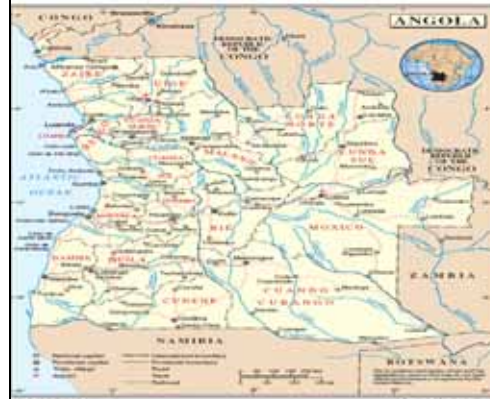


**Annex 5.**

**Annex 5.1 Agricultural Research & Capacity Building Project – Dr Chris Asanze**

**Agricultural Research and Capacity Building Programme (ARCB) for post-conflict regions of the Republic of Angola and the Democratic Republic of Congo**

**Project Operational Areas**



**Project Aim**

The aim of the programme is to increase the income of smallholder farmers through more competitive and sustainable agricultural production systems that respond to market demand

**Overall Objectives**

1. Improve sustainable crop production technologies and systems for management of natural resources to increase agricultural production and productivity.
2. Empower smallholder Farmer Associations and develop an integrated value chain for selected high value crops.

**Specific Objective**

Re-vitalize the capacity of the National Agricultural Research Systems (NARS) in Angola and the Democratic Republic of Congo to carry out demand-led research to address the needs of smallholder farmers.

**Capacity Building**

- ☐Angola:
  - On-the-job training: Six researchers and technicians
  - Training workshop: 14 technicians from IDA and IIA
  - CGIAR Training workshops:
- ☐DRCongo:
  - On-the-job training: Seven Researchers and technicians

## Local Germplasm Collection

- Angola:
  - Ten maize, twenty bean, ten Irish potato and thirty other crops varieties/accessions were collected.
- DRCONGO:
  - Thirteen Wetland rice, five Upland rice, fifteen groundnut and seven maize varieties/accessions have been collected

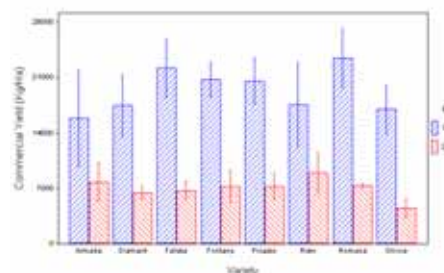
## Improved Germplasm from CGIAR and Other

- o Maize germplasm from CIMMYT and IITA
- o Nerica Rice germplasm from WARDA
- o Irish potato germplasm from CIP and Agrico
- o Groundnut germplasm from ICRISAT
- o Phaseolus bean germplasm from CIAT

### Grain yields (mt/ha) of maize cultivars in Mother/Baby experiments during 2007/08 season at Chianga and Ekunha

Variety	Chianga		Ekunha	
	Green	Yellow	Green	Yellow
ZM 423Y	1.78	0.78	4.77	1.18
ZM 523Y	2.44	0.59	3.80	2.29
ZM 623Y	3.25	1.01	3.48	2.62
ZM 725	3.02	0.91	4.16	1.99
02SADVE-##	2.77	0.74	3.74	2.39
03SADVI-##	2.65	1.16	4.20	1.39
ZM 421	2.11	0.84	3.56	1.24
ZM 521	2.22	0.75	2.98	1.40
ZM 621	2.60	0.92	3.83	1.62
NOMAA-1	3.07	0.93	3.92	1.78
SAM1070	0.33	0.40	0.64	0.34
SAM-3	2.03	1.01	3.98	1.69
LSD (0.05)	0.93	0.44	NS	0.70
CV %	20.43	-	17.37	-

