

# Vote:142 National Agricultural Research Organisation

## VI: Vote Overview

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

Table V1.1: Overview of Vote Expenditures

Billion Uganda Shillings	FY2018/19 Outturn	FY2019/20		FY2020/21 Proposed Budget	MTEF Budget Projections			
		Approved Budget	Spent by End Sep		2021/22	2022/23	2023/24	2024/25
Recurrent Wage	22.472	22.472	5.547	22.472	22.472	22.472	22.472	22.472
Non Wage	7.099	19.717	4.119	19.717	23.660	28.392	34.070	40.884
Devt. GoU	29.892	37.473	3.030	37.473	37.473	37.473	37.473	37.473
Ext. Fin.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<b>GoU Total</b>	<b>59.463</b>	<b>79.662</b>	<b>12.697</b>	<b>79.662</b>	<b>83.605</b>	<b>88.337</b>	<b>94.015</b>	<b>100.830</b>
<b>Total GoU+Ext Fin (MTEF)</b>	<b>59.463</b>	<b>79.662</b>	<b>12.697</b>	<b>79.662</b>	<b>83.605</b>	<b>88.337</b>	<b>94.015</b>	<b>100.830</b>
<i>A.I.A Total</i>	4.396	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<b>Grand Total</b>	<b>63.859</b>	<b>79.662</b>	<b>12.697</b>	<b>79.662</b>	<b>83.605</b>	<b>88.337</b>	<b>94.015</b>	<b>100.830</b>

### (ii) Vote Strategic Objective

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

# Vote:142 National Agricultural Research Organisation

## V2: Past Vote Performance and Medium Term Plans

### Performance for Previous Year FY 2018/19

During the financial year 2018/19 NARO generated 70 production technologies against the set target of 70; submitted 23 new varieties/prototypes to the Variety Release Committee versus the annual set target of 20; undertook 16 research studies under the Competitive Grants Scheme (CGS) against a target of 40; established/supported 22 technological innovation platforms against a target of 10 and delivered 77 technological innovations to uptake pathways against a target of 40. The successful attainment of the set targets and beyond was enabled by the off-budget funding.

Maize Commodity; Two (2) advanced maize lines are ready for advancement to the National Performance Trials (NPTs) prior to submission for consideration for release. In addition, a number of Maize cultivars adaptable to Eastern Uganda were identified. A variety known as Bazooka was found to yield 6.2 t/ha compared to Longe 10H which yielded 5.3 t/ha.

Beans research; two (2) drought tolerant, nutritionally enhanced with multiple pathogen resistance varieties (NAROBAN 6 and NAROBAN 7) were released targeting infants and pregnant women. A total of 6.8 MT of foundation seed (including NAROBAN 4C and 5C) was released and distributed to 14 farmer groups in South Western Uganda.

Rice research, NARO developed and submitted 2 high yielding and aromatic candidate varieties (E-20 and Met-16) to the National Variety Release Committee (NVRC). In addition, 6 lines were under performance trials to test for Distinctiveness, Uniformity, and Stability (DUS).

Bananas; One (1) banana variety - NAROBAN5 (nabio808/M31) was generated. Through application of a specific manure rate and maintenance of specific plant population, a 50% increase in yield of bananas was registered.

Cassava; One (1) management practice for cassava, dubbed the Mandi Plus seed treatment technology for enhanced germination and vigour was identified, developed

### Performance as of BFP FY 2019/20 (Performance as of BFP)

Towards release of varieties, NARO has submitted seven rice candidate varieties to the Variety Release Committee. Three (3) Candidate varieties of sorghum were selected for to National Performance Trials(NPT). Similarly four tomato lines (mt56, pruna, vega, and Avto1315) have been advanced to NPT. A total of 8,500 kgs of bean foundation seed, three (3) technologies (Pure Mubende goat genotype, NAROBAN 3, and Maksoy 3N soya bean) were multiplied and delivered to uptake pathways.

Eleven commodity platforms - 5 cassava platforms (Nakasongola, Kigumba, Dokolo, Serere, Abi); 4 bean platforms (Lwengo, Mubende, Rakai, Mityana); 1 Horticulture platform; 1 SOSPA-Soroti Sweet potato platform; have been supported to enhance increased production and value addition,

Fall Army Worm (FAW) control in maize, thirteen (13) pesticides have been recommended for use by farmers. These include; Amdocs, Rocket, Agro-cypro, Supa Profenofos, Hitcell, Profecron, Socket Plus, Cypical, Striker, Engos, Chlobenzo, Prove, and Dynamo. To control cassava white fly one (1) pesticide has been recommended. NARO has promoted and upscaled Aquaponics on four farms; and has promoted Cassava mechanization in Kigumba and Serere.

Four advanced tomato lines (mt56, pruna, vega, and Avto1315) advanced to National Performance Trials(NPT).

Towards the development of anti-tick vaccines, training and capacity building of staff were undertaken. This specifically focused on using oral anti-tick vaccine as compared to the injectable, its administration follow-up requirements, data to be collected and the vaccine's efficacy.

