Annex 10.1:
Case Study on Northern Nicaragua Action Site

Introduction of improved pasture seeds in integrated production systems is a key farmer priority in Nicanorte to enhance livestock productivity for income; and there is frequent realization of soil enhancement from such pastures that improves subsequent crop performance in the rotation.

Photo by E. Kueneman, 2015.

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ACRONYMS

CATIE	Tropical Agricultural Research and Higher Education Center
CCEE	CRP-Commissioned External Evaluation
CGIAR	Name of the CGIAR Fund and Consortium of Centers
CIAT	International Center for Tropical Agriculture
CIP	International Potato Center
COP	Community of Practice (diverse stakeholders engaged in a common thematic)
CRP	CGIAR Research Program
CRS	Catholic Relief Service
FTA	CGIAR Research Program on Forests Trees and Agriculture
HI	Heifer International
IAC	Independent Advisory Committee
ICRAF	World Agroforestry Centre
IDO	Intermediate Development Outcome
IEA	CGIAR Independent Evaluation Arrangement
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
INTA	Instituto Nacional de Tecnologia Agricola
IPM	Integrated Pest Managment
SIMAS	Servicio de Información Mesoamericano sobre Agricultura Sostenible
SLO	System-Level Outcome
SO	Strategic Objective
SRF	Strategy and Results Framework
SRT	Strategic Research Theme
UNA	National Agrarian University
WUR	Wageningen University and Research Center

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Introduction

1.1 Overview on the Central America and the Caribbean Flagship

The Central America and the Caribbean (CAC) Flagship, consists of three Action Sites (northern Nicaragua, greater Trifinio in Honduras-Guatemala-El Salvador, and the border region in Haiti-Dominican Republic), which is characterized by erosion and nutrient depletion of soils resulting in degradation of 75% of agricultural lands. Table 1 below provides the description of each Action Site.

Table 1. Basic description of Action Sites in CAC Flagship.

Action Site	Geographic area[1]
Northern Nicaragua	The Northern Nicaragua Action Site includes six Departments and covers 56 municipalities stretching from the municipality of Somotillo in the west to the border region of the Northern Atlantic Autonomous Region (RAAN) in the east.
Greater Trifinio bordering Honduras, Guatemala and El Salvador	Research activities were not initiated due to budget cuts, and therefore no selection of specific sites was made.
Border region between Haiti and the Dominican Republic	Haiti: Departments of Nord-Est. Centre Dominican Republic: Provinces of Dajabón, Rodriguez, Santiago, La Vega.

The CCEE Team has used the Nicaragua Action Site as a "Critical Instance Case Study" of the CAC Flagship to examine several Field Sites for the purpose of understanding the implementation and accomplishments to date of Humidtropics. These finding combined with those from other case studies and from a wide range of diverse sources of information, inform to make up the findings reported in the Main Report of the CCEE.

Table 2 below lists the key partners involved in each Action Site. Their level and nature of involvement is described in detail in Section 3.2 of this report on the CAC Flagship.

Table 2. Major partners in Action Sites in CAC Flagship.

Action Site	Major partners[2]
Northern Nicaragua	CIRAD, APROMUWA, CATIE, CESESMA, INTEWAS/FUMAT, ADDAC, URACCAN, Wageningen University, Foro, Miraflor, FEM, ASDENIC, OCTUPAN, UNAG, UNI Norte, INTA, MAG, UCA, SOPPEXCCA, FUNJIDES, Asociación de Educación y Comunicación "la Culculmeca", Universidad Nacional Autónoma de Nicaragua-León *Core partners*: CIAT, Bioversity International
Greater Trifinio	See Table 1 above. No partnerships initiated.
Haiti / Dominican Republic	LWR, IDIAF, MARNDR, Veterimed, FAES, REDDOM *Core partners*: CIAT, Bioversity International

[1] Humidtropics. June 2015. Implementation Status Report – Central America and Caribbean.
[2] Source: Humidtropics. June 2015. Implementation Status Report – Central America and Caribbean.

In the northern Nicaragua Action Site, referred to as Nicanorte, the research focus is on three major land use systems: 1) maize-bean-livestock-tree in degraded hill-lands referred to as the Quesungual System; 2) coffee-banana-tree systems; and 3) cocoa-banana-tree systems.

Table 3 below outlines the activities and entry themes that correspond to the land use system in each Action Site.

Table 3. Activities and entry themes in Action Sites in CAC Flagship.

Activities[3]	Entry themes[4]
Northern Nicaragua	
Cocoa Territory: Rancho Grande/Wasala ▪ Finalized situation, territorial, organizational analysis ▪ Market Access Realities of Rural Families in Remote Communities and Novel Products and Value Chains to Increase Rural Women's Income (ongoing) ▪ Gender strategy developed Mixed system basic grains & livestock Territory: Esteli/Condega: ▪ Finalized. Situation, territorial, organizational analysis ▪ Market Access Realities of Rural Families in Remote Communities and Novel Products and Value Chains to Increase Rural Women's Income (ongoing) ▪ Gender strategy developed ▪ Eco-efficient crop and livestock production for the poor farmers in the sub-humid hillside areas of Nicaragua (improved agroforestry system) ▪ Scaling of Agro-ecological Production in Nicaragua Coffee Territory: Jinotega/El Cuá ▪ Finalized. Situation, territorial, organizational analysis ▪ Market Access Realities of Rural Families in Remote Communities and Novel Products and Value Chains to Increase Rural Women's Income (ongoing) ▪ Gender strategy developed ▪ Diagnosis and management of water resources in banana communities: better resilience to climate variability (ongoing, FONTAGRO project).	▪ The general entry theme is sustainable intensification taking advantage of high value genetic resources and resilience in marginal farming environments. ▪ More specific entry points include farmer and farm household management tools for learning and decision making for more productive, resilient and profitable farms oriented to different types of on- and off-farm activities; integrated perennial/annual crop and livestock land use systems with greater resilience and increased contribution to farm and community food security and income generation; community-based local landscape management approaches for clean water, greater off season water, climate resilience and habitat diversification; addressing gender and intergenerational issues and understanding labor dependency; and innovation incubator strategies. ▪ Main research products will be on institutional innovation (policy), dietary diversity in food security, farm/local territory modelling, household decision making tools (trade-offs, resilience), and trade-offs within integrated livestock-fodder-crop-tree systems.
Greater Trifinio	
▪ It was expected in the Extension Proposal that work would begin during the extension phase, 2015-2016, in the Greater Trifinio Action Site.	▪ Due to budget cuts, no entry themes were identified beyond the ones in the original Humidtropics proposal.
Haiti / Dominican Republic	
▪ Situational analysis finalized (Haiti/DR) ▪ Organizational analysis on-going (Haiti) ▪ Diagnosis and management of water resources in banana communities: better resilience to climate variability (ongoing, FONTAGRO project) ▪ Cluster 4: In development	▪ As requested by the Executive Office, all activities were postponed until budgets were conducive to start research interventions.

[3] Source: Flagship Summary – Central America and Caribbean, 2014.
[4] Source: Update from Central America and Caribbean Action Area. 2015.

Table 4 describes the Cluster 4 projects implemented in the CAC Flagship.

Table 4. Cluster 4 research projects in CAC Flagship.

Cluster 4 research project[5]
Cocoa Territory: Rancho Grande/Wasala ▪ Cluster 4 (ongoing): (i) soil fertility in diversified agricultural systems; (ii) public policy and rural women's agency for integrated and equitable territorial development; (iii) Improved Decision Making on Diversified Smallholder Tools. ▪ Cluster 4 (in development): (i) Pilot Local Business Initiatives Based on the Use of Agrobiodiversity and Engendered Value Chains to Improve Diet and Nutrition of Rural Families and to Increase Income for Rural Women; (ii) Improving Capacity for Collective Learning, Innovation and Decision Making Based on Routine Use of Territorial Information Systems
Mixed system basic grains & livestock Territory: Esteli/Condega ▪ Cluster 4 (ongoing): (i) Monitoring changes in soil fertility in diversified agricultural systems to identify successful soil restoration measures; (ii) Public policy and rural women's agency for integrated and equitable territorial development; (iii) Improved Decision Making on Diversified Smallholder Tools ▪ Cluster 4 (in development): (i) Pilot Local Business Initiatives Based on the Use of Agrobiodiversity and Engendered Value Chains to Improve Diet and Nutrition of Rural Families and to Increase Income for Rural Women; (ii) Improving Capacity for Collective Learning, Innovation and Decision Making Based on Routine Use of Territorial Information Systems
Coffee Territory: Jinotega/El Cuá ▪ Cluster 4 (ongoing): (i) Monitoring changes in soil fertility in diversified agricultural systems to identify successful soil restoration measures; (ii) Participatory development of common certification codes and practices for small coffee growing households facing the challenge of multiple certifications; (iii) Improved Decision Making on Diversified Smallholder Tools. ▪ Cluster 4 (in development): (i) Pilot Local Business Initiatives Based on the Use of Agrobiodiversity and Engendered Value Chains to Improve Diet and Nutrition of Rural Families and to Increase Income for Rural Women; (ii) Improving Capacity for Collective Learning, Innovation and Decision Making Based on Routine Use of Territorial Information Systems.

A more detailed mapping process of stakeholders, their linkages and mechanisms has provided the basis to assemble a diverse group of partners into incipient Innovation Platforms (IPs)[6]. These groups generate approaches focusing around the farm household as an enterprise/ livelihood system/agro-ecosystem management unit, the multi-farm territory with important service and support functions in ecosystem services, infrastructure and market access and diverse forms of social capital, and the broader institutional and market system.

The approach, although localized, is also helpful in shedding more light about the underlying theory of the integrated systems approach that underpins Humidtropics. The case study design and methods used will also be helpful for answering the cause and effect questions of the Theory of Change (ToC) of Humidtropics, which is "based on the hypothesis that the region's inherent potential is best realized through an integrated systems approach, built around sustainable intensification and diversification, involving participatory action across stakeholder groups.

[5] Humidtropics. June 2015. Implementation Status Report – Central America and Caribbean.
[6] See detailed Situation Analysis Phase I, Organizational Analysis Report for Nicanorte Action Site, Central America and the Caribbean Action Area of Humidtropics by Wendy Godek, February 2015.

Humidtropics addresses this by enhancing the capacity to innovate at farm, institutional and landscape levels thus contributing to delivering on the four System Level Outcomes (SLOs). IPs and other change coalitions help to identify and prioritize systems problems and opportunities, supported by systems analysis, to identify entry points that require social and technical innovations. The main drivers for determining entry points for innovation testing are: poverty status; and ecosystem integrity status to determine social and technical intervention pathways where changes in systems productivity; natural resources management; and institutions and markets that will improve the status of these entry points."

1.2 Context of the Nicaragua Action Site

While Nicaragua is considered as one of the poorest countries in the Americas, it has invested significantly in rural roads and rural electrification. There is pride of accomplishment. The very centralized government seems yet distant from the Humidtropics processes, however, its agriculture research institute, INTA, is engaged meaningfully with Humidtropics Field Site activities, in part enabled by longer-term on-going partnerships with CIAT's staff in the country, building on a legacy of close associations and trust. CIAT/Humidtropics staff are making efforts to build alliances at all levels. For example, one full time CIAT staff is employed as a representative to the governments of Honduras and Nicaragua. Humidtropics staff are beginning to be involved in government planning meetings. One such meeting occurred during our mission.

Figure 1: Pasture and cattle.

Part of the program on hill-land systems regeneration is based on inclusion of maze/ bean no-till cropping grown under light canopies of mixed tree species, which hold the soil from further erosion, coupled with introduction of improved pastures that enable better livestock production for dairy and meat. The pastures too contribute to soil organic matter acquisition. This mix of integrated technologies evolved in a FAO-funded project in Honduras about 20 years ago, and is known as the Quesungual System. It provides a proven integrated production system appropriate for many farm families living on the marginal hill lands of Central America. Degraded landscapes show major recovery in six years (personal communication A. Castro, 2015). Humidtropics rightfully has incorporated this as one of the entry point innovations, building on not only the earlier of the FAO project, but also on CIAT's follow-up engagement on the Quesungual in Central America prior to the operations of Humidtropics. The promising implications of adoption for CAC (especially Haiti) and the hill lands of Africa have been noted by Humidtropics' field team and its management.

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Figure 2: Badly degraded hill lands under initial recovery process of the Quesungual; where maize and beans are being planted between rocks under the mixed tree canopy, while pasture grasses are being sown in similarly-degraded fenced fields.

2. Case Study Design & Methodology

In line with the mixed methods approach proposed in the Inception Report, the CCEE team used different methods such as desk reviews, key informant interviews, and field site visits to gather the evidence on the status of Humidtropics in the various Field Sites visited in Nicanorte Action Site, as presented in this report. During the field site visits, the team conducted Focus Group Discussions (FGD) with members of the respective Platforms to gain a more in-depth understanding about their perceptions on Humidtropics, their involvement in not only the implementation of the research programs but also the extent to which they were involved in setting priorities and choosing the relevant entry points to address their unique challenges at each site, and what kind of benefits they perceived to be getting from participating in the IPs.

In the original CCEE Evaluation TOR, there were over 26 evaluation questions which the team summarized into 8 overarching questions during the inception phase. It was along these 8 questions, categorized under the four evaluation criteria (Relevance; Efficiency, Quality of Research & Effectiveness) that the team used different data types collected from the various methods to triangulated to present as evidence in answering each of these evaluation questions. Table 5 summarizes the 8 overarching questions and their associated data types and sources used for the Case Studies.

Table 5: Data types and sources used to answer the 8 overarching CCEE questions

Evaluation Question	Data Type	Data Sources
Relevance		
1. To what extent is Humidtropics' ToC **strategically coherent** and consistent with the **CGIAR's Strategy and Results Framework**, considering its crosscutting issues of **gender** and **capacity development** priorities and the rationale and coherence of Flagship Projects?	• Alignment of System-Level Outcomes (SLOs) to CGIAR Strategy • Progress Flagship Projects Outcomes (IDOs) • SRTs/Clusters • Alignment with Country Strategies	• CGIAR Strategy Results Framework • Revised Humidtropics Programmatic Results Framework • Nicanorte Action Site project records • National strategy (The Nicaragua Strategic Development Plan)
2. Is the **partnership design** and targeting based on **plausible assumptions** for Program **delivery of results**?	• List of Partners engaged in the Action Site - Both local & International • List of Partners & their engagement at Action Site Level	• IITA and Core Partner Records
Efficiency		
3. Is Humidtropics **effectively managed** with appropriate internal processes and conditions (including research staff and leadership quality, institutional arrangements, and governance and management arrangements) for **assuring high quality research outputs**, considering different genders and generations, documenting and disseminating	• Decision-making mechanisms to optimize use of resources • Institutional & governance arrangements over time in response to external demands and internal insights	• Program & financial records

Evaluation Question	Data Type	Data Sources
both positive and negative findings, and monitoring and reporting progress?[7]		
Quality of Research		
4. To what extent does the integrated systems **research design** (problem-setting and choice of approaches) reflect **high quality**, up-to-date scientific thinking, and knowledge, innovation, in the areas of research, including **relevance for women and youth**?	• Plausible integrated solutions and integrated system research outputs • Systems tradeoff and synergy analysis completed and used by R4D Partners • Models developed to analyze effect of interventions on farm productivity, farm system components, and their interactions	• Workshop summaries • Project reports • Publications • R4D Partner records • Interviews
5. Have Humidtropics **research for development activities** been **appropriately prioritized**, and **effectively coordinated, and implemented**, given key **contextual factors** (such as diverse sources and types of funding; the on-going reform of CGIAR structures and processes; changing resource availability), **legacy projects, and financing needs** for long-term research programs and key partnerships?	• Prioritization of research needs in line with resource availability • Quality of publications • Involvement by senior scientists in research • Contribution to global leadership role in integrated systems research	• Humidtropics Integrated Systems - Final Proposal • Humidtropics Annual Reports • Financial alignment to "systems" approach
Effectiveness		
6. Does Humidtropics **effectively collaborate with its partners** to **achieve planned outputs and outcomes, maximize synergies, and enhance partner capacity**?	• Capacity to innovate at farm, institutional & landscape levels • IPs • Scaling Up of Innovations: • Information Sharing Platforms • Change Agents or Coalitions • Key Humidtropics Implementation Activities	• IITA and Core Partner records • Other CGIAR Records
7. To what extent does the overarching theory of change and impact pathway **translate into site-relevant processes** and research for development?	• Platform evolution in the key elements of an integrated system. • Gender & Youth livelihood profiles • Tradeoffs (between multiple objectives)	• Humidtropics Integrated Systems – Final Proposal • Area-based Flagship projects records • IITA and Core Partner records • Cluster 4 Design & Performance Data – to-date • Googleforms
8. To what extent does Humidtropics' **integrated systems approach plausibly lead to** better and more **holistic results, impact at scale** and provide **additional**	• Evidence of synergies within and among domains • Global Synthesis of data and results from: ○ Synthesis of experiences with	• Area-based Flagship projects records • IITA and Core Partner records

[7] Note that the concurrent audit of Humidtropics will address related issues and the CCEE will coordinate with the auditing team as appropriate.

Evaluation Question	Data Type	Data Sources
value to the **CGIAR**'s capacity to deliver relevant international public goods that lead to impact?	interventions and scaling-out, ranging from action area to Program levels. • Diverse interventions • Lessons Learned across the Flagships.	

Note: Prior to engaging in the field visit of the case study the team conducted telephone interviews and reviewed numerous background documents, entering the country with sample guiding questions to address the 8 overarching questions above. The team spent seven days (June 6 to 12, 2015) in discussions at the Flagship Headquarters, but mostly at Field Sites that represented three distinct agro-ecologies that were selected by stakeholders as centers of initial focus. The team conducted group discussions with stakeholders and conducted special interviews, such as with the Country Representative of IICA regarding relations between the federal government and Humidtropics. The agenda for the visit is attached as Annex 6.3.

3. Key Findings on the Nicaragua Action Site

3.1 Relevance of Humidtropics in Nicaragua

3.1.1 Alignment of CAC Flagship to the Humidtropics ToC and Intermediate Development Outcomes

"To what extent is Humidtropics' Theory of Change strategically coherent and consistent with the CGIAR Strategy and Results Framework (SRF), considering its crosscutting issues of gender and capacity development priorities and the rationale and coherence of Flagship Projects?"

The focus of Humidtropics in Nicanorte is very much aligned the Nicaragua Strategic Development Plan with respect to goals on:

- Rural Development;
- Farmer Empowerment;
- Market Access;
- Poverty Alleviation;
- Food Security.

