

# Vote: 142 National Agricultural Research Organisation

## Vote Summary

### VI: Vote Overview

This section sets out the Vote Mission, Strategic Objectives, and provides a description of the vote's services

#### (i) Snapshot of Medium Term Budget Allocations

Table V1 below summarises the Medium Term Budget allocations for the Vote:

**Table V1.1: Overview of Vote Expenditures (UShs Billion)**

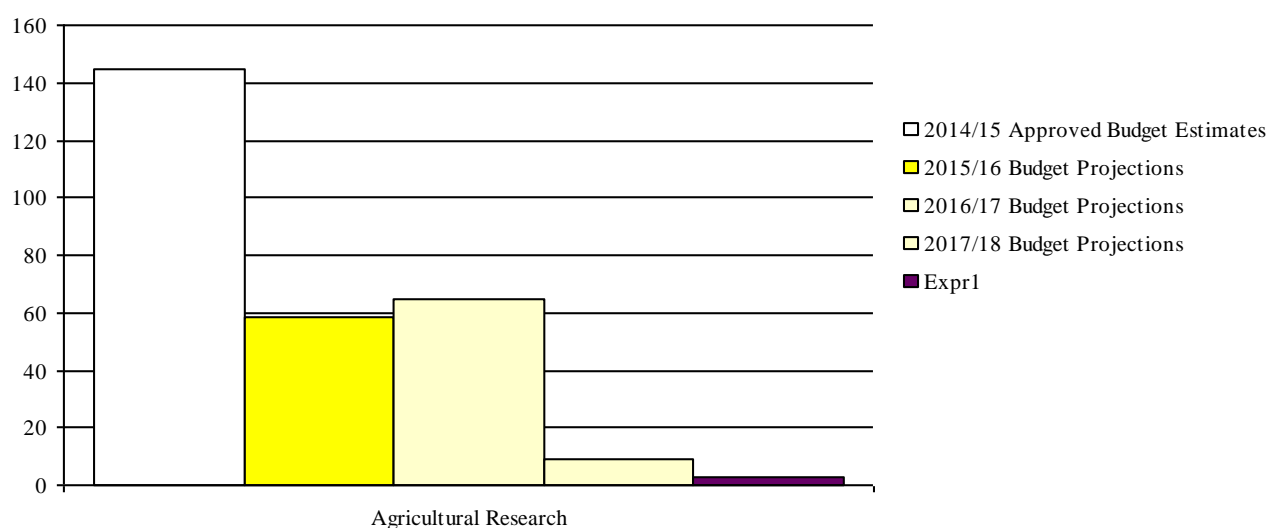
	2013/14 Outturn	2014/15		MTEF Budget Projections		
		Approved Budget	Spent by End Sept	2015/16	2016/17	2017/18
<i>(i) Excluding Arrears, Taxes</i>						
Recurrent						
Wage	0.000	18.972	4.743	18.972	22.586	0.000
Non Wage	27.615	8.765	2.191	8.765	8.675	8.676
Development						
GoU	4.598	9.130	2.283	9.130	10.957	0.240
Ext.Fin	0.000	110.667	19.512	21.495	22.289	0.000
<b>GoU Total</b>	<b>32.213</b>	<b>36.868</b>	<b>9.217</b>	<b>36.868</b>	<b>42.218</b>	<b>8.916</b>
<b>Total GoU+Donor (MTEF)</b>	<b>32.213</b>	<b>147.535</b>	<b>28.728</b>	<b>58.362</b>	<b>64.508</b>	<b>8.916</b>
<i>(ii) Arrears and Taxes</i>						
Arrears	0.000	0.000	0.000	0.000	N/A	N/A
Taxes**	0.000	2.848	0.000	0.000	N/A	N/A
<b>Total Budget</b>	<b>32.213</b>	<b>150.383</b>	<b>28.728</b>	<b>58.362</b>	<b>N/A</b>	<b>N/A</b>
<i>(iii) Non Tax Revenue</i>						
	0.000	7.089	0.360	4.270	3.670	3.670
<b>Grand Total</b>	<b>32.213</b>	<b>157.472</b>	<b>29.089</b>	<b>62.632</b>	<b>N/A</b>	<b>N/A</b>
Excluding Taxes, Arrears	32.213	154.624	29.089	62.632	68.178	12.586

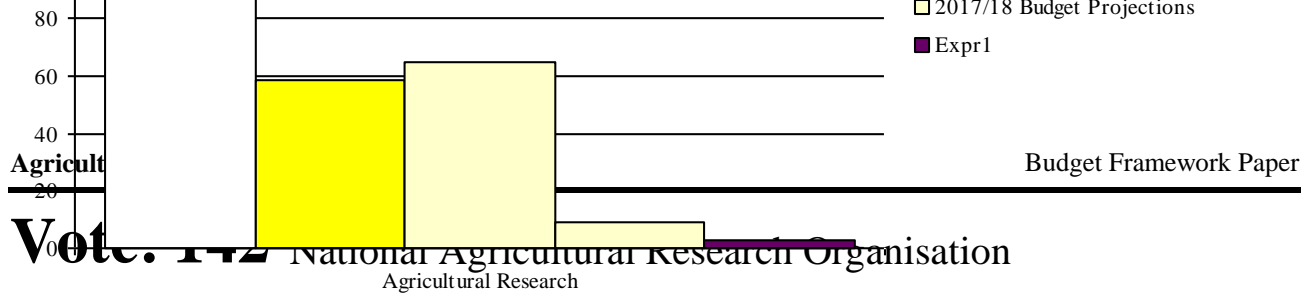
\* Donor expenditure data unavailable

\*\* Non VAT taxes on capital expenditure

The chart below shows total funding allocations to the Vote by Vote Function over the medium term:

**Chart V1.1: Medium Term Budget Projections by Vote Function (UShs Bn, Excluding Taxes, Arrears)**





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### (ii) Vote Mission Statement

The Vote's Mission Statement is:

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

### (iii) Vote Outputs which Contribute to Priority Sector Outcomes

The table below sets out the vote functions and outputs delivered by the vote which the sector considers as contributing most to priority sector outcomes.

**Table V1.2: Sector Outcomes, Vote Functions and Key Outputs**

Sector Outcome 1:	Sector Outcome 2:	Sector Outcome 3:
<i>Agricultural Production and Productivity</i>	<i>Improved markets and increase in value addition</i>	<i>Improvement in the enabling environment &amp; Institutional strengthening</i>
<b>Vote Function: 01 51 Agricultural Research</b>		
<i>Outputs Contributing to Outcome 1:</i>	<i>Outputs Contributing to Outcome 2:</i>	<i>Outputs Contributing to Outcome 3:</i>
<i>Outputs Provided</i>	None	None
015101 Generation of agricultural technologies		
015102 Research extension interface promoted and strengthened		
015105 Generation of technologies for priority commodities		

## V2: Past Vote Performance and Medium Term Plans

*This section describes past and future vote performance, in terms of key vote outputs and plans to address sector policy implementation issues.*

### (i) Past and Future Planned Vote Outputs

#### 2013/14 Performance

1. - Crop varieties released: 7 bean varieties released: NABE 17, 18, 19, 20, 21, 22 & NABE 23; 2 – Bananas (M19 and M20), 11 – Maize, 4 rice
2. - Crop varieties submitted for release: 4 - Climbing beans (1) F4: 834ML-14/4 (dark red mottled), (2) F4:834ML-2/3 (Pinkish), (3) F5:8 90ML-2/1/3a, (Light red mottled) and (4) F6:8 90 ML-5/13 (Red); 1- cassava, 7- rice upland, 5 - rice paddy, 3 - wheat
3. - Used MAS to select resistant bean plants to anthracnose, angular leaf spot and phythium root rot diseases for introgression into climbing bean variety NABE 12C to generate 2nd backcross hybrid.
4. - Determined bean genotypes BRB 194, MORE 88002, NUA 99, NUA69, RWR 2154, and RWR 2245 most resistant to angular leaf spot, common bacterial blight and flower leaf spot across many locations in order to promote nutrient dense bean lines.
5. - Identified 100 prioritised core research projects to be undertaken in the PARIs once they have passed ESMF screening and/or those with fully developed mitigation measures.
6. - Developed a proposal for eradication of Banana Bacterial Wilt (BBW) in Uganda. A task force has been put in place, and PARIs within the Lake Victoria Crescent Agro-ecological zones have been encouraged to integrate research on BBW in their work plans.
7. - Conducted a one – month banana bacterial wilt control campaign in 13 districts
8. - National launch of the banana bacterial wilt control in Uganda was launched in Mbarara. BBW Management committees (platforms) were established in all the 8 hotspots in the 4 districts of the Kigezi region
9. - Planted 121 demonstration plots of M9, FHIA 17 and M2 in Eastern Uganda (Iganga, Bugiri, Kamuli, Sironko, Mayuge and Mbale)
10. - Supported the 13 on-going Competitive Grant Scheme studies which are due for completion. New

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CGS call profiles have been developed and are to be advertised. Forty new studies are expected to be implemented.