### FY 2020/21 Planned Outputs

During FY 2020/21 NARO will generate 107 production technologies; submit 37 new candidate varieties to the Variety Release Committee; undertake 38 research studies under the Competitive Grants Scheme (CGS); develop 53 production technological innovations; establish or support 68 technological innovation platforms, deliver 131 technological innovations to uptake pathways; and publish 110 journal articles and manuscripts. The successful attainment of these set targets will significantly contribute to the building of a climate resilient, food secure and economically vibrant Ugandan society. The key outputs are as highlighted below; Coffee and Cocoa research, NARO will develop and submit three Arabica Coffee candidate varieties to the varieties release committee. The varieties have high yield potential ranging from 705-941 kgs of clean coffee/ha compared to 299kgs/ha of the local check.

Fisheries research: NARO will generate 1 Least-cost mycotoxin safe aquafeeds formulations, 1 technology for increasing shelf of life live feed, 1 broad spectrum probiotic combination to manage hatchery bacterial diseases, build capacity for 32 fish hatchery operators in Uganda, produce 6,000,000 sex reversed tilapia fry, and develop 1 design for a cost effective crop and fish integrated production system. Additionally, 16,000,000 fish seed (Tilapia, catfish mirror carp and Barbus) will be produced and availed to farmers across the country, targeting the youth and women entrepreneurs. Similarly, 16,500 brood stocks of 4 farmer preferred fish species (Tilapia 60.6%, catfish 30.3%, mirror carp 6.1%, Barbus 3%) will be acquired.

In the same vein, 2 sets of guidelines in aquaculture management will be developed and 2 sets of information packages (including 1 batch culture production guideline for live feed, 1 enterprise budget on production of Barbus in earthen ponds, 1 enterprise budget for integrated fish and crop production systems and 1 protocol for the production of pure live feed cultures) will be developed.

Gender and social safeguards in fisheries: NARO will undertake analysis of women and youth participation in various value chains of small fish to guide key intervention areas. NARO will Partner with at least 1 CSO/NGO to work on HIV AIDs in fishing communities

Maize research for food security and export; 5 candidate maize varieties shall be submitted to varieties release committee.

Beans research; 4 drought tolerant bean candidate varieties nutritionally enhanced with multiple pathogen resistance will be released targeting infants, the youth and pregnant women. The intervention will save the country medical bills arising from nutritional deficiencies.

Rice research for import substitution: NARO will develop and submit two (2) very high yielding and aromatic candidate varieties to the National

# Vote:142 National Agricultural Research Organisation

Variety Release Committee (NVRC).

Bananas research: Three (03) high yielding candidate banana varieties will be submitted to the VRC for release. Once, delivered to uptake pathways, these varieties will significantly contribute to increased production and productivity of bananas in Uganda.

Cassava research: Two cassava candidate varieties shall be submitted to the VRC. This intervention will enhance cassava production as an industrial raw material and food for improved food security and household income.

Groundnuts research: NARO will generate two management technologies for ground nuts and will improve availability of ground nuts decorticator.

Potato research: Three (03) high yielding sweet potato candidate varieties shall be submitted to the VRC. This intervention will enhance production and productivity of the 3 million smallholder farmers who are the primary source of agricultural output.

Cotton research: Twenty (20) Cotton strain lines shall be evaluated on station and 3 other locations of Lira, Arua and Kasese for yield, fibre quality attributes, quality of oil and protein content for future development to support Agro industrialization.

Delivery of Technologies to uptake pathways: NARO will deliver 113 technologies to uptake pathways across various agro ecological zones in Uganda for improved production and productivity among farmers;

Dry land crops research: NARO will undertake research in, sorghum, greengram, sun flower and cowpea and 5 new candidate varieties will be developed, 2 sorghums, 2 greengram, and 1 sunflower for submission to the VRC and information on gender preferred farmer traits for sorghum and finger millet shall be established, in order to strengthen house hold income and food security in Uganda, especially for areas where millet is a delicacy and sorghum is of great economic importance. Additionally, 6 MT of foundation seed of improved cowpea and green gram varieties will be produced and availed to uptake pathways.

Livestock research: In an effort to mitigate the tick and tick-borne diseases burden in Uganda, one viable anti-tick candidate vaccine molecule will be validated as per National and Pan African Veterinary Center of African Union (AU-PANVAC) guidelines at two (2) levels out of the required four (4) levels. The effort is aimed at saving the National economy an estimated annual cost of UGX 3.6 trillion in management of tick and tick borne diseases. In addition, one multi strain Foot and Mouth Disease (FMD) candidate vaccine molecule shall be constituted and evaluated at laboratory level. Relatedly, three (3) African swine fever genotype X vaccine candidates shall be constituted.

Pastures and forage research: Two (2) lablab varieties with high protein content and low anti nutritional factor shall be released. The intervention will increase milk and beef production among farmers in Uganda to boost dairy and beef industries.

