

Roots, Tuber and Bananas for Food Security and Income (RTB): update on recent impact assessment activities, strategy and plans



Research
Program on
Roots, Tubers
and Bananas

SPIA IAFP Meeting
Minneapolis, MN
July 25, 2014

Scientists directly involved with RTB IA

CIP: Guy Hareau (RTB IAFP), Julius Okello

IITA: Tahirou Abdoulaye, Arega Alene

CIAT: Ricardo Labarta, Bernardo Creamer, Glenn Hyman

Bioversity: Charles Staver, Diemuth Pemsl (consultant)

RTB: Graham Thiele, Director

Others: Ulrich Kleinwechter (exCIP), Joseph Rusike (exIITA),
Holger Kirscht (IITA)

Brief outline



- Update on RTB priority assessment study
 - The six steps process
 - Example of results:
 - Expert surveys: score ranks
 - Economic surplus/beneficiaries/poverty impacts
- Current strategy and plans for RTB IA in 2014-2015
- Highlights of Center-specific IA studies covering RTB crops

Why strategic assessment of RTB priorities?

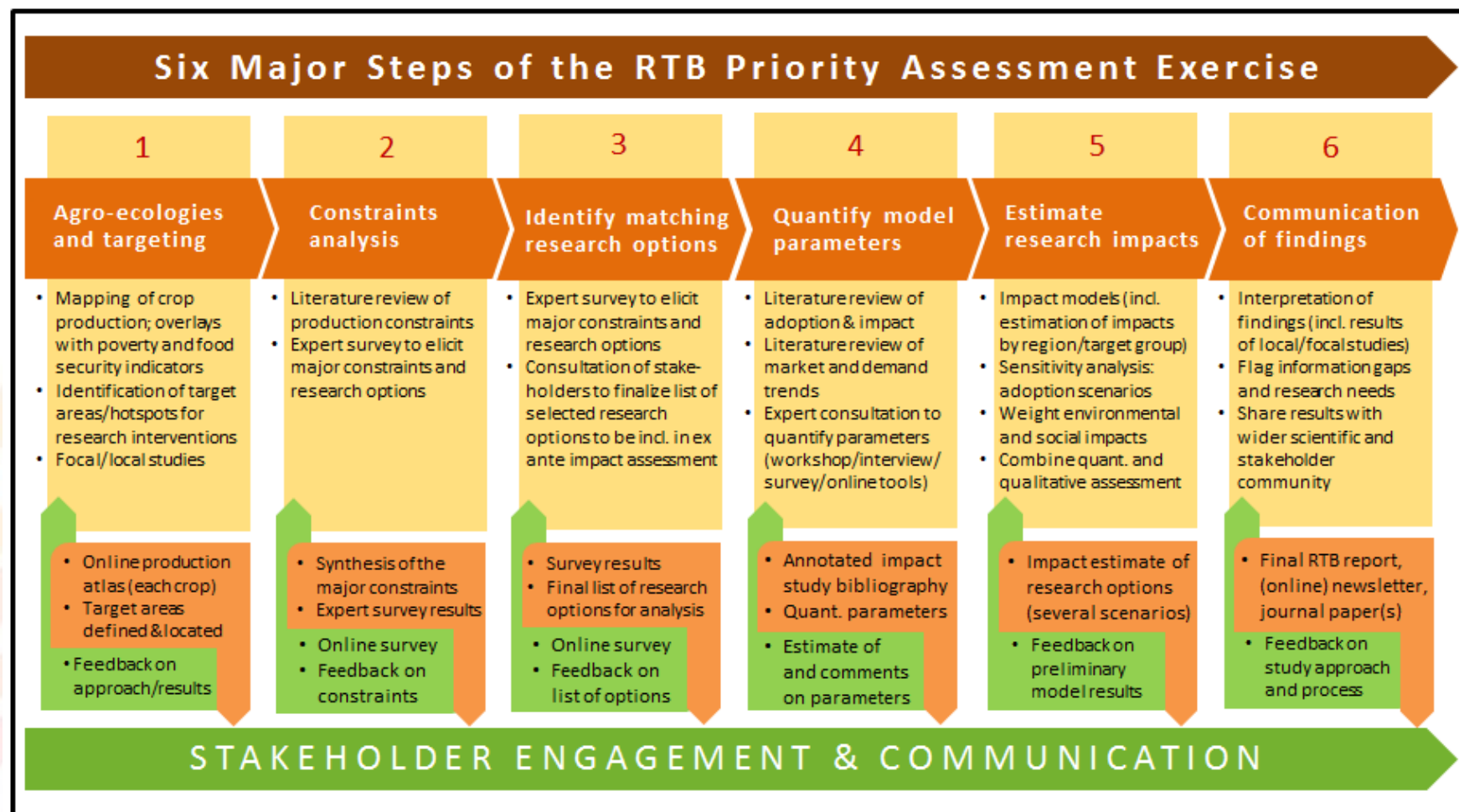


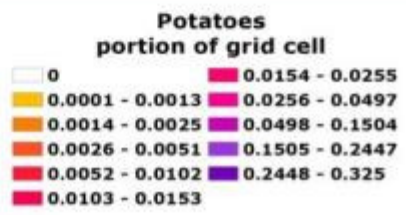
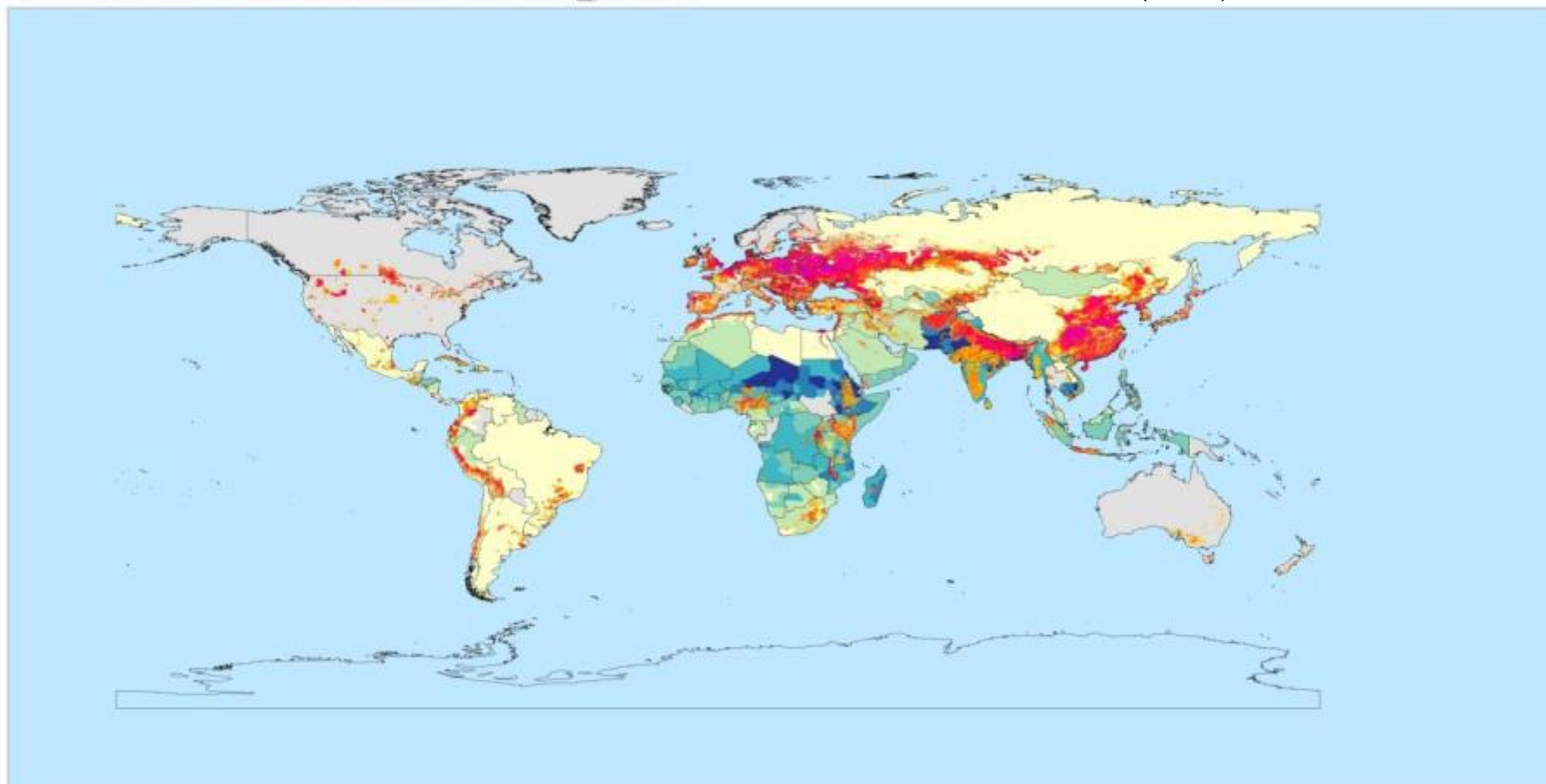
Limited resources for research