11. - Under Soil and Land LM trial on optimising fertiliser application recommendations on maize and rice in Kasese and Nakasongola was established during 2012B.
12. - Developed a decision support tool for Integrated soil fertility management
13. - Contributed to 11 regional projects as by-ins to previous and some on-going studies. These include 1 (soil management options)-ASARECA; 1 (Fertiliser optimiser decision support tool)-AGRA, 1 (Crop/livestock integration for sustainable management of natural resources)-ASARECA; and 8 (EAAPP: cassava, rice, wheat and dairy regional projects).
14. - Climate change adaptation innovations mapped, i.e. in agriculture: water harvesting, small scale irrigation, use of organic pesticides. And in the energy sector - use of wind, solar energy, & biological waste to generate energy, e.g. biogas
15. - One 2000-m<sup>3</sup> earthen pond prepared for happa fry nursing and brood stock holding.
16. - Established breeding levels in Lake Edward. Fishes in the river-mouth habitat showed the highest level of breeding.
17. - Three reconnaissance surveys were conducted in the inshore waters of the Ugandan part of Lake Victoria.
18. - 147 fish breeding nursery areas of Lake Victoria were identified, characterized and mapped targeting protection of Nile perch, Tilapia and Mukene
19. - Established pollution levels and their impacts on the environment and aquatic biota in the northern part of Lake Victoria. Eutrophication results in algal blooms and proliferation of water hyacinth were generated.
20. - Established status of the hydrology and hydrometeorology; physico-chemical parameters and lake productivity processes; composition, diversity and relative abundance of fishes, fishery and fishery yield, biological and ecological characteristics of fishes; livelihoods and adaptation strategies for the Lakes Wamala and Kawi.
21. - Geo-referenced map and database on trends and impacts (profitability and constraints) if fish farming to livelihoods in Central Uganda were generated for 90% (820 fish farmers). The output allows fish farmers and government to enhance profitability while intervention is moved to other regions.
22. - Three water reservoirs (constructed for cattle use) were identified as suitable for stocking with fish and more reservoirs to be identified will be forwarded to MAAIF for implementation (fish stocking of commercial dams) in Isingiro, Sembabule and Nile Districts.
23. - The Central and Eastern parts of Lake Victoria were surveyed to identify suitable cage culture sites out of which, 17 bays were investigated, from which, 10 sites were physico-chemically characterized, with six found suitable for cage culture and Low Volume High Density (2x2x2 to 5x5x2.5m) cage operations, and four (>5x5x5m cages) for bigger operations which can be started following permit (i.e NEMA, DFR, DWD) applications
24. - Lake Victoria: An increase in fishing factors (boats, fishers, gears) from 2010 to 2012 and influx of under-size nets and hoots (380% increase) requires much more vigilance by enforcement agencies through curbing of illegal fishing practices that may require seasonal closures. Similar patterns were observed from the studies on Lake George, Edward and Kazinga Channel as well as Lake Albert and Albert Nile. All these output results have been packaged as draft reports for peer review and presentation to wider audiences.
25. - Natural feed (insects and plankton) availability in Lakes Edward and George were determined as adequate to sustain the suppressed fish populations in those lakes while ingredients for feed formulations were identified in three zones (Central, Eastern and Northern Uganda).
26. - 55 potential fish breeding and nursery areas on Lakes Edward-George system were identified, characterized and mapped for targeting their gazettement
27. - Two candidate ornamental fish species from Lake Victoria were identified for development into cultured species
28. - Completed on-station induced spawning of *Barbus altianalis* (Kisinga) with 203 larvae

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29. - Characterized fish disease pathogens from 12 fish farms and two hatcheries
30. - 120 brood fish of Nile tilapia were acclimatised on-station as parent stock
31. - A draft policy brief on heavy metals (Lead, Zinc, Copper, Iron, Manganese and Nickel) in Lake Victoria was started based on findings in sediments and bottom waters of the lake.
32. - Two Geo-referenced maps were prepared showing aquatic weed sports in the Western and Central zones of Lake Kyoga, and the north-western part of Lake Kyoga
33. - Estimates of annual profits, break even points and payback periods for investments in Tilapia, Nile perch and muziri/ragoge fisheries enterprises on Lake Albert generated by March 2013
34. - Key market destinations, demand, prices and drivers for Nile perch, tilapia and ragoge/muziri from Lake Albert assessed by June, 2013
35. - Baseline information on fishers' livelihoods around Lake Edward-George established
36. - Farmers trained on commercialization of orphan crop commodities and farming
37. - Market linkages between traders' and farmers' groups facilitated through consultations and meetings
38. - Adoption surveys for the minor crops promoted
39. - Produced a distribution map on the genetic diversity of Shea tree butter trees.
40. - 167 superior plus Shea butter trees for use in improvement programmes identified in West Nile, Teso and northern agro-ecological zones.
41. - One progeny trial of *Faidherbia albida* to assess parent offspring relationship established on-station (Kifu – Mukono).
42. - Three trees of *M. Volkensii*, 2 trees of *G. Robusta*, 2 trees of *M. Lutea* selected and marked as superior phenotypes in West Nile AEZ.
43. - Two harvesting methods (Debarking and root extraction) for indigenous medicinal trees assessed: Debarking and root extraction for medicinal products threatens the sustainability of indigenous tree species, Alternate debarking recommended over ring barking to enhance sustainable harvesting.
44. - Survival rate of *Pinus caribea* and *P. caribea caribaea* from *Cinara cronortii* established at Mabuye and Mpoma (Kifu) studies were 83% and 92% respectively indicating that *P. caribea* is more robust to dry conditions.
45. - Assessment of the trials at Mabuye and Mpoma in Kifu showed absence of attack from *C. cronortii* indicating that very early stages of *Pinus* spp are not preferred by *C. Cronortii*. Assessments in Kiriima and Mafuga forest reserves showed average damage levels of *C. Cronortii* as 15%, and 12% respectively. Assessments also showed *C. cronortii* population as highest in Lower (50.5%), followed by Middle (28.5%) and 21% upper section of crown implying that the pest is a shade loving pest.
46. - Have identified an exotic parasitoid *schlereides neseri* for management of the Eucalyptus gall wasp (*L.invasa*) and in collaboration with Forest Invasive Species Network for Africa (FISNA) intend to import and release it against the pest.
47. - Produced 30,000 seedlings of *Measopsis*, 10,000 seedlings kg of *E. grandis* and 10,000 seedlings of *Albizia chinensis* for trial establishment and rehabilitation of degraded areas of Kifu forest.
48. - Established 3 trial plots of *Measopsis*, *Eucalyptus grandis* and *A. chinensis* in Sironko. Maintained and assessed 8 trials in Kifu and 3 trials in Kyembogo. Results of 1 year show no significant differences in height between spacing regimes.
49. - Database of 1826 plants for health, nutrition and incomes developed.
50. - Above ground carbon and below ground carbon for 2 farming systems established: 9503 t/ha found in Masaka (Banana coffee farming system), while below ground carbon (BGC) for Kamuli was 6920t/ha) Kamuli (Cotton-millet farming system) (AGC = 91t/ha Soil Carbon was 3500t/ha), 2 more trials were established in the Kamuli and Masaka experimental sites.
51. - A report on forest products extraction and the forest law in Namatale CFR developed
52. - Six policies affecting dairy, indigenous chicken and vegetable value chains ( the feeds policy, delivery of Veterinary Services, Animal Breeding Policy, Control of Agro-chemicals Statute, National Veterinary Drug Policy and Dairy Industry Act and Animal welfare) were identified and analyzed. They were reviewed

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with stakeholders. Constraints limiting policy implementation and recommendations for amendments documented.