Capacity building: In order to ensure sustainability for future Agricultural research, capacity for 45 staff shall be strengthened in both long and short term training (PhD, Masters, post graduate studies and certificates among others). In this intervention 25% of the opportunities are set aside for women in order to strengthen their uptake of key positions in NARO.

Forestry research: NARO will evaluate 6 avocados and sixteen (16) sheaethno varieties, propagate and promote 5 jackfruit varieties for food and commercial values; develop 1 protocol for control of soil borne citrus diseases, develop 6 Wood and non-wood products with commercial values. Through its research, the organization will also conserve 5 medicinal, 5 high quality timber tree species and 2 avocado species for future utilization. Additionally, 1 Multi-stake holder innovation platform for Calliandra value chain to enhance dairy production among dairy farmers will be supported.

Tea research, NARO will generate 6 tea research technologies which will trigger business enterprise development and increased production along the value chain.

Bio-control; One performance evaluation for biocontrol agent of Kariba weed will be tried on Lake Albert and one bio agent for Fish disease management shall be developed.

Research studies conducted under the Competitive Grants Scheme (CGS): NARO will conduct 38 research studies in the different intervention areas including crop, apiary, forestry, livestock, fisheries and agro machinery under CGS during the 2020/21 FY.

Technological innovations delivered to uptake pathways: 131 technological innovations will be delivered to uptake pathways and disseminated to various parts of the country through demonstrations, exhibitions and collaborations with individual farmers and farmer groups, seed companies, NGOs, academia among others.

Provision of improved planting materials and empowerment of stakeholders: NARO will deliver 5 hybrids varieties of maize; 2 cassava varieties clean seed multiplied on 18 acres in 2 districts and multiplied two (2) Virus-indexed vines of 4 sweet potato varieties (NASPOT 8, NASPOT 12-O, NASPOT 13-O, Dimbuka-Bukulula).

NARO will undertake gender and equity responsive agricultural research infrastructure development initiatives; 34 infrastructure development interventions will be delivered in various agro-ecological zones where the PARIs are located (Multipurpose laboratory at NaCORI, one livestock breeding research infrastructure, remodel seven cash offices, 4 staff houses at NaCORI, NaLIRRI, Nabuin and Bulindi ZARDIs, 4 engineering feasibility studies and engineering designs, completion of bioscience laboratory at NARL Kawanda, establishment of Aflasafe plant and 3 livestock research facilities at Nakyasasa among others) for enabling environment for research.

Sixteen (16) technologies with IP potential shall be identified across 16 PARIs.

Ten (10) technologies with commercial potential identified

Six (6) online platforms to support research & development in place

Four (4) existing platforms shall be maintained.

One (1) Mobile App development initiated

One (1) digital library platform developed

Three (3) resource mobilization platforms and work plans for FY 2022/22 developed

## Medium Term Plans

## Vote:142 National Agricultural Research Organisation

Increase niche markets for communities in agricultural sector through Undertaking Market studies to define flagship products tailored to the industry in order to spur agro industrialization for share prosperity and have research for impact

Increase research products and services suited for industry through, development of market differentiated research products tailored to different social and economic class typologies, Strengthen capacity for business incubation, and promotion and business development for the industry.

Undertake research to broaden application of natural resources for agro industrial resources.

Develop database on technical efficiency, social acceptability and economic profitability of the developed research products. Increase competitiveness of the developed products in the niche markets and tools for their traceability.

Design appropriate public private partnership models to boost uptake of products for the market for people impact.

Develop appropriate agro mechanization innovations to stimulate the youth in Agro entrepreneurship.

Strengthen communities to increasingly use improved agricultural technologies and innovations through; Strengthened research extension and outreach linkages for impact programmes among the early adopters on and off NARO PARIs.

Increasing availability of improved technologies and information, improved seed multiplication across the 17 centers and across all 9 Agro ecological Zones in Uganda.

Enhance conservation and harnessing genetic resources through research. (In-vitro fertilization, embryo transfer, seed banks among others)

Enhancing Natural Resource Management and response to research emergencies (invasive species and pests).

Strengthen Institutional Orientation to Agricultural Transformation through; building capacity of Agricultural research funding self-reliance, targeting Establishment of one grants management office and strengthening internal revenue generation)

Strengthening land security and management through titling, Strengthening Human resource management planning and development, targeting welfare improvement for recruitment and retention. Strengthen effective research planning, Monitoring and evaluation management functions.