- Five crops: cassava, potatoes, sweetpotatoes, bananas and plantains, yams
 - Four Centers: Bioversity, CIAT, CIP, IITA, + CIRAD
 - Fund Council and ISPC requested rigorous priority setting exercise for RTB as condition of implementation
 - The purpose was to assess economic, poverty, food security, gender, health and environmental impacts of investments in alternative potential research areas of the RTB program
 - Ensure alignment with Strategic Results Framework (SRF) and System Level Outcomes (SLOs)
- What are the best alternatives to invest resources to achieve highest impacts through research?



Strategic assessment: the six steps process

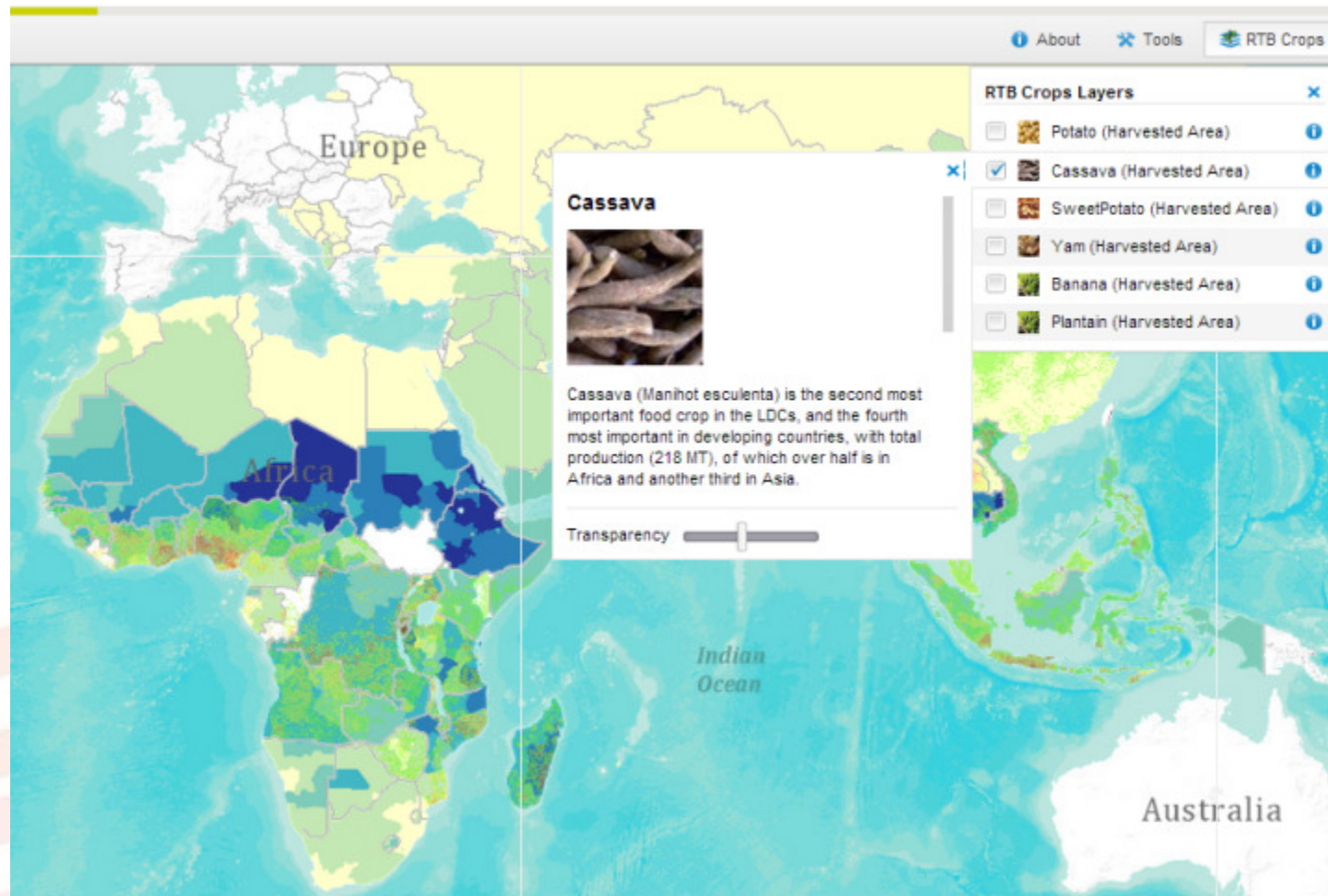




Online Atlas



Research Program on
Roots, Tubers
and Bananas



Agro-ecologies
and targeting

Constraints
analysis

Identify matching
research options

Quantify model
parameters

Estimate
research impact

Assess priority
research options

ROOTS
TUBERS &
BANANAS

RTBMaps Beta Version

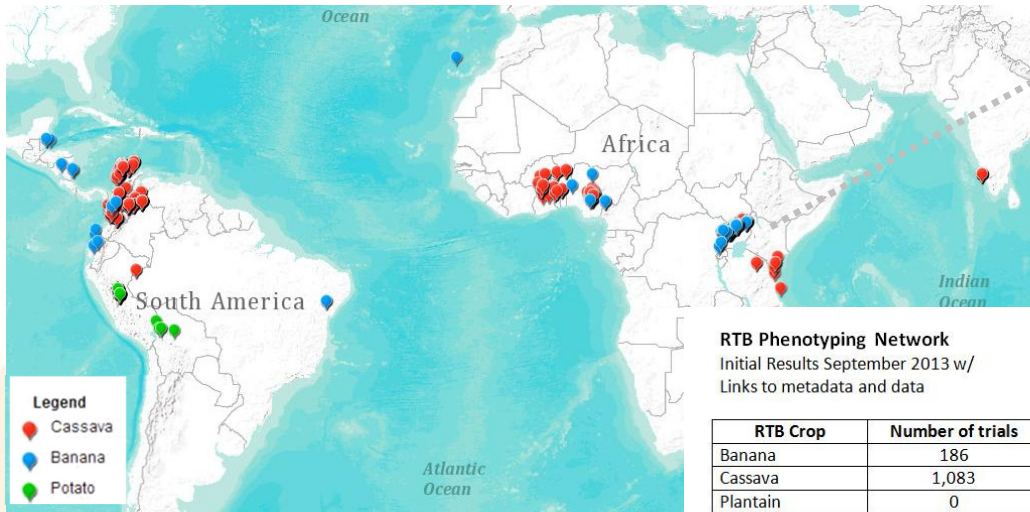
rtb.cgiar.org/RTBMaps/



Research Program on
Roots, Tubers and Bananas

Tools RTB Crops Abiotic Biotic Socio-economic Management Social

Evaluation sites – Trial Sites



RTB Phenotyping Network
Initial Results September 2013 w/
Links to metadata and data