Table 6 below outlines the strategies undertaken by the CAC Flagship in order to contribute to the various IDOs.

Table 6. Humidtropics Intermediate Development Outcomes (IDOs) and strategies identified for achieving them in CAC Flagship.

Interim Development Outcomes[8]	CAC strategies
SO Livelihoods Improvement	
IDO Income: Increased and more equitable income as a result of Humidtropics system interventions, with special focus on rural women.	• Current state of human development indicators including income and consumption in the 56 municipalities of the Northern Nicaragua Action Site, compiled and elaborated in maps for discussion, debate and decision of territories for action. • Analysis of sources of income increase in the past five years based on farm size, localities and gender, in Northern Nicaragua, based on farm household survey data of local NGOs. • National common bean platform for decision makers is being facilitated to enhance planning and policy of production and commercialization. • Capacity development for value chain and effective business models for common bean, cocoa, coffee, vegetables in Northern Nicaragua being implemented with partner organizations (Learning alliance and Value Link).
IDO Nutrition: Increased consumption of diversified and quality foods by the poor, especially among nutritionally vulnerable women and children.	• Current state of human development indicators including consumption and health and nutrition indicators in the six departments of the Northern Nicaragua Action Site, compiled and elaborated in maps for discussion, debate and decision on Field Sites.
SO Sustainable Intensification	
IDO Productivity: Increased total	• Current state of production and productivity indicators including

[8] Source: Flagship Summary – Central America and Caribbean, 2014.

Interim Development Outcomes[8]	CAC strategies
farm-level productivity in smallholder production systems.	food, cash crop and cattle production in the 56 municipalities of Northern Nicaragua Action Site, compiled and elaborated in maps for discussion, debate and decision of territories for action. • Decision making tools and platform for soil fertility amendment being developed for use in small holders diverse farm systems. • Design of forage production and silvopastoral systems for improved production, nutrient and water use and natural resource conservation with farm households of El Salvador, Nicaragua and Honduras. • Effect of the Quesungual improved agroforestry system on food grain productivity in semihumid regions in Nicaragua investigated, documented and disseminated.
IDO Environment: Minimized adverse environmental effects of increased system production.	• Current state of natural resource indicators including soil, climate and forest cover in the 56 municipalities of Northern Nicaragua Action Site, compiled and elaborated in maps for discussion, debate and decision of site of intervention. • Effect of the Quesungual improved agroforestry system on soil erosion and water retention in semi-humid regions in Nicaragua.
SO Women and Youth Empowerment	
IDO Gender: Increased control over resources and participation in decision-making by women and other marginalized groups.	• Analysis of sources of income increase in the past five years based on farm size, localities and gender, in the humid tropics of Nicaragua, based on farm household survey data of local NGOs.
SO Systems Innovation	
IDO Capacity to Innovate: Improved capacity to innovate integrated systems by actors at household, institutional and landscape levels.	• Current state of organizational landscape, networking and innovation connections in the 56 municipalities of Northern Nicaragua Action Site. • Exploration of organizational landscape, networking and innovation connections in Haiti-Dominican Republic Action Site. • R4D Platform Nicaragua: convergence with Humidtropics development objective and fostering alliance. • Themes for six R4D projects and result based management identified by the members of the learning alliances and the proposals for implementation of the project developed with assistance from Humidtropics staff.

Similarly, there is a tight alignment of work in Nicanorte with goals of the CGIAR. The existing and proposed activities are clearly focused on meeting the stated Intermediate Development Outcomes (IDOs). Examples are:

- IDO 1 – Increased incomes for the rural poor. The work is increasing farm profitability through the application of the integrated management tool to increase farm resource use efficiency and improved management and productivity of marketable crops and livestock.
- IDO 3 – Improved productivity in pro-poor food systems. The crop and livestock management decision tool to be applied is aimed at increasing productivity.
- IDO 4 – Reduced adverse environmental effects of integrated systems intensification and diversification. The crop and livestock management decision tool which use agro-ecological approaches to intensification is aimed at increasing resource-use efficiencies and ecological services.
- IDO 5 – Empowered women and youth with better control over and benefit from integrated production systems. Women participate in all components of the proposed work, including project and tool development, the field-based work and the monitoring and evaluation. The analysis of the impacts of the tool on decision-making process is

being disaggregated by gender and characterizes the role of and impact on women in different crop and livestock management decision and activities.

- IDO 6 – (Systems) Innovation. Strengthening of regional innovation systems in coffee, cacao, and maize-bean-livestock systems through knowledge mobilization and collective integration, analysis and adaptation of improved decision making tools. The tool will be developed using an iterative design methodology incorporating feedback from diverse actors.

The focus of the CAC Flagship is mainly on (a) Productivity and Income Generation coupled with Natural Resource Management; (b) Development of Tools; and (c) Innovation Capacity. Humidtropics identified the missing link regarding the innovation capacity of local organizations, who are eager to participate, but not take on a leadership role. Humidtropics has helped in filling this gap by taking on the leadership on extending innovations to local communities. Local stakeholders are gaining confidence. This was observed in group meetings in Nicaragua, and in all other sites we visited subsequently. Community empowerment is a key output of the Humidtropics process. The degree to which this enabling process can be replicated merits additional research.

3.1.2 Partnership Design

With regard to partnership design and targeting of innovation entry points based on plausible assumptions for Program delivery of results, there is significant evidence of robust partnering in the nucleus communities, including partnership-driven platforms (with strong perceived ownership across partners). This resulted in participatory selection and implementation of entry point projects. While it's a too early stage to assess delivery of results, the Program has achieved partnerships through the Alliance Platforms. Partners involved include: (a) INGOs/ Cooperation Agencies; (b) Universities/ University Research Institutes; (c) Private Sector; (d) Producer Organizations. There are apparent challenges with public sector involvement at central national levels, despite efforts to engage.

It is important to recognize that these investments create an environment where farmers and their partners are empowered, and the tangible research and development outcomes will unfold. At the same time, it is important to appreciate that what makes this a special and effective process, is a costly process that requires, were it to be scaled up widely, careful training of and enabling (financially) a cadre facilitators, organizers, recorders, etc.

Table 7 below outlines the core partners involved in the Action Site with CIAT taking a prominent lead role, followed by Bioversity International.

Table 7. Core partners involved in Action Sites in CAC, 2014-2015.

Action Site[9]	AVRDC	Bioversity	CIAT	CIP*	ICRAF	ILRI	IWMI	WUR
Northern Nicaragua		*X*	*L*					
Haiti / Dominican Republic		*X*	*L*					
L indicates lead partner. * Indicates involvement is unclear at this point.								

There was a consistent message that partners have ownership and very active engagement in Field Site research for development and cross-site interactions. The high level of local participation and absorption of Humidtropics approach is a positive indicator for potential future impact (e.g. dissemination of innovations from within CGIAR; venue for innovation at

[9] Humidtropics. June 2015. Implementation Status Report – Central America and Caribbean.

Field and Action Site scale). Knowledge sharing emerged as a central benefit to alliance participants.

In trying to understand how institutional collaboration has evolved, a meeting with Partners and International Research Centers revealed the following examples:

- **Bioversity International:** Bioversity International engaged strongly in early stage of process development and in the formulation of the Cluster 4 projects.
- **CATIE**: CATIE participated in various territorial alliances and national planning for Humidtropics. Window of opportunity: Cluster 4 monitoring was assigned to CATIE for next two years. CATIE has been working in a similar area to Nicanorte, using a platform with 16 different organizations (engaging 7,000 farmers). INTA is restructuring its focus on research and innovation (multi-level) – CATIE and CIAT/Humidtropics were asked to participate.
- **Heifer International (HI):** HI has a functional relationship with CIAT. Two of their programs link strongly to CIAT: smallholder value chains and livestock. These focus on livelihood strategy research components. On the ground, work coincides with CIAT/Humidtropics' work. Two years ago, CIAT/Humidtropics invited HI to join a project. HI implements development projects including the uptake of CIAT's research on pastures, and livestock and dairy value chains, etc. The relationship with CIAT pre-dates Humidtropics. There is a natural collaboration given geographic overlap, but also enhanced by CIAT/Humidtropics' applied research with useful products: tools, etc. HI brings strategy for building social capital. Both have been able to focus at the territorial level. HI has expanded to work with Humidtropics on linking farmers to markets and they are writing proposals together. Both have stable relationships with many partners through which they pursue multiple objectives, sometimes together. For example, the LINK methodology developed by CIAT has been adopted by HI. Work with rural women's groups (toward social capital, entrepreneurial skills). LINK methodology is included in many HI programs.
- **National Agrarian University (UNA)**: UNA has very broad, 20-year relationship with CIAT. UNA scientists have contributed very substantially to research design, implementation and analysis. For instance, they engage strongly on themes related to soils (evaluation of soil quality, erosion), agroforestry and trees (carbon stocks, tree biodiversity) and livestock production (effect of improved forages on livestock production). A recent joint workshop focused on the need to be open to other organizations; and move beyond very specific areas of cooperation with Humidtropics. Various UNA students (both undergraduate and masters) have contributed to generating research results, through implementing experiments and data collection with the goal of preparing students for future needs (climate change adaptation/ mitigation). Humidtropics, as a kind of pilot program, appears to help interrelations among different programs toward common goals. UNA is mostly participating actively in carbon sequestration inside the Humidtropics project.
- **Solidarity Network (*Solidaridad*)**: Started with 2013 project with CIAT ("Milky Way") on livestock systems enhancement. This network brings CIAT, CATIE, HI and *Solidaridad* together. It has become very active with Humidtropics' plan and Field Site selection. One important part of the platform is the breaking traditional scheme of linear research to inform extension. More on-farm research with CoP partners observing and interpreting results. There is focus on production systems with realistic emphasis. Emphasis is on getting all the actors together. The process integrates rural women and families. The situational analysis of the process gave clear indications of what to do (certification, markets, climate change). *Solidaridad* works to link farmers, markets, etc., so the Humidtropics model is very attractive. *Solidaridad* maintains that monoculture is no longer relevant for small producers in Nicaragua. Small farms with diversified crops enable survival with some income in context of variable climate and markets. This diversification provides a very strong conceptual alignment with Humidtropics. Working

platforms are key to bring knowledge and people together. The Humidtropics process ensures that staff and resources are dedicated to platform development toward tangible outputs. Will this be scaled? We are unsure.

- **SIMAS**: is a national/ regional NGO working with two platforms – north and south, focusing on informatics for sustainable agriculture. It stimulates capacity (methods, training, concepts) building of small community organizations, and information systems, which are shared with the project. The relationship with CIAT/Humidtropics includes a deep analysis of existing datasets. Through the Pan-Americana alliance, SIMAS is transferring resulting knowledge to many organizations. SIMAS has been providing database resources for many projects, often bridging between national and local organizations. SIMAS brings its communication expertise to local groups.

3.2 Efficiency

3.2.1 Management and Institutional Arrangements

In terms of management and decision-making, there was guidance from the Executive Office though not always timely. However, Action Areas are given a lot of room to operate. Humidtropics Management was overall appreciated in CAC. The Executive Office has provided substantial support to the various CAC Action Sites.

CIAT leadership has been instrumental, and the active participation of Bioversity International was observed. Similarly the inputs of WUR on shaping early processes were visible. Not much in the way of collective decisions about the future had emerged by the time of our site visit. Probably because the evolution of the CRPs at the CGIAR Consortium Office level was still vague and in transition.

When Cluster 4 proposal requests were given only one month for submission in May 2014, this opportunity provided a window for quick wins enabling first generation partner projects to be elaborated in consultation with partners; although the process was rapid. The instruction was very clear that these are partner projects. CIAT needed to develop mechanisms for projects to be executed with partners who are receiving funds – this process took until November 2014. Contract management procedures required a lot of financial data from organizations and pass through financial filters. CIAT ran the territorial analysis at the same time (finished in November 2014).

In November 2014, three territories came together and agreed they would have same structures for implementing research projects. “Foresight analysis” for the projects included negotiating “research fair” (looking for resonance across territories). In December 2014, CAC proposed second generation projects after feedback on first generation of projects. The 2014 projects are now moving ahead (started actually in November 2014 and will continue through November 2017). In April 2014, SRT2 meeting presented a plan to follow up Action Area situational analysis with territorial (Field Site) analysis. Formal interaction (i.e. workshops) did happen, but was more an “incidental interaction”, being limited by time and resources.

The Nicanorte staff are learning how to become research advisors rather than only researchers. Local organizations have shown extraordinary speed in execution – almost faster than Humidtropics Nicanorte can keep up with.

Implementation appears to be: (a) informed by situation analysis; (b) led by scientific thinking and knowledge; (c) participation and leadership by senior researchers evident on the ground. Evidence gathered from the FGDs with staff and partners in the alliance indicated that there appears to be a positive working relationship between Humidtropics research staff and

partners in the Action Site. See Table 8 for involvement of key institutions with respect to the three farming systems. Clearly CIAT and Bioversity International have been central CGIAR Centers taking the lead in the Nicanorte Action Site. WUR's strategic input on process was noted.

Attention to gender considerations were very apparent at all sites. There appears to be substantive of Humidtropics-associated activity despite a quite limited budget and time since its inception.

Table 8: Major focus of field sites in Nicanorte

Sub-Project	Site (municipality)	Lead Institute	Partner Institutions	Accompanying CGIAR Centers
Improved decision-making on diversified smallholder farms with emphasis on coffee in the Humidtropics Action Site in Northern Nicaragua	Jinotega, El Cuá	CUCULMECA	SOPPEXCCA, FUNJIDES, COOPSAEC, Aldea Global, UCASUMAN, CAFENICA	Bioversity International, CIAT (Charles Staver Marie Turmel Falguni Guharay Pablo Siles)
Improved decision-making on diversified smallholder farms with emphasis on cocoa in the Humidtropics Action Site in Northern Nicaragua	Rancho Grande, Waslala	FUMAT INTEWAS	ADDAC-RG, ADDAC-Was, CACAONICA, ACAWAS, ADIC, CESESMA	Bioversity International, CIAT (Charles Staver Marie Turmel Falguni Guharay Diego Valbuena)
Improved decision-making on diversified smallholder farms with emphasis on maize-bean-livestock in the Humidtropics Action Site in Northern Nicaragua	Estelí, Condega	ASDENIC	UNAG Estelí, FEM, OCTUPAN, INTA, ASOGAPCON, Foro Miraflor	Bioversity International, CIAT (Charles Staver Marie Turmel Martin Mena Rein Van der Hoek)

3.3 Quality of Research

The foundation for bio-physical research in Nicanorte is grounded mostly on existing research legacy projects of the international community in Central America and also past coffee and cocoa research of the national institutions. Most of the discussion here is about the research on community discovery processes of Humidtropics that empower farmers in the Community of Practice (CoP) to identify constraints and opportunities, and work (including practical biophysical and socio-economic research) to reach stated goals in alignment with the Program's IDOs.

There is an emphasis on tweaking integrated systems such that innovations on components drive added value (synergies) that enhance the overall system and farm family livelihoods, including gender and youth empowerment. The central innovation of Humidtropics is the process (described below). The buy-in ownership process directs applied research to tune the production system identified by the CoP. Most of the biophysical research evolving is not cutting-edge science, but is appropriate to the needs. For example, the project is organizing soil sampling in cocoa fields to assess the soil nutrient status and eventually guide farmer ability to effectively and efficiently enhance productivity of coca. Similarly, the Program is

training on IPM to minimize pest and disease losses to improve both the quality and quantity of the crop.

There is evidence of progress in platform establishment, collaborative problem identification and research project selection, and leveraging in skills/ capacities of partners. Most of the underpinning biophysical research for the strong development agenda has come from legacy research such as Quesungual from Honduras, and from the coffee and cocoa research from CATIE and national research from commodity centers, and more recently from INTA. Humidtropics encourages students from national universities to conduct research in the Field Sites. For example students are determining the diversity of tree species farmers leave intact in the Quesungual System and determine why the species are chosen.

During the October 2013 workshop, Humidtropics staff presented mapped data to key actors to discuss the meaning (convergence workshop). Participants agreed on a selection criteria for which territories should be the focus, including emphasis on being a "representative" of the Action Site with these three Field Sites. "Sliding toward a consensus": Humidtropics staff asked people ahead of time which three territories they suggest as a Field Site (within Nicanorte). Entry themes were not identified before selecting Field Sites. At the same time, there were workshops within Humidtropics to figure out an agreed process for implementing Humidtropics in Action Areas/ Sites and Field Sites.

In November 2013-May 2014, the Humidtropics team continued situational analysis and planning methodology for territorial analyses. Discussing with partners about the specific Field Sites ("pinpointing beyond convergence") and practically trying to figure out what a participatory program would look like on the ground, including contribution of different CRPs.

The territorial analysis was initiated at Field Sites in May 2014 after greenlight at workshop on SRT1 in Nairobi. In October 2014, Nicanorte defined the process with the alliance. Stakeholders proposed that a farm is not just to produce food, but is also the organizing point for optimizing the multi-functional character of agriculture and land. Technicians were recruited from field organizations, farmers, women farmers and hired local facilitators. CIAT and Bioversity International came together to facilitate the creation of the alliance.

3.3.1 Research Design, System Tradeoffs & Synergies

Humidtropics is exploring the tradeoffs in research design, e.g. producer-focused design vs. optimal ability to link management practices to soil fertility. **Hypothesis**: Farmers who have data taken from their own farm will take better decisions. Shifting/ expanding understanding of management variables. The toolkit provides a systematic way of observing in order to support decisions. One outcome (anticipated) is local capacity to innovate. Other characteristics include:

- Evidence of 60 (biased) plots with some improved outcomes;
- Hypothesis is that if scaled out, the toolkits would make a big difference for sustainable production in the territory;
- Process of farmer decision-making based on the toolkits is under study;
- Farmer experimentation at 60 different situations.

Humidtropics in Nicanorte is pursuing "better quality science" – integrated complex research, which will need different statistics, etc. **Innovating a new research model** applying "structured treatment" which is the process of technicians working with producers, looking for "treatment effects" that make big differences. Emphasis is on optimizing Rate of Investment (ROI) for labor and money. Farmer typologies (using well-characterized type of producers) are being articulated to determine what the first factors are in influencing productivity and

income (e.g. soil fertility, pruning, IPM). Surveys are conducted on farms at specified stages to determine farmer observations and conclusions on what is working.

