



**ECABREN SC Annual Planning and Review
Meeting
03 – 07 Feb, 2014
Speke Resort Munyonyo, Kampala, Uganda**

*Report on the status of ECABREN/PABRA
supported activities in Northern and North-
Western TANZANIA (SARI)*

By

S.O. Kweka, Magdalena William and J.C. Rubyogo

Major common bean production regions in Tanzania

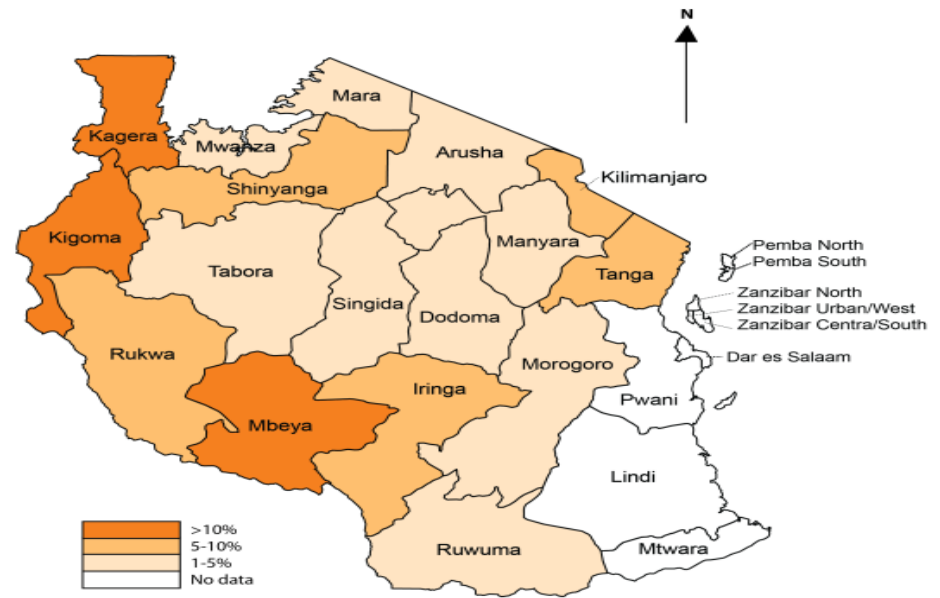
At least 17 of the 20 administrative regions of Tanzania produce common bean

The highest concentrations are located in the:

-Lake zone (Kagera region).

-Southern Highlands zone
(Mbeya, Ruvuma, Iringa, Rukwa regions)

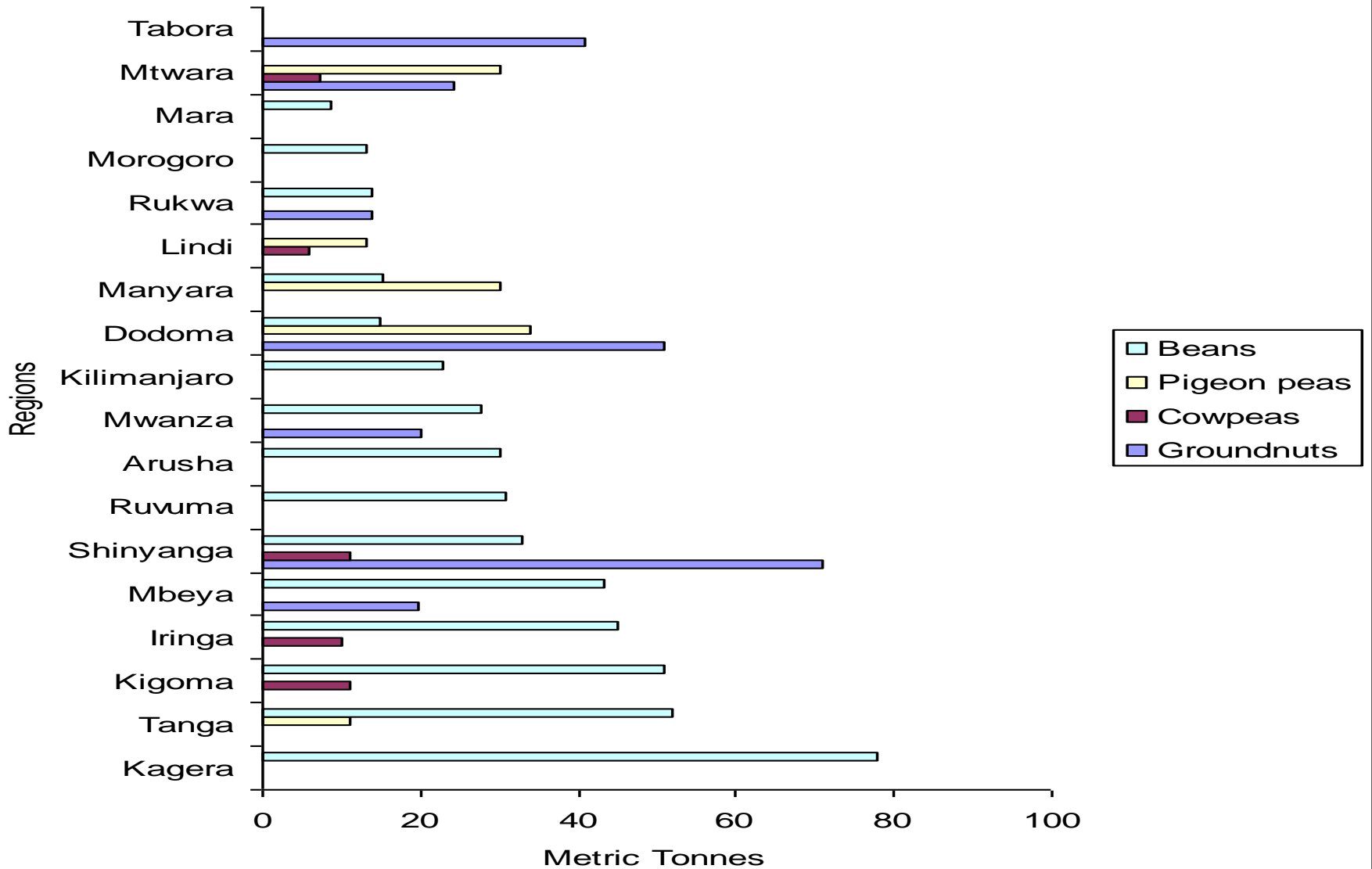
- Northern zone (Kilimanjaro, Arusha, Manyara, Tanga regions)



Common bean



Main Legumes producing regions



PRODUCTION/DEMAND

National Production:

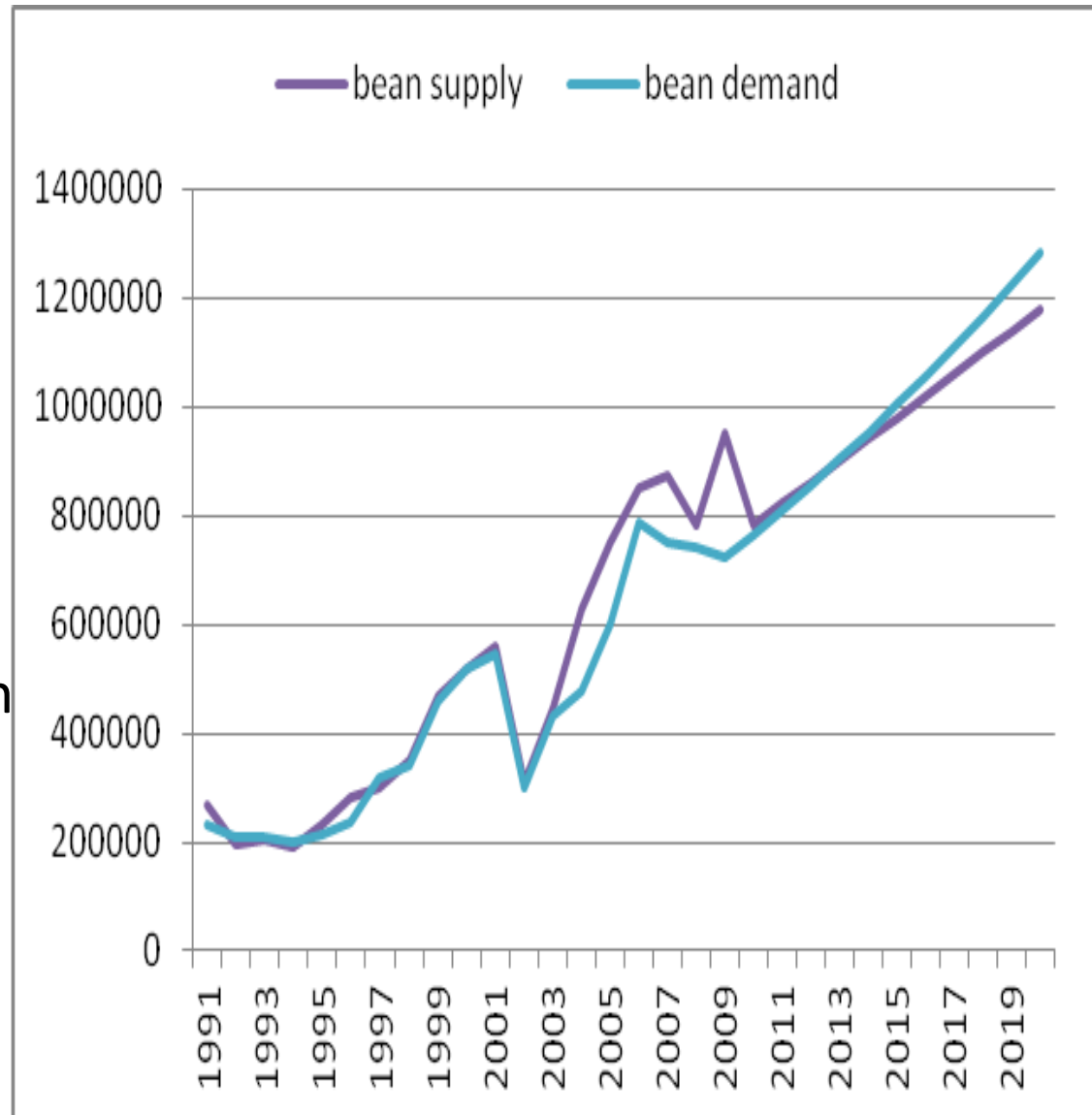
948,974 ton

National Demand:

724,017

Expected growth in demand:

77% by the year 2020 (an average of 7% per year)



1.1.2.1.1 Identify sources of resistance to new races/biotypes of pests and diseases that may have emerged, especially as a result of climate change and document their mechanisms of resistance. Focus on one or more of these: angular leaf spot, rust, anthracnose, aschochyta, web blight and halo blight, rust, BSM, bruchids, aphids and whiteflies

Activity 1: IDENTIFY NEW SOURCES OF RESISTANCE TO KEY DISEASES (Angular leaf spot, rust, Anthracnose

- The trial was conducted at Madiira farm during the short rains.
- It involved 20 lines which were selected in the previous evaluation as best performers.
- The lines were assigned in a randomized complete block design with four replication.

Results and discussion

- The weather during the season did not favour the development of any disease symptoms.
- Therefore it was suggested the seeds to be bulked and nursery to be re-evaluated in the long rains where we expect to have more disease pressure.

Activity 2: Baseline survey of common bean production constraints in selected villages of Babati district, Tanzania

Objective:

- To identify priority pests and disease of common beans in the target area.
- To assess demographic characteristics of farmers and identify other socioeconomic constraints faced by farmers.
- A survey was conducted in the three villages (Long, Sabilo and Seloto) during March, 2013.
- A total of 30 farmers within (11) and outside (19) the project were randomly and purposively selected.
- Both quantitative and qualitative data was obtained from farmers using a structured questionnaire and field observation for pests and diseases.
- **Results ad discussion**
 - 16 out of 30 (i.e. 56%) famers interviewed indicated production of common beans has been **decreasing** in the last five years while 30% thought production had **remained the same**.
 - **Drought** and plant **pests/diseases** were the major production constraints faced by farmers in the study sites.
 - At postharvest level **storage pests** were rated highest and bean **bruchids** were reported as the sole major pest.

Immediate outcome 1.1 Increased access by especially women farmers to improved dry bean varieties resistant to multiple environmental stresses

Output 1.1.3 At least 130 new multiple stress resistant bean germplasm identified , widely tested and selected for release

Sub activity Activity Set # 1.1.3.1 Identify, select and test widely new multiple stress resistant bean germ-plasm for release

1.1.3.1.5: Evaluate bean germplasm (bush and climbing) nurseries including (P. vulgaris, lunatus, acutifolius etc) or resistance to pests and diseases (NTZ, GU, RW, SEN, STZ, ZM, ZW, UG, CD) on station.

- **Preliminary variety evaluation of nurseries**
- Two nurseries namely TL II (+ & - stress) received late in JUNE, 2012 and Canning nursery were multiplied and evaluated in 2013.
- 21 Canning bean Genotypes were received from Kenya
- 130 TL II lines (+ & - stress) received late in JUNE, 2012 from Malawi were planted in October, 2013 and the crop is still in the field
- **Promising materials will be promoted to multi location trial this year during main rain season.**