### Efficiency of Vote Budget Allocations

Following the FY 2020/21 resource allocations, NARO received a ceiling of UGX 79.66 billion for both recurrent and development. The FY 2020/21 will be the first year of NDP III implementation, the agro-industrialization paper forms a chapter for agriculture sector in NDP III. The NARO allocations were efficient to spur agro-industrialization as indicated below;

- Generation of agricultural technologies and innovations and strengthening agricultural research through Competitive Grants Scheme (CGS) UGX 9.15 billion (11.48%),
- Vaccines research and development UGX 1.8 billion (2.26%)
- Upscaling clean seed production and multiplication UGX 1.50 billion (1.88%)
- Increased value-addition through incubation UGX 1.0 billion (1.26%)
- Research to broaden application of forestry products in Pulp and paper industry UGX 0.20 billion (0.25%)
- Capacity building for food and feed safety research UGX 2.8 billion (3.51%)
- Increasing resilience in fisheries research and production for import substitution UGX 1.60 billion (2.01%)
- Strengthening livestock breeding research to rejuvenate the national herd's genetic potential was allocated UGX 5.26 billion (6.6%)
- Establishment of research facilities to support agricultural research in the key priority commodities UGX 6.8 billion (8.54%)
- Agricultural research technology promotion UGX 1.99 billion (2.49%)
- Research coordination and development UGX 1.98 billion (2.49%),
- Response to environmental cross-cutting issues through use of renewable energy UGX 0.8 billion, 1% of the total budget,
- Information communication technology infrastructure UGX 0.29 billion (0.36%)
- Contributions to International Organizations was allocated UGX 1.84 billion (2.31%),
- Retooling ZARDI laboratories and other offices UGX 0.6 billion (0.75%),
- Support to corporate services for improved management of research assets (land, laboratories and other infrastructure was allocated UGX 3.34 billion (4.19%) and
- Human resource management and development (Staff gratuity at 25%, NARO NSSF 10% contribution, Contract staff salaries) was allocated UGX 31.03 billion which constituted 38.95% off the total budget.

### Vote Investment Plans

## Vote:142 National Agricultural Research Organisation

NARO will undertake gender and equity responsive agricultural research infrastructure development initiatives in order to augment and strengthen the creation of a conducive agricultural research enabling environment. In this regard, NARO will implement a total of 34 infrastructure development interventions in various agro-ecological zones which include the following;

- Establishment of a state of the art accredited multipurpose laboratory at NaCORI to support coffee and cocoa research for accelerated Agro-industrialization,
- Establishment of an ultra-modern livestock breeding research infrastructure at Nakyesasa,
- Remodeling of seven (7) cash offices plus four (4) staff houses at NaCORI, NaLIRRI, Nabuin and Bulindi ZARDIs,
- Conducting four (4) engineering feasibility studies and engineering designs,
- Completion of an ultra-modern bio-science laboratory at NARL Kawanda,
- Establishment of an Aflasafe production plant in a bid to build impeccable capacity for food and feed safety. This will reduce the incidence of food and feed allied illnesses, especially through elimination of aflatoxin in cereals, vegetable oil seeds, legumes, livestock and fish feeds,
- Establishment of a vaccine production facility at Nakyesasa to provide enabling environment for research and production of preferred, efficient livestock vaccines,
- Setting up a livestock handling structure to facilitate livestock handling for research,
- Supporting human resource capacity building in order to ensure sustainability of quality agricultural research products and services. To achieve this, 49 staff will be supported in both long term and short term trainings (PhD, Masters, post-graduate studies, certificates among others). In this intervention, a minimum of 30% of the opportunities are set aside for female staff.
- NARO will acquire one fish feed line with an extruder to make the feeds float and commercial production of fish will be enhanced

### Major Expenditure Allocations in the Vote for FY 2020/21

- 1) Generation of agricultural technologies and innovations and Strengthening agricultural research through Competitive Grants Scheme (CGS); In the effort to promote agro industrialization, NARO will intensify generation of demand driven Agriculture technologies and innovations, identify and develop flagship products to spur agro industrialization. UGX 9.15 billion.
- 2) Vaccines research and development: NARO will validate anti-tick candidate vaccine molecule as per National and PANVAC guidelines at 2 levels out of the required 4 levels, one multi strain FMD candidate vaccine molecule and three (3) African swine fever genotype X vaccine candidates shall be constituted and evaluated at laboratory level. UGX 1.8 billion.
- 3) Upscaling clean seed production and multiplication to respond to increased national demand for increased production and productivity: NARO will intensify seed production to meet the National demand for improved seed crop varieties in Uganda which is estimated at 140,000 MT. UGX 1.5 billion.
- 4) Increased value-addition through incubation: NARO will intensify technology incubation and commercialization, NARO has aimed to adopt technology incubation and techno-entrepreneurship development with private sector as a major driver in value addition. For example, the fish smoking kiln for eliminating carcinogenic smoke elements in smoked fish. UGX 1.0 billion
- 5) Research to broaden application of forestry products in Pulp and paper industry: The successful set up of the local paper industry supported by NARO's research will cause import substitutions of over US\$ 162.38 million per annum and in turn more gains from the export to the regional markets will be realized. UGX 200 million.
- 6) Capacity building for food and feed safety research in Uganda, to reduce the incidence of food and feed allied illnesses, through elimination of aflatoxin in cereals, vegetable oil seeds, legumes, livestock and fish feeds. UGX 2.8billion.
- 7) Increasing resilience in fisheries research and production for import substitution and export promotion: NARO has focused on production of cost-effective fish feed of low Feed Conversion Ratio (FCR, less than 1.5) that can lower the overall cost of on farm production for fish farmers at the same time conduct breeding research and produce viable fish seed for farmers. UGX 1.99 billion
- 8) Strengthening livestock breeding research to rejuvenate the national herd's genetic potential: Through research and scientific approaches to improve production and productivity, NARO intends to develop Uganda's own breeds thereby solving the current challenge of inbreeding. UGX 1.5billion.
- 9) Establishment of research facilities to support agricultural research in the key priority commodities: NARO remains committed to executing cutting-edge research that responds effectively to emerging issues in the key priority commodities in Uganda. UGX 6.8 billion.
- 10) Agricultural research technology promotion: NARO remains dedicated to ensuring that communities practice transformative agriculture to spur agro-industrial development. Efforts will be geared towards strengthening the research-extension interface to boost productivity and incomes. UGX 1.99 billion
- 11) Research coordination and development: NARO will build robust systems that enhances research coordination agenda and resolutely fast tracks agricultural transformation agenda including performance and impact (traceability) of technologies and innovations disseminated within communities. UGX 1.98 billion.
- 12) Support to corporate services; for improved management of research assets (land, laboratories and other infrastructure): UGX 3.34 billion