The Nicaragua Action Site has developed tools to support awareness of agro-ecological practices, e.g. on-farm decision-making tools in a participatory manner. Examples include:

- The public policy dialogue – links to the Territorial Learning Alliance, which has 30 organizations;
- Humidtropics has been involved in research on modalities for scaling-up adoption. For example, a Ph.D. student is currently conducting research on scaling up to consolidate lessons learned;
- IPs have been key to rural communities adopting Humidtropics initiatives on-farm, e.g.:
  - Using the Platforms as a catalyst for change at the farm level;
  - Appraising both social and technical innovations; i.e. social innovation from individual to community level, such as how the gender norms play out, with women participation in decision-making, etc.;
  - Doing applied research with organizations, such as NGOs who would normally not be involved in research;
  - Pulling in different players around the table to play their different roles.

3.3.2 Research Leadership

Research for development in CAC Flagship is coordinated by Dr Rein van der Hoek, Humidtropics CAC Flagship Manager, employed by CIAT. A small group of crop, livestock, biodiversity, socio-economics and communication researchers most of which with Ph.D. and more than five years experience from CIAT, Bioversity International and WUR support the research in Nicanorte. They partner with National Universities and Ministries and support the development of their capacity to deliver high quality research. Similar to the other Flagship Projects research is guided by the global Humidtropics Strategic Research Theme (SRT) Leaders that, together with all the scientists active in each of these SRTs, govern the general approaches to ensure cross-site learning, exchange and synthesis. Even small teams as in Nicaragua therefore can tap into research support from the Program as a whole. This is facilitated through face-to-face meetings, planning workshops, publications that cover more than one Action Area, such as the work on multi-stakeholder processes in Central Mekong, East and Central Africa, and West Africa is shared with CAC. The main challenge for the team, similar to Central Mekong, is the language barriers by many of the local partners to exchange research results globally. It also requires tailoring of common principles to the specific languages and cultures adding to the cost of delivery, and in some cases such as Quesungual difficult to share. At this stage it can be considered strategically correct to have limited the activities to Nicanorte with some exploration to the other Action Sites as the funding would have been too limited with too few researchers spreading themselves too thin. As such the CCEE Team found that the leadership optimized the use of resources by focusing research and partnership efforts to few of the main identified entry points, which in the near future should be considered to transit into the Site Integration Leadership with Nicaragua being earmarked as priority country.

3.3.3 Scaling and Institutional Innovation

This topic is covered in depth under the section on Efficiency. The high level of farmer and development community buy-in with respect to the Humidtropics process, along with solid innovation entry points has resulted in tangible and substantial evidence for very significant “incremental” farmer-to-farmer scaling up. At the same time the broad engagement of key partners in the alliance at the Platform level and Field Site level is showing remarkable engagement, where partners seem to feel they have meaningful ownership and influence.

Federal policy level involvement in Nicanorte is still not adequate for broad non-incremental scaling. This is largely a constraint from the modality of how the government operates. The IICA representative to Nicaragua confirmed that Humidtropics is engaging with the government and needs to give this continued emphasis. Humidtropics will need to engage in the research on development processes to determine how to best scale-up adoption of the essential element of the process. This issue cuts across the entire Humidtropics initiative and consequently is covered in more depth under the Case Study for Institutional Innovation in the main report.

With regard to scaling of adoption, it became clear that it will be necessary to repeat the territory-level implementation processes as soon as the field work is moved beyond the area of influence of the field site institutions. The tools to community engagement (situational analysis – alliance – prioritization) have been tested, such as:

- Decision-making tool in cocoa: anticipated amplification beyond 60 intended target farmers – "critical mass" for helping send the practice across the immediate territory. Uptake by CRS project is under discussion, which is will scale to 6,000 farmers in the immediate expansion domain.
- Each of the three production systems entry point projects has some element of local scaling with partners.

3.3.4 Synthesis of Quality of Research Outputs

In summary, with respect to:

Research Design, Systems, Tradeoffs and Synergies: The model of applied research is innovative and flexible in order to deal with the complexities derived from on-farm research for development of integrated production systems. There may be scope for some criticism that the non-orthogonal designs are not robust for making broad interpretations of results, but the CCEE Team endorses the approach in most cases as observations are made involving many farmers in diverse conditions, even within a Field Site area. The tradeoff of doing more traditional approaches of on-farm trials would be a reduction of famers involved. This in turn would reduce the breadth of insights from the diverse farmers, as well as the eventual degree of farmer-to-farmer-based adoption.

Research Leadership and Quality: The leadership skill set of the current Humidtropics team in Nicanorte and their dedication to the process are very effective. They have been able with limited resources to establish "proof of concept" for the development process. Were there to be a greater expansion of the program of work, the team would have to be expanded accordingly, and there is a danger of not keeping the same level of leadership and engagement.

Research Priorities & Relevance for Women and Youth: There is a strong emphasis and buy-in by the community on empowering women throughout the innovations and value chains. Youth are somewhat less emphasized but still clearly on the "radar screen".

Building of Legacy Projects: Much of the biophysical research and development of entry points in the three agro-ecologies are based on legacy projects. This is especially evident for the Quesungual System of integrated crop, pasture, livestock and trees that is being promoted on highly degraded hill lands that has its roots in an FAO project 20 years ago in Honduras, and which has been tweaked and scaled-up by CIAT in several locations in Central America.

Integrated Systems Improvement: All three of the IPs for the agro-ecologies under study can be characterized as focused on capturing synergies through innovations in integrated production systems, but Quesungual is more clearly oriented to systems integration than either the coffee- or cocoa-based systems.

3.4 Effectiveness (i.e. progress towards outcomes, integrated systems approach, etc.)

3.4.1 Progress towards outcomes

Accomplishments have been realized with regard to:

- Institutional Innovation (Platform establishment);
- Dietary Diversity in Food Security;
- Farm/ Local Territory Descriptions;
- Household Decision-making Tools and Tradeoffs; seen within integrated livestock-fodder-crop-tree systems.

Although it is too early a stage for Global Synthesis across all Action Sites, Nicanorte's accomplishments suggest effectiveness and that tangible improvements in integrated systems could be realized in the Flagship and beyond. Scaling up the approach is likely to be a challenge, requiring significant investment along with effective partnerships.

Table 9 below provides some examples on what has been achieved towards the planned outputs, which will eventually contribute to the expected outcomes.

Table 9. Examples of progress toward objectives in CAC Flagship.

Progress Toward CAC Flagship Objectives[10]
Platforms/territorial learning alliances were established in Nicaragua and are implementing not only Cluster 4 / Platform Research Projects but several alliance partners are also active in special complementary research projects.
Major progress towards completing target outcomes was made when the National Research Institute of Nicaragua included the experiences of agroforestry Quesungual and silvopastoral systems (implemented under Humidtropics) as a disseminating technology in northern Nicaragua.
Each of the IPs focuses on one of three major land-use systems: cocoa-tree based in Waslala and Rancho Grande, coffee-tree based in Jinotega and El Cuá, and maize-beans-livestock based in Estelí and Condega. Members of the IPs participated in the territorial analysis and collectively analyzed local data and information in an effort to identify strategic entry themes and entry points for the work of Humidtropics.
Several products related to gender were completed, including a gender strategy to guide Humidtropics work in Central America and the Caribbean, and preliminary reports from one research component of the "Gender and Public Policies" Cluster 4 project that aims to understand rural women's agency in policymaking and the impact of policies on their lives.
At the request of the Ministry of Agriculture in Nicaragua, an analysis was started on the factors for scaling of agro-ecological agriculture, officially adopted as mainstream in Nicaragua. Surveys were conducted in Estelí/Condega and a workshop was held with technicians and members of the IP.
In the Haiti-Dominican Republic Action Site, planning for the situation analysis began in late 2014.
Various research projects were conducted in Nicaragua and in Honduras/El Salvador to assess the potential for the introduction of interventions to enhance various system components (including natural resource management, value chains, public policies, and agro-ecosystems), some with an explicit focus on gender.

[10] Sources: Humidtropics. June 2015. Implementation Status Report – East and Central Africa. Flagship Summary – East and Central Africa, 2015.

3.4.2 Translation of ToC and Impact Pathway into site-relevant processes

With the vision to enable scaling of adoption at diverse levels, the team is investing in the development of tools for Action Site guidance, including those at the farm level. The tools shown to the CCEE team by Nicanorte staff were mostly calendar-like guidelines, advising when to consider field level activities. The actual guidelines on good practices were still under development by local level partners who interact with farmer groups regularly.

Nicanorte is investing in training trainers (21), seven in each of the three Field Sites. At least 25% are women. These 21 trainers interact with farmers in their Field Site areas, and all 21 trainers meet periodically among themselves to consolidate and share lessons learned that are documented in the database. The technical decision-support tools elaborated by the stakeholders will be reviewed and re-tuned in a workshop.

The Nicanorte Action Site has invested in data collection coupled to monitoring and evaluation, especially relevant at the Field Site level, to enable understanding and insights on adoption and other decision process by stakeholders.

Field-level decision-making tools: The toolkit is based on monthly management decision processes with distinct elements:

- Organizations have volunteered one technician (the best one) to the monitoring and working with farmers. Some organizations, however, don't have technicians;
- Start with baseline data (soils, management, pest/ disease). Discuss between each phase of monitoring.

Online information system: A mega database has been developed and is accessible to all stakeholders who have Internet. The staff say: "It's all here. It belongs to everyone". The template has been designed so it can be copied by anyone. It is robust in Spanish format and content. This program has cost USD ~$22,000 over two years. CIAT staff feel the local system is essential and worthy of continuation. However, Alfresco remains the official information-sharing platform of the broader Humidtropics. There is some disagreement on the future hub(s). This system is being used in parallel with the main Humidtropics DevResults system, which they say is not accessible by all stakeholders.

For the Learning Alliances: The coffee sector in Nicaragua hasn't conducted research for many years. It's important to farmers to understand soil fertility, pest management and their link to income. Currently farmers are dependent on tools/ technologies developed in other Central American countries, not tailored to Nicaragua. The Program needs to ensure tools are used and are available in the long-term. Tools (guidelines) to interpret soil analysis and implication for productivity will make a contribution and facilitate interpretation without needing to hire a specialist.

Gender*:*

- SOPPEXXCA works with women and youth (examples of programs and leadership roles for women); roles split by physical strength and quality control. At alliance level, some of the sampled farms are run by women. Women technicians are active in data collection.
- [Gomez] Women are 30% of her cooperative. Legalization of farms can be problematic (within household). Women are generally more responsible with credit. It is important to have a gender policy.
- Focused gender policy derives actions to involve women and youth in production activities. 30% of associates are women. Women are important in the coffee sector – 90% of the personnel hired are women. Work requiring physical strength is usually reserved for men; quality control and selection work is usually better done by women.

- Credit line aimed at women to purchase land; cooperatives export brands of coffee produced exclusively by women (women tend to be more responsible when paying back loans).
- Women and youth participate in administration councils, leadership roles in base cooperatives.
- Ensure gender is a crosscutting element in all initiatives; this is a challenge because the traditional culture is that women stay at home. The first step is to enable women to leave their home for days at a time to be trained.
- Soil research project – ensure samples and secondary information are taken from women's farms as well.
- Women technicians and farmers actively participating in data collection.
- Change in the field mindset: regarding farms as family units.

Setting up Territorial Alliances: comments from stakeholders

- Territorial Alliances are difficult to start and keep members motivated; this Alliance works because all organizations have a common goal. Usually when there is no leading institution, things fall apart, the organizational culture is that "we know the needs", but always wait for someone else to call. "We can't let that happen to this Alliance because it has been a beautiful experience, not just in cocoa but in all other territories."
- "In a short time we have a great achievement, all 15 organizations have kept up their involvement, and this didn't happen before."

3.4.3 Capacity to deliver international public goods

The research trials with farmer participation have been turned into some publications, which contribute to the capacity to deliver on international public goods and lessons learned. Table 10 below lists some of these publications and their status.

Table 10. Publications emerging from R4D activities in CAC Flagship.

Publication[11]	Status
Landmann DH. **With trust and a little help from our friends: how the Nicaragua Learning Alliance scaled up training in agribusiness**.	Submitted to the Humidtropics IP case study competition.
Guharay F. **From situation analysis to strategic system research: grounding Humidtropics in three territories of northern Nicaragua with local partners.**	Technical report. In preparation.
Guharay F. **Mapping current state of human development, natural resources, production, markets and organizational landscape to foster convergence with partners**.	Technical report. In preparation.
Guharay F. **Connections and Disconnections: Peasant Participation in Formulating National Food Sovereignty Legislation**.	Journal article. In preparation.
Guharay F. **Analyzing the Potential of Food Sovereignty Policies**.	Journal article. In preparation.
Guharay F. **Mapping Organizational Landscapes as the first Step towards effective Alliance building for stimulating local innovation**.	Journal article. In preparation.
Guharay F. **Discourses of Food Sovereignty in Nicaragua**.	Journal article. In preparation.
Guharay F. **Jumping Policy Barriers: Evolving Agrarian and Food Security Policy in Nicaragua.**	Journal article. In preparation.
Guharay F. **A Brief History of Nicaragua's Food Sovereignty**	Journal article. In preparation.

[11] Source: Humidtropics Publication Table 2013-2014-2015.

Publication[11]	Status
Movement.	
Landmann DH. **Influence of trust on capacity development within the members and influenced groups of the Nicaraguan Learning Alliance**.	Presented at the 2015 International Food and Agribusiness Management Association Symposium 14-15 June 2015, Saint Paul. Conference paper pending corresponding thesis.
Landmann DH. **The influence of trust in the Nicaraguan Learning Alliance on capacity development of members and other influenced groups**.	MSc thesis. Published. Available https://cgspace.cgiar.org/handle/10568/56689
Mena M. **Forages and Ecosystem service (overview and perspectives, emphasis on Central America and Caribbean).**	In progress, to be finished 2015.
Staver C. **Integrated systems research for Humidtropics Action Area: Central America & Caribbean.**	In progress, to be finished 2015.

4. Conclusion

For the integrated systems approach:

There is no question that the farmers exposed to the Humidtropics process in Nicanorte will have long term benefits derived from the empowering process. There is ample evidence of farmer-to-farmer (incremental) scaling up of adoption of innovations, including socio-economic shifts. The understanding from the project process that there are often synergistic beneficial effects of better practices in one component of the production system on other components. For example, farmers now know that a well grown improved pasture will not only enable increases in beef and dairy, but that the soils will be enriched in organic matter that will help in the following crop cycle. In Nicanorte the likelihood of a government buy-in on the heavy investment of creating thousands of field sites like the ones we visited, is unknown but unlikely. If Humidtropics is able to garner strong government awareness and support, it could invest in helping the government develop an investment-level project for scaling-out. This kind of process could enhance the likelihood that this initiative will have very long-term positive effects on Nicaragua's food security and its resilience to the climate change stresses that are already impacting the food and agriculture systems.

The CCEE Team can conclude from the observations in previous sections that the Nicanorte Action Site is progressing on realizing (pilot testing) all of the IDOs. The biggest concern is how well this process can be scaled-up in situations when and where human and financial resources are limited. The farmer and CoP buy-in is excellent. This is coupled with strong incremental (mostly farmer-to-farmer) scaling-up of adoption, showing "proof of concept". But the investment in the process is substantial, and it is too early in the evolution of the Humidtropics process to know when and where an "area-wide" scaling up will emerge, and to know what conditions are necessary for this to happen reliably. The goal is to impact this kind of change on a broad scale and in a timely manner.

The CCEE Team expresses strong concern that the critical (empirical research) experiment of testing the functionality of the Humidtropics process, especially regarding its merit for scaling-up adoption of better agriculture practices, will be jeopardized by CGIAR management decisions to prematurely close systems research outside of farming systems related to major CGIAR commodity foci. In CAC, Humidtropics was layered onto existing Centers and CRPs. If Humidtropics ceases to exist, the CGIAR will lose an edge on delivery research and donor interest (impact focus).

5.1 Conclusion on "Systemness" Checklist of the Nicanorte Action Site

Below is a general outline based on the Key 10 Points of "systemness":

1. **Systems mindset**: Yes
2. **Inter-disciplinary research team**: Yes
3. **Stakeholder engagement (IPs)**: Yes
4. **Integrated systems research & tradeoffs**: Yes
5. **Innovation**: Mainly process
6. **Scaling up/out:** Partial (good incremental level; but not national)
7. **Gender research – Women & Youth**: Yes, but less on youth
8. **Capacity building**: Yes
9. **Development orientation (IDOs)**: Yes
10. **Learning**: Yes

6. Annexes

6.1 Key Contacts

CIAT and Bioversity International are core leaders: Charles Staver, Marie Turmel, Falguni Guharay, Pablo Siles, Diego Valbueno, Marin Mena, Rein Van der Hoek (lead), Shadi Azadegan.

Territorial Learning Alliances: Member Organizations and Participating Representatives

I. Coffee Learning Alliance Meeting Participants – Monday, June 8th, 2015

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II. Cocoa Learning Alliance Field Visit – Tuesday, June 9th, 2015

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Marbeli Mairena	Farmer	N/A
Dominga Mairena	Farmer	N/A
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III. Mixed Crop-Livestock Systems Learning Alliance Field Visit – Wednesday, June 10th, 2015

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6.2 Key Background References

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- Research outline, Nicaragua, August 2014.
- Escalonamiento de prácticas agroecológicas: Un análisis sistémico e individual, N/d.
- Escalonamiento de prácticas agroecológicas en Nicaragua: Resultados preliminares, N/d.
- Proposed conference abstract, “Scaling up agroecology in Nicaragua: linking systemic and individual determinants,” May 2015.