Table 1: Evaluated characteristics of elite canning bean lines at SARI -2013

	Bean Genotype	Seed size & color	Mean pod /plant	Yield in Kg/Ha	Diseases			
					PY	CBB	BCMV	B-Rot
1	KAT - SW -01	Small white	8.4	2020.0	2	1	1	1
2	KAT - SW -02	Small white	14.8	3203.5	3	2	1	1
3	KAT - SW -03	Small white	10.6	1515.6	4	2	2	1
4	KAT - SW -04	Small white	10.6	2748.2	3	1	3	1
5	KAT - SW -05	Small white	10.2	2604.8	2	1	4	1
6	KAT - SW -06	Small white	7.0	1909.5	4	2	3	4
7	KAT - SW -07	Small white	9.0	3212.4	2	2	2	2
8	KAT - SW -08	Small white	12.2	2942.6	2	1	1	1
9	KAT - SW -09	Small white	9.8	3511.4	3	1	1	1
10	KAT - SW -10	Small white	10.2	4226.2	1	1	1	1
11	KAT - SW -11	Small white	12.6	5300.0	1	1	2	1
12	KAT - SW -12	Small white	19.8	4472.5	2	1	1	1
13	KAT - SW -13	Small white	11.2	2255.5	2	1	1	1
14	KAT - SW -14	Small white	9.2	2787.7	2	1	4	1
15	KAT - SW -15	Small white	9.6	1552.2	2	2	1	2
16	KAT - SW -16	Small white	12.4	1932.2	2	1	5	3
17	KAT - SW -17	Small white	11.2	463.1	1	1	3	1
18	KAT - RM - 01	Red Mottled	11.8	3452.4	1	3	1	6
19	KAT - RM - 02	Red Mottled	10.6	2579.1	1	2	1	1
20	KAT - RK - 01	Red Kidney	6.8	2504.5	1	1	1	1
21	KAT - RK - 02	Red Kidney	8.4	2908.8	2	2	4	1

Table 2: Participatory Variety Selection (PVS) of elite canning bean lines at SARI

Line	Bean genotype	No. of Positive Ribbons			No. of Negative Ribbons			General Farmers Comments	
		Men	Women	Total	Men	Women	Total	For liking of variety	For disliking variety
1	KAT - SW -01	0	0	0	3	1	4	-Good market with respect to color	-Susceptible to diseases
2	KAT - SW -02	2	0	2	0	0	0		
3	KAT - SW -03	1	1	2	1	3	4		
4	KAT - SW -04	0	0	0	5	1	6	-Good plant vigour	-No reliable market with respect to seed size and colour
5	KAT - SW -05	0	0	0	1	0	1		
6	KAT - SW -06	1	2	3	1	3	4	-Good pod load	-Susceptible to drought
7	KAT - SW -07	6	6	12	1	1	2		
8	KAT - SW -08	0	1	1	5	0	5	-Good number of seed per pod	-Poor yield
9	KAT - SW -09	7	0	7	2	1	3		
10	KAT - SW -10	5	4	9	1	0	1	-Tolerant to diseases	-Poor germination
11	KAT - SW -11	1	1	2	2	0	2		
12	KAT - SW -12	1	1	2	0	2	2	-Early Maturity	-Late maturing bean variety
13	KAT - SW -13	0	1	1	3	2	5		
14	KAT - SW -14	2	1	3	1	1	2	-Drought tolerant	-Poor pod load
15	KAT - SW -15	3	1	4	1	1	2		
16	KAT - SW -16	0	2	2	1	2	3	-High yield	-Few number of seed per pod
17	KAT - SW -17	0	4	4	4	4	8		
18	KAT - RM - 01	3	0	3	2	2	4	-Good seed size	
19	KAT - RM - 02	7	5	12	1	3	4		
20	KAT - RK - 01	2	0	2	4	3	7		
21	KAT - RK - 02	1	0	1	0	0	4		
		36	30		39	30			

Evaluation of different climbing bean varieties for adaptability and farmer acceptability in Kagera region, North West Tanzania

S/n	Variety	Mean yield (t/ha)		Overall Mean
		FYM	TSP+FYM	
1	Gasirida	0.250	0.389	0.319
2	Kenya mavuno	0.611	0.833	0.722
3	Kenya tamu	0.889	1.361	1.125 (2)
4	MAC-09	0.750	1.00	0.875
5	MAC-44	0.861	1.00	0.931
6	MAC-49	1.167	1.056	1.111 (3)
7	Mamesa	0.611	0.889	0.750
8	RWV 1129	0.611	0.611	0.611
9	RWV 5348	1.111	1.417	1.264 (1)
10	Umubano	1.028	1.139	1.083 (4)
	Mean	0.789	0.969	0.879
	CV			36.2
	SE			0.26

Immediate outcome 1.1

1.1.3.1.11: Conduct NPT and DUS tests for candidate bush and climbing bean varieties with multiple constraint resistance including culinary tests (KE-AGRA-Kakamega, STZ, ZW, LS, MZ, ET, CAR, CM, GU, TG, CD and NTZ - TLII)

- Four candidates (i.e. 2 bush and 2 semi climbing types) selected by farmers for pre-release in 2013 were sent to TOSCI (Tanzania Official Seed Release Institute) for DUS Test and NPT (National Performance Trial).
- The pre-release paper was written and sent to NPT-Technical Committee .
- Unfortunately the lines were not released.
- **Hence the materials will be re- evaluated during 2014 cropping season.**

Elite lines for release

✓ Four candidates (i.e. 2 bush and 2 semi climbing types) selected for pre-release this year (2013) and pre-release paper submitted to the National seed release committee.



Bush Types

F9Kidney (15)



F8Drought line (36)



Semi Climbing Types

KAT B9



KG98 (42)



Immediate outcome 1.1

Activity 1.1.4.1 Develop and assess gender responsive and efficient seed delivery systems

Sub activity 1.1.4.1.1. Increase/multiply/produce foundation seeds by both formal and informal seed producers/ partners

1.3 BREEDER SEED PRODUCTION- N.TZ

S/N	Variety name	Year//Kgs					Total Kgs
		2009	2010	2011	2012	2013	
1	Lyamungu 85	480	548	400	900	1200	3528
2	Lyamungu 90	400	475	400	800	1100	3175
3	Selian 94	200	480	250	150	200	1280
4	JESCA	500	465	177	175	900	2217
5	Selian 97	340	485	480	450	700	2455
6	Selian 05	100	200	57	140	200	697
7	Selian 06	35	90	10	45	100	280
8	CHEUPE	20	52	6	-	50	128
Grand Total (Kgs)		2,075	2,795	1,780	2,660	4,450	13,760

1.4 FOUNDATION/CERTIFIED SEED PRODUCTION –N.TZ

Variety name	Year//Kgs							
	2009/10		2010/11		2011/12	2012/13		Total (Kgs)
	Cert	Basic	Cert	Basic	Cert	Basic	Cert	
Lyamungu 85	823	3020	11,100	980	955	900	1,700	19,478
Lyamungu 90	54,725	3,165	35,878	350	43,488	1,000	700	139,306
Selian 94	4,170	829	3,330	650	693	-	-	9,672
Selian 97	11,850	2,760	9,700	1,530	4,895	-	1,300	32,035
JESCA	5,525	3,140	3,630	650	1,473	150	-	14,568
Selian 05	-	-	-	400	143	50	-	593
Selian 06	-	-	-	100	-	30	-	130
CHEUPE	-	-		50	-	-	-	50
DRK	2,800	-	1,300	-		-	-	4,100
Grand Total (Kgs)	79,893	12,914	64,938	4,710	51,647	2,130	3,700	219,932

QDS - Seed produced at local level by farmers, community/village level - N.TZ (2009 – 2013)