53. - Strains of *Theileria parva* circulating in the different agro-ecological zones in Uganda have been characterised. This is useful information in improving the ECF (Muguga cocktail) vaccine for prevention and protection of cattle against East Coast fever disease in Uganda. It has also helped us to understand the role of buffalos in the maintenance of *Theileria parva* and control of East Coast fever.
54. - A parasite pathogen bank for *Theileria parva* has been established at NaLIRRI. It now easy to conduct immunology and molecular of study on the organism for development of either vaccine or drugs.
55. - The genetic structure *G. f. fuscipes* in the Lake Victoria basin has been established. Since this is one of the most important tsetse flies in the country, it has made it easy to develop intervention strategies for control of tsetse flies in tsetse infested areas in Uganda.
56. - The distribution maps for tsetse species and trypanosomiasis outbreaks in Uganda have been updated. This has helped in determining the selection of priority study areas in the country.
57. - Causes of calf and kid mortality in the agro-pastoral farming system, as perceived by the farmers, have been established. This has provided useful information in determining the diseases and conditions to investigate in the immediate future.
58. - The worm burden in kids in both the wet (13% strongyloides and 3.5% tapeworms) and dry (36% strongyloides and 14.5%) seasons in one of the districts in Uganda has been determined. Also established is the nutritional content of up to 25 pastures and shrubs on which goats feed. Additionally, the relationship between dry and wet season feeding and worm burden has been established. It has made it easy to develop feeding and worm control strategies that farmers can use to reduce the worm burden during each season of the year.
59. - Humoral immunity titres of poultry sera against influenza A viruses has been determined for the West (8.8%) and East (3.7%) parts of the country. We have now confirmed that influenza A viruses occur in different regions of Uganda, although at different levels of prevalence. It is now easy to develop measures to prevent further occurrence or transmission away from wetlands.
60. - Twenty two (22) Napier grass clones tolerant to Napier stunt disease were obtained from Kenya Agricultural Research Institute and screened for tolerance to Napier stunt disease at NaCRRRI. Four tolerant Napier grass clones have been identified and are being multiplied for further distribution to farmers.
61. - Farmers' awareness on Napier stunt disease control methods has increased- This has led to a decline in disease incidence from 60% to 20%.
62. - A nutrient Feed Block was developed using farm waste and agro-industrial by-products. The cost of the block is lower (UGX 2,000) than imported mineral blocks (UGX 3,500). The Protein content of the Nutrient feed block is 16% and Metabolizable energy is 11MJ.
63. - The potential of Ugandan Calcium bentonite in animal nutrition was evaluated. Bentonite supplemented cows gave more (10 litres/cow/day) milk than animals supplemented with commercial concentrates (8 litres/cow/day).The aflatoxin and mycotoxin absorbing properties of bentonite also help in reducing the negative impacts of aflatoxin on feed utilization, growth and milk yield of animals. This ration based on maize stover-calcium bentonite has a potential to increase milk yield increased by 20%
64. - *Brachiaria mulato* promoted on 25 farms as an alternative feed resource
65. - A case study "Climate change technologies for improved livelihoods of smallholder crop-livestock farmers in Eastern and Central Africa region", an output from the project activities is one of the top case studies selected for the "Finals of the 2012-2013 All Africa-Wide Women in Science Competition which will take place in Ghana, 15th to 20th July 2013.
66. - Over 200 household cattle herds have been screened and 400 cows and heifers with superior dairy traits selected from these herds for genetic improvement through crossbreeding. The selected animals will now kick-start the synchronisation and artificial insemination (AI) using semen from proven Ayrshire and Jersey bulls by NAGRC collaborating partner organization.
67. - On-station herd of Small East African Zebu cattle established at NaLIRRI with an initial stock of 10

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cows and 6 calves under EAAPP. Infrastructure for holding the animals, pastures, paddocks and water and health management systems are being put in place. An exotic herd of 5 Ayrshire heifers for NaLIRRI is held at NAGRC pending completion of infrastructural placements to handles them. The animals will be synchronized and artificially inseminated to produce crossbred offspring for dairy production.

68. - On-station experimental unit has established at NaLIRRI. Procurements of experimental goats in progress from NAGRC for studies on meat characteristics of indigenous goats and their Boer crossbreds.
69. - Genomic selection studies have been initiated for goats with the establishment of 12 goat experimental sites in Katakwi and Mpigi. Phenotypic, performance and pedigree data collection is on-going and will be used to select superior goats using younger animals for faster genetic gain using genomic selection tools.
70. - Genomic selection studies continued for chickens at 11 experimental sites with more data on phenotypic, performance and pedigree information being collected for genomic selection in younger animals.
71. - A tool for characterization of guinea fowls and turkeys has been developed in a participatory manner by involving district extension staff and farmers through a discussion workshop and pre-testing process. The tool which includes questionnaires and sampling protocol are now ready for use in both phenotypic and blood sampling surveys.
72. - Stakeholders have been sensitized and study sites identified in the districts of Pallisa, Mukono, Masaka and Kiboga as initial phase for characterizing pig breeds and their management system.
73. - Selective breeding of honeybees for increased production of honey and other bee products
74. - Honeybee colonies have been set at Bulindi ZARDI and NaLIRRI demonstration apiaries to start with bee breeding experiments. This project intends to come up with bee strains resistant to Varroa and small hive beetles.
75. - Molecular characterisation of honeybee races and evaluation of their productivity in Uganda
76. - A total of 200 samples of honeybees for characterisation of Ugandan honeybees have been collected and preserved awaiting analysis. This project will identify bee species that are productive and easy to manage.
77. - Molecular identification and characterisation of honeybee diseases in Uganda
78. - Samples of bees for disease identification have been collected and preserve awaiting analysis
79. - On-station evaluation of the model biogas cooking stove appliance completed and on-farm evaluation in progress (Farmer selection done in Jinja and Iganga districts).
80. - One open-sun drying technology for local rice varieties developed and established on-farm and farmer selection done in Hoima district.
81. - One model stove prototype for utilisation of rice husks fabricated and being tested on-station; Farmers for on-farm evaluation selected.
82. - One fireless cooker prototype under fabrication. Farmers for on-farm testing selected in Masaka and Hoima districts.
83. - 9 mouldboards for walking tractor ploughs have been fabricated and under field performance evaluation by farmers in Nankoma, Bugiri district.
84. - 1st prototypes of planter and weeder tested on-farm in Mairerwe, Hoima district. Both planter and weeder undergoing modifications for further evaluation
85. - Surface irrigation: Assessment of research needs and works on restoration of Mobuku, Agoro and Doho irrigation schemes
86. - One prototype of efficient animal-drawn planter for selected small and large grain seeded crops developed
87. - On-farm evaluation is in progress of a prototype of stainless steel hopper and cutting surfaces for grating and chipping cassava
88. - Three water storage tanks (Lined with HDPE) Constructed in Masaka district for vegetable production.
89. - Finalizing fabrication of a pond aerator prototype (diffuser type).

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1. - Priority setting conducted at Rwebitaba ZARDI with stakeholders and key areas for research intervention identified.
2. - Reviewed and updated NARO priority setting guidelines for demand articulation, and the draft document is ready for submission to NARO Council.
3. - Established MSIPs during the reporting period: 2 in Rwebitaba ZARDI (1-cassava 1-banana), 1 Buginyanya ZARDI (coffee), and 1 on livestock control in Mbarara ZARDI. Maize in Kapchorwa, Beans in Wakiso, rice in Ngetta, Coffee in Buginyanya, , Rice and 1 platform in Soroti (cassava). A rice market chain actors from the districts of Luwero, Kayunga and Kiboga is being established
4. - Conducted 3 MSIPs capacity strengthening workshops for NARO and NAADS staff at the zonal level
5. - 100 ha of cassava and 60 ha rice multiplication sites established at NaCRRI and all ZARDIs
6. - Established 5.7 ha of breeder seeds for three rice commercial varieties: NERICA 1, NERICA 4 and NERICA 10.
7. - Distributed to seed companies and farmer groups 4,825 and 3,500 kg of foundation bean seed, respectively.
8. - Promoting improved technologies were promoted Mukono ZARDI delivered 553 Bags for 79 Acres of NASE 14 in 7 districts ,Abi Zardi : re-distributed 965 bags of NASE 14 for planting, 600 bags of NASE 14 redistributed in Ngetta zardi; 15 acre multiplication site established in Kidetok Serere District; Ngetta: 3,048 bags (509 acres); Bulindi:900 bags (150 acres); Mukono: 553 bags (79 acres); Abi ZARDIi: 60 bags(15 acres)
9. - A total of 86 farmer groups trained in bean seed production.
10. - Distributed 2,323 kg of foundation bean seed (NABE 4, 12C, 15, 16 and K 132) to farmers in Kabale, Kisoro, Kamwenge, Mpigi, Wakiso, Rakai and Bushenyi.
11. - Distributed 2 mt of rice seed to zonal institutes for multiplication
12. - 15-cassava based cottage businesses mapped in Soroti & Masindi districts
13. - Capacity to promote GMP of over 80 extension staff built
14. - Capacity of over 65 artisans to comply to good practices to fabricate cassava processing equipment and hermetic metallic silos built
15. - Presented cassava-based starch for industrial testing by East African Packaging industries; and Uganda Pulp & paper Industry
16. - Protocepts of glucose syrups from cassava were developed and presented to partners. The quality meets up to 60% the required standard.
17. - 9-food formulations for different products developed. Cassava starch of high purity and potential for various uses developed (comparable and in some cases better than cereal starch in some attributes). Riham & Variety Plus Ltd has evaluated a few protocepts.
18. - Production of foundation bean seed by partners was undertaken and cleaning of harvets is ongoing. Certified and Quality declared seed production was undertaken CEDO and Farmer associations respectively.
19. - 86 bags of Naspot 8 (Clean/Improved planting materials) multiplied and availed to uptake pathways;
20. - On-farm trials 75 conducted various ZARDIs across the country
21. - Technology demonstrations held on station and technology parks - 30 demons held by the PARIs;
22. - Capacity of Farmers and Farmer Groups to make choices and implement decisions that affect their livelihoods enhanced-2500 in different commodities;
23. - Dissemination and training workshops held for subject matter specialists and other service providers - 20 different workshops;
24. - Twenty four radio talk shows were conducted.
25. - Scientific, extension, dissemination and farming manuals materials were developed and some published. These include
  - a. Training material on CBSD, CMD and whiteflies developed
  - b. 10 maps showing prevalence of CBSD and CMD, generated