RTB Crop	Number of trials
Banana	186
Cassava	1,083
Plantain	0
Sweet Potato	0
Yam	38

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Id: 2912

Trial group: Cassava breeding trials

Contact person: Edward Kanju - ekanju@cgiar.org

Country: Tanzania, United Republic Of

Trial site: Naliendele agricultural research institute

Field name number:

Name: 2009uytaliendele

Sow/plant date: 2009-01-01

Harvest date:

Irrigation: N/A

Technology: Cassava

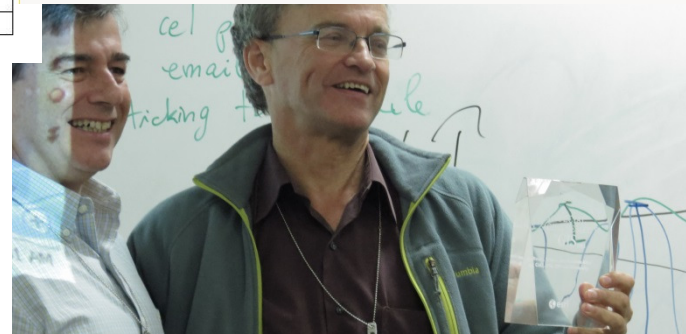
Varieties/Race: Khb 2001/136, Khb 2002/477, Khb 2002/482, Khb 2002/494, Khb 96/1056, Khb 96/108, Kigoma red, Kiroba, Ndi 2003/031, Ndi 2003/111, Ndi 2005/040, Ndi 2005/1471, Ndi 2005/1472, Ndi 2005/201, Ndi 2005/443, Ndi 2005/492, Ndi 90/034

Variables measured: Root number, Fresh weight of storage root, Fresh shoot weight, Taste of boiled roots, Necrosis, Ease_of_peel, Weight_in_air, Weight_in_water

2013 Special Achievement in GIS Awards
International

Managing Natural Resources

- Forest Change
- Visualizing Forests
- Agricultural Modeling
- Aquaculture
- Water Resources
- Food Production
- Palm Oil Sustainability
- Mangrove Biodiversity
- Food Security
- Groundwater Conservation



Special Achievement in GIS Award
ESRI International Conference -2013

Overview of expert survey final sample disaggregated by region and crop

	SSA	LAC	Asia	Others	Global	Total per crop
Cassava	200	32	35	8	40	315
Potatoes	59	127	170	18	37	411
Sweet potatoes	68	27	90	4	27	216
Bananas & Plantains	184	176	125	4	34	523
Yams	176	6	7	6	21	216
Total per region	687	368	427	40	159	1,681

Agro-ecologies
and targeting

Constraints
analysis

Identify matching
research options

Quantify model
parameters

Estimate
research impact

Communication
of findings

Global mean score: top 4 highest ranked research options by crop (I)