Village	District	Name of Farmer/Farmers' association	Variety	Quantity (Kg/ha)
Bashnet	Babati	Hhando	Lyamungu 90	3,700
Long	Babati	Monica Isaquel	Lyamungu 85	960
Guse	Babati	Zuberi Julius	Lyamungu 90	2,750
Endamanang	Babati	Marcel Martin	Lyamungu 85	700
Gabadaw	Babati	Martin Benedict	Lyamungu 90	670
Naar	Babati	Mzee Khoki	Lyamungu 85	1,390
Boheloi	Lushoto	Ali Saidi Kaoneka	Lyamungu 90	1,200
		Handei Primary School	Lyamungu 85	1,560
Baga	Lushoto	Ismail Abbasi	Lyamungu 90	2,300
		Thabiti Issa	Lyamungu 85	660
		Baga Primary School	Lyamungu 90	578
		Hakia Ayubu	Lyamungu 90	545
Lolkisale	Monduli		Lyamungu 85	400
			Selian 97	160
Grand Total				17,573

QDS Production



Visit to Bashnet (QDS) farmers by Drs. Jeff (BMGF), Monyo (ICRISAT) and Jc. Rubyogo (CIAT)



1.6 Summary of **bush** bean seed distributed and produced in Karagwe– N.W.TZ, 2013

S/N	Variety name	Amount distributed (kgs)	Amount produced(kgs)
1	Lyamungu 90	200	800
2	Uyole Njano	60	300
3	Uyole 03	5	20
4	Uyole 04	5	10
5	Uyole 96	9	15
6	Kabanima	10	25
7	Wanja	5	15
Total		294	1,185

Distribution of improved **climbing** bean seed varieties in Kagera region

Season	Variety	Amount (Kg) distributed	Farmer groups		Individuals	
			Men	Women	Men	Women
Short rains (Sept. – Dec, 2013)	Selian 06	40	89	60	25	30
	MAC 9	10			7	10
	MAC 49	5			7	10
	MAC 44	10			7	10
	Kenya mavuno	10			7	10
	MAC ...	4			3	8
	Gasirida	3			3	-
	Mamesa	3			1	1
	Umubano	3			2	2
	RWV 1129	3			-	-
	RWV 5348	3			2	2
			94	89	60	64



Both men and women sowing beans at Rwigembe village in Muleba District, Sept. 2013



Involvement of both men and women in fertilizer application and staking of the climbers at Rwigembe, October, 2013.



Daily monitoring of climbing bean field by farmers (Mrs. Kaijage and her family) at Nshambya in Bukoba peri-urban, October, 2013.



Immediate outcome 1.1

Activity 1.1.4.1.7. Design and mass production of information materials for the new bean based technologies

Promotional Materials-Posters & Leaflets produced & distributed

Zone	Title	Number of Copies
N.TZ	Poster:Utafiti Shirikishi wa Maharagwe Kamba - Bango	500
	Leaflet:Kilimo – MaharagweKamba	5,000
	Leaflet:Kilimo – Maharagwe(Bush)	5,000
	Booklet: Ujuzi wa Biashara kwa Wazalishaji Mbegu Wadogo Wadogo(Toleo la Pili)	1,500
	Booklet: Kuzalisha Mbegu ya Maharage (Kijitabu cha Kwanza)	2,500
S.H. TZ	Poster:Teknolojia za uzalishaji bora wa maharage	206
	Leaflets	1000

Immediate outcome 1.1

- **1.1.4.1.8. Carry out demonstrations, seed fairs, Agriculture shows and open days for pre-release/released varieties targeting different clients**
- **Nationally bean based technologies were displayed at NANENANE (Arusha and Bukoba) exhibitions and information on the preference of traders, processors, exporters and farmers**
- **Seven(7) promising genotypes selected by farmers from UCT 2012 through PVS were planted for demo and further re-evaluation at Rhotia and Kilimatembo (Karatu district), Kwaraa village (Babati district), Masaera and Rauya villages (Moshi Rural district), in Northern zone of Tanzania**

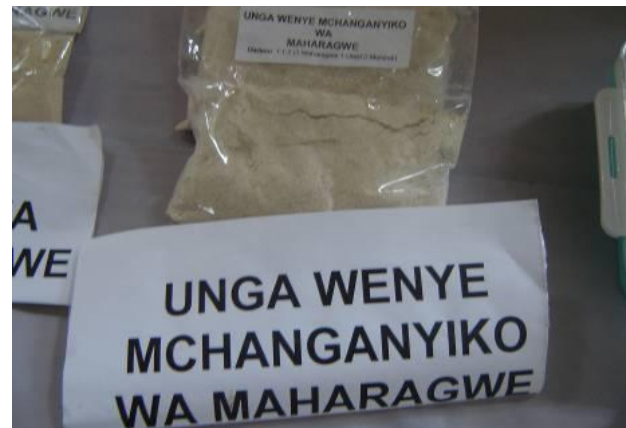
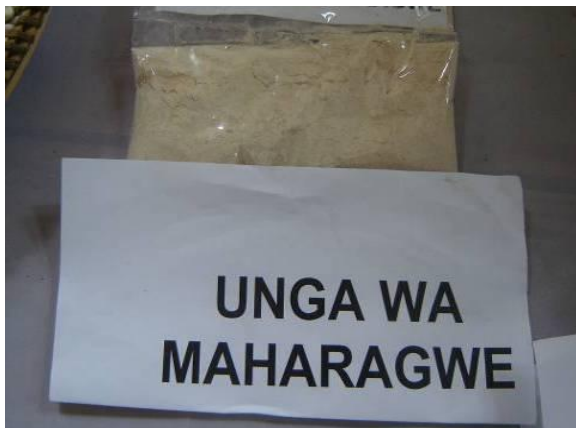
Field Day- LOLKISALE, MONDULI



Field day at Kagera



Exhibitions at NANENANE-Arusha: 2013



Number of People Reached

	Channels for Reach	Total	Male	Female
1	Nane-Nane	1671	741	930
2	World Food Day	100	43	57
3	Training/demonstration*	83	34	49
4	Radio message	10,000	4,000	6,000
	Total	11,894	4,818	7,076
	Percentage	100%	40%	60%
***	Seed access along	166,708	64,268	102,440

Agriculture show (Nane nane) 2013 at Kyakairabwa, Bukoba District



Cont; 1.7 Capacity building- **DEMOS, 2013**

Region	District	No. of Demos
Arusha	Arumeru	38
Arusha	Monduli	3
Kilimanjaro	Moshi Rural	20
Kilimanjaro	Hai	14
Manyara	Karatu	5
Manyara	Babati	12
Tanga	Lushoto	31
Tanga	Kilindi	3
		126

Cont; 1.7 Capacity building- QDS TRAININGS, 2013

Village	District	No. of participants	Gender	
			Males	Females
Leguruki	Arumeru	31	12	19
Ekenywa	Arumeru	29	14	15
Lolkisale	Monduli	28	18	10
Boheloi	Lushoto	45	19	26
Baga	Lushoto	48	20	28
Bashnet	Babati	30	12	18
Kilimatembo	Karatu	28	11	17
Mungushi	Hai	25	-	25
Koboko	Siha	34	15	19
	Bukoba, Misenyi, Muleba, Karagwe, Kyerwa, Biharamulo and Rorya districts	55	37	18
		353	158	195