6.3 Agenda of Field Visit

Hour	Staff/organizations	Focus	CCEE Lead
TBD	Rein van der Hoek		
18.00-20.00	Rein van der Hoek		
8.00-10.00	**Humidtropics staff: RvdH, WG, MM, SA, CZ, PS, FG**	*Filling in the gaps on substantive dimensions of research program. Design and implementation (eg, mechanisms for program implementation).*	Rosern
10.00-12.00	**IICA, CATIE, Heifer, Solidaridad, UNA**	*Understanding how institutional collaboration has evolved and effectiveness of scaling up.*	Eric
15.30-18.00	**Aldea Global, Cuculmeca, Funjides, SOPPEXXCA, UCASUMAN, UNAN/Leon, FUMDEC**	*Specifics of integrated systems research projects including how research domains interact. Understanding perceptions of highest value and major barriers for Humidtropics in Action Area.*	Christine
7.00-10.30	**arrival INTEWAS at 9:30, then continue to Los Chiles**		
10.30-13.00	**ADDAC, APROMUWA, Coop NW, FUMAT**	*Specifics of integrated systems research projects including how research domains interact. Understanding perceptions of highest value and major barriers for Humidtropics in Action Area.*	Eric
13.00-14.00	**INTEWAS or pupusas (Mennonites)**		
14.00-16.00	**FUMAT, Coop NW, ADDAC, APROMUWA, AMFVGW, URACCAN, CINDE, ADIS, ACAWAS., CACAONICA**	*Specifics of integrated systems research projects including how research domains interact. Understanding perceptions of highest value and major barriers for Humidtropics in Action Area.*	Eric

9.00-12.00	INTA, OCTUPAN, ASDENIC, UNA, FEM	*Specifics of integrated systems research projects including how research domains interact. Understanding perceptions of highest value and major barriers for Humidtropics in Action Area.*	Christine
14.00-16.00	**OCTUPAN, ASDENIC, FEM, UNI, UNAG, ASOGAPCON, Foro Miraflor**	*Specifics of integrated systems research projects including how research domains interact. Understanding perceptions of highest value and major barriers for Humidtropics in Action Area.*	Christine
08:00-10:00	CCEE Team meeting		
10:00-on	***TBD: Individual meetings with Humidtropics staff***		

6.4 Acknowledgements

The entire Nicanorte team gave the CCEE Team exceptional support, enabling us to gather information from many sources. We will not attempt to thank everyone involved but we would be drastically remiss if we did not mention Rein van der Hoek, Falguni Guharay, and especially Shadi Azadegan who not only, as the communications expert, provided many essential documents; she also provided excellent simultaneous translation for group meetings, and her own notes from those discussions were equally excellent and valuable.

6.5 Synthesis of action plan for scaling of agro-ecological production in Nicaragua[12]

Key staff and participating organizations

Wageningen University (Katharina Schiller, Onno Giller, Anne Marike Lokhorst, Marijn Poortvliet, and Laurens Klerkx), CIAT (Falguni Guharay), and local consultants in Nicaragua.

Project summary

This complementary research project began in August of 2014 and will end in December 2017. The objective of the project is several fold. First, it seeks to better support agro-ecological smallholders and promote a higher rate of adoption of agroecology amongst smallholders in Nicaragua. It also aims to improve national policies aimed at agro-ecological smallholders (including credit and risk mitigation instruments) and foster the creation of value chains and market outlets for agro-ecological produce by supporting national public certification system for agro-ecological production.

The project's overall ToC is that action research will support the functioning of the learning alliances, the creation of financial instruments specific to agro-ecological producers, the creation of a national public certification program for agro-ecological produce, and the integration of actors in the agro-ecological value chain. This will in turn stimulate demand for and availability of agro-ecological produce in national markets, enabling agro-ecological farmers to better access markets, reduce risks involved in agro-ecological farming, and earn higher incomes.

[12] Provided by Rein van der Hoek

Science behind it

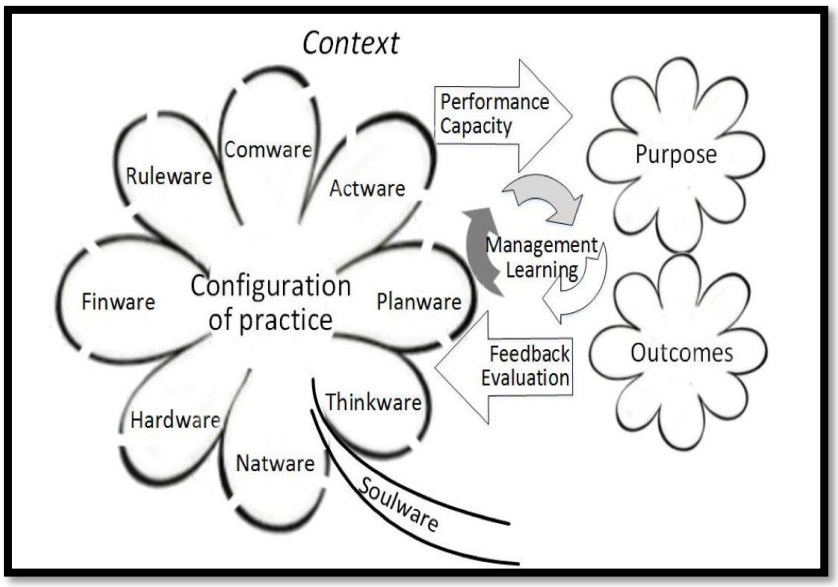
The central question of the proposed research addresses what factors influence the transition towards more agro-ecological practices, i.e. the scaling of agro-ecological farming? In answering this question, we focus on variables on different levels. Some of those are on the collective level of the agricultural innovation system (knowledge infrastructure, policies, incentives, markets, etc.) while others are on a more individual level.

At the collective level, a first study will focus on diagnosing the mechanisms in the agricultural innovation system that encourage or discourage agro-ecological production, such as existing incentive systems, value chain configurations and policies. These policies and mechanisms will be identified by doing a Rapid Appraisal of Agricultural Innovation Systems (RAAIS). This part of the study will also include an analysis of linkages and information flows and feedbacks in the innovation system (e.g. between research, extension, farmers – both formal and informal knowledge systems).

As for the individual level, we will focus on the farmer as the shaper of the agro-ecosystem. What are perceived barriers and facilitators to agro-ecological production? Often in adoption research, researchers and experts implicitly assume that farmers act as rational decision-makers, who base their course of action on a cognitive appraisal of the (dis)advantages of each option (Zwickle, Wilson & Doohan, 2014).

However, given that a lot of such decisions are made in the context of everyday life and in conditions of cognitive overload and possible hardship, it is likely that a lot of these decisions will be based on routine, intuition, habit, partner preferences, emotions, and intra-household dynamics (Pannell 2006). Such psychological determinants have so far been understudied in adoption research. In the current study, we aim to amend this omission in order to get a comprehensive overview of the decision-making processes of farmers.

What is new?



To address the research question we propose a two-stage scoping study, based on a newly conceptualized research framework entitled Practice Oriented Multi-level perspective on Innovation and Scaling (PROMIS). First, it will be necessary to map the existing state of the agricultural innovation system as regards its capacity to support a transition towards agro-ecological production systems through a broad diagnostic study. This includes both the state of the agricultural system (production system and value chain for selected sectors and territories) in terms of agro-ecological production, and how the innovation support system is capable of supporting the transition (Schut et al., under review). Then, in a second step, we will carry out a survey among farmers to tap into the factors that promote or inhibit agro-ecological

production. The variables measured and the model tested will be based on a relevant overview of the literature and input from the diagnostic study.

Expected results

- Increase capacity of smallholders to productively engage with markets through agro-ecological production;
- Contribute to better livelihoods for smallholders;
- Increase smallholder's capacity to innovate through agro-ecological production;
- Enable stronger women and youth participation in agro-ecology and support smallholders in increasing their system productivity and livelihoods.

Relation to other CRPs

Ecological intensification is at the core of CGIAR's ToC and Impact Pathway. Hence, the results of this project will be relevant for both the commodity CRPs (Maize, FTA, RTB, L&F) and the thematic CRPs (PIM, WLE, A4NH). Formal connections need to be sought between this project and other CRPs so that the scope of the study can be extended over other territories.

Related documents

- Research outline, Nicaragua, August 2014.
- Escalonamiento de prácticas agroecológicas: Un análisis sistémico e individual, N/d.
- Escalonamiento de prácticas agroecológicas en Nicaragua: Resultados preliminares, N/d.
- Proposed conference abstract, "Scaling up agroecology in Nicaragua: linking systemic and individual determinants," May 2015.

Annex 10.2:

Case Study on East and Central Africa Flagship

Author(s)

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ACRONYMS

CAC	Central America and the Caribbean
CATIE	Centro Agronómico Tropical de Investigación y Enseñanza
CCAFS	CGIAR Research Program on Climate Change, Agriculture and Food Security
CCEE	CRP-Commissioned External Evaluation
CGIAR	Name of the CGIAR Fund and Consortium of Centers
CB	CGIAR Consortium Board
FC	CGIAR Fund Council
CIALCA	Consortium of Improving Agriculture-based Livelihoods in Central Africa
CIAT	International Center for Tropical Agriculture
CIP	International Potato Center
CIRAD	French Research Center on Agricultural Research for Development
CM	Central Mekong
CO	CGIAR Consortium Office
CRP	CGIAR Research Program
DRC	Democratic Republic of Congo
ECA	East and Central Africa
FARA	Forum for Agricultural Research in Africa
FGD	Focus Group Discussions
FH	Food for the Hungry
FTA	CGIAR Research Program on Forests Trees and Agriculture
IAC	Independent Advisory Committee
ICCO	Inter-Church Cooperation Organization
Icipe	African Insect Science for Food and Health
ICRAF	World Agroforestry Centre
IDO	Intermediate Development Outcome
IEA	CGIAR Independent Evaluation Arrangement
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
INERA	Institut National pour l'Etude et la Recherche Agronomiques
IP	Innovation Platform
ISFM	Integrated Soil Fertility Management
IWMI	International Water Management Institute
L&F	CGIAR Research Program on Livestock and Fish
LDF	Levain Des Femmes
LLF	Lessons learning Framework
MAIZE	CGIAR Research Program on Maize
MIS	Market Information Systems
NGO	Non-Governmental Organisations
PAD	Programme Agricole pour le Développement
PMM	Performance Monitoring Matrix
QAAP	Quality Assurance Advisory Panel

R4D	Research for Development
RAAIS	Rapid Appraisal of Agricultural Innovation Systems
RBM	Results-Based Management
SAR-SC	Support to Agricultural Research and Development for Smallholder Communities
SARCAF	Service d'Accompagnement et de Renforcement Communautaire des femmes
SENASEM	Service National de Semences
SLO	System-Level Outcome
SO	Strategic Objective
SRF	Strategy and Results Framework
SRT	Strategic Research Theme
UCB	Université Catholique de Bukavu
UEA	Université Evangélique en Afrique
WA	West Africa
WLE	CGIAR Research Program on Water, Land and Ecosystems
WUR	Wageningen University and Research Center

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1.0 INTRODUCTION

1.1 Overview on the ECA Flagship (Six Countries)

The **East and Central Africa (ECA)** Flagship Project covers the highlands (1,125-1,800m above sea level) of Western Kenya, Southern Uganda (Lake Victoria Basin), the Ethiopian highlands, Eastern DRC, Burundi and Rwanda. The area is uniquely endowed with great potential in terms of water, soils and a variety of staple and cash crops as well as livestock. Agriculture is the mainstay of the economy of the area. However, with an average population density of 263 persons/km^2, 36% of the population living on less than US$1.25/day, and 49% of the total land estimated to be degraded, the region faces debilitating poverty and food insecurity.

Against this backdrop, the ECA Flagship identified several entry points within its integrated research program in order to remove barriers to production and enable enhanced livelihoods and natural resources management for small scale holder farmers. The entry points identified include:

- Improved soil fertility management;
- Integration of legumes and trees into production systems;
- Crop diversification;
- Nutritional integration into cropping and food systems;
- Strengthening of seed systems;
- Integrated livestock production, *Striga* management;
- The development of improved value chains for priority system(s), socio-technical regime, landscape and potential for R4D Platform development.

While Kenya, Uganda and Ethiopia identified one Action Site each namely Western Kenya, Lake Victoria Basin (Uganda), Western Ethiopia, the other three countries, Eastern DRC, Rwanda and Burundi identified more than one Action Site. At each Action Site, a R4D Platform has been established to guide activities, facilitate alignment of Humidtropics to national priorities, as well as scaling up and out of proven technological and institutional innovations. Table 1 below provides a description of the Field Sites, within the selected Action Sites.

Table 1: Basic Description of Action Sites in ECA Flagship.

Action Site	Field sites[1]
DRC	Midlands: Walungu –Kabare Axis. Field site: Mushinga. DR Lowlands: Kamanyola/Ruzizi Plain. Midlands; Masisi-Rutshuru Axis.
Rwanda	Highlands: Rubengera/ Kidaho/Ntarabana Sectors. Field site: Musanze. Lowlands: Gatore/Nyagatare/Mayange Sectors. Midlands: Mayaga-Marangara- Gisagara-Nyamagabe axis.
Burundi	Central Highlands: Kirimiro, Buyenzi, Buyogoma & Bweru Gitega. Field

[1] Humidtropics. June 2015. Implementation Status Report – East and Central Africa.

Action Site	Field sites[1]
	site: Gitega. Mugamba High altitudes. Mumirwa (Escarpment between Imbo & Mugamba)
Western Kenya	Field sites: Kisumu, Vihiga, Busia, & Siaya
Lake Victoria Basin (Uganda)	Field sites: Kiboga-Kyankwanzi & Mukono-Wakiso
Western part of Ethiopia	Field sites: Jeldu & Diga

Table 2 below provides the key partners involved in each Action Site. Their level and nature of involvement is described in detail in the respective Country-specific Action Site Case Studies 1, 2 and 3 that follow this main write-up on the ECA Flagship.

Table 2: Major Partners in Action Sites in the ECA Flagship.

Action Site	Major partners[2]
DRC	Ministry of Agriculture. University of Catholic of University of Bukavu (UCB). *Core partners*: IITA, CIAT, Bioversity International, FARA, Wageningen University, Legume Choice, N2Africa
Rwanda	IMBARAGA – Rwanda National Federation of Farmers – involved in facilitation and organization of farmers into marketing associations to target niche markets. Equity Bank, Rwanda – involved in management of small loans to members of Innovation Platforms (for various technologies emanating from platforms research), and encourages farmers on efficient and effective community banking, savings and borrowing. *Core partners*: IITA, CIAT, Bioversity International, ICRAF, FARA, Wageningen University, CIP, FARA, SLU.
Burundi	*Core partners*: IITA/CIALCA, CIAT, ICRAF, Bioversity International, Wageningen University, FARA.
Western Kenya	Ministry of Agriculture. *Core partners*: CIP, icipe, ILRI, FARA, CIAT, Bioversity International, ICRAF, Wageningen University.
Lake Victoria Basin (Uganda)	Ministry of Agriculture. National Agricultural Organization (NARO). *Core partners*: ILRI, IITA, ICRAF, AVRDC, FARA, Bioversity International, Wageningen University, CIAT, CIALCA/N2Africa, FARA.
Western part of Ethiopia	Ministry of Water and Energy in Ethiopia. *Core partners*: ILRI, CIP, ICRAF, IMWI, FARA, Legume Choice, Wageningen University.

Table 3 below provides the list of activities being implemented in each Action Site within the ECA Flagship and their corresponding entry themes. Some of these include maize and soybean intercropping, agroforestry, soil and water management, legume intensification, scoping exercises, FEAST assessments, etc.

[2] Source: Flagship Summary – East and Central Africa, 2014.

Overall, for the ECA Flagship, these activities are linked to the entry points identified which include improved soil fertility management, integration of legumes and trees into production systems, crop diversification, nutritional integration into cropping and food systems, strengthening of seed systems, integrated livestock production, *Striga* management, and the development of improved value chains for priority commodities.

Table 3: Activities and Entry Themes in Action Sites in the ECA Flagship.

Activities[3]	Entry themes
Lake Victoria Basin (Uganda)	
▪ **Maize and soybeans intercropping**: system research protocol through the Kiboga and Kyankwanzi Platform, linked to livestock production. ▪ **Agro-forestry:** At the Mukono-Wakiso Field Site ICRAF has initiated the establishment of agro-forestry related demonstrations with 8 farmer groups through the Mukono-Wakiso Platform.	▪ Improved productivity within maize-legume intercrops and rotations, as well as smallholder engagement in the sub-region's emerging soybean industry. ▪ Multi-purpose soil, water and nutrient management, and watershed management
Western Ethiopia	
▪ **FEAST**: In Diga and Jeldu Field Sites ILRI is leading a livestock feed scoping exercise using the FEAST methodology to assess livestock feed constraints. ▪ **Soil and Water Management**: Also at the Diga and Jeldu Field Sites, IWMI is leading research on the effects of agronomic and soil and water management practices on systems productivity.	▪ Intensified smallholder dairy and small ruminant production, improved feed resources and well organized product markets ▪ Soil, water and nutrient management
Western Kenya	
▪ **Evaluation of potatoes varieties** in response to high temperature in Vihiga and Kisumu Field Sites. ▪ **Crop diversification** research on the use of root and tuber crops in kitchen home and school gardens for food security. ▪ **Crop-livestock integration** through dual purpose sweet potato intercropping with major crops. ▪ **Legume intensification**: evaluate performance of soybeans in Busia, Siaya and Vihiga for improving soil fertility and nitrogen fixation in smallholder farms. ▪ **Striga management trials** in three Field Sites (Busia, Siaya, Kisumu). ▪ **FEAST quick assessment tool** to identify animal	▪ Improved productivity ▪ Smallholder engagement in the sub-region's emerging soybean industry. ▪ Elimination of parasitic *striga* on cereals ▪ Intensified smallholder dairy and small ruminant production, improved feed resources and well organized product markets

[3] Source: Flagship Summary – East and Central Africa, 2014.

Activities[3]	Entry themes
feed gaps in Busia, Vihiga and Kisumu. ▪ **Situation Analysis** in each Action Site. ▪ Baseline survey process.	
Burundi, DRC and Rwanda	
▪ **RAAIS workshops** and establishment of R4D Platform and Innovation Platform in the three countries. ▪ Key interventions for Mushinga, Musanze, and Gitega Field Sites.	▪ Building on existing innovation platforms in DRC, Rwanda and West Kenya offers opportunity to fast-track new technologies.

Table 4 below provides a description of the Cluster 4 Projects that are currently being implemented in each Action Site.

Table 4: Cluster 4 Research Projects in the ECA Flagship.

Cluster 4 research project[4]
Uganda: **Wakiso-Mukono and Kiboga-Kyankwanzi** ▪ Cluster 4: Evaluating Equitable Nutritional and Income options in Urban and Rural settings. Includes: Baseline survey to understand constraints & opportunities for youth and women empowerment for income & nutrition. Trainings in selected need based areas. Trainings in system integration, production, value addition of vegetables, business planning and marketing. Development of promising socio-economic & technological packages. Development of contractual agreements between traders and youth & women groups. Piloting the implementation of promising packages (business plans) for empowering women and youths in urban and rural settings. Participatory on-farm trials of ISFM. Development of promising remunerative packages for youths & women. Participatory evaluation on-farm trials of ISFM technological options. ▪ *Expanded Cluster 4:* Integrating small-stock, crop and trees for dietary diversity, income and sustainable ecosystem services in rural and peri-urban regions of Uganda.
DRC: **Mushinga** ▪ Livestock Integration in Cassava-Grain Legumes Production Systems.
Rwanda: Kadahenda ▪ Cluster 4: Improving agroforestry and Irish potato based cropping system. Includes: Testing yield performance of improved potato varieties for seed multiplication. Interaction if improved variety X mineral fertilizer on potato yield. Rotational effect of potato-maize-bean on potato growth and yield. Evaluation of bean response to Alnus acumunata incorporated in soils. Evaluation of the response of potato to Alnus biomass X mineral fertilizer interactions. ▪ *Expanded Cluster 4*: Improving Potato Based Production Systems to Enhance Productivity, Gender Mainstreaming, Nutrition and Income.