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- c. One fact sheet on CBSD spread in Uganda produced and shared with stakeholders nationally and Regionally
- d. Draft guidelines for groundnuts production were developed.
- e. Draft guidelines for cowpea and sorghum production were developed.
- f. Two training manuals for the use of forage sorghum for livestock feeding developed.
- g. Integrated Pest Management (Fruit fly management): About 1200 brochures produced on the ecology of mango fruit flies and distributed to stakeholders. Posters produced and shared with stakeholders
- h. Published information on situation analysis of agro-chemical use in Central Region
- i. Draft review script on agro-chemical use in Uganda
- j. Draft training manual for dairy farmers in Uganda
- k. 2 Information materials developed on 'Use of metal silo' and translated in Lunyoro and Langi
- l. Draft guidelines groundnuts production & marketing developed
- m. Sample brochures and leaflets on CBSD management produced and await printing and distribution
- n. A recipe book for available bean based products and a post-harvest management guide is being developed
- o. Developed the rice communication strategy
- p. Cassava curriculum developed participatory with farmers in the EAEZ
- q. Rice curriculum developed participatory with farmers in the EAEZ
- r. Manual on Passion fruit Production: Complementary Notes for Extension Workers was repackaged
- s. Draft paper produced on options for AfrGM management practices

#### *Preliminary 2014/15 Performance*

#### July-september 2013 Achievements and progress

a) No of Varieties submitted to the Variety release committee/No of Prototypes which include 3-wheat,7-maize (4 highland, 3 lowland), 4-rice(irrigation), 3 prototypes

b) No of production technologies generated in Crops-7 final, 47 interim, Fish-11 final, Forestry-6 final, Livestock -3 final

1)Survey for insect pests in oil palm growing areas was conducted. Preliminary findings in Buvuma and Iganga suggest that mealy bugs, scales and birds were the major pests in in the two areas. Further assessment underway

2)Raised 20,500 seedlings each of M. eminii, E. grandis and M. volkensii

3)10,000sqm of land identified and cleared for trial establishment; 20 soil samples collected and being analyzed; germplasm for 5 indigenous tree species collected and being raised in the nursery

4)Propagation protocol for tree crop interaction (for five indigenous fodder species) trial developed

5)Four indigenous tree species (Piliostigma thorningii, Bridelia micrantha, Erythrina abyssinica and Vitex doniana) characterised for medicinal and firewood uses.

6)2 energy technologies assessed: the three-stone stove mostly used (82%) with energy consumption of 69MJ/cap; Lorena stove was the least used (4%) at 35MJ/cap

7)1863 plants identified and botanical data collated for use in selection for domestication

8)Leafy biomass harvesting for Warburgia ugandensis under farm conditions documented

9)50 F4 cotton progenies planted in replicated trials on-station.

10)10 promising cotton lines in DUS trials planted in Ngetta, NaSARRI and NaCRRRI

11)14 early maturing elite lines from IITA were evaluated, highest yield (700 kg/ha) was for IT04K2274), followed by IT07K21011 (617 kg/ha) lines. Three Elite lines performed better the SECOW 2W (check).

11 medium duration elite lines were evaluated. Four of them performed better than the check variety as follows:IT07K29210 (1045 kg/ha) IT07K211118 (1031kg/ha),



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- IT07K30944 (925 kg/ha), IT08K1493 (895 kg/ha) and SECOW2W (772 kg/ha). 11 dual purpose elite lines were evaluated, the check variety out yielded (775 kg/ha) them. Among the elite lines IT06K1472 gave the highest yield (469 kg/ha).
- 12) 11 elite cowpea lines planted at NaSARRI and yield data was collected. Four of elite lines gave yields over 1000 kg/ha and they out yielded Secow-2W (check). Ngoji gave the highest yield (1,319 kg/ha). Planting of 11 elites for second rains 2013 was done
- 13) A total of 54 local cowpea accessions planted out and twenty of them gave yields above 1,000 kg/ha and five of them shown resistance to viral diseases .
- 14) A total of 52 cowpea crosses planted out and data on yield analyzed ten of them gave yields above 1,000 kg/ha and five of them shown resistance cowpea scab disease.
- 15) Twelve lines planted out and yield data analyzed. The yield was severely affected by the drought experienced. Mauritius gave the highest yield (718 kg/ha), followed by VC6173B-10 (648 kg/ha) and then VC61137B-14 (625 kg/ha). They out yielded the local variety (463 kg/ha).
- 16) Evaluation completed and 45 cowpea lines resistant to blast and 13 lines with tolerance to drought identified.
- 17) Selected 40 advanced cowpea lines for further screening;
- 18) Selected 5 lines drought tolerance for further analysis
- 19) 20 sunflower lines selected for further screening
- 20) Four cowpea lines B312, ACC11, ACC12, ACC26, were found to be resistant. Among the released varieties SECOW 2W and 3B showed moderate resistance. 5T, NC and 3B23 were tolerant. 1T4W, SS and ACC23 were susceptible.
- 21) 10 promising NaSARRI selections and 6 BC3 drought and Striga resistant sorghum lines were replanted in Bukedea, Kumi and Serere trial sites. results indicate that 2 NaSARRI selections had low Striga incidence while 2 BC3 lines from Sudan were early maturing and high yielding. Data on plant establishment and shoot fly incidence has been collected.
- 22) 20 BC2S2 crosses were advanced to BC3S3 generation, 12 BC6 lines were advanced to BC7 generations for bulking and evaluation
- 23) Pest field screening experiments in four locations of 16 sorghum advanced lines resulted in the identification of four lines resistant to shoot fly attack .54 lead farmers and 10 Agric extension staff trained on sorghum pest management in the three districts.
- 24) 16 elite forage sorghum lines planted for evaluation in 4 different locations for the first rain season 2013. Agronomic data collected on pest and disease responses. 5 lines identified promising.
- 25) 40 forage sorghum accessions assembled and characterized. 16 elite forage sorghum lines planted for evaluation in 4 locations first rain season 2013. Agronomic data collected on pest and disease responses. 30 introduced forage lines planted for further advancement.
- 26) 4 sweet sorghum varieties were planted 10 demonstration sites in 3 Sub-counties of Kayunga, Baale and Busaana to introduce NaSARRI released sorghum varieties to the farming communities. Data collection and harvesting has been done and two have been identified promising M.O.U signed between NaSARRI and Bio Green investments Kayunga. 400 farmers selected to start producing sweet sorghum for bio- ethanol production. Chinese company given permission by Govt. to start construction of the factory.
- 27) 14 sweet sorghum lines were planted for screening against resistance to major insect pest and diseases and stem sugar composition at NaSARRI, Kayunga and Ikulwe. Data collection and harvesting has been done. 10 identified promising
- 28) 10 Agriculture Extension staff and 47 lead farmers trained on pest and disease management and quality sweet sorghum seed production in Kayunga district.
- 29) 10 promising BC5 populations were bulked to advance to BC6 population Three additional parents with high stem sugar content were incorporated into the breeding program to generate new crosses.
- 30) Draft report detailing farmers agricultural need, constraints and opportunities in Bukedi sub zone produced

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### Vote Summary

31) A survey of 40 households in Masindi district was conducted. Preliminary results indicated that; poor hive performance, low hive colonization, inefficient baiting materials, bee abscondment, decline of bee forage floras, short flowering month of bee forage species, poor honey extraction techniques, bee pests and diseases, poisonous plants to bees and limited capacity of farmers in improved apiary management were the factors limiting honey yield production among bee keepers. The survey has revealed that the most important bee forage plant species and major sources of pollen and nectar in Hoima district are; *Calliandra calothyrsus*, *Albizia coriaria*, *Coffea* species and *Grewia millis*. The major bee forage species in Masindi district are; *Vernonia amygdalina*, *Acacia* spp, *Millicia excelsa*, *Albizia coriaria*, *Mangifera indica*, *Sena spectabilis*, *Coffea* spp, *Albizia ziggia*, *Grewia mollis*, *Combretum molle*, *Mangifera indica* and *Combretum collinum*.

32) Data has been collected on severity of aphids, plant aphid infestation, groundnut rosette disease severity following application of botanicals extracts of *Tephrosia vogelli*, Mexican marigold, red pepper, *Nicotiana tabacum* (at rate of 500g of plant paste in 4 litres of water per 209 sqm) on groundnut established in a groundnut rosette disease hotspot. Results of the analysis will follow.