Categories of Seed producers **trained** on Quality declared seed production – Kagera 2013

S/N	Category	Gender		Total
		Men	Women	
1	Farmers	26	15	41
2	Agriculture extension officers	6	1	7
3	Researchers	3	1	4
4	University Students	2	1	3
Total		37	18	55



Cont; 1.7 Capacity building- **FIELD DAYS, 2013**

Village	District	No. of participants	Gender	
			Males	Females
N. TANZANIA				
Leguruki	Arumeru	31	11	20
Ekenywa	Arumeru	29	13	16
Lolkisale	Monduli	28	18	10
Bohelo	Lushoto	> 200		
Baga	Lushoto	> 200		
Bashnet	Babati	120	43	77
N. WESTERN TZ.				
Kibona & Irango	Karagwe & Bukoba	240		

Immediate outcome 1.1

Immediate Outcome 1.2. Increased access to cost effective and environmentally friendly integrated stress management options (e.g. for soil fertility and water, pest and diseases) by particularly women farmers

1.1.2.1.3 To make follow-up technologies developed by individual countries in an earlier snap project to streamlined and confirmed regionally.

Activity 1: VALIDATION FOR SNAP BEANS INTEGRATED CROP MANAGEMENT (ICM) TECHNOLOGIES FOR IMPROVED LIVELIHOOD WITH RESPECT TO INTEGRATED PEST MANAGEMENT (IPM) STRATEGIES

- **IPM options were validated at Madiira and Rundugai.**
- **The treatments were arranged using RCBD design with three replications.**

Table 1: Mean counts/scores for insect pests and yield – Madiira farm

Treatment	Plant stand at Emerg.	Plant stand at harvest	BSM (<i>O.Spencerella</i>)			White flies (cm ²)		Aphids		Yield Kg/ha
			Dead plants	1 st count	2 nd count	1 st count	2 nd count	1 st count	2 nd count	
1. Control	214	107	102	1.0	4.2	1.7	3.7	2.7	3.0	3503
2. Farm practice	100	5.0	79	1.0	3.6	1.1	2.7	2.3	2.7	206
3. Apron + Nimbecidine	284	232	33	0.2	3.6	0.8	2.3	1.7	0.7	14799
4. Apron-strip, crop + pyrethroid	247	224	22	0.1	3.0	0.5	1.3	1.7	0.7	26984
5. Apron + Pyrethroid + Nimbecidine	268	187	50	0.4	3.0	1.0	1.8	0.3	0.3	24021
6. Nimbecidine + pyrethroid	239	198	39	0.3	3.3	0.7	1.7	1.7	0.7	15238
G.M	226	159	54	0.3	3.3	1.0	2.2	1.3	1.3	14125
LSD (5%)	51	56	62	0.4	1.2	1.2	1.3	1.9	2.4	12896
Sign.	x	x	x	NS	x	x	x	x	x	x

Table 2: Mean counts/scores for insect pests and yield – Rundugai (Hai – District)

Treatment	Plant stand at Emerg.	Plant stand at harvest	BSM (<i>O.Spencerella</i>)			White flies (cm ²)		Aphids		Yield Kg/ha
			Dead plants	1 st count	2 nd count	1 st count	2 nd count	1 st count	2 nd count	
1. Control	259	199	4.3	0.2	0.4	1.7	2.0	2.3	2.3	8302
2. Farm practice	247	101	3.7	0.3	0.3	2.7	0.7	2.0	2.0	4747
3. Apron + Nimbecidine	235	148	2.7	0.2	0.2	0.7	2.0	1.3	1.0	9788
4. Apron-strip, crop + pyrethroid	289	102	2.3	0.0	0.1	1.0	1.3	1.3	1.0	17630
5. Apron + Pyrethroid + Nimbecidine	356	197	2.7	0.0	0.2	0.7	0.3	1.5	1.0	22381
6. Nimbecidine + pyrethroid	278	209	2.0	0.1	0.3	1.0	2.0	1.7	1.0	21905
G.M	278	159	2.9	0.1	0.3	1.3	1.4	1.7	1.4	14125
LSD (5%)	113	54		0.2	0.4	3	2.6	2.2	3.9	1752
Sign.	NS	NS	x	x	NS	NS	NS	NS	NS	x

Activity Set # 1.2.1.1. Develop/identify simple, effective, environmentally friendly IPDM management options

Activity 2: VALIDATE ENVIRONMENTALLY IPDM FRIENDLY MANAGEMENT OPTIONS AND SCALE UP WITH PARTNERS

❖ Introduction.

- Phaseolus beans are attacked by many insects pests and disease.
- However, since the study is carried out during the off-season, it is anticipated to have more of insect pests than diseases.
- Bean Stem Maggot (BSM), whiteflies and aphids are mostly the target key pests.
- Whiteflies are now becoming are major pest in bean growing areas in northern Tanzania.
- This could be associated with major climate change.

Objective

- To validate environmentally friendly IPDM management options.
- To scale up the most effective options with the partners

The study was conducted in Hai District at Mungushi Village in 2013B.

Table 1: Mean counts/scores for insect pests and yield

Treatments	Plant stand at Emerg.	Plant stand at Harvest	BSM		Whiteflies	Aphids	Yield
			Dead Plants	Count	Count	Count	Kg/ha
1.Control	64.7	60.3	6.7	2.3	4.7	3.7	859.5
2.Apron+Nimbecidine	61.7	60.3	5.3	2.0	4.0	1.7	1719.0
3.Apron+pyrethroid	61.0	59.7	4.0	1.0	2.7	1.3	1485.0
4.Apron+DAP	61.7	69.7	3.0	1.7	4.0	3.3	2187.0
5.Apron+Orius+Astar	63.0	60.7	4.2	1.0	2.3	2.3	1407.0
6.FYM	62.7	60.7	3.4	2.0	4.7	3.3	1719.0
G.M	61.9	60.2	4.2	1.7	3.7	2.6	1562.4
LSD (5%)	6.6	5.6	2.6	0.9	3.2	2.7	1227.0
Sign.	NS	NS	x	x	NS	x	x

Conclusion and Recommendations

- Plots treated with fertilizers had higher seed yields i.e. 2187 kg/ha and 1719 kg/ha for DAP and FYM respectively.
- This is reflected that by increasing soil fertility, level of crop tolerance can be increased
- Though BSM infestation was slightly higher 1.7 insect/plant (DAP) and 2.0 insect/plant (FYM) as compared with 1.0 insects/plant for plots with apron star + pyrethroid and apron star + orius + Astar.