[4] Humidtropics. June 2015. Implementation Status Report – East and Central Africa.

Cluster 4 research project[4]
Kenya: Busia, Siaya, Vihiga-Sabatia ▪ Integrated soil fertility and *striga* management in Western Kenya. Includes: Participatory development of best fits involving cereal crops and legumes in 4 counties. On-farm demonstrations for best fit dissemination in the 4 counties. Production of ISFM guides. Training of trainers for best fit up-scaling. Soil analysis including for *striga* seed bank density. Market studies and linkages including group sales. Strengthening the capacity of stakeholders on ISFM strategies. ISFM policy reviews with county assembly members in four counties.
Ethiopia: Jeldu and Diga ▪ *Expanded Cluster 4*: Sustainable intensification of mixed tree-crop-livestock systems in Western Ethiopia - linking platform initiated interventions with systems analysis for improved livelihood (food, nutrition, income) and natural resource status in Humidtropics Field Sites in Ethiopia.
Burundi: Gitega ▪ Livestock integration in improved cassava-legumes-based system to improve livelihoods. This research seeks to maximize crop productivity, economic returns and crop residues that can contribute to livestock feed as well as to concomitantly improve soil fertility and household nutrition and income.

2.0 CASE STUDIES DESIGN & METHODOLOGY

In line with the mixed methods approach proposed in the Inception Report, the CCEE team used different methods such as desk reviews, key informant interviews, and field site visits to gather the evidence on the status of Humidtropics in all the three specific country Action Sites case studies: Uganda, Rwanda and DRC, as presented in this report. During the Field Site visits, the team conducted Focus Group Discussions (FGD) with members of the respective Platforms to gain a more in-depth understanding about their perceptions on Humidtropics, their involvement in not only the implementation of the research program but also the extent to which they were involved in setting priorities and choosing the relevant entry points to address their unique challenges at each site, and what kind of benefits they perceived to be getting from participating in the IPs.

In the original CCEE Evaluation ToR, there were over 26 evaluation questions, which the team summarized into 8 overarching questions during the inception phase. It was along these 8 questions, categorized under the four evaluation criteria (Relevance, Efficiency, Quality of Research and Effectiveness) that the team used different data types collected from the various methods triangulated to present as evidence in answering each of these evaluation questions. Table 5 summarizes the 8 overarching questions and their associated data types and sources used for the Case Studies.

Table 5: Data types and sources used to answer the eight overarching CCEE questions

Evaluation Question	Data Type	Data Sources
Relevance		
1. To what extent is Humidtropics' ToC **strategically coherent** and consistent with the **CGIAR's Strategy and Results Framework**, considering its crosscutting issues of **gender** and **capacity development** priorities and the rationale and coherence of Flagship Projects?	• Alignment of System-Level Outcomes (SLOs) to CGIAR Strategy • Progress Flagship Projects Outcomes (IDOs) • SRTs/Clusters • Alignment with Country Strategies, the National Development Plan & DSIP (Uganda). • Republic of Rwanda's Economic Development and Poverty Reduction Strategy, 2013 – 2018. •	• CGIAR Strategy Results Framework • Revised Humidtropics Programmatic Results Framework • Uganda, Rwanda, DRC Action Site project records • Government Strategies (Uganda, Rwanda, & DRC).
2. Is the **partnership design** and targeting based on **plausible assumptions** for Program **delivery of results**?	• List of Partners engaged in the Action Site - Both local & International • List of Partners & their engagement at Action Site Level	• IITA and Core Partner Records
Efficiency		
3. Is Humidtropics **effectively managed** with appropriate internal processes and conditions (including research staff and leadership quality, institutional arrangements, and governance and management arrangements) for **assuring high quality research outputs**, considering different genders and generations, documenting and disseminating both positive and negative findings, and monitoring and reporting progress?[5]	• Decision-making mechanisms to optimize use of resources • Institutional & governance arrangements over time in response to external demands and internal insights	• Program & financial records
Quality of Research		
4. To what extent does the integrated systems **research**	• Plausible integrated solutions and integrated system research	• Workshop summaries • Project reports

[5] Note that the concurrent audit of Humidtropics will address related issues and the CCEE will coordinate with the auditing team as appropriate.

Evaluation Question	Data Type	Data Sources
design (problem-setting and choice of approaches) reflect **high quality**, up-to-date scientific thinking, and knowledge, innovation, in the areas of research, including **relevance for women and youth**?	outputs • Systems tradeoff and synergy analysis completed and used by R4D Partners • Models developed to analyze effect of interventions on farm productivity, farm system components, and their interactions	• Publications • R4D Partner records • Interviews
5. Have Humidtropics **research for development activities** been **appropriately prioritized**, and **effectively coordinated, and implemented**, given key **contextual factors** (such as: diverse sources and types of funding; the on-going reform of CGIAR structures and processes; changing resource availability), **legacy projects, and financing needs** for long-term research programs and key partnerships?	• Prioritization of research needs in line with resource availability • Quality of publications • Involvement by senior scientists in research • Contribution to global leadership role in integrated systems research	• Humidtropics Integrated Systems - Final Proposal • Humidtropics Annual Reports • Financial alignment to "systems" approach
Effectiveness		
6. Does Humidtropics **effectively collaborate with its partners** to **achieve planned outputs and outcomes, maximize synergies, and enhance partner capacity**?	• Capacity to innovate at farm, institutional & landscape levels • IPs • Scaling Up of Innovations: • Information Sharing Platforms • Change Agents or Coalitions • Key Humidtropics Implementation Activities	• IITA and Core Partner records • Other CGIAR Records
7. To what extent does the overarching theory of change and impact pathway **translate into site-relevant processes** and research for development?	• Platform evolution in the key elements of an integrated system. • Gender & Youth livelihood profiles • Tradeoffs (between multiple objectives)	• Humidtropics Integrated Systems – Final Proposal • Area-based Flagship projects records • IITA and Core Partner records • Cluster 4 Design & Performance Data – to-date • Google forms
8. To what extent does Humidtropics' **integrated**	• Evidence of synergies within and	• Area-based Flagship

Evaluation Question	Data Type	Data Sources
systems approach plausibly lead to better and more **holistic results, impact at scale** and provide **additional value** to the **CGIAR**'s capacity to deliver relevant international public goods that lead to impact?	among domains • Global Synthesis of data and results from: ○ Synthesis of experiences with interventions and scaling-out, ranging from action area to Program levels. • Diverse interventions • Lessons Learned across the Flagships.	projects records • IITA and Core Partner records

3.0 RELEVANCE & PARTNERSHIPS IN THE ECA FLAGSHIP

3.1 Relevance of Humidtropics to ECA Flagship

3.1.1 Alignment of ECA Flagship to the Humidtropics ToC and Intermediate Development Outcomes

"To what extent is Humidtropics' Theory of Change strategically coherent and consistent with the CGIAR Strategy and Results Framework (SRF), considering its crosscutting issues of gender and capacity development priorities and the rationale and coherence of Flagship Projects?"

The Flagship's projects are in line with the overall framework of Humidtropics' Theory of Change (ToC) and is based on the fundamental logic that a Flagship's potential is best realized through an integrated systems approach, built around sustainable intensification and diversification, involving participatory action across stakeholder groups.

The ToC starts with good understanding of the baseline situation characterized by a combination of poverty status and ecosystem integrity, related to productivity, natural resources integrity and institutional effectiveness. There are different degrees of issues along the poverty/ecosystem integrity nexus. Systems interventions are site-specific in order to transform their respective baseline situations to the desired system level outcomes.

The ToC maps out the logical sequence of changes that are anticipated along the impact pathway. In ECA, like in any other Humidtropics Flagship, stakeholders were mobilized and engaged at different intensities along the pathway. This engagement entailed bringing them together into consultative workshops to identify potential field sites.

Figure 1: Operationalizing the ToC & Launch Activities

Making such links between research outputs and development and environmental outcomes explicit through ToC helped projects to plan and implement the right activities geared towards achieving the desired results.

Table 6 below indicates how the ECA Flagship seeks to achieve the six IDOs.

Table 6: Humidtropics Intermediate Development Outcomes (IDOs) and Strategies Identified for Achieving them in the ECA Flagship.

Intermediate Development Outcomes	ECA strategies[6]
SO Livelihoods Improvement	
IDO Income: Increased and more equitable income as a result of Humidtropics system interventions, with special focus on rural women.	**Market-oriented**: Increase local value addition, integration of cash crops including livestock products, facilitation of local market organization, and access to financial services.
IDO Nutrition: Increased consumption of diversified and quality foods by the poor, especially among nutritionally vulnerable women and children.	**Productivity-Oriented**: Increase staple crop productivity through the efficient use of appropriate production factors, including improved germplasm, nutrients, and water, so that more land and labor is available for diversification into high-value crops and income-generating agro-processing activities.
SO Sustainable Intensification	
IDO Productivity: Increased total farm-level productivity in smallholder production systems.	Best bet options targeting system productivity, natural resource improvement, nutritional diversity and tradeoffs generate best fit options (e.g. *Striga* management in Kenya).
IDO Environment: Minimized adverse environmental effects of increased system production.	Increased resource integrity, especially in terms of soil retention on hillsides, soil fertility status and water use, and system resilience, higher and more stable farm level productivity, and benefits related to higher productivity, including food security and income.
SO Women and Youth Empowerment	
IDO Gender: Increased control over resources and participation in decision-making by women and other marginalized groups.	Capacity development of partners for gender research and mainstreaming. Situation analysis on the role of women in different aspects of farming and related activities. Gender-sensitive technology development and innovation.
SO Systems Innovation	
IDO Capacity to Innovate: Improved capacity to innovate integrated systems by actors at household, institutional and landscape levels.	Complementary market oriented research and development activities including multiple commodity value chain analyses in Action Sites.

[6] Based on the candidate entry points and impact pathways identified in the August 15, 2012 Humidtropics Final Proposal

Intermediate Development Outcomes	ECA strategies[6]
	Innovation Platforms will be strengthened to serve as effective mechanisms to develop and achieve scale with technical and institutional innovation in Action Sites.

3.2 Partnership Design and Targeting for Results

Is the partnership design and targeting based on plausible assumptions for Program delivery of results?

There are three levels to the Humidtropics partnership strategy: (1) Core partnerships form among the eleven founding institutions[7], which undertake core areas of work under Program Participant Agreements with IITA (Humidtropics' Lead Center); (2) Through sub-contracting agreements with a core partner, other institutional partners provide active leadership in Research for Development (R4D) Platform coordination, Action Site facilitation, implementing a research sub-component, etc.; (3) A large set of collaborating partner engage in the R4D Platforms and participatory research in Action Sites[8].

Table 7 maps the core partners involved in the ECA Flagship in the respective Action Sites.

Table 7: Core Partners Involved in Action Sites in ECA, 2014-2015.

Action Site[9]	AVRDC	Bioversity	CIAT	IITA	ICRAF	ILRI	IWMI	CIP	Icipe	FARA	WUR
DRC		X	X	X						X	X
Rwanda		X	X	X	X			X		X	X
Burundi		X	X	X	**X**					X	X
Western Kenya		X	X		X	X		X	X	X	X
Lake Victoria Basin	X	X	X	X	X	X				X	X
Western Ethiopia					X	X	X	X		X	X
L indicates lead partner. * Indicates involvement is unclear at this point.											

Capacity building for all partners: In the ECA Flagship, several capacity building workshops have been undertaken to equip all stakeholders with the knowledge and skills in order to assist them to become functional members of the R4D Platform and Innovation Platforms (IPs). Broad consultations were also undertaken in order to get

[7] Seven CGIAR centers (IITA, ILRI, ICRAF, CIP, IWMI, Bioversity International, CIAT) and four non-CGIAR institutions (FARA, *icipe*, WUR, AVRDC).
[8] Source: http://humidtropics.cgiar.org/at-a-glance/
[9] Humidtropics. June 2015. Implementation Status Report – Central America and Caribbean.

their buy-in but more importantly to have them involved in the identification of constraints, and potential entry points needed to address those constraints.

Facilitators of IPs were taken through special trainings to equip them with the leadership skills necessary to manage several stakeholders and equip them with the ability to plan and implement the agreed upon activities (Figure 2 below).

Figure 2: Capacity Building for Platform Facilitators in ECA

4.0 KEY FINDINGS: RESEARCH OUTPUTS & PROGRESS TOWARDS ECA FLAGSHIP OBJECTIVES

4.1 Key Research Outputs (Publications)

Humidtropics in the ECA Flagship has contributed to delivering on International Public Goods (IPGs) in terms of its generation of tools, processes and new research outputs on integrated systems, which are applicable to various contexts. Specifically, with regard to publications, ECA has generated over 30 publications, some of which are accessible worldwide (**Table 8** below).

The ECA Flagship was also one of the first to pilot and operationalize DevResults (http://www.devresults.com), which template was later adopted by the other Flagships.

Table 8: Publications Emerging from R4D activities in the ECA Flagship.

Publication[10]	Status
1. Van Wijk M. **Big data from small farms: analysis of drivers of food security across farming systems in sub Saharan Africa.**	To be submitted for peer-review before end 2015.
2. Van Wijk M. **Application of a rapid food security analysis across a diverse set of smallholder farming systems: an example from East and West Africa.**	To be submitted for peer-review before end 2015.
3. Cadilhon J. **The factors impacting on Ugandan smallholders' decision to join organized value chains.**	Expected submission for peer-review before end 2015.
4. Duncan A. **Innovation platforms for improved natural resource management and sustainable intensification in the Ethiopian Highlands**.	Submitted to the Humidtropics innovation platform case study competition.
5. Bidogeza J-C. **Analysis of horticultural crops value chains within the farming systems of Western Oromia Action Site, Ethiopia**.	Report. In production.
6. Yang R-Y. **Situational analysis of food and nutritional assessment in Western Kenya.**	Report. In production.
7. Pham Ngoc Diep. **The Tanga Dairy Platform: fostering innovations for more efficient dairy chain coordination in Tanzania.**	In production. Final revised case study accepted by FAO for publication.
8. Pham Ngoc Diep. **Field testing a conceptual framework for innovation platform impact assessment: the case of MilkIT dairy platforms in Tanga region, Tanzania**.	Conference paper. 6th All Africa Conference on Animal Agriculture. https://cgspace.cgiar.org/handle/10568/51587 Expected journal submission for peer-review before end 2015.

[10] Source: Humidtropics Publication Table 2013-2014-2015.

Publication[10]	Status
9. Buruchara RA. **Integrated Agricultural Research for Development (IAR4D): An approach to enhance the livelihoods of smallholder farmers in the Lake Kivu region**	Book Chapter. CIALCA Agro-Ecological Systems, Earthscan, London.
10. Yang R-Y. **Situational analysis of the food and nutritional diet in Westen Oromia Action Site, Ethiopia**.	Report. In production.
11. Emana B. **Characterization and assessment of vegetable production and marketing systems in the humid tropics of Ethiopia.**	Quarterly Journal of International Agriculture. Published: http://ageconsearch.umn.edu/bitstream/210313/2/3_Afari-Sefa.pdf
12. Ayana A. **Analysis of Vegetable Seed Systems and Implications for Vegetable Development in the Humid Tropics of Ethiopia.**	International Journal of Agriculture and Forestry. Published: http://article.sapub.org/10.5923.j.ijaf.20140404.10.html
13. Baker TJ. **Nested scale modeling of Ethiopian Highland farming systems scenarios and potential impacts on water resources using SWAT and APEX**.	Unpublished. To be submitted to a journal in 2015.
14. Dessalegn M. **Socioeconomic factors influencing agricultural production systems: A case study in Arjo, Diga, Western Ethiopia.**	Unpublished. To be submitted to a journal in 2015.
15. Wudneh A. **Sediment and nutrient lost by runoff from two watersheds, Diga district in Blue Nile basin, Ethiopia.**	African Journal of Environmental Science and Technology. Published: http://www.academicjournals.org/journal/AJEST/article-full-text/8A68C0447362
16. Blomme G. **Banana Systems in the Humid Highlands of Sub-Saharan Africa – Enhancing Resilience and Productivity.**	CABI. Published 2013. http://www.musalit.org/seeMore.php?id=14859
17. **Agricultural Intensification in the Humid Highlands of Africa - Challenges and Opportunities.** (Collection of papers from the CIALCA International Conference, diverse authors)	Earthscan. Published 2013. http://www.springer.com/jp/book/9783319076614
18. Mulema A. **Characterization of gender constraints in intensifying farming systems: A case of Ethiopian Highlands**.	Expected publication in October 2015.
19. Sakana N. **Modelling land use decisions by smallholder agrowetland households in rural areas of East Africa.**	Agriculture, Ecosystems and Environment. Published 2014: https://cgspace.cgiar.org/handle/10568/42253

Publication[10]	Status
20. Klapwijk L. **The 'One cow per poor family' programme: Current and potential fodder availability within smallholder farming systems in southwest Rwanda.**	Agricultural Systems. Published 2014: https://cgspace.cgiar.org/handle/10568/51360
21. Bucagu C. **Resource use and food self-sufficiency at farm scale within two agro-ecological zones of Rwanda.**	Food Security. Published 2014: https://cgspace.cgiar.org/handle/10568/51347
22. Bucagu C. **Assessing farmers' interest in agroforestry in two contrasting agro-ecological zones of Rwanda.**	Agroforestry Systems. Published 2013: https://cgspace.cgiar.org/handle/10568/33302
23. Buruchara R. **Establishment and Implementation of Integrated Agricultural Research for Development in Eastern and Central Africa: Some Operations and Lessons Learnt from the Lake Kivu Pilot Learning Site**.	Book Chapter in IAR4D: from Concept to Practice. http://ciat-library.ciat.cgiar.org/Articulos_Ciat/biblioteca/Integrated_agricultural_research_for_development_from_concept_to_practice.pdf
24. Tenywa MM. **Operationalisation of Innovation Platforms in the Lake Kivu Pilot Learning Site**.	Book Chapter in IAR4D: from Concept to Practice. http://ciat-library.ciat.cgiar.org/Articulos_Ciat/biblioteca/Integrated_agricultural_research_for_development_from_concept_to_practice.pdf
25. Tenywa MM. **Strategies for Setting up Innovation Platforms in the Lake Kivu Pilot Learning Site.**	Book Chapter in IAR4D: from Concept to Practice. http://ciat-library.ciat.cgiar.org/Articulos_Ciat/biblioteca/Integrated_agricultural_research_for_development_from_concept_to_practice.pdf
26. Nkonya E. **Initial impact of integrated agricultural research for development in East and Central Africa.**	AfJARE Vol 8 No 3, 135-144. http://www.afjare.org/resources/issues/vol_8_no3/7.%20Nkonya%20et%20al%20impact%20of%20IAR4D%20%28edited%29.pdf
27. Kalibwani R. **Local institutions in southwestern Uganda: the role of integrated agricultural research for development.**	AfJARE Vol 8 No 3, 160-171. http://www.afjare.org/resources/issues/vol_8_no3/5.%20Bonabana%20-Wabbi%20et%20al%20The%20Economic%20Potential%20of%20Farmer%20Jackie%20%28edited%29.pdf
28. Bonabana-Wabbi J. **Agricultural profitability and**	AfJARE Vol 8 No 3, 145-159.