### V3: PROGRAMME OUTCOMES, OUTCOME INDICATORS AND PROPOSED BUDGET ALLOCATION

#### Table V3.1: Programme Outcome and Outcome Indicators

# Vote:142 National Agricultural Research Organisation

<b>Programme :</b>	<b>51 Agricultural Research</b>				
<b>Programme Objective :</b>	(1) Develop and promote demand-driven technologies, innovations and management practices that respond to target clientele demands; (2) Increase research products and services suited for vertical integration into industries; (3) Improve access and sustainable utilization of improved agricultural technologies and innovations by communities; (4) Increase Total Factor Productivity to accelerate community institutional orientation to agricultural transformation.				
<b>Responsible Officer:</b>	Director General				
<b>Programme Outcome:</b>	<b>Increased production and productivity of priority and strategic commodities</b>				
<i>Sector Outcomes contributed to by the Programme Outcome</i>					
<b>1. Increased production and productivity of priority and strategic commodities</b>					
Programme Performance Indicators (Output)	Performance Targets				
	2019/20 Plan	2019/20 Q1 Actual	2020/21 Target	2021/22 Target	2022/23 Target
• Percentage of new varieties promoted and adopted by farmers and other users	12%	3%	14%	17%	20%
• Number of commercialisable technologies and innovations generated through competitive grant projects	5	1	5	5	5
• Increased production and productivity at some level resulting from utilization of improved technologies	1.8%	0.45%	2%	2%	2%

**Table V3.2: Past Expenditure Outturns and Medium Term Projections by Programme**

Billion Uganda shillings	2018/19	2019/20		2020/21	MTEF Budget Projections			
	Outturn	Approved Budget	Spent By End Q1	Proposed Budget	2021/22	2022/23	2023/24	2024/25
<b>Vote :142 National Agricultural Research Organisation</b>								
51 Agricultural Research	57.709	79.662	12.521	79.662	83.605	88.337	94.015	100.830
<b>Total for the Vote</b>	<b>57.709</b>	<b>79.662</b>	<b>12.521</b>	<b>79.662</b>	<b>83.605</b>	<b>88.337</b>	<b>94.015</b>	<b>100.830</b>

## V4: SUBPROGRAMME PAST EXPENDITURE OUTTURNS AND PROPOSED BUDGET ALLOCATIONS

**Table V4.1: Past Expenditure Outturns and Medium Term Projections by SubProgramme**

Billion Uganda shillings	2018/19	2019/20		2020/21	Medium Term Projections			
	Outturn	Approved Budget	Spent By End Sep	Proposed Budget	2021/22	2022/23	2023/24	2024/25
<b>Programme: 51 Agricultural Research</b>								
01 Headquarters	27.439	35.065	7.790	38.015	46.132	50.864	56.542	63.357
0382 Support for NARO	29.892	35.445	2.799	36.973	37.473	37.473	37.473	37.473
07 National Crops Resources Research Institute	0.195	0.654	0.158	0.250	0.000	0.000	0.000	0.000
08 National Fisheries Resources Research Institute	0.072	0.987	0.215	0.350	0.000	0.000	0.000	0.000
09 National Forestry Resources Research Institute	0.048	0.645	0.136	0.250	0.000	0.000	0.000	0.000
10 National Livestock Resources Research	0.071	0.180	0.035	0.250	0.000	0.000	0.000	0.000