33) Monitored the performance of improved fruit trials/mother gardens in Mbarara, Sembabule and Kiruhura districts. Fruits yields ranged from 5-7 tons/ha for all varieties. Preliminary findings have suggested that fungicide and pesticide application regimes are appropriate for management of major mango, avocado and citrus pests and diseases. The use of systemic fungicide at vegetative, flowering and fruiting stages give promising results towards managing anthracnose and powdery mildew diseases in mangoes and avocados.

34) Dominant agroforestry practices in the zone are being documented. Secondary data indicates that upper storey indigenous woody species scattered in crop fields and along the boundary constitute the prevalent tree-crop management practice in the region. These are mainly for wood production and to a less extent fodder but not soil fertility management in degraded fields.

35) Monitored the survival, pest & disease resistance of agroforestry technologies. Survival: Kayunga 98% of citrus and Mubende 95% for mangoes. Average fruiting in all citrus varieties was 300, and mangoes 76.

36) Preliminary technical report on yield performance for improved potato varieties developed in Rwebitaba ZARDI

c) No. of technological innovation platforms established/supported

1. Multistakeholder innovation platforms established or supported; 43 (3 new, 40 supported)

d) No of technological innovations delivery to uptake pathways

1) Foundation and basic seed provided to farmers, farmer groups and seed companies; (600kgs-cowpeas; 2.31 tons-maize; 17 tons-beans; 9 tons of basic seed potato)

2) Clean/Improved planting materials multiplied and available to uptake pathways; 2735 bags-cassava; 1,000 apple seedlings; 37,000 tree seedlings; 1114-coffee; 2500 fruit seedlings; Pasture seed (400 kg- *Chloris* Guyana; 300 kg -*Clitoria ternatea*; 126 kg -lablab seed, 21,000 splits of *Bricharia* species)

3) On-farm trials conducted; 35 trials

4) Technology demonstrations held on station and technology parks; 20 demonstration established (excluding on-station and show demos)

5) Capacity of Farmers and Farmer Groups to make choices and implement decisions that affect their livelihoods enhanced; Farmers empowered in 12 areas (seed production, IPM, QPM production, forage seed and fodder production, pest and disease management and quality sweet sorghum seed production, good agronomic practices for maize and rice, Fruit nursery operations, value addition; agroprocessing)

6) Dissemination and Training workshops held for subject matter specialists and other service providers; 10 agricultural extension workers

7) Scientific conferences, dissemination workshops and seminars for scientists, extension agents and policy makers conducted; 2 –extension agents; 1-policy dialogue

8) Scientific & extension dissemination materials developed and published; 4 scientific, 10 sets of extension

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materials

9) Design and development of Farming manuals; 0

10) Publicity and News articles developed and published, 2

11) Audio Visuals in English and local languages developed and availed to uptake pathways; 0

12) Radio talk shows conducted; 2

**Table V2.1: Past and 2015/16 Key Vote Outputs\***

<i>Vote, Vote Function Key Output</i>	<b>Approved Budget and Planned outputs</b>	<b>2014/15 Spending and Outputs Achieved by End Sept</b>	<b>2015/16 Proposed Budget and Planned Outputs</b>
<b>Vote: 142 National Agricultural Research Organisation</b>			
<b>Vote Function: 0151 Agricultural Research</b>			
<b>Output: 015101</b>	<b>Generation of agricultural technologies</b>		
<i>Description of Outputs:</i>	<ul style="list-style-type: none"> <li>- Technologies for enhancing production and productivity of crops (new, intermediate), Livestock (new and intermediate), Forestry (new and intermediate) and natural resource management</li> <li>- Cross cutting outputs to include but not limited to the Environment, HIV/AIDS</li> <li>- New varieties of submitted for release</li> <li>- New CGS studies conducted and on-going CGS studies maintained</li> </ul>	<ul style="list-style-type: none"> <li>Technologies for enhancing production and productivity of crops (new, intermediate), Livestock (new and intermediate), Forestry (new and intermediate) and natural resource management</li> <li>Cross cutting outputs to include but not limited to the Environment.</li> <li>New CGS studies conducted and on-going CGS studies maintained.</li> </ul>	<ul style="list-style-type: none"> <li>- Technologies for enhancing production and productivity of crops (new, intermediate), Livestock (new and intermediate), Forestry (new and intermediate) and natural resource management</li> <li>- New varieties of priority commodities submitted for release;</li> <li>- 41 New CGS studies conducted.</li> </ul>
<i>Performance Indicators:</i>			
No. of research studies under competitive grants scheme	65	41	25
No. of new varieties submitted to Variety Release Committee for release	30	0	20
No. of improved productivity technologies generated	90	15	60
<i>Output Cost: US\$ Bn:</i>	12.919	3.305	6.639
<i>Output Cost Excl. Ext Fin. US\$ Bn:</i>	2.546	0.637	2.506
<b>Output: 015102</b>	<b>Research extension interface promoted and strengthened</b>		
<i>Description of Outputs:</i>	<ul style="list-style-type: none"> <li>- Multistakeholder innovation platforms established or supported;</li> <li>- Foundation and basic seed provided to farmers, farmer groups and seed companies;</li> <li>- Clean/Improved planting materials multiplied and availed to uptake pathways;</li> <li>- On-farm trials conducted;</li> <li>- Technology demonstrations held on station and technology parks;</li> <li>- Capacity of Farmers and</li> </ul>	<ul style="list-style-type: none"> <li>None, as re-strategy was ongoing for new extension system in place.</li> </ul>	<ul style="list-style-type: none"> <li>- Multistakeholder innovation platforms established or supported;</li> <li>- Foundation and basic seed provided to farmers, farmer groups and seed companies;</li> <li>- Clean/Improved planting materials multiplied and availed to uptake pathways;</li> <li>- On-farm trials conducted;</li> <li>- Technology demonstrations held on station and technology parks;</li> <li>- Dissemination and Training</li> </ul>

# Vote: 142 National Agricultural Research Organisation

## Vote Summary

<i>Vote, Vote Function Key Output</i>	<b>Approved Budget and Planned outputs</b>	<b>2014/15 Spending and Outputs Achieved by End Sept</b>	<b>2015/16 Proposed Budget and Planned Outputs</b>	
	Farmer Groups to make choices and implement decisions that affect their livelihoods enhanced; - Dissemination and Training workshops held for subject matter specialists and other service providers; - Scientific conferences, dissemination workshops and seminars for scientists, extension agents and policy makers conducted; - Scientific & extension dissemination materials developed and published; - Design and development of Farming manuals; - Publicity and News articles developed and published, - Audio Visuals in English and local languages developed and availed to uptake pathways; - Radio talk shows conducted;		workshops held for subject matter specialists and other service providers; - Scientific conferences, dissemination workshops and seminars for scientists, extension agents and policy makers conducted; - Scientific & extension dissemination materials developed and published; - Design and development of Farming manuals; - Publicity and News articles developed and published, - Audio Visuals in English and local languages developed and availed to uptake pathways; - Radio talk shows conducted; - Farmer field days held.	
<i>Performance Indicators:</i>				
No. of technological innovations delivered to uptake pathways		0	5	
No. of technological innovation platforms established/supported		0	5	
	<i>Output Cost: US\$ Bn:</i>	13.293	<i>US\$ Bn:</i> 1.848	<i>US\$ Bn:</i> 4.433
	<i>Output Cost Excl. Ext Fin. US\$ Bn:</i>	1.536	<i>US\$ Bn:</i> 0.384	<i>US\$ Bn:</i> 1.576
<b>Output:015105</b>	<b>Generation of technologies for priority commodities</b>			
<i>Description of Outputs:</i>	- Technologies for enhancing productivity of Crops (cassava,maize,Rice, Horticultural crops, bananas)(new, intermediate), Livestock (dairy cattle, meats(new and intermediate), and fisheries - New varieties of submitted for release - Foundation and basic seed provided to farmers, farmer groups and seed companies; - Breeder seed provided to seed companies; - Clean/Improved planting materials multiplied and availed to uptake pathways; - On-farm trials conducted; - Technology demonstrations held on station and technology parks;		- Technologies for enhancing productivity of Crops (cassava,maize,Rice, Horticultural crops, bananas)(new, intermediate), Livestock (dairy cattle, meats(new and intermediate), and fisheries - New varieties of submitted for release - Foundation and basic seed provided to farmers, farmer groups and seed companies; - Breeder seed provided to seed companies; - Clean/Improved planting materials multiplied and availed to uptake pathways; - On-farm trials conducted; - Technology demonstrations held on station and technology parks;	