Publication[10]	Status
technical efficiency: the case of pineapple and potato in SW Uganda.	
29. Birachi E. **Expanding market access and value addition in selected agricultural value chains: the role of IAR4D in the Lake Kivu Learning Site.**	AfJARE Vol 8 No 3, 135-144. http://www.afjare.org/resources/issues/vol_8_no3/4.%20Karumi%20Birachi%20et%20al%20Expanded_market_value_addition%20%28edited%29.pdf
30. Chiuri W. **Market access for agro-enterprise diversity in the Lake Kivu Pilot Learning Site of the sub-Saharan Challenge Programme**.	AfJARE Vol 8 No 3, 120-134.
31. Farrow A. **Selecting sites to prove the concept of IAR4D in the Lake Kivu Pilot Learning Site, AfJARE Vol 8 No 3, 101-119.**	AAAE, ISSN 1993-3738, Vol 8, No 3 (Sept 2013) - Special Edition.
32. Bacigale S. **Characterizing feeds and feed availability in Sud-Kivu Province, DR Congo.**	Tropical Grasslands – Forrajes Tropicales 2(1):9–11 (2014). http://www.tropicalgrasslands.info/index.php/tgft/article/view/112/62
33. Duncan A. **A situational analysis of agricultural production and marketing, and natural resources management systems in West Ethiopia**.	Report. In production.
34. Ekesa B. **A situational analysis of agricultural production and marketing, and natural resources management systems in Uganda**.	Report. In production.
35. Ra J. **A situational analysis of agricultural production and marketing, and natural resources management systems in West Kenya.**	Report. In production.

4.2 Progress Made Towards ECA Objectives

Table 9 below summarizes examples of progress achieved toward the ECA objectives as outlined in its Plan of Work and Budgets (POWB) since 2013 to date.

Table 9: Examples of Progress Toward ECA Flagship Objectives.

Progress Toward ECA Flagship Objectives[11]
1. Situation analyses and baseline surveys were completed for the six Action Sites. Initial draft reports have been reviewed by various platforms of stakeholders.

[11] Source: Flagship Summary – East and Central Africa, 2015.

Progress Toward ECA Flagship Objectives[11]
2. Using various robust rural appraisals diagnostic tools such as Rapid Appraisal of Agricultural Innovation Systems (RAAIS) and Ex-ante tool for ranking (policy) alternatives (EXTRAPOLATE), structured entry points were identified. Five R4D Platforms along with their Innovation Platforms in Uganda, Burundi, Kenya, DRC and Rwanda were assisted to identify and set research priorities that will address farmers' most severe constraints and use the opportunities that the farming systems offer.
3. Six R4D Platforms were organized. 12 Innovation Platforms set up and strengthened (two in Uganda, two in Ethiopia, one in DRC, one in Burundi, four in Kenya, and two in Rwanda).
4. Integrated system research led by CRP partners. Five R4D Platforms were supported to develop and implement integrated system research based on result-based management approach.
5. A joint work planning meeting for the 2015 Program of Work and Budget was organized.

Case Study 1:

THE UGANDA ACTION SITE REPORT

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1.1 Uganda Country Context

Box 1: Uganda Quick Facts

- Uganda has a population of 32 million (85% rural)
- The population growth rate is 3.2% (2nd highest in world)
- GDP growth of 5.8% in 2010
- Agriculture contributes close to 20% of GDP and employs 70% of the labor force
- On average, Ugandans live on less than $1.25 a day
- 38% of children <5 suffer from stunting

Uganda is one of the fastest growing economies in Africa with sustained growth averaging 7.8% since 2000. Coupled with 2.9% growth in agriculture, Uganda is on target to meet the first Millennium Development Goal of halving poverty and hunger by 2015. Despite these recent gains, Uganda still suffers from the hardships of widespread poverty. Under-nutrition is widespread in Uganda, with 38% of children chronically undernourished or stunted. This affects all economic groups, with 44% stunting in the middle wealth quintile, 43% in the lowest quintile, and 25% in the highest quintile. Parts of Uganda's southwest, known as the country's breadbasket, have one of the highest stunting rates of 49.6%. Uganda has a population growth rate of 3.2%, one of the highest in the world. This has led to an explosion in the number of young people, with over 50% of the population under 15 and 75% under 30. This is due in part to the fact that 41% of family planning needs are unmet. This large youth population poses a potential hazard to national security if they remain unproductive or unemployed.

Uganda's five-year Agricultural Sector Development Strategy and Investment Plan (DSIP) 2010/11 - 2014/15, which is in line with the agricultural priorities in the National Development Plan (NDP) came at a critical time for Uganda. There was renewed recognition of the fundamental importance of agriculture to the Ugandan economy and of the central role it has to play in development, economic growth and poverty reduction. Technocrats and politicians agreed to engage strongly to deal with agricultural issues and implemented a number of major initiatives. These included the Prosperity for All policy with its goal of improving the lives of all Ugandans and the five-year National Development Plan that prioritizes agriculture among the key productive sectors driving growth in the economy. To date, a new DSIP for the next five years is being developed and still prioritizes agriculture.

1.2 Adoption of Humidtropics Systemness

The implementation of Humidtropics in the Uganda Action Site adheres to the systemness as evidenced by processes, outputs, and outcomes. Table 10 below outlines the key systems entry points for the two selected Field Sites in Uganda, representing the Lake Victoria Basin.

Table 10: Entry Points for Field Sites in the Lake Victoria Basin Action Site in Uganda.

Humidtropics Field Site	System entry point
Kiboga-Kyankwanzi	Maize-legume (soybean)+ livestock (poultry/piggery) + Banana Agroforestry
Mukono-Wakiso	Banana + Vegetable + Poultry + Agro forestry (fruit trees) + Piggery

Working with other key stakeholders, the broader approach of Humidtropics focuses on entire systems, sustainable intensification, and use of multi-sectoral, multi-institutional and multidisciplinary R4D Platforms to improve livelihoods. Table 11 below summarizes the more detailed Humidtropics research being undertaken under the leadership of each CGIAR Center within each site.

Table 11: Humidtropics Research at Each Field Site Linked to the Six IDOs - Uganda

Mukono-Wakiso	Establishing of agro-forestry related demonstration plots with farmer groups - **completed** Agro-forestry (calliandra) linked to livestock and soil fertility management- **ongoing**	ICRAF	IITA, Saza Kyagwe	**For productivity, income, NRM**
	Vegetable trials to assess rate of chicken manure and bio-slurry required for vegetable performance Vegetable research protocols were developed and implemented Participatory vegetable evaluations completed	AVRDC		**For productivity, income, nutrition, NRM- ongoing**
	Integrated pig – vegetable production options	ILRI	IITA, Makerere University,	**For productivity, income, nutrition-ongoing**
Kiboga-Kyankwanzi and Mukono-Wakiso	Evaluating Equitable Nutritional and Income options in Urban and Rural settings of HT Uganda Action Sites	Makerere University/**Cluster4**	IITA, World Vision, Farm Gain, Makerere University, Luwunga Agaliwamu, Action for Rural Women's Empowerment (ARUWE), NGO Forum,	**For productivity, income, nutrition, NRM-ongoing**
	Value chain analysis and market surveys for nutrition sensitive commodities ongoing	CIAT	IITA, Bioversity	**For income-ongoing**
	In the pipeline: Integrating small-stock, crop and trees for dietary diversity, income and sustainable ecosystem services in rural and peri-urban regions of Uganda	IITA/Expanded **Cluster 4**	IITA, World Vision, Farm Gain, Makerere University, Luwunga Agaliwamu, Action for Rural Women's Empowerment (ARUWE), NGO Forum,	**For productivity, income, nutrition, NRM, income-waiting**

2.0 KEY FINDINGS FROM THE UGANDA ACTION SITE

2.1 Relevance of Humidtropics in the Uganda Action Site

In examining relevance, the CCEE team assessed the extent to which Humidtropics was coherent and consistent with CGIAR's Strategy and Results Framework including its focus on gender and capacity development priorities. In addition, the team was also looking out for the extent to which the Program on the ground was trying to develop different systems actors' capacities to innovate, especially the involvement of women and youth to achieve the expected results. The third key element of relevance required examining the Program design in terms of whether the Humidtropics ToC and impact pathway that takes into account gender, youth and tradeoffs between multiple objectives, among other things.

2.1.1 Alignment of System-Level Outcomes to the CGIAR & Country Strategies

In the case of Uganda, the projects being implemented are well aligned with the Intermediate Development Outcomes (IDOs). For instance, the Mukono-Wakiso Field site focuses on the vegetable & soybean value chains, and the banana with vitamin A supplementation, which are expected to impact on incomes and nutrition for the farming households. For the achievement of productivity and the environment, the Uganda Action Site has focused on using diversification and intensification of banana and coffee systems through soybean-maize intercropping, agroforestry demonstration plots established with farmer groups, and agroforestry based on Calliandra to link to livestock and soil fertility. In terms of its focus on gender and youth, the Mukono-Wakiso IP is working with the Youth Agripreneurs Group and has a strong engagement of women.

Humidtropics projects also have good alignment with the Uganda national policies through the Development Strategy & Investment Plan (DSIP): 2010/11 - 2014/15. The DSIP is being implemented to raise rural household incomes and improve the food and nutrition security of all Ugandans. The Uganda Action Site through its projects is trying to address some of the main challenges that face the agricultural sector in Uganda in three out of the four investment programs, namely: 1) Increasing agricultural production and productivity through the vegetable trials to assess rate of chicken manure and bio-slurry to enhance productivity, improving soybean-maize intercropping systems, and integrated pig-vegetable production options; 2) In terms of increasing access to markets and value addition, the Program has conducted value chain analysis and market surveys for nutrition sensitive commodities; 3) Towards strengthening agricultural institutions at the center and in local governments; the Program has a joint Agri-Investment Plan that brings together

different stakeholders in the rice value chain to improve rice bunds technology and construction, and has a multi-stakeholder IP that collaborates research between:

- International Research Organizations and Partners (E.g. IITA; ICRAF; WUR; AVRDC, ILRI, etc.);
- National Agricultural Research Organization (NARO). Table 12 below lists the NARO staff who are participating actively in Humidtropics. The Mukono Zonal Agricultural Research and Development Institute (MUZARDI) is one of the Zonal Research Institutes of NARO, which is mandated to conduct adaptive research within the Lake Victoria Crescent Agro-ecological Zone of Uganda. MUZARDI together with Makerere University have been actively involved in facilitating various activities such as IP meetings, market innovations meetings and trainings among others;

Table 12: NARO Staff Currently Involved in Humidtropics Activities

Name	Title
Dr. Ambrose Agona	Director General, NARO
Mr. Peter Lusembo	Director of Research MUZARDI
Ms. Immaculate Mugisa	Research Officer/Crop Agronomist MUZARDI
Ms. Molly Allen	Research Assistant/Horticulture MUZARDI
Dr. Jimmy Ssemakula	Animal Health Scientist/Biometrician NARO Secretariat
Mr. Ssenyonjjo Joseph	Technician, Livestock MUZARDI
Mr. Lumu Richard	Technician, Livestock MUZARDI

- Partnership with International (WUR) and local Universities (Makerere & Christian Universities);
- District Local Governments (Mukono-Wakiso & Kiboga-Kyankwanzi) on production and extension services.

In addition, the Uganda Action Site implements a school feeding program aimed at fighting the 'silent hunger and anger' in schools through crop diversification. One challenge in Uganda's Universal Primary Education (UPE) that resulted in an influx of many children of school going age, is that of poor feeding which eventually affects pupil's performance. A number of schools cannot afford to prepare lunch for pupils, where the most common meal given is porridge that is made from maize flour. This provides mainly carbohydrates as a source of calories for the children, which was perfect for Kiboga-Kyankwanzi IP, a maize growing area.

2.1.2 Program Design

The CCEE team saw significant evidence of robust partnering as a key Program design feature including partnership-driven platforms (with strong perceived ownership across partners) and selection and implementation of projects. However, it is too early stage to assess delivery of results based on these partnerships. Specific examples of the partnership engagement in the Uganda Action Site included but were not limited to the following activities:

- There were many key stakeholders **(Box 1 & 2)** engaged in the initial process of baseline information, entry-point identification, partnership building, facilitation of IPs and R4D Platforms, etc., from diverse CGIAR and other core partners, down to district level government agents, NARES, local universities, farmers organizations, youth groups etc. MUZARDI has also been hosting the IP monthly meetings of the Mukono-Wakiso IP. This also includes other meetings of Humidtropics such as market innovations meetings.
- Through the Alliance Platforms, partners involved include: (a) International NGOs (INGOs) such as Bioversity International, ICRAF; (b) Universities such as Makerere University and the Uganda Christian University; (c) the Private Sector such as Farm Gain and the Youth Forum; (d) Producer Organizations such as the Uganda Famers Federation, and d) a very active public sector involvement & linkages.
- There has been very good collaboration between Local Governments (Mukono-Wakiso (Urban) & Kiboga-Wakiso (Rural), which demonstrates a very good example of linkages that are likely to lead to the achievement of results, whereby the Mukono Local Government which has many processors have been linked to the Kiboga Local Government, which produces a lot of grains. Previously, there were no such linkages. This has led to a stronger collaboration between the two Platforms. This linkage has also facilitated the vertical integration scaling through soybean processing for both food and feed.
- With regard to private sector involvement, there were critical partners engaged "inside the tent" such as Farm Gain for linkage to markets and provision of market information among many services. It has not only linked commercial users of soybean in Mukono to the Kiboga IP, who are the main producers, but also provides information on prevailing market prices especially to the Youth Forum. Youth are also actively engaged through the

Box 1: WUR Contributions to R4D in Uganda

Key staff and partners involved include: Prof. Dr. Cees Leeuwis, as Chair of Knowledge Technology and Innovation Group (KTI), WUR; Dr. Marc Schut – Social Scientist, IITA/WUR; Murat Sartas – Innovation System Scientist, IITA/WUR. In Humidtropics, WUR KTI was given the mandate to coordinate SRT 3 activities in in ECA covering Uganda. In 2014 and 2015, WUR contributed to identification of entry points for R4D system improvements through RAAIS as well as developing and operationalizing a learning system to assess the performance and contribution of multi-stakeholder platforms to enhancing 'capacity to innovate' and women and youth empowerment within Humidtropics.

Box 2: Site characterization and identification of existing women and youth farmer groups

MUZARDI, together with the District Local Governments of Mukono and Wakiso, and the NGO forum and IP members of Kyankwanzi and Kiboga districts, led the process of site characterization and identification of existing women and youth groups that would be involved in the Cluster 4 project. These groups include Nyonyi-nkeze, Kikoko development, Bivamuntuyo, Buwagga kwekulakulanya, Kawerimidde and Nalumuli farmers group among others.

Youth Forum and use current ICT apps such as WhatsApp to request for and share market information plus any other relevant updates on Humidtropics activities.

- In terms of how partnerships assist with the realization of the objectives and scaling up of the interventions, the Humidtropics team is clearly aware of the need of government support for meaningful scaling up. There is a very strong 'branding' of Humidtropics as a substantive innovative Program with excellent buy-in from stakeholders. The enthusiasm of the district officers for the Humidtropics IP has, we were told, led to these districts to be the first to request additional extension officers from the new government expanded extension program. The interventions by the district officer and by the head of the Mukono research station were very strong and supportive of Humidtropics' integrated innovation process **(Box 3)**.

Box 3: Extension system empowerment

Humidtropics activities are also implemented through the District Department of Production and Marketing. A Technical Team has been set up at District level, and a M&E Focal Person nominated and trained. A Sub-County Focal Person and technical team has been nominated and set up. These extension workers were sensitized and trained about Humidtropics activities on May 27, 2015. An Action Plan for all Sub-Counties (Participating and Non-participating) has been drawn. The Team intends to establish a task force to implement, strengthen, deepen, and monitor Humidtropics activities at Sub-County levels.

The district production officer of Wakiso was also invited during the orientation of the extension workers of Mukono, he is ready and promised to duplicate the same process in Wakiso. There is hope that this spill over will go to other districts like Kiboga and Kyankwanzi. Below is a link to the report of the extension workers orientation, including the action plan:

https://www.dropbox.com/s/b0jt61kk0ywz4x4/EXTENSION%20WORKERS%20ENHANCEMENT%2027TH%2C%20MAY%2C%202015.pdf?dl=0

- In promoting vertical scaling/institutionalization of Humidtropics, the Mukono-Wakiso IP has mainstreamed Humidtropics activities in their activity work plans at District (Local Government), Sub-County (Lower Local Government) and at farmer group levels. In Mukono District, Humidtropics activities were incorporated in the 2014/2015 Financial Year, and in the 2015/2016 – 2019-2020 District five-year Development Plan. For a start, they provided one million, which will be increased over time. The most important thing is that a budget line has been created and will be able to create awareness and the need to budget for Humidtropics-related activities. Below is a link to the letter from the Mukono chief administrative officer confirming the availability of the funds:

https://www.dropbox.com/s/u4ylym87e9kv4nr/Re%20ALLOCATION%20OF%20UGX.%201%2C000%2C000%20AS%20SUPPORT%20TO%20THE%20MUKONOWAKISO%20HUMID%20TROPICS%20INNOVATION%20PLATFORM%20FOR%20THE%20FINANCIAL%20YEAR%2020142015..pdf?dl=0

2.2 Efficiency (Management; Institutional & Governance Arrangements; Budget Analysis)

2.2.1 Humidtropics Management in the Uganda Action Site

The Uganda Action Site is managed by a Facilitator, Prof. Moses Tenywa from Makerere University, who provides management oversight of research in the two Field Sites. In either site, he leads a team of researchers that manage the IP projects in the Field Site.