Crops and research options	Global <i>Mean score</i>	LAC <i>Mean score</i>	SSA <i>Mean score</i>	Asia/P <i>Mean score</i>	CGIAR <i>Mean score</i>	Male <i>Mean score</i>	Female <i>Mean score</i>
BANANAS and PLANTAINS:							
Breeding for high yield	4.21	4.14	4.40	4.05	4.17	4.25	4.07
Management of fungal leaf disease (excl. resistant varieties)	4.11	4.40	3.88	3.85	3.77	4.16	3.91
Breeding for resistance to fungal leaf diseases	4.11	4.45	3.82	3.85	3.71	4.15	3.95
Strategies to improve soil fertility (micro-nutrients and fertilizer)	4.08	4.18	4.18	3.82	4.03	4.12	3.89
CASSAVA:							
Improving shelf life of cassava roots	4.24	4.28	4.10	4.11	<i>n.d.</i>	4.23	4.27
Improving production and distribution of elite planting materials	4.24	4.18	4.16	3.79	<i>n.d.</i>	4.21	4.36
Cassava Mosaic disease(Disease management)	4.24	3.89	4.29	3.73	<i>n.d.</i>	4.20	4.34
Developing cassava products for industrial applications (flour and starch)	4.18	4.36	4.04	4.10	<i>n.d.</i>	4.14	4.27
POTATOES:							
Late blight control and management	4.71	4.63	4.77	4.77	4.52	4.68	4.80
Breeding for late blight resistance	4.60	4.56	4.52	4.66	4.36	4.57	4.78
Breeding for drought tolerance / water use efficiency	4.51	4.56	4.34	4.62	4.70	4.47	4.67
Breeding for earliness	4.49	4.48	4.66	4.52	4.78	4.49	4.49

Global mean score: top 4 highest ranked research options by crop (II)



Crops and research options	Global <i>Mean score</i>	LAC <i>Mean score</i>	SSA <i>Mean score</i>	Asia/P <i>Mean score</i>	CGIAR <i>Mean score</i>	Male <i>Mean score</i>	Female <i>Mean score</i>
SWEET POTATOES:							
Improving the quality of planting material (e.g., elimination of diseases)	4.35	4.29	4.71	4.15	4.48	4.30	4.48
Pro-vitamin A (beta-carotene) (breeding)	4.28	4.21	4.70	4.02	4.52	4.20	4.51
Breeding for high yield	4.26	4.21	4.61	4.10	4.42	4.21	4.41
Improving production and distribution of elite planting materials (formal seed systems)	4.21	4.21	4.46	4.08	4.35	4.19	4.27
YAM:							
Improving shelf life of yam tubers	4.30	4.50	4.47	<i>n.d.</i>	4.29	4.25	4.58
Improving soil fertility)(micro-nutrients, fertilizer, organic matter)	4.17	4.17	3.98	<i>n.d.</i>	4.31	4.15	4.41
Improving small scale processing of yam for human consumption	4.13	3.80	4.23	<i>n.d.</i>	4.16	4.02	4.55
Improving technologies for farmer based production and distribution of planting materials(informal)	4.10	4.50	4.13	<i>n.d.</i>	4.27	4.15	4.13

Ex-ante assessment of research options for RTB crops: some results of the economic surplus model.



Technology	Adoption ceiling		All Benefits				Number of beneficiaries				Poverty reduction	
	Lower adoption '000 ha	Higher adoption '000 ha	Lower adoption		Higher adoption		Lower adoption		Higher adoption		Lower adoption '000 persons	Higher adoption '000 persons
			NPV (m USD)	IRR	NPV (m USD)	IRR	'000 households	'000 persons	'000 households	'000 persons		
Banana Bunchy Top Virus (BBTV)	413	793	1,198	56%	2,756	74%	2,063	10,030	3,966	19,013	725	1,400
Cassava high yielding varieties w/CMD&CBSD resistance	2,610	5,200	1,201	69%	2,420	82%	21,100	136,000	42,000	272,000	1,000	2,010
Potatoes Late Blight resistance	774	1,548	1,803	62%	3,738	80%	2,109	9,466	4,217	18,932	306	616
Orange-Flesh Sweet Potato	673	1,346	531	34%	1,232	50%	2,999	14,675	5,998	29,349	451	908
Yam clean planting materials and agronomic practices	660	2,190	589	40%	2,076	58%	2,420	17,860	8,050	59,520	190	630