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## Vote Summary

<i>Vote, Vote Function Key Output</i>	<b>Approved Budget and Planned outputs</b>	<b>2014/15 Spending and Outputs Achieved by End Sept</b>	<b>2015/16 Proposed Budget and Planned Outputs</b>
	- Capacity of farmers and farmer groups to make choices and implement decisions that affect their livelihoods enhanced;		- Capacity of farmers and farmer groups to make choices and implement decisions that affect their livelihoods enhanced;
<i>Output Cost: US\$ Bn:</i>	13.868	<i>US\$ Bn:</i> 2.860	<i>US\$ Bn:</i> 3.825
<i>Output Cost Excl. Ext Fin. US\$ Bn:</i>	1.900	<i>US\$ Bn:</i> 0.447	<i>US\$ Bn:</i> 1.600
<b>Vote Function Cost</b>	<b>US\$ Bn: 157.472</b>	<b>US\$ Bn: 28.728</b>	<b>US\$ Bn: 62.632</b>
<i>VF Cost Excl. Ext Fin. US\$ Bn</i>	<i>46.805</i>	<i>US\$ Bn 9.217</i>	<i>US\$ Bn 41.138</i>
<b>Cost of Vote Services:</b>	<b>US\$ Bn: 154.624</b>	<b>US\$ Bn: 28.728</b>	<b>US\$ Bn: 62.632</b>
<i>Vote Cost Excl. Ext Fin. US\$ Bn</i>	<i>46.805</i>	<i>US\$ Bn 9.217</i>	<i>US\$ Bn 41.138</i>

\* Excluding Taxes and Arrears

### 2015/16 Planned Outputs

#### Planned outputs 2014/2015

- a) Varieties submitted to the Variety release committee/No of Prototypes; 30 new
- b) Production technologies generated, 80 new technologies.
- c) Multistakeholder innovation platforms established or supported; 12 new, 15 supported.
- d) Technnological innovations delivery to uptake pthways, 40 new.
  - 1)Foundation and basic seed provided to farmers, farmer groups and seed companies;
  - 2)Clean/Improved planting materials multiplied and availed to uptake pathways;
  - 3)On-farm trials conducted;
  - 4)Technology demonstrations held on station and technology parks;
  - 5)Capacity of Farmers and Farmer Groups to make choices and implement decisions that affect their livelihoods enhanced; Farmers empowered in 12 areas(seed production, IPM, QPM production, forage seed and fodder production, pest and disease management and quality sweet sorghum seed production,good agronomic practices for maize and rice,Fruit nursery operations,value addition; agroprocessing)
  - 6)Dissemination and Training workshops held for subject matter specialists and other service providers; 10 agricultural extension workers
  - 7)Scientific conferences, dissemination workshops and seminars for scientists, extension agents and policy makers conducted; 2 –extension agents; 1-policy dialogue
  - 8)Scientific & extension dissemination materials developed and published;
  - 9)Design and development of Farming manuals;
  - 10)Publicity and News articles developed and published,
  - 11)Audio Visuals in English and local languages developed and availed to uptake pathways;
  - 12)Radio talk shows conducted;

**Table V2.2: Past and Medum Term Key Vote Output Indicators\***

<i>Vote Function Key Output Indicators and Costs:</i>	2014/15		MTEF Projections			
	<b>2013/14 Outturn</b>	<b>Approved Plan</b>	<b>Outturn by End Sept</b>	<b>2015/16</b>	<b>2016/17</b>	<b>2017/18</b>
<b>Vote: 142 National Agricultural Research Organisation</b>						
<b>Vote Function:0151 Agricultural Research</b>						
No. of improved productivity technologies generated		90	15	60	60	
No. of new varieties submitted to Variety Release Committee for release		30	0	20	20	
No. of research studies under competitive grants scheme		65	41	25	25	

# Vote: 142 National Agricultural Research Organisation

## Vote Summary

Vote Function Key Output Indicators and Costs:	2013/14 Outturn	2014/15		MTEF Projections		
		Approved Plan	Outturn by End Sept	2015/16	2016/17	2017/18
No. of technological innovation platforms established/supported			0	5	3	
No. of technological innovations delivered to uptake pathways			0	5	3	
<b>Vote Function Cost (US\$ bn)</b>	<i>N/A</i>	<b>154.624</b>	<b>28.728</b>	<b>62.632</b>	<b>68.178</b>	<b>12.586</b>
<i>VF Cost Excl. Ext Fin.</i>	<i>32.213</i>	<i>43.957</i>	<i>9.217</i>	<i>41.138</i>	<i>N/A</i>	<i>N/A</i>
<b>Cost of Vote Services (US\$ Bn)</b>	<i>N/A</i>	<b>154.624</b>	<b>28.728</b>	<b>62.632</b>	<b>68.178</b>	<b>12.586</b>
<i>Vote Cost Excl. Ext Fin</i>	<i>32.213</i>	<i>43.957</i>	<i>9.217</i>	<i>41.138</i>	<i>N/A</i>	<i>N/A</i>

### Medium Term Plans

To submit for release 100 new varieties, 100 new production technologies/strategies. Initiate the rehabilitation of the Regional Cassava Centre of Excellence at NACRRI in Namulonge (No progress in FY 2012/13). To initiate the construction of Nabuin ZARDI offices and laboratories and rehabilitation of ZARDI offices and laboratories; Training of at least 5 new PhDs and 5 MScs, reviewing of the NAR Act, review and development of research standards and guidelines, initiation of the ISO certification of PARI laboratories. Strengthen research in Food Biosciences, value addition and market linkages. Strengthen the NARO-NAADS linkages.

### (ii) Efficiency of Vote Budget Allocations

- Strengthening the Monitoring and evaluation of research
- Strengthening the internal audit
- Institutionalise Research management information systems,
- Strengthen and Institutionalise financial management systems
- Strengthen and Institutionalise quality assurance management systems

**Table V2.3: Allocations to Key Sector and Service Delivery Outputs over the Medium Term**

Billion Uganda Shillings	(i) Allocation (Shs Bn)				(ii) % Vote Budget			
	2014/15	2015/16	2016/17	2017/18	2014/15	2015/16	2016/17	2017/18
Key Sector	40.1	14.9	24.1		25.9%	25.5%	36.4%	0.0%
Service Delivery	40.1	14.9	24.1		25.9%	23.8%	36.4%	0.0%

NA

**Table V2.4: Key Unit Costs of Services Provided and Services Funded (Shs '000)**

### (iii) Vote Investment Plans

There is a reduced allocation to capital expenditure because a number of works and other capital procurements have been concluded in the current FY, and EAAPP Phase I is coming to a closure. GOU funding is chronically low. In some quarters of the FY, completely no funds are released.

**Table V2.5: Allocations to Capital Investment over the Medium Term**

Billion Uganda Shillings	(i) Allocation (Shs Bn)				(ii) % Vote Budget			
	2014/15	2015/16	2016/17	2017/18	2014/15	2015/16	2016/17	2017/18
Consumption Expenditure (Outputs Provided)	102.1	54.3	42.1		66.0%	86.8%	63.7%	
Grants and Subsidies (Outputs Funded)	9.7	2.0	1.2		6.3%	3.3%	1.8%	
Investment (Capital Purchases)	42.9	6.2	22.8		27.7%	10.0%	34.5%	
<b>Grand Total</b>	<b>154.6</b>	<b>62.6</b>	<b>66.1</b>		<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Procurement and delivery of a Liquid nitrogen Plant by EAAPP for NAGRC&DB, and wheat testing equipment for Buginyanya ZARDI.

**Table V2.6: Major Capital Investments**

Project, Programme	2014/15	2015/16
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## Vote Summary

Vote Function Output <i>US\$ Thousand</i>	Approved Budget, Planned Outputs (Quantity and Location)	Actual Expenditure and Outputs by September (Quantity and Location)	Proposed Budget, Planned Outputs (Quantity and Location)
<b>Project 1139 ATAAS (Grant) EU, WB and DANIDA Funded</b>			
<b>015172 Government Buildings and Administrative Infrastructure</b>	- Building designs developed and submitted for approval - Development and construction of research infrastructure advertised, evaluated and contracts signed	NA.	- Building designs; - Bills of Quantities; - Contractor procured; - Infrastructure at NaCRRRI Namulonge-Wakiso, NAFIRRI - Jinja, Bulindi ZARDI - Hoima, Nabuin ZARDI - Moroto & Ngetta ZARDI - Lira..
<b>Total</b>	<b>13,000,000</b>	<b>0</b>	<b>3,200,000</b>
<i>GoU Development</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>External Financing</i>	<i>13,000,000</i>	<i>0</i>	<i>3,200,000</i>
<b>015176 Purchase of Office and ICT Equipment, including Software</b>	Assortment of Office and ICT equipment purchased for the secretariat and the PARIs	At Kachwenkano ZARDI: Internet and web hosting subscriptions have been met and a total of 36 computers installed with an anti Virus Guard	Assortment of Office and ICT equipment at NARO Secretariat and Public Agricultural Research Institutes (PARIs).
<b>Total</b>	<b>1,000,000</b>	<b>291,206</b>	<b>900,000</b>
<i>GoU Development</i>	<i>100,000</i>	<i>0</i>	<i>0</i>
<i>External Financing</i>	<i>900,000</i>	<i>291,206</i>	<i>900,000</i>
<b>015177 Purchase of Specialised Machinery &amp; Equipment</b>	Assortment of laboratory and field equipment purchased for the PARIs	NA.	Assortment of research laboratory and field equipment at the PARIs.
<b>Total</b>	<b>10,613,626</b>	<b>0</b>	<b>1,690,000</b>
<i>GoU Development</i>	<i>1,660,978</i>	<i>0</i>	<i>0</i>
<i>External Financing</i>	<i>8,952,648</i>	<i>0</i>	<i>1,690,000</i>