## Vote:142 National Agricultural Research Organisation

11 National Semi arid Resources Research	0.058	0.080	0.012	0.250	0.000	0.000	0.000	0.000
12 National Laboratories Research	0.103	0.297	0.065	0.350	0.000	0.000	0.000	0.000
13 Abi ZARDI	0.068	0.278	0.065	0.192	0.000	0.000	0.000	0.000
14 Bulindi ZARDI	0.058	0.488	0.105	0.192	0.000	0.000	0.000	0.000
15 Kachwekano ZARDI	0.074	0.475	0.111	0.192	0.000	0.000	0.000	0.000
1560 Relocation and Operationalisation of the National Livestock Resources Research Institute (NALIRRI)	0.000	2.028	0.217	0.500	0.000	0.000	0.000	0.000
16 Mukono ZARDI	0.086	0.475	0.101	0.350	0.000	0.000	0.000	0.000
17 Ngetta ZARDI	0.070	0.475	0.189	0.192	0.000	0.000	0.000	0.000
18 Nabium ZARDI	0.071	0.349	0.081	0.192	0.000	0.000	0.000	0.000
19 Mbarara ZARDI	0.059	0.475	0.104	0.192	0.000	0.000	0.000	0.000
20 Buginyaya ZARDI	0.067	0.480	0.095	0.350	0.000	0.000	0.000	0.000
21 Rwebitaba ZARDI	0.089	0.475	0.167	0.192	0.000	0.000	0.000	0.000
26 NARO Internal Audit	0.080	0.130	0.033	0.180	0.000	0.000	0.000	0.000
27 National Coffee Research Institute	0.064	0.180	0.042	0.250	0.000	0.000	0.000	0.000
<b>Total For the Programme : 51</b>	<b>58.663</b>	<b>79.662</b>	<b>12.521</b>	<b>79.662</b>	<b>83.605</b>	<b>88.337</b>	<b>94.015</b>	<b>100.830</b>
<b>Total for the Vote :142</b>	<b>58.663</b>	<b>79.662</b>	<b>12.521</b>	<b>79.662</b>	<b>83.605</b>	<b>88.337</b>	<b>94.015</b>	<b>100.830</b>

N / A

**Table V4.3: Major Capital Investment (Capital Purchases outputs over 0.5Billion)**

FY 2019/20		FY 2020/21
Appr. Budget and Planned Outputs	Expenditures and Achievements by end Sep	Proposed Budget and Planned Outputs
<b>Vote 142 National Agricultural Research Organisation</b>		
Programme : 51 Agricultural Research		
Project : 0382 Support for NARO		

# Vote:142 National Agricultural Research Organisation

## Output: 72 Government Buildings and Administrative Infrastructure

1. NACORI staff houses rehabilitated and habitable;	- Procurement process initiated for rehabilitation of NACORI staff houses and NACORI office blocks rehabilitated.	Thirteen (13) Gender and equity responsive agricultural research infrastructure developed in PARIs located in different Agro ecological zones.		
2. NACORI office blocks rehabilitated with ramps for the weak and disabled and functional;				
1. NASARRI staff houses rehabilitated and habitable;	- Contractor on Board. Work In Progress at 10% (NASARRI office blocks).			
2. NASARRI office blocks with ramps rehabilitated and functional;	- Procurement process ongoing for rehabilitation of RWEBITABA ZARDI staff houses, Office blocks with ramps, drying yards/floors vehicle/equipment workshop.			
3. Drying yards/floors rehabilitated and functional;	- Procurement process initiated for rehabilitation of staff houses and office blocks re-roofed with iron sheets.			
4. Vehicle/equipment workshop rehabilitated and functional.	Procurement process ongoing.			
1. RWEBITABA ZARDI staff houses rehabilitated and habitable;	- (Construction of water pump House at NARL - (Awaiting submission of Bills of Quantities by end user).			
2. RWEBITABA ZARDI Office blocks with ramps rehabilitated;				
3. RWEBITABA ZARDI drying yards/floors rehabilitated;	- Asbestos Removal and Roofing ((Evaluation completed, Report to be submitted to CC for consideration)).			
4. RWEBITABA ZARDI vehicle/equipment worksh	- Procurement process ongoing for improved Infrastructure at Kajansi.			
1. Staff houses rehabilitated asbstos removed and re-roofed with iron sheets.	- Procurement process initiated for Improved value addition Infrastructure at Bulindi ZARDI			
2. Office blocks re-roofed with iron sheets rehabilitated and functional;	- Awaiting for submission of BOQs. (Procurement process for purchase of mproved value addition Infrastructure at Bulindi ZARDI).			
Functional and rejuvenated PARIs	- Procurement process initiated for rehabilitation of Nabuin ZARDI perimeter fence.			
Improved Infrastructure at Kajansi				
Improved value addition Infrastructure at Bulindi ZARDI				
Improved value addition Infrastructure at Nabuin Nabuin ZARDI perimeter fence in place, farm animals and field experiments secured				
<b>Total Output Cost(Ushs Thousand):</b>	<b>12.113</b>		<b>0.327</b>	<b>13.323</b>
Gou Dev't:	12.113		0.327	13.323
Ext Fin:	0.000		0.000	0.000
A.I.A:	0.000	0.000	0.000	



