaders held in Mayuge, Buikwe and Mukono districts and sites for the trial identified and set Pre-treatment data shows most important cocoa constraints in Mayuge are:- capsids (317%), psyllids (23%) and scales (224%), and in Buikwe, are:- capsids (706%), aborted cerelles (359%) and psyllids (312%)

Sun flower

- On farm testing of foliar fertilizers on sunflower with Megacole and BioZinc conducted at 4 farmers' fields in Mukura sub-county and Omodoi sub-county

Sorghum

- 3 candidate sorghum lines selected for release
- survey conducted on midge effect on sorghum productivity in Nabuin zone Obtained results indicated that midge contributed highly to sorghum head and grain/kernel growth failure with the incidence prematurely attributed to 60% and 20% to fields with local and improved varieties respectively
- 10 TOTs trained in drought and integrated striga management technologies in serere district;

Pearl millet

- Identified markets for pearl millet in Kenya, Malaba and Busia in Uganda
- 25 lines of pearl millet were screened and five selected based on (1) earliness, egort tolerance and high yield

Potato

- State of seed potato stocks in Mt Elgon region has been determined. Established that low supply of quality seed potato with high scab and late blight in stores at Kapchorwa and Kween

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- 10,000 plantlets of quality declared potato varieties produced ready for uptake pathways

Sweet potato

- Multiplication of sweet potato basic, non-virus indexed planting material established on 25 acres
- 3 sweet potato varieties cleaned through virus indexing and multiplied in vitro in screen house
- Crossing block for promising nutrient-rich and stress tolerant sweet potato genotypes constructed and parent lines planted
- New Kawogo x Beauregard population phenotyped for storage root yield traits and resistance to major pests and diseases in 4 locations
- 30 parents with OFSP and other traits identified and established in a crossing block

Tea

- Conducted a pest and disease survey in Kisoro district Findings indicate that the prevalence of diseases Brown Leaf Spot, Grey Leaf Spot and pests thrips, mosquito bugs & 55 % red spider mite;

Cotton

- Breeder and nucleus seed of the two Candidate cotton lines with high yield, good fibre qualities adaptable and resistant to diseases planted;
- planted 25 Cotton strains for preliminary evaluation drought tolerance and fibre qualities
- Plucking cowpea leaves thrice under cotton/cowpea intercropping system gave the best combined advantages based on number of cotton bolls per plant and income from cowpea leaves compared to plucking twice or once
- The cotton farmers' manual/guide is being updated with more information on technology generation

Soy bean

- Advanced yield trial (AYT) conducted on rust resistance, nodulation, loading and yield
- 428 kg of breeder seed for MAKSOY 3N, 4N and 5N produced
- 295 tons of foundation seed for Maksoy 2N, 3N, 4N and 5N produced
- A total of 220 farmers and 40 ToTs trained on new soybean technologies
- 30 promising soybean genotypes included in the PYT

Cattle

- Review of major disease diagnostics conducted Available tools are costly, inaccessible and require specialized technical expertise Blood and serum samples for FMD pathogen and antigen isolation collected Nationwide survey on FMD and CBPP outbreak patterns conducted
- Identified and collected on-farm plants with potential therapeutic, ecto-parasiticidal, antimicrobial, and antihelminths control properties from all agroecological zones in Uganda
- Determined the performance of growing Zebu bulls with diets of varying protein levels during a three months (July-Sep) growth period Increase in %CP from 9 to 11 resulted into better weight gains and growth rates for experimental animals
- Determined the performance of Chaloris bulls supplemented with different finishing rations
- 200 acres of grazing pastures established
- Established experimental fields for evaluation different pasture grass-legume combinations, silage production attributes of lablab foliage
- Developed and validated a modified Ngu B2 trap, a tsetse trap and an impregnated net for zero grazing
- Held Feedback meetings with 50 farmers in Kyegegwa and Kyenjojo on prevalent livestock diseases and parasites.