Cont; Activity Set # 1.2.1.1 Develop/Identify new/existing options and strategies for managing different stress environments

1.2.3.1.2.4. Validate snap bean integrated crop management technologies for improved livelihoods (ASARECA - UG, KE, RW, TZ) **WITH RESPECT TO INTEGRATED NUTRIENT MANAGEMENT (INM) STRATEGIES**

- 4 INM options were validated at Madiira and Rundugai.
- The treatments were arranged using RCBD design with three replications.

Table: 1 Agronomic Data at Madiira -2013

Treatments	Plnt at emerg	Stand at harv.	Pod width	Pod lenght	Pods /plant	Yield /Ha
1. FYM 5 t/ha & Minjingu Mazao (30kg/ha)	289.3	260	0.53	13.17	7.33	10629
2. FYM at 5 tons/ha + DAP (30kg/ha)	261.7	257	0.54	13.46	8.33	11823
3. FYM at 5 tons/ha + CAN (60kg/ha)	212.7	209	0.55	13.63	9.00	13865
4. DAP-CAN combination:	212.3	370	0.53	13.57	6.00	15786
5. Check plot (Farmers practice)	410.5	370	0.53	13.57	6.00	5786
GM	277.3	261	0.536	13.468	7.532	11273.4
CV (%)	10.2	1605	6.87	4.33	21.9	16.5
Lsd (P=005)	51.31	78.6	0.34	3.68	3.01	1300.2
Sign	x	x	ns	ns	ns	x

Table:2 Agronomic Data at Madiira -2013

Treatments	Plnt at	Stand	Pod	Pod	Pods	Yield
	emerg	at harv.	width (cm)	length (cm)		
1. FYM (t 5 t/ha&Minjingu Mazao (30kg/ha)	271.3	260	0.53	14.76	7.33	14765
2. FYM at 5 tons/ha + DAP (30kg/ha)	230.3	267	0.52	23.46	8.33	15371
3. FYM at 5 tons/ha + CAN (60kg/ha)	257	183	0.57	14.45	9	20399
4. DAP-CAN combination:	190	177	0.59	14.52	7	22256
5. Check plot (Farmers practice)	303.7	274	0.57	15.16	6	6912
	1252.3	1161	2.78	82.35	37.66	79703
GM	250.46	232.2	0.556	16.47	7.532	15940.6
CV (%)	14.1	17.6	11.3	7.83	21.9	28
Lsd (0.05)	65.72	74.2	0.12	2.34	3.008	905
Sign	x	x	ns	ns	ns	x

1.2.1.1.2.2 Identify/validate simple environmental friendly ISFWM options (e.g. organic manure in association with inorganic fertilizers)

Activity 1: VALIDATION OF SIMPLE ENVIRONMENTAL FRIENDLY ISFWM /IPDM - A CASE STUDY OF FOLIAR FERTILIZERS ON BEAN PRODUCTIVITY IN HAI DISTRICT -NORTHERN ZONE- TZ

Treat. Foliar fertilizers

- 1. Byfolan**
- 2. Mukpar Booster**
- 3. Booster**
- 4. Kyto Booster**
- 5. Synergiser**
- 6. Agro-feed**
- 7. Control**

Treatments	Plant at emerg	Stand at harv.	Aphids	Pods per plant	Seed / pod	Yield/Ha (kg)
1. Byfolan	59.0	60.7	1.3	8.9	6.1	1222
2.Mukpar Booster	55.3	55.7	1.0	8.3	6.3	1111
3 Booster	60.3	55.0	1.0	8.3	6.2	1447
4.Kyto Booster	53.3	58.3	1.0	9.3	6.2	1400
5.Synergiser	59.0	63.7	1.0	7.7	6.5	1222
6.Agro-feed	52.7	55.3	1.3	14	6.5	2000
7.Control	63.3	64.3	1.3	8.4	6.2	1488
GM	57.56	59.00	1.13	9.27	6.29	1413
CV%	10.4	6.1	33.1	17.6	6.1	31
Lsd(0.05)	10.6	6.4	0.7	1.5	3.3	387
Sign	x	x	ns	x	ns	x

1.2.1.1.2.2 Identify/validate simple environmental friendly ISFWM options (e.g. organic manure in association with inorganic fertilizers)

Activity 2: RESPONSE OF ORGANIC AND INORGANIC FERTILIZERS ON BEAN PRODUCTION IN HAI DISTRICT – NORTHERN ZONE - TZ

- The organic and inorganic fertilizer effect on growth and yield of bean plants are shown in Tables. The results revealed that the use of DAP-CAN combination: 43.2kg N/ha as DAP at planting and 46.8 kg N/ha top dressed as CAN at 21 DAE. This was followed by FYM at 5 tons/ha + CAN (60kg/ha. The control plot had the least at Mungushi

Table I: Agronomic data at Mungushi – 2013

Treatments	Plant at emerg	Stand at harv.	APHIDS	No. of pods/plant	No. of seeds/pod	Yield (kg/ha)
1. FYM	65.0	65.0	1.33	4.87	3.80	1666
2. DAP	62.0	62.0	1.33	4.73	4.07	2287
3. Minjingu mazao	62.3	59.3	1.33	5.47	3.87	1874
4. FYM + DAP	60.7	56.7	1.00	5.00	3.93	2384
5. FYM + Minjingu mazao	63.0	62.0	1.33	4.27	3.80	1978
6. DAP-CAN combination	65.5	65.3	1.00	5.27	4.13	2484
7. Control	59.0	56.3	1.67	4.40	3.93	1462
GM	62.50	60.94	1.28	4.86	3.93	2019.29
CV%	8.3	12.7	38.0	17.7	13.4	40.7
Lsd(0.005)	9.03	13.6	0.855	1.502	0.923	672.9
Sign	ns	x	ns	ns	ns	x

Immediate outcome 1.2. Increased access to cost effective and environmentally friendly integrated stress management options (e.g. for soil fertility and water, pest and diseases) by particularly women farmers

Activity 1.2.1.1. Review the status and characterize old/new pests and diseases including angular leaf spot, anthracnose, root rot , web blight, rust, halo blight, bean stem maggot, bruchids, aphids and white flies in N. Tanzania.

- **Status of insect pests**
- **Identification of WHITEFLIES SPECIES.**
- **Samples for Whiteflies were collected from the field during the short rain season.**
- Analysis of whitefly samples was done .
- The results show that all of them are *Trialeurodes vaporariorum* and not *B. tabaci* as earlier thought (*by Artua Valente*)
- Any possibility of virus transmission in the fields will be checked in the coming growing season.