## Vote:142 National Agricultural Research Organisation

### Output: 76 Purchase of Office and ICT Equipment, including Software

3 Laptops, 4 computers and accessories, Upgrade Server and LAN, 2 Photocopiers, Upgrade Ms Dynamics, - Ponar Grab, Van Dorn Water Sampler, Cadmium copper column, Hand held portable pump, Portable multi probe purchased Computers (workstations), Firewall, UPSes, patchcodes, External Hard disc, internet data for ISP internet, modems, flash discs, external hard disks soft and hard ware Enhanced and unified NaFIRRI communication infrastructure (Internet, website, email, portals, Active directory, file services, replication and recovery services). NaFIRRI research developments shared on the different communication networks. LG air conditioner purchased (Rwebitaba)	- Procurement process initiated for purchase of upgrades for Ms Dynamics, Procurement Initiated for purchase of Computers (workstations, laptops, servers), Firewall, UPSes, patchcodes, External Hard disc, internet data for ISP internet, modems, flash discs, external hard disks soft and hard ware - Procurement process initiated. for purchase of Enhanced and unified NaFIRRI communication infrastructure. - Procurement process initiated for purchase of air conditioner purchased for Rwebitaba.	One software acquired, and ten offices retooled with computers. Two research institutes connected to the area wide networks.	
<b>Total Output Cost(Ushs Thousand):</b>	<b>0.786</b>	<b>0.000</b>	<b>0.385</b>
Gou Dev't:	0.786	0.000	0.385
Ext Fin:	0.000	0.000	0.000
A.I.A:	0.000	0.000	0.000

# Vote:142 National Agricultural Research Organisation

## Output: 77 Purchase of Specialised Machinery & Equipment

<p>Assortment of labour saving value addition equipment for NAFORRI suitable for women</p> <p>Assortment of labour saving value addition equipment for NACRRI suitable for women</p> <p>Assortment of labour saving value addition equipment for NAFIRRI suitable for women</p> <p>Assortment of value addition equipment for Abi ZARDI</p> <p>Assortment of value addition equipment for Bulindi ZARDI</p> <p>Assortment of value addition equipment for Nabuin ZARDI</p> <p>Assortment of value addition equipment for NARL-Kawanda</p> <p>Cage equipments and installation, tractor implements like Loader, Slasher, echo sounder ,radar, fire extinguishers, public address system,money counting machine and other water vessel purchased equipments</p> <p>Functional invitro fertilisation and semen processing equipment procured and installed</p> <p>Functional Marine vessel CORMORANT overhauled</p> <p>Functional solar system in place</p> <p>Irrigation equipment for one PARI</p> <p>New one tractor with implements</p>	<p>- Procurement process initiated. for purchase of an assortment of labour saving value addition equipment for NAFORRI.</p> <p>- Procurement process initiated. for purchase of an assortment of labour saving value addition equipment for NACRRI.</p> <p>- Procurement process initiated. for purchase of an assortment of value addition equipment for NAFIRRI</p> <p>- Procurement process initiated. for purchase of value addition equipment for Abi ZARDI</p> <p>- Procurement process initiated. for purchase of value addition equipment for Bulindi ZARDI.</p> <p>- Procurement process initiated. for purchase of an assortment of value addition equipment for Nabuin ZARDI.</p> <p>- Procurement process initiated. for purchase of an assortment of value addition equipment for NARL-Kawanda</p> <p>Procurement process initiated. for purchase of Cage equipment and installation, tractor implements like Loader, Slasher, echo sounder ,radar, fire extinguishers, public address system,money counting machine and other water vessel purchased equipments</p> <p>- Ponar Grab, Van Dorn Water Sampler, Cadmium copper column, Hand held portable pump, Portable multi probe</p> <p>- Procurement process initiated. for purchase of an invitro fertilisation and semen processing equipment</p> <p>Procurement process initiated. for the repairs of Marine vessel CORMORANT.</p> <p>- Procurement process initiated. for purchase of functional solar system</p> <p>- Awaiting submission of Bills of Quantities by the end user. (Procurement process for purchase of irrigation equipment for one PARI)</p> <p>- Procurement process initiated. for purchase of a new tractor with implements</p>	<p>Three (3) batches of assorted laboratory equipment acquired to support research.</p>
--	---	---

<b>Total Output Cost(Ushs Thousand):</b>	<b>2.516</b>	<b>0.010</b>	<b>2.004</b>
--	--------------	--------------	--------------