Apriay

Survey on bee forage plants conducted in Kyenjojo. Preliminary results show Calliandra and angels trumpet are most preferred.

IV. Medium Term Plans

Medium Term Plans will be implemented to deliver the following outputs:

(a) Agricultural Technology Generation : Submit for release New varieties, New production technologies/ strategies, Provision of foundation seed; Provision of breeder seed, Multiplication of clean/Improved planting materials.

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(b) Strengthening the Research-Extension-Farmer interface:

1. Strengthen research in MSIPs, value addition and market linkages. Strengthen the NARO-Operation Wealth Creation-NAADS linkages.
2. On-farm trials.
3. Empower or enhance the capacity of Farmers and Farmer Groups to make choices and implement decisions that affect their livelihoods.
4. Technology demonstrations (on station, on farm, technology parks).
5. Dissemination and Training workshops for subject matter specialists and other service providers
6. Scientific conferences, dissemination workshops and seminars for scientists, extension agents and policy makers
7. Dissemination materials developed,
8. scientific & extension materials published,
9. Publicity and News articles published,
10. Radio talk shows;
11. Audio Visuals in English and local languages,
12. Design and development of Farming manuals,

(c) Strengthening agricultural research capacity

1. Construction of New and rehabilitation of New Offices, Laboratories and Farm and field Infrastructure (NALIRRI, NASARRI, Rwebitaba ZARDI, NACORI)

2. Training of 20 PhDs and 30 MScs, reviewing of the NAR Act, review and development of research standards and guidelines, initiation of the ISO certification of Public Agricultural Research Institute Laboratories.

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V. Summary of Past Performance and Medium Term Budget Allocations

Table 5.1: Overview of Vote Expenditures (US\$ Billion)

	2015/16 Outturn	2016/17		2017/18	MTEF Budget Projections				
		Approved Budget	Expenditure by End Dec		2018/19	2019/20	2020/21	2021/22	
Recurrent									
Wage	18.972	22.472	11.235	22.472	23.596	24.776	26.014	27.315	
Non Wage	7.499	8.523	3.893	7.377	8.852	9.737	11.198	11.198	
Devt.									
GoU	9.192	9.130	1.597	8.780	11.415	13.698	16.437	16.437	
Ext. Fin.	30.257	67.739	38.342	45.540	0.000	0.000	0.000	0.000	
GoU Total	35.663	40.126	16.725	38.629	43.862	48.210	53.649	54.950	
Total GoU+Ext Fin (MTEF)	65.920	107.865	55.067	84.169	43.862	48.210	53.649	54.950	
Arrears	0.743	0.000	0.000	0.007	0.000	0.000	0.000	0.000	
Total Budget	66.663	107.865	55.067	84.177	43.862	48.210	53.649	54.950	
A.I.A Total	1.791	6.272	2.077	5.792	4.000	4.000	4.000	4.000	
Grand Total	68.454	114.137	57.144	89.968	47.862	52.210	57.649	58.950	
Total Vote Budget Excluding Arrears	67.711	114.137	57.144	89.961	47.862	52.210	57.649	58.950	