For specific "Research Themes" as outlined in Table 11 above, scientific leadership, oversight, and guidance for the research is provided by the Centers concerned such as ICRAF, AVRDC, ILRI, IITA, Bioversity International, CIAT or Makerere University. These researchers are part-time and are supported and employed by their host organization. They ensure that the research is appropriately planned, implemented, and monitored. They work with the Field Site Facilitator to support technical quality and rigor in research for the Action Site.

On decision-making mechanisms to optimize use of resources

Initially, resources were primarily devoted to process development and research required to establish the IPs for local ownership. Over time, there is good evidence of vision and efficiency of putting together strong partnerships toward integrated systems research since the Program launch in August of 2013, right from the establishment of the R4D Platform (alliances with major partners) down to the facilitation, organization, documentation and platform research at the Field Sites.

2.2.2 Institutional & Governance Arrangements in the Uganda Action Site

The use of Cluster 4 resources to fund locally-designed activities such as soybean integration and S. Aethiopricum, has fostered pride and commitment by farmers and their local partners. Bringing together of several partners with different expertise has helped in meeting both internal and external demands in terms of not only understanding the real issues that affect the farmers, but also gaining access to multi-stakeholder processes in providing the necessary response.

For instance, involvement of local government in the Platform has facilitated the extension work with farmers but with more quality research services. For the vegetable farmers, they have access to local government market structures they would not otherwise have had without being part of the Platform. Universities have also gained visibility and information sharing as well as engaging their students into the on-going research activities. The youth involvement in the IP has provided them with a network with not only researchers, advisory services but also mentorship. In the case of Mukono-Wakiso Field Site, the youth have been assigned an extension officer at the sub-county level.

2.3 Quality of Research

2.3.1 Research Design, Systems Tradeoffs & Synergies

The entry points and choice of projects was informed by the findings from the situation analysis and baseline survey based on what was prioritized to address constraints and opportunities for youth and women empowerment for income and nutrition. For example, the choice of soybean was based on its nutrition, nitrogen-fixing qualities and income related benefits. The soybean component is informed by up-to-date scientific thinking. It was developed by Makerere University and the Nitrogen to Africa (N2A) initiative implemented by IITA.

For the vegetable component, farmers are piloting their learning research on their farms (learning by doing) as an initial process to identify farm-level and marketing constraints. The Christian University in the Mukono Field Site is conducting research trials with Solanum aethiopicum (local name: Nakati) and is using a “decision-making tool” to analyze the profitability between different vegetables; and between vegetables and bananas.

However, the CCEE team’s initial impression is that the biophysical research at the Field Sites currently being conducted is not well executed. The plant stands in the vegetable trials were poor and irregular, confounding any possible nutrient treatment effects. In addition, the location of soybean inoculant trials in the farmer’s fields had serious plant growth irregularities not linked to the treatments. The training of the students overseeing the research so far seemed strongest on process with less mentoring on biophysical science.

2.3.2 Research Leadership & Quality

Participation and leadership of the research is by senior researchers from both local and international Universities, Makerere University and Uganda Christian University (local) and WUR (international). The knowledge generation on IP learning is clearly led by Humidtropics partners with guidance from WUR. The effective use of the RAAIS methodology for needs and opportunity appraisal was with the application of individual (WUR) technology. Little biophysical research in Uganda is underway at this early stage.

With regard to Institutional Innovation & Partnerships (SRT3 component), efforts are based on interdisciplinary teams that engage in participatory action research/learning. The action research is within the Platform. We were not shown any field research of ILRI but were informed that IFPRI, Bioversity International, and IITA played significant roles in the early appraisals and processes leading up to the IPs.

It is important to note that the program of work in the Flagship as a whole has been challenged by continuing budget cuts (determined externally to the CRP), which has made implementation difficult. One cannot fill posts and make commitments with uncertain funding.

2.3.3 Research Priorities & Relevance for Women and Youth

Throughout the Program, there is a strong explicit attention given to needs and opportunities for women and youth. For example youth are especially involved in cell phone-based information technology on market information. The representation of women in the group discussion was numerous and articulate.

There is on-going surveys focusing on women and youth engaged in production and marketing. MUZARDI, in collaboration with the District Local Governments, the IP members and NGO Forum of Kiboga and Kyankwanzi districts organized and held two surveys in the two districts. One survey targeted women and youth involved in soybean, maize, cattle, piggery and poultry production. This was aimed at obtaining information about their activities, e.g. reasons for their choice of enterprises, challenges faced, major buyers, varieties/breeds they grow/rear. A market survey was also held on soybean, maize, cattle, piggery and poultry products with the aim of understanding the sources and markets of their products, and how they access market information and challenges related to marketing their products among others. Highlights of this survey were given in the detailed CCEE Main Report.

2.3.4 Building on Legacy Projects

The Program has built on legacy work (N2A) but the trend is to focus on priorities emerging from the participatory process of the IPs, especially through use of Cluster 4 funds.

There is also a lot of on-going work through the ICRAF legacy projects such as the East Africa Diary Development Project (EADD) – supported by Bill and Melinda Gates and implemented by five partners (Heifer International, Technoserve, ILRI, African Breeders Association, ICRAF) – targeting 45,000 farmers in 20 districts in Uganda. This uses volunteer farmers to provide extension services and the project is now mapped to Humidtropics in Mukono-Wakiso IP. Table 13 below summarizes some of ICRAF work in the Mukono-Wakiso R4D Platform in Ntenjeru, Kyampisi and Nabale sub-counties, Mukono district.

Table 13: ICRAF Engagement with Mukono-Wakiso R4D Platform

Farmer group	Host farmer	System integration
Del- farmers group Nakija Farmers group	Nabimanya Robinah Sonia Pascal	Fruits Fodder Multi-purpose trees
Nampate farmers groups Nakija Farmers group Twekembe Women's group	Nkusi Charles Masaba Dorothy Nakabembe	Shade trees for bananas and coffee, fodder, fruits, Woodlots, Multi-purpose trees
Anonya Farmers group	Abdul	Fruits and fodder
Kwagalana farmers group	Teo Byekwaso	Fruits, fodder and woodlots

2.3.5 Integrated Systems Improvement

Some of ICRAF's on-going and planned studies are good examples of integrated systems improvement within the Uganda Action Site. These include:

- Evaluating local/indigenous fodder shrubs for improved livestock productivity – on-going
- Improving dry season dairy faming for sustained milk yields – on-going
- System integration through incorporation of multipurpose trees and shrubs for fruits, fodder, poles, shade and timber – on-going
- Tree pests in integrated systems focusing on fruits (fruit fly) and pole and timber trees (termites) – planned
- Understanding local knowledge on use and management of trees and shrubs in the integrated farming system in the lake Victoria agro-ecological zone – planned
- Improving the tree seed and seedling system in Uganda (agro-ecological zones) – survey conducted.

Note: Part of the above legacy work by ICRAF has been reflected in the CCEE Main report as an example.

2.3.6 Scaling and Institutional Innovation

Horizontal scaling of soybean seed multiplication program

With the introduction of the soybean crop as an entry point for the Kiboga-Kyankwanzi Action Site, soybean has shown a tremendous performance in the previous two seasons. Farmers in the region have picked great interest in growing of

the crop. In the second season, with the need for seed to be distributed to farmers, Humidtropics established seed multiplication demonstrations on farmers' fields in three sites of one acre each identified as: 1) Kiboga town council; 2) At the school (Kizinga Muslim P/S) in Kibiga; 3) Tukolerewamu farmer group in Kyankwanzi. A variety Maksoy 3N was selected for multiplication and backstopping was done by Makerere University Soya Breeding Program under the supervision of Tony Obua.

The seed was later purchased by Kiboga-Kyankwanzi IP through a business plan where farmers received 20kg of seed and were expected to return 40kg of the seed after harvest. A total of 101 farmers from both Kiboga and Kyankanzi received seed from the Platform but it was not sufficient to cater for the demand from about 450 farmers.

Farmer to farmer scaling

Humidtropics formed the Kiboga- Kyankwanzi IP, which selected the farmers who would host the demonstration sites. 18 farmers were chosen in Kiboga and 19 farmers in Kyankwanzi. These demonstrations brought communities together to learn a few things such as growing, management, harvesting and post-harvest handling of soybean. In addition the Platform held trainings with the Platform members on management, post-harvest handling and value addition of soybean. Matia Tamale is one of the farmers selected to host the field days. Through all these trainings and him being a member of the Platform, he obtained knowledge which he disseminated to other farmers.

He is referred to as a model farmer by his fellow farmers who are willing to learn from him. The farmer has gone ahead to identify farmers that are willing to grow soybean that are outside the Humidtropics action sites and they include farmers in Kibale and Mityana districts. It is too early to know how scaling up will unfold, but clear ideas on what elements need replication for ownership by the communities have been articulated.

For market innovations

MUZARDI together with IITA, Makerere University and Farmgain Africa have been engaging Kampala Capital City Authority (KCCA) on establishing more urban market outlets for the sale of produce by farmers engaged in Humidtropics. Currently, KCCA has agreed to dedicate some outlets in two urban markets, which can be utilized by farmers under Humidtropics. The farmers are yet to be organized and encouraged to utilize this opportunity.

2.4 Effectiveness

2.4.1 Translation of ToC and Impact Pathway into Site-Relevant Processes and R4D

There is strong evidence of institutionalization of system integration. Entry points for innovation were identified with community participation such as the vegetable trials and diversification through soybean.

There is capacity to innovate at farm, institutional and landscape levels. Excellent institutional innovations are underway at the farm and R4D Platform levels. Farm-level innovation seems promising; landscape innovation and scaling have not yet developed.

All district extension staff have been sensitized about Humidtropics activities, specifically the systems approach. There has been excellent buy-in of relevant stakeholders so far. The Program in Uganda looks very promising from the point of view of buy-in by stakeholders. The enthusiasm is high and Humidtropics' approach is branded as something new and different.

There was a consistent message that partners have ownership and very active engagement in Field Site research and cross-site interaction. The high level of local participation and absorption of Humidtropics' approach is a positive indicator for potential future impact (e.g. dissemination of innovations from within CGIAR; venue for innovation at Field and Action Site scale). Knowledge sharing emerged as a central benefit to IP participants.

2.4.2 Tracking Progress Towards Planned Outputs & Outcomes

It is too early to determine outputs beyond the efficiency of IPs that are well grounded and appreciated at the farm level and above. However, the Monitoring and Evaluation (M&E) team is in place and is collecting data. There was good information sharing platforms (Researchers Innovation networks) providing the Program with a strong documentation and information sharing capacity.

In the Uganda Action Site, there are two complimentary M&E systems, namely the global learning system developed by IITA and WUR, and the Cluster 4 M&E system. For the Cluster 4 M&E system, there is a draft M&E framework, tools and planned activities as per the links below. The data collected for Cluster 4 projects is entered in DevResults (**Figure 9** below).

Draft M&E Framework:

https://www.dropbox.com/s/qe2kc18k322wrlv/M%20%26%20E%20Framework%20for%20Humidtropics%20%28Draft%20one%29%20summary.doc?dl=0

Tools:
https://www.dropbox.com/sh/lw4x0w1iok2zbh5/AABv6h68C29ysYhFSCz3gzJda?dl=0

Planned activities:
https://www.dropbox.com/s/72ecovosju2jr2p/M%26e%20wayforward%2026th%2C%20may%2C%202015.pdf?dl=0

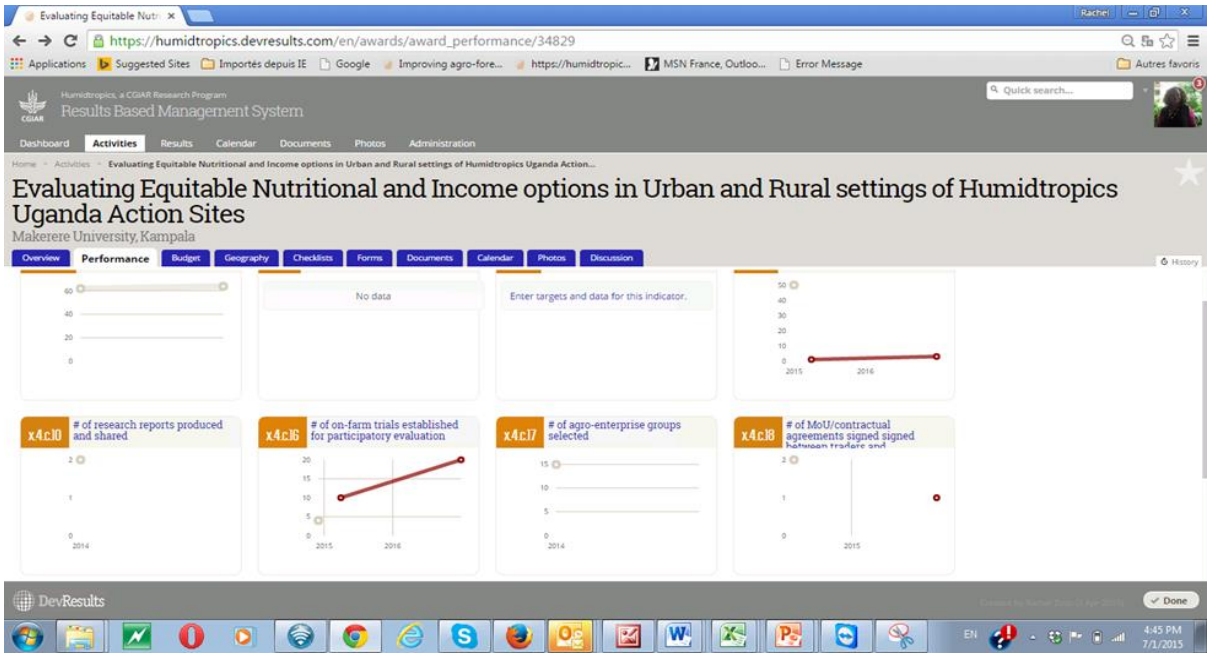

Figure 3: Screen Shot of DEVResults Data Entry Window

There are future plans for Humidtropics to venture into advocacy with Parliament to legislate the approach of system integration/innovation through multi-stakeholder platforms. In addition, the cross learning between the regional action sites can go a long way towards improving processes in order to grow the regional potential and markets. Since climate change impacts have no boundaries, the good practices in each country must/need/ought to spill over in the region to warrant regional development and reduce costs via duplication.

2.4.3 Integrated Systems Approach & Achievement of Impact at Scale

There was evidence of Platform evolution in the following key elements of an integrated system:

- The work on processes, which builds on tools, methods and especially empowering participation, is well underway and promising results are starting to emerge. These processes include:
  - Use of processes such as the situation analysis & baseline survey conducted prior to selecting entry points.
  - Use of the Rapid Appraisal for Agricultural Innovation Systems (RAAIS) tool in each of the IPs.

- It appears that the overarching ToC would result in important outputs and outcomes.
- The plans for scaling-up processes appear well articulated for incremental progress, and the team is aware that increased advocacy at the federal level will be needed for broader scaling after proof of concept is documented.

2.4.4 Capacity to Deliver Relevant International Public Goods that Lead to Impact

The Uganda Action Site through its IPs has been building capacity to innovate across genders and generations. For example, it has provided trainings to about 1,000 people across different partners to equip them with skills such for business plan development, on dietary diversity, and post-harvest handling, through Training of Trainers (ToTs), which have also conducted community outreach to 540 families. In addition, WUR has (co) produced the following outputs related with Humidtropics Uganda:

- Training Needs Assessment of Humidtropics facilitators in Uganda and ECA Flagship;
- Report on capacity development workshops for Action Area and Action Site Facilitators, April 2014;
- Concept note “Capacity to innovate from a system CGIAR Research Program perspective”;
- RAAIS: Rapid Appraisal of Agricultural Innovation Systems. A diagnostic tool for integrated analysis of complex problems and innovation capacity. Agricultural Systems;
- A result framework on the performance of multi-stakeholder processes in contributing development outcomes of CGIAR (internal use);
- Oral presentation in Humidtropics conference “Entry points for innovation for sustainable intensification of agricultural systems. Multi-stakeholder priority setting and the need for systems approaches in Humidtropics” (to be published in proceedings);
- Oral presentation in Humidtropics conference “A New Documentation and Learning System for Multi-stakeholder Processes in Integrated Systems Research for Development Interventions” (to be published in proceedings);
- Oral presentation in Humidtropics conference “The Stepping Stones to Success: How We Achieve High Ownership and Reflective Learning in Multi-stakeholder Process in Uganda” (to be published in proceedings);
- Oral presentation in Humidtropics conference “Opportunities for higher impact agricultural research for development: A systematic review on a generic theory of change linking multi-stakeholder platforms to development outcomes and available tools” (to be published in proceedings);
- Poster presentation in Humidtropics conference “Participatory evaluation of soya bean and maize fertilizer response in the farming systems in Kiboga and

Kyankwanzi, Lake Victoria Crescent of Uganda" (to be published in proceedings);

- Case study on "Crop-livestock-tree integration in Mukono-Wakiso Humidtropics site, Uganda" (published in Humidtropics case study book);
- Blog on Humidtropics webpage "The Partnership Behind Uganda's Fledgling Soybean Industry".

In relation to other CRPs, the outputs of the WUR team informed other Action Areas of Humidtropics in West Africa, Central America and Central Mekong, as well as the system CRPs: Dryland Systems and Aquatic Agricultural Systems.

References for Academic Outputs, which can be used as international public goods include:

1. Leeuwis, C., Schut, M., Waters-Bayer, A., Mur, R., Atta-Krah, K., Douthwaite, B., & van Veldhuizen, L. (2014). Capacity to innovate from a system CGIAR Research Program perspective. Penang, Malaysia: CGIAR Research Program on Aquatic Agricultural Systems (AAS) Program Brief AAS-2014-29.
2. Schut, M., Klerkx, L., Rodenburg, J., Kayeke, J., Raboanarielina, C., Hinnou, L.C., Adegbola, P.Y., van Ast, A., Bastiaans, L., 2014. RAAIS: Rapid Appraisal of Agricultural Innovation Systems (Part I). A diagnostic tool for integrated analysis of complex problems and innovation capacity. Agricultural Systems."