### (iv) Vote Actions to improve Priority Sector Outcomes

- Strengthening research coordination
- Strengthening technology promotion, partnerships and collaboration
- Strengthening knowledge, information, communication management, and public relations
- Strengthening the Monitoring and evaluation of research
- Strengthening the internal audit
- Institutionalise Research management information systems,
- Strengthen and Institutionalise financial management systems
- Strengthen and Institutionalise quality assurance management systems

**Table V2.7: Priority Vote Actions to Improve Sector Performance**

2014/15 Planned Actions:	2014/15 Actions by Sept:	2015/16 Planned Actions:	MT Strategy:
<b>Sector Outcome 0:</b>			
Vote Function: 01 51 Agricultural Research			
<i>VF Performance Issue: Infrastructure development</i>			
- Rehabilitation of the CRCOE laboratories, ZARDI offices (Abi, Ngetta, Bulindi).	ZARDI offices completed and to be handed over in Q2. CRoCE rehabilitation is on track.	Completion of works ongoing under ATAAS Project.	Establish and maintain appropriate infrastructure for NARIs and ZARDIs; regularly replace and updating old and obsolete equipment; purchase new equipment for under-

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## Vote Summary

2014/15 Planned Actions:	2014/15 Actions by Sept:	2015/16 Planned Actions:	MT Strategy:
			equipped laboratories; Annual assessment of status and needs for new equipment
<b>Sector Outcome 1: Agricultural Production and Productivity</b>			
Vote Function: 01 51 Agricultural Research			
<i>VF Performance Issue: Low levels of adoption of improved technology</i>			
- NARO and NAADS will continued establishing and supporting multi stakeholder innovation platforms and other approaches. - NARO will continue to empower farmers in making choices. - Implementation of research activities under ATAAS and EAAPP	NARO, through Local Governments Production Departments, is reaching out to the farmers with improved seed technologies. Research activities under ATAAS and EAAPP are ongoing as planned as captured in the relevant sections.	Enhance outreach capacity NARO wide, including establishment and support of Multi Stakeholder Innovation Platforms (MSIPs).	Implement institutional reforms resulting from studies and report findings.
<b>Sector Outcome 3: Improvement in the enabling environment &amp; Institutional strengthening</b>			
Vote Function: 01 51 Agricultural Research			
<i>VF Performance Issue: Human capacity development</i>			
- 30 posts advertised during the period. Interview conducted. Some posts filled.	NARO Council approved positions; advertisement to be run in Q2.	Plan for recruitment of more staff according to HRD plan. Long term training of staff ongoing.	Recruit 263 by 2014, 40% of staff to have doctorates, 55% to have masters and 5% to have bachelors.

## V3 Proposed Budget Allocations for 2015/16 and the Medium Term

This section sets out the proposed vote budget allocations for 2015/16 and the medium term, including major areas of expenditures and any notable changes in allocations.

**Table V3.1: Past Outturns and Medium Term Projections by Vote Function\***

	2013/14 Outturn	2014/15		MTEF Budget Projections		
		Appr. Budget	Spent by End Sept	2015/16	2016/17	2017/18
<b>Vote: 142 National Agricultural Research Organisation</b>						
0151 Agricultural Research	32.213	154.624	28.728	62.632	68.178	12.586
<b>Total for Vote:</b>	<b>32.213</b>	<b>154.624</b>	<b>28.728</b>	<b>62.632</b>	<b>68.178</b>	<b>12.586</b>

### (i) The Total Budget over the Medium Term

Moving forward, the decline in resource allocation is arising from the decline in NARO's major source of financing, External Financing. EAAPP Phase I is closing, whilst ATAAS has suffered due to the restructuring of the Government Extension service.

### (ii) The major expenditure allocations in the Vote for 2015/16

Major allocations have been made under VF 015101 Generation of technology and VF 015105 Generation of technologies for priority commodities, in line with the DSIP & NDP.

### (iii) The major planned changes in resource allocations within the Vote for 2015/16

NARO will focus resources more on generation of technologies and on research-extension interface, to a lesser extent, arising from changes in ATAAS which was a key funding source for this Vote Function output. Capital expenditure shall decline due to the closure of EAAPP Phase I and the fact that most of the works will be completed in the current FY.



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## Vote Summary

**Table V3.2: Key Changes in Vote Resource Allocation**

Changes in Budget Allocations and Outputs from 2014/15 Planned Levels:			Justification for proposed Changes in Expenditure and Outputs
2015/16	2016/17	2017/18	
<i>Vote Function: 0101 Agricultural Research</i>			
<b>Output: 0151 01 Generation of agricultural technologies</b>			
<i>US\$ Bn:</i> -6.403	<i>US\$ Bn:</i> -5.657	<i>US\$ Bn:</i> -12.919	EAAPP funding ceases in January 2015, pending due processes to commence EAAPP Phase II. Consequently, research thrusts in the EAAPP commodities of cassava, rice, dairy and wheat (the first 3 being priority commodities in the DSIP & NDP) will be negatively affected. Going forward, until such a time when EAAPP II, or any other project comes on board, only ATAAS and GOU funding will continue to operationalise the NARO MTP which is aligned to the DSIP & NDP.
The number of technologies (products and protocols) to be generated and studies to be undertaken shall be accordingly reduced to match available resources.	The number of technologies (products and protocols) to be generated and studies to be undertaken shall be accordingly reduced to match available resources.	The number of technologies (products and protocols) to be generated and studies to be undertaken shall be accordingly reduced to match available resources.	
<b>Output: 0151 02 Research extension interface promoted and strengthened</b>			
<i>US\$ Bn:</i> -8.860	<i>US\$ Bn:</i> -11.254	<i>US\$ Bn:</i> -13.293	EAAPP has sub components of strengthening research-extension interface, a key result area in the DSIP & NDP. The closure of EAAPP will definitely affect the performance of the VF output negatively. ATAAS and GOU funding will continue to operationalise planned activities to achieve outputs.
The number of Multi Stakeholder Platforms (MSIPs) and innovations delivered to uptake pathways shall be proportional to funding available.	The number of Multi Stakeholder Platforms (MSIPs) and innovations delivered to uptake pathways shall be proportional to funding available.	The number of Multi Stakeholder Platforms (MSIPs) and innovations delivered to uptake pathways shall be proportional to funding available.	
<b>Output: 0151 04 Agricultural research capacity strengthened</b>			
<i>US\$ Bn:</i> -29.356	<i>US\$ Bn:</i> -43.958	<i>US\$ Bn:</i> -61.958	Under EAAPP and ATAAS are staff on training, as part of the capacity building efforts for the DSIP/NDP. Many of the staff on long term training will have completed their courses. Very few staff will remain on long term training. Many of the consultancies will have been completed. ATAAS and GOU funding will continue to operationalise planned activities to achieve outputs.
<b>Output: 0151 05 Generation of technologies for priority commodities</b>			
<i>US\$ Bn:</i> -10.043	<i>US\$ Bn:</i> 0.892	<i>US\$ Bn:</i> -13.868	NARO will continue giving special attention to existing constraints such as BBW, CWD, MLN, CBSD and AFRGM, etc seed multiplication and improving access to clean planting materials, all key outputs in the DSIP and NDP. ATAAS and GOU funding will continue to operationalise planned activities to achieve outputs.
<b>Output: 0151 51 Payments to International Organisations (CGIAR, ASARECA, WARDA)</b>			
<i>US\$ Bn:</i> -7.637	<i>US\$ Bn:</i> -8.475	<i>US\$ Bn:</i> -9.675	Only contributions to ASARECA and CGIAR will continue, being funded through ATAAS and GoU.
Only membership to the most key/critical institutions will be maintained, to fit within funds available.	Only membership to the most key/critical institutions will be maintained, to fit within funds available.	Only membership to the most key/critical institutions will be maintained, to fit within funds available.	
<b>Output: 0151 72 Government Buildings and Administrative Infrastructure</b>			
<i>US\$ Bn:</i> -21.800	<i>US\$ Bn:</i> -14.100	<i>US\$ Bn:</i> -25.000	Civil construction of offices and laboratories will be completed at
Civil works are reducing	If the proposal for EAAPP		