VI. Budget By Economic Classification

Table V6.1 2016/17 and 2017/18 Budget Allocations by Item

<i>Billion Uganda Shillings</i>	2016/17 Approved Budget				2017/18 Draft Estimates			
	GoU	Ext. Fin	AIA	Total	GoU	Ext. Fin	AIA	Total
Output Class : Outputs Provided	37.421	50.739	6.272	94.432	33.249	33.240	5.792	72.281
211 Wages and Salaries	22.738	3.781	0.841	27.360	22.481	2.431	0.827	25.739
212 Social Contributions	2.648	0.000	0.000	2.648	2.292	0.000	0.000	2.292
213 Other Employee Costs	2.160	0.000	0.012	2.172	2.060	0.000	0.000	2.060
221 General Expenses	3.295	14.178	0.658	18.131	3.135	7.603	1.286	12.024
222 Communications	0.292	2.190	0.034	2.516	0.512	0.859	0.027	1.398
223 Utility and Property Expenses	0.449	0.000	0.803	1.252	0.570	0.000	0.367	0.938
224 Supplies and Services	1.241	14.020	1.452	16.713	0.527	12.392	1.953	14.873
225 Professional Services	0.110	1.494	0.015	1.619	0.120	0.670	0.004	0.794
226 Insurances and Licenses	0.028	0.000	0.001	0.028	0.119	0.000	0.003	0.122
227 Travel and Transport	3.950	11.347	0.647	15.944	1.044	8.147	0.577	9.767
228 Maintenance	0.511	3.729	1.810	6.049	0.295	1.138	0.744	2.178
273 Employer social benefits	0.000	0.000	0.000	0.000	0.094	0.000	0.004	0.098
Output Class : Outputs Funded	1.705	0.000	0.000	1.705	1.780	0.000	0.000	1.780
262 To international organisations	1.605	0.000	0.000	1.605	1.780	0.000	0.000	1.780

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Total for the Vote	66.663	114.137	55.546	89.968	47.862	52.210	57.649	58.950
Total Excluding Arrears	65.920	114.137	55.546	89.961	47.862	52.210	57.649	58.950

VIII. Programme Performance and Medium Term Plans

Table V8.1: Programme Outcome and Outcome Indicators (Only applicable for FY 2017/18)

Programme :	51 Agricultural Research					
Programme Objective :	1. Develop and disseminate appropriate technologies, knowledge and information that meet client needs and respond to market opportunities; 2. Develop the human and infrastructural capacity of National Agricultural Research System constituents to meet the dynamics of the demand for research products and services; 3. Empower and enhance participation of stakeholders in agricultural research demand articulation, output delivery and governance.					
Responsible Officer:	Director General					
Programme Outcome:	1. Adoption rate of research outputs increased; 2. The level of awareness of technologies generated in the NARS; 3. Farm households satisfied with improved technologies; 4. Farm households using improved agricultural technologies.					
<i>Sector Outcomes contributed to by the Programme Outcome</i>						
1. Increased production and productivity of priority and strategic commodities						
Outcome Indicators	Performance Targets					
	2015/16	2016/17		2017/18	2018/19	2019/20
	Actual	Target	Actual	Target	Projection	Projection
N / A						
N/A						

IX. Major Capital Investments And Changes In Resource Allocation

Table 9.1: Major Capital Investment (Capital Purchases outputs over 0.5Billion)

FY 2016/17		FY 2017/18	
Appr. Budget and Planned Outputs	Expenditures and Achievements by end Dec	Proposed Budget and Planned Outputs	
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<i>Program : 01 51 Agricultural Research</i>			
Development Project : 0382 Support for NARO			
Output: 01 51 72 Government Buildings and Administrative Infrastructure			
Agric Laboratory at NARL Kawanda and Rwebitaba ZARDI		Enhance coffee research operational at NACORI	
Abi ZARDI, Arua: Functional pit latrine for farm workers		Enhance research operational at Rwebitaba ZARDI	
Kachwenkano ZARDI, Kabale: 2 staff houses, 1 guest house and 2 underground water tank renovated; Repair of seed stores at Kalengyere;A housing u		Enhanced office and laboratory space at NARL	
		Functional and operational NALIRRI	
Total Output Cost(Ushs Thousand)	500,000	0	1,200,000
Gou Dev't:	500,000	0	1,200,000
Ext Fin:	0	0	0