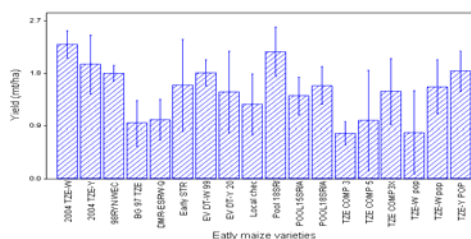
### Commercial yield (kg/ha) of Irish potato varieties during the dry season 2007 at Chianga and Ekunha



### Yields (kg/ha) of Phaseolus bean varieties during the growing season 2007/08 across Locations

Variety	Pod yield (kg/ha)	Grain yield (kg/ha)
Cebo indeterminate	402.3	285.7
Calungupa determinate	397.5	228.5
Manteiga indeterminate	373.7	245.3
Manteiga Uige determinate	351.7	252.3
Manteiga Uige indeterm	307.2	204.7
Branco indeterminate	299.8	171.3
Branco determinate	264.3	171.3
Manteiga determinate	261.8	159.3
LSD(0.05)	NS	NS
CV %	21.19	20.93

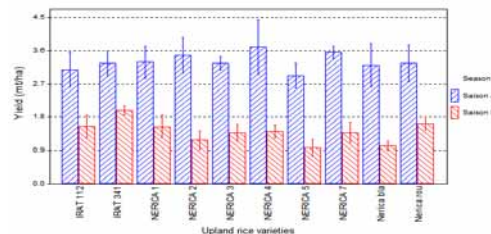
### Yield (mt/ha) of early maize varieties during second cropping season 2008 at Mvuazi



**Yield (mt/ha) and yield parameters of Wetland rice Nerica varieties during 2007/08 growing season at Minkonga**

Variety	Panicles m <sup>-2</sup>	Weight of 1000 seeds (g)	Yield (mt ha <sup>-1</sup> )
NERICA-L54	283.67	25.33 abcd	1.62 bc
NERICA-L22	223.00	22.00 d	1.62 bc
NERICA-L12	265.33	28.00 a	2.15 abc
NERICA-L23	247.67	22.67cd	1.42 c
NERICA-L7	265.33	27.67 a	1.86 abc
NERICA-L59	301.00	27.67 a	2.83 a
NERICA-L49	292.33	26.67 ab	2.90 a
NERICA-L4	305.67	26.00 abc	2.73 a
NERICA-L9	271.00	23.67 bcd	2.61 ab
IL-17	225.00	25.33 abcd	2.86 a
JASMINE	214.33	25.33 abcd	2.63 ab
CV (%)	22.64	7.86	26.81

**Yield (mt/ha) of Upland rice Nerica varieties during main and second growing seasons at Mvuazi**



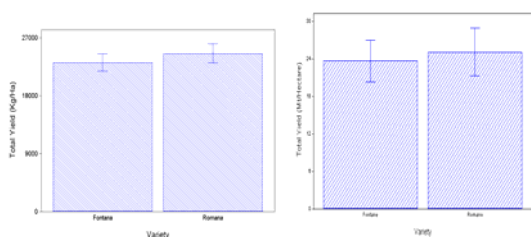
**Pod yield (mt/ha) and yield parameters of groundnut varieties during 2007/08 growing season at M'vwazi**

Variety	Pod yield (mt/ha)	Number of Pods	
		Total	Matured
K12	4.43	26.5	13.5
ICGV-SM96677	4.37	24.0	12.75
ICGV-SM93553	4.24	27.0	14.75
ICG 9998	4.08	24.5	10.50
ICGV 12991	4.05	29.0	12.00
JL 24	3.80	23.75	13.00
ICGM281	3.78	22.25	12.50
JL 12	3.55	27.75	13.00
A 1408	3.50	26.0	13.50
HYQ (CES) 14	3.08	19.75	7.25
CV %	15.03	24.02	31.58
LSD 0.05	0.56	NS	NS