RTB strategic assessment: achievements and further steps





- 11 reports (now under review process)
- Large data set (>1,650) on experts/stakeholders and opinions (still to be analyzed in full)
- Database of parameters for ex ante assessment of technologies
- Enhanced comparability of results: same approach for all five crops
- Capacity building of Centers' impact assessment teams
- Gender assessment in progress: case studies based on focus groups
- Data can be used to look at other types of impacts and learning from model comparisons (e.g. IMPACT) => linkage with PIM
- Several aspects not fully captured (e.g., environmental impacts, demands from a broader set of stakeholders and final beneficiaries)
- Improve modeling of yield losses: extent and severity of diseases and pests
- Links with yield gaps analysis being generated

RTB Impact Assessment strategy 2014-15

- Strategy is to continue strengthening links with advanced research institutions, SPIA and other CRPs in joint initiatives and leveraging resources: e.g. SIAC objective 2.1
- Finding common areas of interest and synergies across Centers and crops: DNA fingerprinting for cassava varietal identification and improved estimates of yield gains
- Links with RBM pilot sites will be explored: e.g. seed potato in Kenya
- Moving towards cross-center and multi-crop IA opportunities
- RTB currently directly supports IA through PMU funds
- Funding for full projects costs still an issue, puts pressure on scientists to cover their time; centers supporting IA with different strategies

RTB direct support to IA studies 2014-15

-  Re-engaging stakeholders: leveraging banana priority assessment and network analysis for more effective outcomes and impact of RTB research
-  Towards a better impact assessment of the cassava genetic improvement in Asia and Latin America
-  Outcomes of crop germplasm improvement research: potatoes and sweetpotatoes varietal release and adoption in Asia
-  Assessing adoption and impacts of improved cassava varieties on poverty reduction in Nigeria.

Other center-specific IA studies (RTB crops)



- Parallel to priority assessment, Bioversity commissioned an **impact assessment in relation to its banana research** over the past 10-15 years to understand scope and scale of its impact and ways to improve it
- Ex post assessment focused on **three sets of activities**: 1) delivering new varieties; 2) IPM and crop management; and 3) market activities (planting material delivery and value chains)
- **Final reports** submitted in May 2014 (Tripp 2014a,b)
- In addition, we started analyzing the **outreach of the international and regional networks** coordinated by Bioversity, with a focus on research partners as next users of our outputs (draft report available)
- This **network analysis will be broadened** to include downstream partners, aimed at better understanding how research outputs and outcomes translate into development outcomes and impact over time

Other center-specific IA studies (RTB crops)



- New partnerships for building impact assessment (SIAC Obj.4, led by Virginia Tech, with CIP and CIFOR).
 - Impacts of potato variety Cooperation 88 in China
 - CIP Gene bank
- Impacts of High-Quality Potato Seed on Household Well-being in Kenya: Factors Influencing Wide-spread Adoption of a Key CG Technology (submitted to SPIA with Virginia Tech and SSA Potato program)
- Milking DIIVA data: additional studies on determinants and constraints to adoption (Rwanda, Uganda an Ethiopia)
- Impact Evaluation of the “Scaling Up Sweet potato Through Agriculture and Nutrition (SUSTAIN)” Project in East and Southern Africa - RCT in Rwanda + Malawi (with Michigan State University)

Other center-specific IA studies (RTB crops)



- Assessing impact of adoption of yam technologies in West Africa
 - Under YIISFWA project funded by BMGF in Nigeria and Ghana (Baseline conducted in Ghana and Nigeria).
- Impact of R4D interventions on Cassava of SARD-SC project in Sierra Leone, DRC, Tanzania and Zambia. - Baseline surveys completed in all countries.
- Ex-ante impact of GM Banana resistant to BXW (on-going)
- In collaboration with Global futures (Led by IFPRI), assess potential impact of improved Cassava varieties
- Adoption of Cassava Varieties in Ghana (Led by MSU)



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Thank you