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A.I.A:	0	0	0
Output: 01 51 76 Purchase of Office and ICT Equipment, including Software			
			An assortment of Office and ICT equipment .
Total Output Cost(Ushs Thousand)	0	0	950,000
Gou Dev't:	0	0	950,000
Ext Fin:	0	0	0
A.I.A:	0	0	0
Output: 01 51 77 Purchase of Specialised Machinery & Equipment			
Imported machinery paid			An assortment of office, laboratory, workshop and field machinery
Total Output Cost(Ushs Thousand)	500,000	0	850,000
Gou Dev't:	500,000	0	850,000
Ext Fin:	0	0	0
A.I.A:	0	0	0
Development Project : 1139 ATAAS (Grant) EU, WB and DANIDA Funded			
Output: 01 51 72 Government Buildings and Administrative Infrastructure			
Mukono ZARDI, Mukono: Construction of 3 concrete tanks for aquaculture research;	None		Functional milking parlour, and a Cattle shed at Nakyesasa-Namulonge
Total Output Cost(Ushs Thousand)	7,700,000	5,320,000	2,900,000
Gou Dev't:	0	0	0
Ext Fin:	7,700,000	5,320,000	2,900,000
A.I.A:	0	0	0
Output: 01 51 75 Purchase of Motor Vehicles and Other Transport Equipment			
Two Pick-ups for administration	None		
Total Output Cost(Ushs Thousand)	700,000	700,000	0
Gou Dev't:	0	0	0
Ext Fin:	700,000	700,000	0
A.I.A:	0	0	0
Output: 01 51 76 Purchase of Office and ICT Equipment, including Software			
Purchase of Office and ICT Equipment, including Software	None		
Machinery & Equipment-ICT EQUIPMENT (Including Information Databases-DATP-, Video conferencing facility, NAROSEC Intercom, Laptops/Desktops- Projectors, Networking infrastructure			
Total Output Cost(Ushs Thousand)	2,700,000	2,158,686	0
Gou Dev't:	0	0	0
Ext Fin:	2,700,000	2,158,686	0
A.I.A:	0	0	0
Output: 01 51 77 Purchase of Specialised Machinery & Equipment			

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Assortment of research laboratory and field equipment at the PARIs.	None		Assortment of laboratory equipment for the constructed laboratories
Total Output Cost(UShs Thousand)	5,000,000	4,900,000	9,400,000
Gou Dev't:	0	0	0
Ext Fin:	5,000,000	4,900,000	9,400,000
A.I.A:	0	0	0
Output: 01 51 78 Purchase of Office and Residential Furniture and Fittings			
Agricultural Laboratory furniture and conference furniture procured	None		
Total Output Cost(UShs Thousand)	900,000	642,291	0
Gou Dev't:	0	0	0
Ext Fin:	900,000	642,291	0
A.I.A:	0	0	0

Table 9.2: Key Changes in Vote Resource Allocation

Major changes in resource allocation over and above the previous financial year	Justification for proposed Changes in Expenditure and Outputs
Programme : 01 51 Agricultural Research	
Output: 01 5102 Research extension interface promoted and strengthened	
<i>Change in Allocation (UShs Bn) :</i> -3.917	The restructured ATAAS emphasized the partnership and technology up-take
Output: 01 5103 Internal Audit	
<i>Change in Allocation (UShs Bn) :</i> -0.032	The budget cuts applied to consumptive operating expenses in 2017/18
Output: 01 5172 Government Buildings and Administrative Infrastructure	
<i>Change in Allocation (UShs Bn) :</i> -4.100	The ATAAS project has less provision for civil works as the project is near closure
Output: 01 5175 Purchase of Motor Vehicles and Other Transport Equipment	
<i>Change in Allocation (UShs Bn) :</i> -0.350	the budget cuts applied to 2017/18
Output: 01 5176 Purchase of Office and ICT Equipment, including Software	
<i>Change in Allocation (UShs Bn) :</i> -1.750	ATAAS project budget to cater for the planned information and communication strategy which is prioritized during 2017/18
Output: 01 5177 Purchase of Specialised Machinery & Equipment	
<i>Change in Allocation (UShs Bn) :</i> 4.750	This includes laboratory and workshop equipment to enhance the communication strategy in 2017/18
Output: 01 5178 Purchase of Office and Residential Furniture and Fittings	

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<i>Change in Allocation (US\$ Bn) :</i>	<i>-0.650</i>	Most of the assets under this output were catered for in 2016/17
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X. Vote Narrative For Past And Medium Term Plans

Vote Challenges

1. Deteriorating infrastructure: Low quality of laboratories in Rwebitaba and NaCORI and NASARRI.
2. Low staff salaries.
3. NARO land encroachment.
4. Delay in enactment of Biotechnology and Biosafety Bill.
5. Unpredictable and/or limited funding of agricultural research for development.
6. Weak dissemination of research findings, up-scaling on farm and on-station research demonstrations.