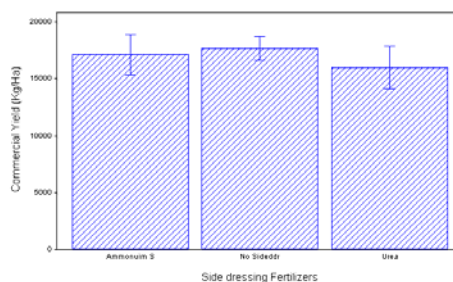
**Crop variety on-farm trials / demonstrations during 2007/08 growing season in Angola and DR Congo**

- Irish potato: Romano and Fontane
- Phaseolus bean: Manteiga, Calungupa and Cebo
- Maize: ZM521, ZM621, Matuba and ZM423
- Wetland rice: Sipi and Jasmine
- Upland rice: IRAT 112, IRAT 341, Nerica 7 and Nerica4
- Groundnut: JL 24 and Mbwaki
- Maize : Samaru

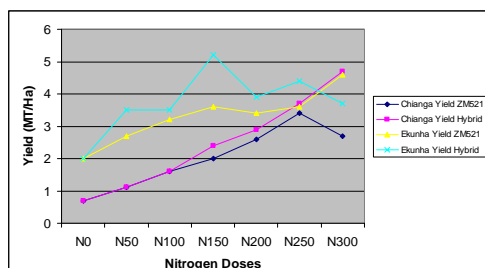
**Total yield (kg or mt /ha) of two Irish potato varieties from on-farm trials/demonstrations during 2007 and 2008 in Huambo province**



**Commercial yield (kg/ha) of Irish potato var. Romano under different side dressing fertilizers during dry season 2007 across Locations**



**Yield ( mt/ha) response of maize ZM521 and hybrid SC715 to different nitrogen fertilizer levels during the growing season 2007/08 at Chianga and Ekunha**



**Yields (kg/ha) of Phaseolus bean Manteiga under different fertilizer types and rates during the growing season 2007/08 at Ekunha**

Fertilizer Rate	Number of Pods	Pod Yield	Grain Yield
N68-P68-K68	676.3 a	859.0 a	573.7 a
N24-P48-K24	625.5 ab	825.3 ab	472.4 ab
N102-P102-K102	412.4 bcd	795.3 ab	523.2 a
N36-P72-K36	567.1 ab	784.0 ab	500.5 a
N60-P120-K60	567.9 ab	752.0 abc	493.2 ab
N85-P85-K85	640.8 ab	705.3 abc	478.8 ab
N34-P34-K34	566.7 abc	694.1 abc	482.1 ab
N51-P51-K51	275.1 d	572.8 abcd	420.2 abc
N48-P96-K48	303.5 cd	513.4 bcde	438.2 ab
N12-P24-K12	270.3 d	450.3 cde	281.9 bcd
N17-P17-K17	298.0 d	340.3 de	217.6 cd
N0-P0-K0	217.0 d	244.0 e	134.5 d
CV (%)	18.86	16.58	17.63

**Grain yield (mt/ha) and yield parameters of Wetland rice variety under different levels of fertilizer during the growing season 2007/08 at Minkonga**

Fertilizer Rate	Number of tillers	Weight of 1000 seeds	Yield (mt/ha)
0-0-0	8.67 b	27.00	1.46 c
30-20-20	10.67 b	25.33	1.97 c
60-40-40	15.67 ab	27.00	1.99 c
90-60-60	18.67 a	27.00	2.53 abc
120-80-80	18.00 a	27.00	3.47 a
150-100-100	22.33 a	25.33	2.18 bc
180-120-120	20.00 a	27.00	3.22 ab
CV (%)	25.20	5.34	28.04