# Vote: 142 National Agricultural Research Organisation

## Vote Summary

Changes in Budget Allocations and Outputs from 2014/15 Planned Levels:			Justification for proposed Changes in Expenditure and Outputs
2015/16	2016/17	2017/18	
drastically, as the ongoing works are being concluded in the current FY.	Phase II and/or other projects is successful, new civil works shall be brought on board in this FY.		NACRRI, Abi, Ngetta, Bulindi, Nabuin, Buginyanya, Kachwekano ZARDIs. ATAAS and GOU funding will continue to operationalise planned civil works in other PARIs.
<b>Output: 0151 75 Purchase of Motor Vehicles and Other Transport Equipment</b>			
US\$ Bn: -5.392	US\$ Bn: -1.500	US\$ Bn: -5.500	Most vehicles that NARO got permission to procure have been procured in the current FY. In FY2015/16, only one vehicle is currently planned for, for the SLM program at NaRL, Kawanda.
Fewer vehicles for procurement as most have been procured already.	Procurement of new vehicles based on the need to replace dilapidated fleet across all NARO institutes.		
<b>Output: 0151 77 Purchase of Specialised Machinery &amp; Equipment</b>			
US\$ Bn: -8.463	US\$ Bn: -6.153	US\$ Bn: -10.153	EAAPP funding will stop in January 2015. ATAAS and GOU funding will continue to operationalise plan activities to achieve outputs. ATAAS and GOU funding will continue to operationalise planned activities to achieve outputs.
Most equipment was being funded by EAAPP, and has already been procured. A few exceptions ongoing are for Buginyanya ZARDI.	Projected contingent on availability of additional funding from GoU or Development partners.		

## V4: Vote Challenges for 2015/16 and the Medium Term

This section sets out the major challenges the vote faces in 2015/16 and the medium term which the vote has been unable to address in its spending plans.

The challenges for NARO arise from the drastic fall, of about UGX 80B, in External Financing due to the decline in ATAAS funding and closure of EAAPP Phase I. Exacerbating the challenge, is the fact that the counterpart funding of GoU for ATAAS to NARO has never been honoured. In addition, the fact that GoU funding has chronically been low, with the greatest portion of it (about 65%) covering only wages and wage related costs. GoU funding needs to be raised to lessen the dependence of NARO on External Financing which, needless to mention, has a bearing on the alignment of research thrusts to the Government priority areas.

**Table V4.1: Additional Output Funding Requests**

Additional Requirements for Funding and Outputs in 2015/16:	Justification of Requirement for Additional Outputs and Funding
<i>Vote Function: 0101 Agricultural Research</i>	
<b>Output: 0151 01 Generation of agricultural technologies</b>	
US\$ Bn: 21.000 Agricultural research technologies developed under the Competitive Grant Scheme (UGX 15B), which is funding for the entire National Agricultural Research System (NARS) and not only NARO (the UGX 4B). UGX 2B is required specifically for research in the invasive weed species of <i>Salvinia molesta</i> (on water bodies) and <i>Parthenium hystophorus</i> )	The Competitive Grant Scheme provides funds for research within and without NARO, to compete for funding in areas not covered by other funding sources.
<b>Output: 0151 04 Agricultural research capacity strengthened</b>	
US\$ Bn: 19.250 For the additional wage request, UGX 3B is required to recruit the established staff positions, whilst UGX 10B is required for a 30% wage enhancement. The additional UGX 5B is required for wage related costs. The UGX 1.25B is required for long term training of more Scientists in line with the DSIP strategy for capacity building in the sector.	With increased capacity of research including both in infrastructure and human resources, the efficiency and quality of research is expected to increase.
<b>Output: 0151 05 Generation of technologies for priority commodities</b>	

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## Vote Summary

Additional Requirements for Funding and Outputs in 2015/16:	Justification of Requirement for Additional Outputs and Funding
<b>US\$ Bn:</b> 5.000 Technologies (products including new varieties and protocols) for priority commodities.	<i>This output addresses core research activities of NARO, as highlighted in the DSIP &amp; NDP, as well as expanding and strengthening the existing Competitive Grants System for the whole of the National Agricultural Research System (NARS). Under this, strategic, national and zonal specific programmes are to be financed to maintain ongoing research on technology generation as well as to taking on new work (including activities in climate change and sustainable land management). The Competitive Grants System will be expanded to deal with new emerging issues as well as being used as an instrument for institutional streamlining.</i>
<b>Output:</b> 0151 72 Government Buildings and Administrative Infrastructure <b>US\$ Bn:</b> 17.000 Renovation works on NARO Institutes building across the country. Construction of Laboratories across NARO Institutes.	<i>The aforementioned infrastructure is gross dilapidated, and in some cases lacking altogether. This funding will go a long way in enhancing the working environment and living quarters for the NARO Scientists in the different Agro ecological zones.</i>
<b>Output:</b> 0151 77 Purchase of Specialised Machinery & Equipment <b>US\$ Bn:</b> 10.000 For assorted equipment for research including water vessels for NaFIRRI in Jinja and Laboratory apparatus at various institutes of NARO.	<i>These outputs are key for enhancing research in general and fisheries sub sector in particular.</i>

*This section discusses how the vote's plans will address and respond to the cross-cutting policy, issues of gender and equity; HIV/AIDS; and the Environment, and other budgetary issues such as Arrears and NTR..*

### (i) Cross-cutting Policy Issues

#### (i) Gender and Equity

<b>Objective:</b> Ensuring the mainstreaming of gender activities in all agricultural research activities.
<i>Issue of Concern :</i> A gender responsive research agenda and work force.
<i>Proposed Interventions</i>
Capacity building programmes for PARI staff in gender mainstreaming and GDD.
<i>Budget Allocations</i> UGX billion 0.1
<i>Performance Indicators</i> No of NARO staff sensitised and no trained in in gender mainstreaming and GDD.
<b>Objective:</b> To generate technologies which are appropriate, with particular regard to women, youth, the elderly and people with disabilities.
<i>Issue of Concern :</i> Ensuring that technologies generated take care of the interests of the women, youth, the elderly and people with disabilities.
<i>Proposed Interventions</i>
<ol style="list-style-type: none"> <li>1. Participatory technology generation</li> <li>2. Multi stake holder innovation platforms and use of market chain platforms•Capacity of gender mainstreaming needs assesment developed</li> <li>3. Gender Analytical tools in agriculture research developed</li> <li>4. NARO Action Plan document completed and shared among NARO staff and other stakeholders</li> <li>5. operational gender strategy for NARO developed</li> </ol>

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### Vote Summary

6. Operational gender policy in NARO initiated and developed  
 7. An operational participatory M&E mechanism to assess progress and performance of NARO's gender mainstreaming initiated and developed

*Budget Allocations* UGX billion 0.7

*Performance Indicators* Number of stakeholder consultation fora held.

#### (ii) HIV/AIDS

**Objective:** To ensure that HIV/AIDS affected persons in the Vote are catered for.

*Issue of Concern :* The HIV/AIDS affected persons receive the treatment and care they need to remain effective at their jobs.

#### *Proposed Interventions*

Provision of medical insurance to staff.

*Budget Allocations* UGX billion 0.099

*Performance Indicators* Number of staff covered on the medical insurance scheme.

#### (iii) Environment

**Objective:** To conduct research in Sustainable Land Management (SLM).

*Issue of Concern :* To generate technologies (products and protocols) relevant to NRM and sustainable land management (SLM).

#### *Proposed Interventions*

Generation of technologies and research-extension interfacing for SLM.

*Budget Allocations* UGX billion 1.5

*Performance Indicators* Number of studies in SLM; number of products for SLM; number of protocols for SLM.

#### (ii) Payment Arrears

The table below shows all the payment arrears outstanding for the Vote:

Payee	Payment Due Date	Amount (US\$ Bn)
INIBAP	30/06/2014	0.74
<b>Total:</b>		<b>0.743</b>

MoFPED released insufficient funds to NARO, necessitating exclusion of this output during Budget execution.

#### (ii) Non Tax Revenue Collections

The table below shows Non-Tax Revenues that will be collected under the Vote:

Source of NTR	US\$ Bn	2013/15 Actual	2014/15 Budget	2014/15 Actual by Sept	2015/16 Projected
Market /Gate Charges		0.000	0.066		0.070
Miscellaneous receipts/income		0.000	4.913		2.500

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**Vote: 142** National Agricultural Research Organisation

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**Vote Summary**

Rent & rates – produced assets – from other govt. units	0.000	1.008	0.800
Sale of (Produced) Government Properties/Assets	0.000	1.101	0.900
<b>Total:</b>	<b>0.000</b>	<b>7.089</b>	<b>4.270</b>

The funds will be spent on running and maintenance of the activities and properties generating the revenues. Payment of wages for casual labourers running the guest houses and other revenue generating units and activities.