## Vote:142 National Agricultural Research Organisation

Gou Dev't:	2.516	0.010	2.004
Ext Fin:	0.000	0.000	0.000
A.I.A:	0.000	0.000	0.000
<b>Output: 78 Purchase of Office and Residential Furniture and Fittings</b>			
An assortment of new furniture and laboratory fittings for NACRRI offices and laboratory		- Procurement process initiated. for purchase of an assortment of new furniture and laboratory fittings for NACRRI offices and laboratory.	Three research facilities furnished
New furniture and assorted laboratory fittings for new offices and laboratory		- Procurement process initiated. for purchase of new furniture and assorted laboratory fittings for new offices and laboratory	Four residential houses furnished
<b>Total Output Cost(Ushs Thousand):</b>	<b>0.487</b>	<b>0.000</b>	<b>0.091</b>
Gou Dev't:	0.487	0.000	0.091
Ext Fin:	0.000	0.000	0.000
A.I.A:	0.000	0.000	0.000
Project : 1560 Relocation and Operationalisation of the National Livestock Resources Research Institute (NALIRRI)			
<b>Output: 72 Government Buildings and Administrative Infrastructure</b>			
Hay barn, grain silos established at Maruzi and light duty tarmac road for easy movement of sophisticated machinery established at Nakyesasa, Experimental fields attendant office space established at Maruzi		- Construction of Calf Barn (Procurement Process Initiated by end user. Bills of Quantities submitted, Bid document prepared, to be submitted to CC for consideration. )	
Infrastructural capacity for feed storage and research operations developed		- Construction of Hay barn, (Procurement Process Initiated by end user. Bills of Quantities submitted, Bid document prepared, to be submitted to CC for consideration).	
		- Construction of grain silos (Awaiting submission of Bills of Quantities by the end user).	
		- Road Network at Nalirri (Awaiting submission of Bills of Quantities by the end user).	
		- Procurement process ongoing for construction of seed processing structure (Procurement Process Initiated by end user. Bills of Quantities submitted, Bid document prepared, to be submitted to CC for consideration).	
		- Construction of Silage Banks (Awaiting submission of Bills of Quantities by the end user).	
<b>Total Output Cost(Ushs Thousand):</b>	<b>0.811</b>	<b>0.000</b>	<b>0.000</b>
Gou Dev't:	0.811	0.000	0.000

# Vote:142 National Agricultural Research Organisation

Ext Fin:	0.000	0.000	0.000
A.I.A:	0.000	0.000	0.000

## V5: VOTE CHALLENGES FOR 2020/21 AND ADDITIONAL FUNDING REQUESTS

### Vote Challenges for FY 2020/21

- 1) There is severe inadequate funding for Agricultural Research to spur Agro-Industrialization to meet existing and emerging demands. Currently, NARO is funded at UGX 79 billion yet the ideal funding is UGX 221 billion annually. Notably from 2008 – 2018, Uganda’s agricultural research intensity ratio – that is, agricultural research spending as a share of its GDP (Ag GDP) – remained less than the minimum investment target of 1 percent set by the African Union and the United Nations.
- 2) Working with limited research infrastructure: Whereas there has been notable improvement in research infrastructure supported by government and development partners, it is still inadequate for executing cutting edge research and responding to emerging issues. There are inadequate facilities such as certified laboratories with scientific equipment, Maintenance of existing infrastructure and transport to effectively conduct research. There is need to upgrade the research infrastructure to adequately contribute to agriculture transformation.
- 3) Operating under competing land use interests: NARO operates under uncertain land ownership and distressing pressure from interested parties with immense development plans on land designated for agricultural research. This has interrupted effective implementation of research land-use plans. It is therefore recommended that Government revisits the Land Act to transfer ownership to the NARO unlike the status quo which gives the custodianship only to the Chairman Uganda Land Commission.
- 4) Lack of Commensurate Pay to NARO Scientists: The recent pay increment for scientists by Ministry of Public service in other fields excluding agricultural research has led to the discomfort of agricultural research scientists and is resulting in the extensive migration of scientists from NARO. It is highly recommended that salaries for scientists be harmonized in order to have stability in human resource management under Agricultural research

**Table V5.1: Additional Funding Requests**

Additional requirements for funding and outputs in 2020/21	Justification of requirement for additional outputs and funding
<b>Vote : 142 National Agricultural Research Organisation</b>	
<b>Programme : 51 Agricultural Research</b>	
<b>OutPut : 01 Generation of agricultural technologies</b>	
Funding requirement US\$ Bn : <b>38.000</b>	The management of pests and diseases will save the country about UGX 3.6 trillion spent on the management of pests and disease losses. This will improve exports to the world markets contributing to attainment of middle income status as per NDP.
<b>OutPut : 02 Research extension interface promoted and strengthened</b>	
Funding requirement US\$ Bn : <b>2.000</b>	Pest and disease mapping for the codling moth; The codling moth ( <i>Cydia pomonella</i> ), is a member of the Lepidopteran family Tortricidae which is a major pest to agricultural crops which has caused great economic losses following high levels of interceptions of Ugandan horticulture products designated to European and other export markets. NARO urgently needs to intensify data collection to determine the occurrence, severity and establish alternative hosts of the codling moth in Uganda.
<b>OutPut : 04 Agricultural research capacity strengthened</b>	

## Vote:142 National Agricultural Research Organisation

Funding requirement US\$ Bn : <b>18.000</b>	Operationalize the relocation of NaLIRRI to MARUZI (project code 1560) to support livestock research – Presidential Directive giving NARO land in Tororo to an investor and Government committed to relocate the institute to Maruzi so funds required for infrastructure development in order for livestock research to continue and minimize loss of valuable research materials.
<b>OutPut : 19 Human Resource Management Services</b>	
Funding requirement US\$ Bn : <b>32.940</b>	Salary enhancement for NARO Scientists and gratuity – NARO was left out during salary enhancement which has led to high staff resignation. Funds are required for salary enhancement among scientists to create human resource stability in research.