Output

1.3.1. Ten (10) bean varieties with enhanced micronutrient concentration and superior agronomic traits developed accepted/released and widely disseminated

1.3.1.1.2: Conduct multi-location bean yield trials in national testing systems (PYT, AYT, NYT) on station/on farm for **micro-nutrient** rich bean varieties (CD, DRC E/W, RW, UG, BU - H+) TZ, SW, ZM,LS,MZQ,)

- Evaluated **49 High Fe rich** bean lines (**21 bush** and **28 climbing types**) at Selian A.R.I (Arusha region) and Machine Tools (Kilimanjaro region)



Bush types: 7 lines out of 21 yielded > 1 ton (Mean 819 kg/ha)

S/N	Line	ALS	CBB	BCMV	Days to Maturity	Yield (kg/ha)
1	SEMC	1.0	4.6	1.0	92	1206
2	KAB06F2-8-27	1.0	1.6	1.0	94	1104
3	CODMLB 033	1.0	2.6	1.0	92	1096
4	LOCAL	1.0	3.6	1.0	93	1062
5	KAB06F2-8-36	1.0	3.0	1.0	95	1048
6	HM 21-7	1.0	4.3	1.0	95	1045
7	RWR 2245	1.0	3.0	1.0	95	1010
***	GRAND MEAN	1.0	2.6	1.14	93	819

Climbing types: 14 lines out of 28 yielded above the mean (1491 kg/ha)

S/N	Line	DFP	ALS	CBB	BCMV	Yield (kg/ha)
1	MAC 72	45	1.0	1.6	1.3	2067
2	SEL 06	46	1.0	2.6	2.3	2032
3	DECELEYA	46	1.0	1.6	2.3	1998
4	RWV 1129	45	1.0	2.3	1.6	1803
5	AGRONOME 2	45	1.0	1.3	2.6	1718
6	VCB 81013	45	1.0	3.0	1.6	1712
7	VRA 4	44	1.0	2.6	1.6	1671
8	KIVUZO	48	1.0	2.6	3.3	1656
9	MAC 42	45	1.0	1.6	1.6	1652
10	KIANGARA	45	1.0	3.3	2.6	1588
11	MAC 74	44	1.0	1.6	1.3	1579
12	MAC 74	47	1.0	2.3	1.6	1578
13	NDIMIRAKAGUJA	45	1.0	2.6	1.3	1574
14	GARUKURARE	44	1.0	2.6	2.3	1512

NUTRITION:

Activity set # 1.3.2.2. Bean based food technologies targeted to address specific nutrition deficiencies developed and promoted on vulnerable households and communities

PABRA Planned Activities:

- ***Training on utilization of micronutrient rich products***
- ***Facilitate nutrition platforms at country level***
- ***Carryout demos, agricultural shows and field days (open days) targeting farmers, organizations support vulnerable group***

A. PRODUCTS

1. Bean based basket = 6

- i. Beans cassava,
- ii. Sweet potato,
- iii. Bean – maize
- iv. Irish - potatoes
- v. Beans, finger millet and maize
- vi. Bean - wheat

2. Four types of Bean Snacks



(i) Kalbab



(iv) Sliced Bean bread



(ii) Samosa



(iii) Kalimati



3. Two types of Bean Composite flour

(i) Pure bean flour (complementary of other food baskets)

(iii) Bean Based Complementary Blend (Finger millet flour + maize flour + oil +sugar)



Finger millet flour + maize flour + bean flour + oil +sugar (porridge)

Trained Farmers on Bean Dishes



Participants enjoying Bean Dishes at Maji ya Chai , arumeru & district & quaraa , babati -district

B. Training of Trainers (ToT)

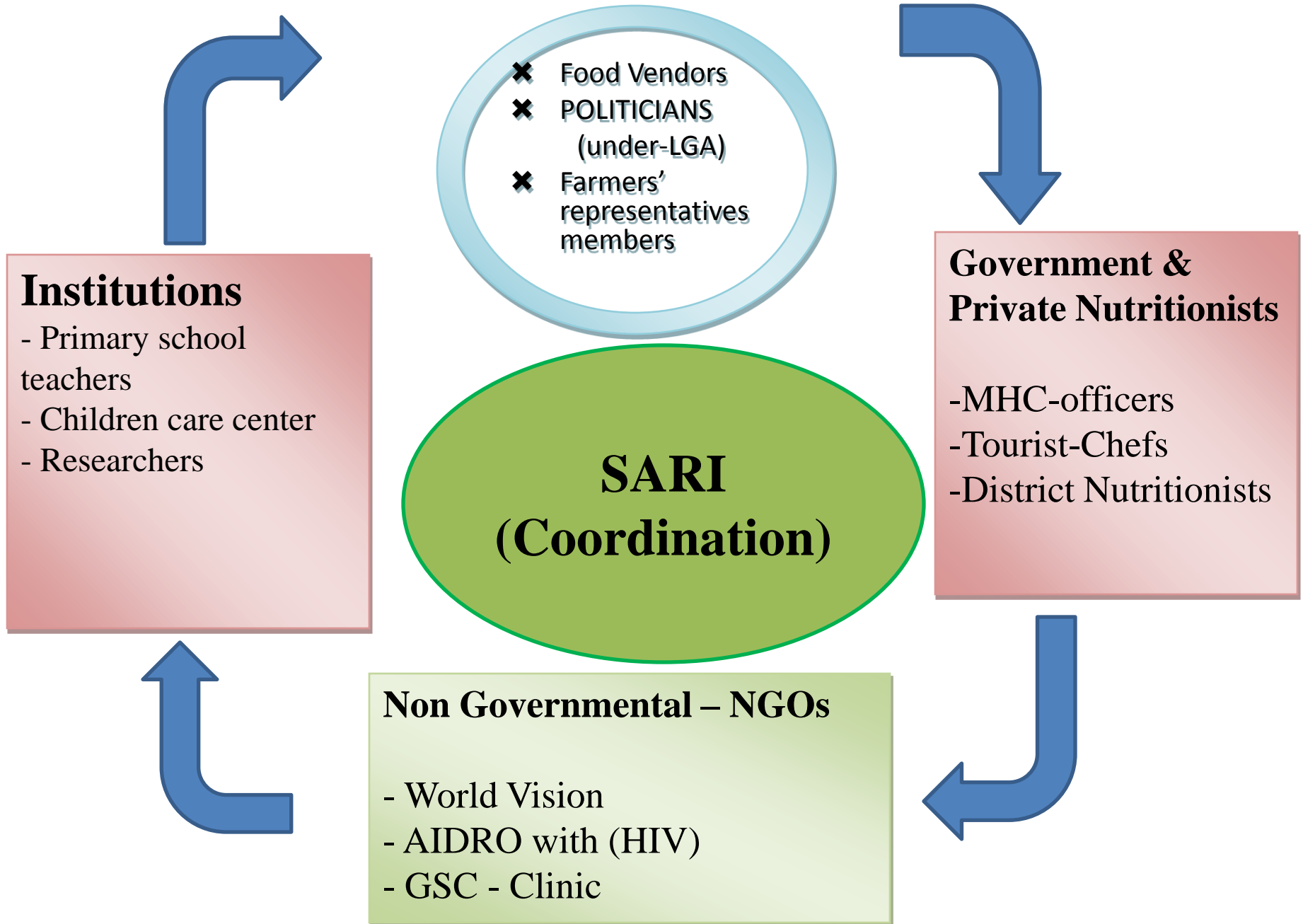
Training of ToTs on nutrition skills related to improved bean recipes for dissemination of the technology to the targeted communities:

- **22 ToTs trained (14 Women & 8 Men)**



Participants attended ToT at SARI station

C. SARI - Nutrition Bean Platform



D. Delivery system/channels

- **Five (5) delivery systems /channels were used for bean products and varieties**
 - i. **Agriculture Show – 2013 Themi, Nanenane ground - ARS; World Food Day -Katesh – Manyara region**
 - ii. **NGO/CBOs – farmer group (mainly through trainings and demonstrations)**
 - iii. **Train of trainers (ToT)**
 - iv. **Radio**
 - v. **Nutrition Bean-platform**

Delivery system/channels with pictures



- **NGO/CBOs – farmer group**
(mainly through training and demonstrations)



- **World Food Day Show-**
Bean recipes with different grain products at
Kateshi, Manyara region

E. Promotion materials

Types of promotion materials:

- i. Leaflets - 510**
- ii. Bean recipe and nutrition booklets - 400**
- iii. Poster – Diversify Bean Based RECIPES for Home & Commercial Purposes**
- iv. Training guide – Bean Nutrition, Preparation and Techniques –in relation to, nutrition requirement for different age and vulnerable groups**

Recommendations

1. There is a need of conducting multi-stakeholder analysis so that motivation mechanism can be established for different community actors.
2. There is a need for a strategic dissemination of bean recipes so as to facilitate bean recipes adoption into vulnerable groups in Northern Zone Tanzania e.g. taking advantage of big forums like World Food day, Farmers shows like Nane-nane etc.

Way forward

1. Different pathways and communication methods should be used to scale up dissemination of bean recipes in and out of Northern zone through: ***exhibitions, field days, local extension services, demonstrations, local radio-FM, Focus Group discussions, information centers –village level, and brochures, presentations – word of mouth, awareness video and pamphlets***
2. Cultural barriers making men not to participate in planning for household meals have to be broken. ***Collaboration of NGOs, Faith based organizations, and government institutions is required to address this challenge.*** The on-going case study on cultural barriers in bean consumption can be a starting point.

MARKET

Output: 1.1.6 A cross border seed trade of multiple released stress tolerant varieties in PABRA member countries within regional economic blocks (SADC, COMESA, EAC) initiated and increased

- Target: 1.1.6.1: 10% increase in bean volume traded by 2013 in at least 3 PABRA member countries within regional economic blocks (SADC, COMESA, EAC) initiated and increased
- Cross border bean seed and grain trade survey was conducted in North-West, Lake and Northern zones of Tanzania.

Cross border bean seed and grain trade survey

- (i) **In North-West zone:**

 - Kabanga** - (Tanzania/Burundi border)

 - Rusumo** - (Tanzania/Rwanda border)

 - Manyovu** - (Tanzania/Burundi border)

 - Mutukula** - (Tanzania/Uganda border)

- (ii) **In Lake zone:**

 - Sirari** - (Tanzania/Kenya border)

- (iii) **Northern Zone:**

 - Holili** - (Tanzania/Kenya border)

 - Horohoro** - (Tanzania/Kenya border)

 - Namanga** - (Tanzania/Kenya border)

Production of Bean Grain and Bean Seed for past 5 years.

YEAR	Bean GRAIN Production (Tonnes)	Bean SEED Production (Tonnes)
2008	570,750	39,075
2009	773,720	54,391
2010	867,530	33,195
2011	675,948	36,000
2012	780,000	36,000
Total	3,667,948	198,661

Lessons learnt and implications for the projects

- Involving farmers and other stakeholders facilitate the process of variety uptake
- Inclusion of market trait components improves attraction of private seed companies.
- Farmer understands the importance of using improved varieties and agronomic practices if they work together as a group (farmers, researchers and extension officers.
- Majority of bean farmers understand soils suitable for bean production, control of field and storage insect pests
- Majority of bean farmers experienced weather condition changes hence adjust planting date accordingly.
- Farmers need more field visits and participation by researchers and extension officers during the growing season.

Cont; Lessons learnt and implications for the projects

- Climbing beans are heavy feeders. The production of climbing beans needs both organic (for soil structure improvement) and inorganic fertilizers for better yield.
- Production of climbing beans in Bukoba area (an area with very poor soil fertility) is possible if farm-yard manure is used to improve the soil structure.
- Mass communication through radio created awareness to the majority of farmers on the importance of growing good quality seed for better yield and income. E.g. Urban, peri-urban and village people are visiting ARI Maruku or call, asking for improved good quality seed (climbing beans).

Major challenges encountered during the reporting period

- Lack of readily available transport
- Group management and maintenance - some of members not committed to the group.
- Change of attitudes of farmers from free public goods to investing in the project (produce bean seed as a business for sustainability)
- Uncompromising weather conditions (climate change) (Uncertain weather conditions affected planting calendar).
- Insect pests especially **Whiteflies and flower beetles**

Cont; Major challenges encountered during the reporting period

- Stakes, drought, diseases (viral and fungal), vermin (thieves especially in the villages).
- Limited Screenhouse space
- Inadequate funds to cover more sites/areas.

SUCCESS STORIES

- Kuwa na wazalishaji mbegu ambao wana uelewa wa kuzalisha mbegu daraja la kuazimiwa- (Availability of knowledgeable farmers who can produce QDS)
- Upatikanaji wa mbegu katika maeneo husika kwa muda unaohitajika na kwa bei nafuu– (Ready availability of seeds in time and affordable price to the respective areas)
- Wakulima na wazalisha mbegu wameongeza kipato chao –(Income increase of the farmers and QDS producers)
- Wananchi wanapoongeza kipato chao wana uwezo kuchangia miradi ya kijamii – Farmers are now able to contribute to social welfare activities in their areas)
- Lishe / protein inapatikana kirahisi kwa watu wa hali ya chini –Easily availability of protein to people with low income).
- Wazazi wametoa michango ya maharage ya wanafunzi mashuleni kwa urahisi – Farmers contributed grain beans to school to feed the pupils).

SUCCESES STORIES



NEXT AREAS OF FOCUS

1. Developing sustainable seed production and delivery systems (Beans)

- High quality breeder/Foundation/certified seed to sale to seed producers, NGOs, Farmer Organizations, and other stakeholders annually
- At least 500 well trained legume seed producers, extension officers and farmers

2. Design, test, and implement diffusion, marketing, and institutional arrangements

- At least 5 pilot marketing sites and pricing strategies that creates variety awareness implemented
- Agro-dealer networks in Tanzania engaged in small seed pack sales of beans

Cont; NEXT AREAS OF FOCUS

3. Enhancing local level capacity to produce, deliver, store and market seed

- At least six short courses on seed production and delivery completed by research technicians and extension agents
- At least one manual on seed production, seed processing and safe storage available

4. Enhancing local level awareness of released varieties

- At least 300 farmers in Tanzania provided with knowledge of seed production technologies and market information annually through agro-dealer outlets



ACKNOWLEDGEMENT

- CIAT/PABRA
- ECABREN
- BILL & MELINDA GATE FOUNDATION
- SARI & MARUKU Administration
- DALDO's/DED's (Northern & N.Western zone regions)
- FARMERS
- NGO;s & CBO;s.
- BEAN RESEARCH TEAM (SARI & MARI)