Plans to improve Vote Performance

1. Recruitment, training and retention of Human Resource.
2. Strengthening technology promotion.
3. Intensification of research-extension-farmer interface. And contribute to strengthening the District Agricultural Research support teams and operations.
4. Recommend to Government to raise the MTEF ceiling and government commits predictable and sustainable funding mechanisms.

XI. Vote Cross Cutting Policy And Other Budgetary Issues

Table 11.1: Cross- Cutting Policy Issues

Issue Type: HIV/AIDS

Objective :	Awareness on HIV/AIDS and appropriate mitigative nutrition among key NARO stakeholders
Issue of Concern :	appropriate mitigative nutrition technologies
Planned Interventions :	Awareness on HIV/AIDS and appropriate mitigative nutrition among key NARO stakeholders
Budget Allocation (Billion) :	0.001
Performance Indicators:	No and types of initiatives

Issue Type: Gender

Objective :	To mainstream gender concerns in agricultural research
Issue of Concern :	Strengthening capacity of scientists in gender mainstreaming to address gender equity
Planned Interventions :	Training programs for researchers to address gender equity concerns in their research projects and programmes (gender analysis, gender budgeting, data disaggregation, M&E etc)
Budget Allocation (Billion) :	0.001
Performance Indicators:	Number of scientists trained in gender equity; number of projects screened/analysed for gender concerns

Issue Type: Environment

Objective :	To generate technologies appropriate for environmental sustainability
Issue of Concern :	Environmental degradation

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Planned Interventions : Generate climate smart and sustainable land management technologies specific to agro ecological zones with special focus on karamoja

Budget Allocation (Billion) : 0.001

Performance Indicators: Number of climate smart and SLM technologies demonstrated

Table 11.2: AIA Collections

Source of AIA(Ush Bn)	2016/17 Budget	2016/17 Actual by Dec	2017/18 Projected
Sale of (Produced) Government Properties/Assets	0.000	0.000	1.800
Rent & rates – produced assets – from private entities	0.000	0.000	0.604
Market /Gate Charges	0.000	0.000	0.100
Miscellaneous receipts/income	0.000	0.000	3.288
Total	0.000	0.000	5.792

XII. Personnel Information

Table 12.1 : Vote Staffing Profile by Post

Post	Authorised Establishment	Filled Posts	Vacant Posts	Cleared for filling in 2017/18	Number of Posts Estimated for 2017/18	Scale	Gross Salary Rate per Month	Annual Cost of Filled Posts 2017/18	Annual Cost of Estimated Posts 2017/18
Accounts Assistant		34	5	5	39	UR 6	1,170,473	39,796,082	14,045,676
Driver		90	2	2	92	UR7	868,312	78,148,080	10,419,744
Procurement Officer		14	3	3	17	UR 5 (ii)	2,138,823	29,943,522	25,665,876
Research Officer		180	10	10	190	UR 5 (i)	2,138,823	384,988,140	25,665,876
Senior Information Communication Officer		1	1	1	2	UR 4	2,486,397	2,486,397	29,836,764
Senior Procurement Officer		1	1	1	2	UR 4	2,717,521	2,717,521	32,610,252
Senior Research Officer		51	3	3	54	UR4	2,576,811	131,417,361	30,921,732
Technician		97	5	5	102	UR6	1,170,473	113,535,881	14,045,676
Vote Total		468	30	30	498		15,267,633	39,796,082	183,211,596