**Yield (mt/ha) of maize under different fertilizer levels during first and second growing season 2007/08 at Mvuazi**

Fertilizer level	First Season	Second Season
N <sub>120</sub> -P <sub>60</sub> -K <sub>60</sub>	6.91	3.85
N <sub>153</sub> -P <sub>77</sub> -K <sub>77</sub>	7.34	3.36
N <sub>85</sub> -P <sub>43</sub> -K <sub>43</sub>	6.52	3.97
N <sub>170</sub> -P <sub>85</sub> -K <sub>85</sub>	7.62	2.54
N <sub>136</sub> -P <sub>68</sub> -K <sub>68</sub>	7.04	2.87
N <sub>102</sub> -P <sub>51</sub> -K <sub>51</sub>	6.87	2.91
N <sub>68</sub> -P <sub>34</sub> -K <sub>34</sub>	6.60	2.83
N <sub>51</sub> -P <sub>36</sub> -K <sub>36</sub>	6.08	3.11
N <sub>34</sub> -P <sub>17</sub> -K <sub>17</sub>	5.29	2.66
N <sub>17</sub> -P <sub>9</sub> -K <sub>9</sub>	4.39	1.72
N <sub>0</sub> -P <sub>0</sub> -K <sub>0</sub>	3.67	1.67

**Yield (mt/ha) of upland rice under different fertilizer levels during first and second season 2007/08 at Mvuazi**

Fertilizer level (NPK kg/ha)	Cropping season		Over-seasons
	First	Second	
150-100-100	5.95	3.67	4.81
180-120-120	5.19	4.28	4.73
120-80-80	5.33	3.21	4.27
90-60-60	4.76	2.37	3.56
60-40-40	4.34	2.78	3.56
30-20-20	3.95	1.81	2.88
0-0-0	3.35	1.58	2.47
LSD 0.05			0.55
CV %			12.36



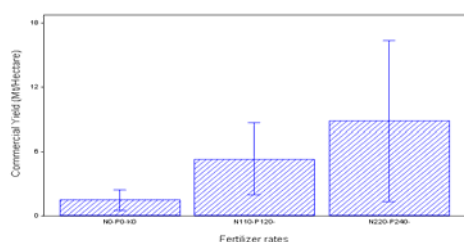
**Subquent maize Yield (mt/ha) after cover crops fallow during 2007/08 cropping season at Mvuazi**

Cover crop	Biomasse (5 mt dry weight)	
	Incorporation	Mulching
<i>Vigna unguiculata</i>	5.42	5.25
<i>Mucuna utilis</i>	5.39	4.47
<i>Pueraria javanica</i>	4.30	4.28
Natural vegetation	3.29	3.23
LSD 0.05	1.32	
CV %	17.27	

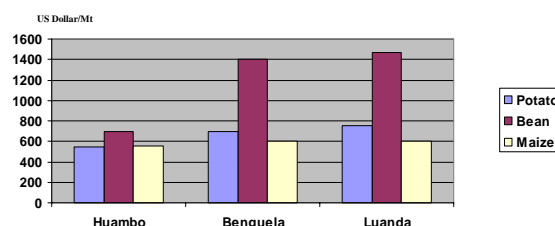
**Wetland rice yield (mt ha<sup>-1</sup>) under the combinations of green manure and NPK fertilizer during 2007/08 season at Mikonga**

Green manure	0-0-0	30-20-20	60-40-40
Natural vegetation	0.593	0.597	0.620
Azolla	0.923	0.730	0.990
<i>Mucuna utilis</i>	1.240	0.990	1.430
CV (%)	21.45		
LSD (0.05)	0.34		

**Commercial yield (mt/ha) of Irish potato Romano under different fertilizer rates during the growing season 2007/08 in Huambo province**



**Informal market price average of potato, bean and maize for the period of April to June 2008 in Huambo, Benguela and Luanda**



**Challenges**

- Inefficiency of public extension services
- No resources allocated to extension activities in the project budget
- Soil samples analyses

**Way forward**

- Budget Amendment
- Call for quotations to analyze soil samples