3.0 CONCLUSION

Report card on the 10 points of "Systemness" of the Uganda Action Site:

Key elements of 10 Points "systemness" not as evident on the ground.

i. Systems mindset: Yes
ii. Inter-disciplinary Research team: Yes
iii. Stakeholder Engagement (IP): Yes
iv. Integrated systems research & tradeoffs: Partial
v. Innovation: Mainly Process
vi. Scaling up/out: Partial
vii. Gender research – Women & Youth - Yes
viii. Capacity Building: Yes
ix. Development orientation (the IDOs): Yes, especially on Income, Productivity, Women & Youth
x. Learning: Yes

4.0 ANNEXES:

4.1 FGD with Members of the Kiboga-Kyankwanzi IP

The FGD was chaired by Mr. Kitaka Mayanja, a member of the Kiboga/Kyankwanzi IP, who welcomed the CCEE Team and all other visitors. He reported that the IP has been moving as a team, including the local council officials and that is why they were represented at the meeting. He thanked the host farmer (Mr. Tamale) for the good work that he has done and for introducing and teaching other farmers about Humidtropics. He also thanked the local government leaders who were present.

In response to the question of why soybean was important to the farmer's as one of their selected crops, Mr. Tamale said that it had multiple benefits such as improving their soil fertility and that they will also get some income when they sell it in the end. With regard to how he became the lead farmer for soybean in the Platform, it was based on his experience and the trainings from Humidtropics. Since then, he has been able to teach other farmers and explain to them the value of the crop. He has taught them the best way to harvest it so that not all the nutrients are lost from the soil. He also told them about the various products that can be obtained from soybean including, soybean milk. In terms of how soybean has benefitted him and his family, he mentioned that from the seed that was distributed to him from the Program, he was able to harvest 136kgs, out of which he was able to provide 70kgs of seed to other farmers in Watuba Sub County as a loan, which they pay back "in-kind". He provided each farmer with 5kgs of seed, for which they agreed to pay him back 8kgs of seeds after harvesting. He has also supplied seed to other sub-counties outside Kiboga-Kyankwazi such as those in Mityana district where the farmers have also planted 408kg during the current season.

Other activities being carried out by the Program entailed trainings in nutrition, which were being carried out at household level. The women and men who have been trained as trainers, were the ones to train other farmers at household level. Responses from most of the FGD participants indicated that there have been multiple benefits from participating in the Platform. Some of these include:

- Gained nutrition knowledge from the trainings, which was used to improve the diet of a very sick child that in the end saved his life;
- Soybean benefits that are now being advocated for inclusion in the school feeding programs;
- Learnt about mixing animal feed and to replace animal protein with soybean as a source of protein;
- The demonstration plots created an avenue for helping other farmers learn through the farmer to farmer extension on how to get better yields;
- Trainings helped to change mindsets.

All the Platform members present at the FGD meeting unanimously agreed that it requires a person with a charismatic character to become a successful leader of a Platform. For Kiboga-Kyankwanzi, the other key characteristics mentioned in describing Mr. Tamale included:

- His advocacy skills and ensuring that all the people have buy-in;
- He is determined;
- He is a good mobilizer and puts in action what he has been taught (leads by example);
- He is accessible at any time and place;
- He is patriotic and willing to talk to people.

4.2 List of Persons Interviewed Especially at the Field Sites

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Case Study 2:

THE RWANDA ACTION SITE REPORT

Author(s)

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1.1 Rwanda Country Context

Rwanda is a landlocked republic in Equatorial Africa, situated on the eastern rim of the Albertine Rift, a western arm of the Great Rift Valley, on the watershed between Africa's two largest river systems: the Nile and the Congo. Much of the country's 26,338 km^2 is impressively mountainous, the highest peak being Karisimbi (4,507m) in the volcanic Virunga chain protected by the Volcanoes National Park.

Box 1: Rwanda Quick Facts

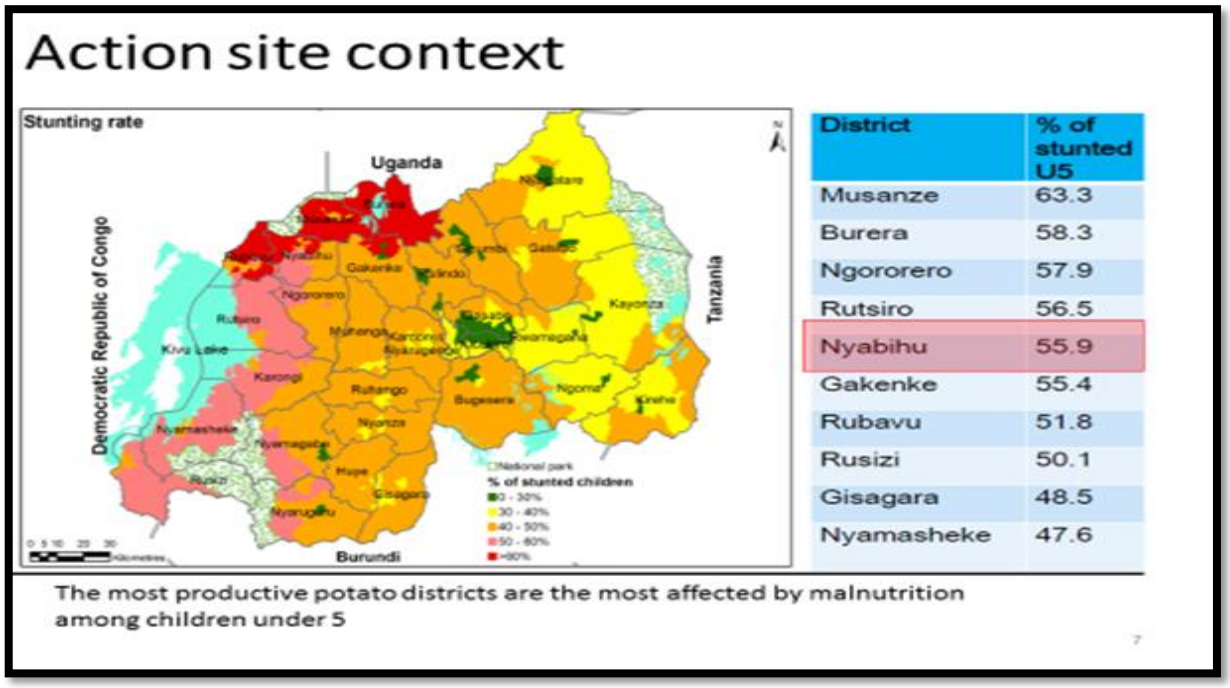
- Population of 12,337,138 with a high population density of 416p/km^2
- Infant mortality rate of above 70/1000.
- 45% population below poverty line (national statistics)
- High rate of literacy, above 60%
- About 80% of population primarily engaged in agriculture
- Decreasing contribution of agriculture to GDP (38-34% between 2005 and 2014)
- Province produces marketable surplus of Irish and sweet potatoes, maize, cassava, banana and beans
- Youths involved in non-farm activities
- Livestock is one main source of income
- Above 60% of the population owned livestock (cattle, goats, chickens, pigs and sheep)

Rwanda has a temperate climate with two rainy seasons (February to April, and November to January) and from its 24,668km^2 of land, 74.5% is arable. Major environmental problems are deforestation, overgrazing, soil exhaustion, soil erosion and poaching. With over 12 million inhabitants (median age 18.7 years), Rwanda is the most densely populated country in Africa. From this population, 80% are engaged in agriculture and jointly earns about 36% of Rwanda's GDP, 27.8% lives in urban areas and 44.9% was estimated to live below the poverty line in 2011 (which decreased from 57% in 2006) (CIA, 2015).

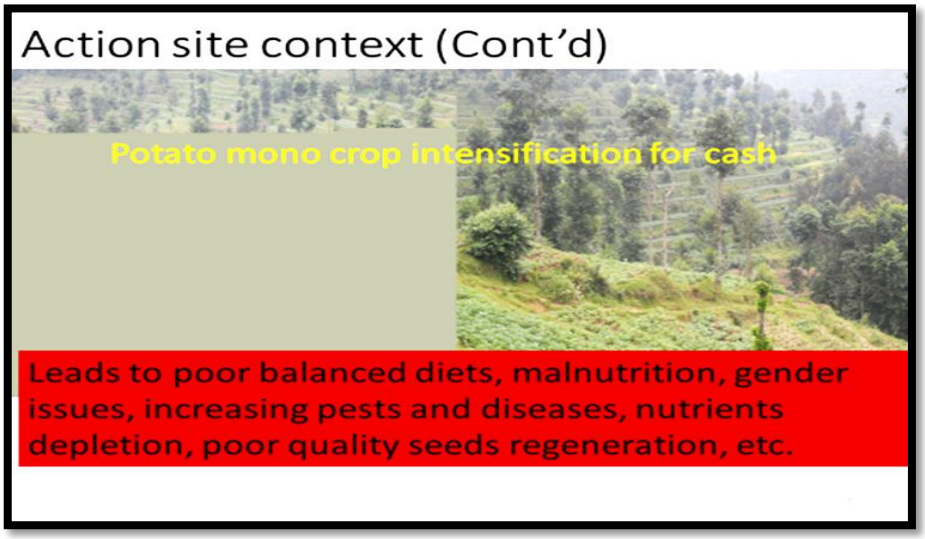
Rwanda's economy is primarily subsistence agriculture. Nonetheless, Rwanda produces for export some of the finest tea and coffee in the world. Other industries include sugar, fishing and flower for export. Another distinctive characteristic about Rwanda is its strong and well-structured government system. The government has a clear vision on agricultural development and interferes amongst other ways through regulation, information dissemination, trainings and subsidies (Kathiresan, 2011). An example is the promotion of monocropping, although intercropping is not forbidden. Its strong institutional environment provides both opportunities and constraints for innovation. On the one hand, once innovations that are found to be useful by the authorities, these can easily go to scale by integrating them in national policy frameworks. On the other hand, when technological and institutional innovations deviate from government policy, testing them can be met with suspicion or resistance. Taken together, the strong governmental interference in agriculture in Rwanda provides a very strong argument for collaboration between research, policy and other stakeholders to reach mutual understanding on the preferred route of sustainable agricultural intensification.

1.2.1 Systemness in the Rwanda Action Site

The Rwanda Action Site is characterized by several constraints, which include: disease, soil nutrient depletion, limited access to agricultural inputs (seed, fertilizer, pesticides, etc.), extreme banana and beans diseases, limited land, climate change and not well organized markets. Coupled with these constraints is an inappropriate Integrated Soil Fertility Management (ISFM) and lack of Integrated Pest Management (IPM) to address issues stipulated under its national Crop Intensification Programme (CIP). In this Action Site, most farmers grow potatoes as a monocrop for cash.



District	% of stunted U5
Musanze	63.3
Burera	58.3
Ngororero	57.9
Rutsiro	56.5
Nyabihu	55.9
Gakenke	55.4
Rubavu	51.8
Rusizi	50.1
Gisagara	48.5
Nyamasheke	47.6



1.2.2 Establishing the Local Level IPs

In Rwanda, there are two local level IPs that have been established under Humidtropics. The first one was launched in the Northwest highlands in Kadahenda in May 2014, and the second one in the Eastern lowlands in Kayonza in August 2014.

For the Kadahenda IP in the Northern highlands, this was still virgin area in terms of previously implemented projects by the Rwanda Agricultural Board (RAB) and other partners in Rwanda. All partners had to start from scratch using the data generated from the Rapid Appraisal of Agricultural Innovation Systems (RAAIS).

Following the RAAIS workshop, the Action Site Facilitator together with some R4D Platform members went to Kadahenda to visit the proposed Field Sites and fine-tune the identified entry points with local farmers. Then a selection of different stakeholders was called, informed about the idea to set up an IP and invited for a launch meeting. During the launch, the Program, the IP and the role of IP members were explained. Then participants committed to become members of the Kadahenda IP. They selected a leadership committee and discussed how each one could contribute to, and benefit from the Platform. The young IP agreed on potato being their main entry point and voiced tackling their challenge of lack of potato seeds (quality and quantity) as their common goal.

For the Kayonza IP in the eastern lowlands, in contrast to Kadahenda, the partners involved in Humidtropics were not unfamiliar with the area. They had been working there under the successful program of the Consortium for the Improvement of Agriculture-based Livelihoods in Central Africa (CIALCA 2)[12] whose funding had been extended under Humidtropics, which became the second Humidtropics IP in Kayonza.

Since the entry points selected during the RAAIS exercise by stakeholders in the lowlands highly coincided with former CIALCA activities, the decision was to continue the testing and up-scaling of CIALCA technological and institutional innovations. Following this decision, a delegation of R4D Platform members visited three big farmer cooperatives in Kayonza to look for potential locations and

[12] CIALCA is an agricultural research for development program that had been implemented in the Great Lakes region of Burundi, Rwanda and DR Congo (South Kivu) in the period 2006-2011. It was led by the CGIAR Centers IITA, Bioversity International and TSBF-CIAT, in collaboration with national research institutes, and focused on improving productivity of legume- and banana-based systems to enhance income, nutrition and environment. When it ended, CIALCA 2 has been thematically expanded – increasing focus on farming systems, livestock integration, climate change and understanding of drivers of impact – to allow periodic continuation under Humidtropics to finalize ongoing work and convert its network to Humidtropics (CIALCA, 2012).

stakeholders to bring on board in this second IP. Subsequently, another R4D Platform meeting was organized in July 2014, where the members started planning activities that could be implemented in Kayonza in the upcoming season. The activities – which were based on former work of CIALCA and its knowledge about the area – were validated and prioritized by the R4D Platform. Then, responsible persons/organizations that would lead the activities were identified and four of them were further detailed. The detailing of activities was finalized during a third R4D Platform planning meeting on 20 August 2014. Table 14 below summarizes the more detailed Humidtropics research being undertaken by the different partners within each site.

Table 14: Humidtropics Research at Each Field Site Linked to the Six IDOs – Rwanda.

RESEARCH PROGRAM ON Integrated Systems for the Humid Tropics
CGIAR

RWANDA

Kanyoza	Assessing vitamin A rich banana varieties	Bioversity	IITA, Gardens for Health, RAB, EPR, University of Rwanda	**For nutrition- ongoing**
	Improved legume-banana intercropping with agroforestry and livestock integration Assessing vitamin A rich banana varieties Maize-soybean intercropping and climbing beans rotation ongoing Improving cassava-legume/agroforestry systems in Eastern-Rwanda	IITA-/CIALCA	IITA, Clinton Foundation, RAB, ICRAF, Abibumbye, SEEDCO, UR/Huye & Nyagatere, RDO	**For productivity, NRM, income- ongoing**
Kadahenda	Improving agro-forestry and Irish potato based cropping system improvement in Rwanda	RAB/Cluster 4	University of Rwanda, IMBARAGA farmer federation, Gardens for Health, IITA, ICRAF, CIP, Bioversity, EPR,CIAT,FARA	**For productivity, NRM, income- ongoing**
	In the pipeline: Improving Potato Based Production Systems to Enhance Productivity, Gender Mainstreaming, Nutrition and Income approved	IITA/Expanded Cluster 4		**For productivity, NRM, income- approved**
	Assessing the response of beans to Alnus biomass Assessing the response of potato to Alnus biomass and mineral fertilizers	ICRAF	RAB, IITA, IMBARAGA farmer federation,	**For productivity, NRM, income- ongoing**

2.0 KEY FINDINGS FROM THE RWANDA ACTION SITE

2.1 Relevance of Humidtropics in the Rwanda Action Site

In examining relevance, the CCEE team assessed the extent to which Humidtropics was coherent and consistent with the CGIAR's Strategy and Results Framework including its focus on gender and capacity development priorities. In addition, the team was also looking out for the extent to which the Program on the ground was trying to develop different systems actor's capacities to innovate, especially the involvement of women and youth to achieve the expected results. The third key element of relevance required examining the Program design in terms of whether the Humidtropics ToC and impact pathway that takes into account gender, youth and tradeoffs between multiple objectives, among other things.

2.1.1 Alignment of System Level Outcomes to the CGIAR & Country Strategies

There is alignment of projects currently being implemented at the Kayonza & Kadahenda IP Field Sites with the Humidtropics IDOs. For Kayonza IP, the projects include:

- The improved legume-banana intercropping with agroforestry, the livestock integration and the maize-soybean intercropping with climbing beans rotation, and improving cassava-legume/agroforestry systems, all link to the Productivity and Environment IDOs.
- Assessing vitamin A rich banana varieties links more to income and nutrition IDOs.

For Kadahenda IP, the projects being implemented include:

- Assessing the response of beans to Alnus biomass, the response of potato to Alnus biomass and mineral fertilizers, both linking to the IDOs on Productivity and Environment.
- On-going studies regarding issues of markets, these link to the Income IDO.

The link to the Gender and Youth IDO in both IPs has been addressed as follows:

- Through the Situation Analysis, which teased out gender-related constraints and how they were to be addressed. In addition, the Cluster 4 project that is focusing on potato-tree-livestock integration provided clear guidelines on how to address gender.
- Women and youth (age range 24-35) are fully engaged within the Platform although not formally institutionalized. The youth involvement requires resources, which may need to be more institutionalized like in the case of Uganda where they are a registered youth group participating in the Platform activities. For Rwanda, the youth are clearly mentioned within the government's policy framework.

With regard to Innovation Capacity, there are diverse partnerships for cooperation, e.g. through facilitation, documentation, organization & Platform research. The buy-in by the Director General (DG) for Planning of the Ministry of Agriculture, who attends R4D Platform meetings indicates exciting opportunities to scale process and biophysical innovations through the Ministry. In addition, the existence of numerous functioning cooperatives that have been strengthened by diverse NGOs is expected to enable innovation capacity.

2.1.2 Alignment with National Strategy

There is good alignment of the Humidtropics projects with the national policies stipulated in the Republic of Rwanda's Economic Development and Poverty Reduction Strategy, 2013 - 2018, mainly under Priority Area 2 of the Rural Development Strategic Framework. The latter focuses on increasing the productivity of agriculture specifically through the Crop Intensification Program (CIP).

2.1.3 Program Design

There were many key stakeholders engaged in the initial process of collecting baseline information, entry point identification, partnership building, facilitation of IPs and R4D Platforms, etc., from CGIAR Centers and other core partners, down to local government level, local universities, farmers' organizations, etc. In Rwanda, the different stakeholders that attended the IP launch included:

- CGIAR Centers' representatives
- Rwanda Agriculture Board (RAB) – Plays a key role (**See Box 2**).
- Local NGOs (Ibakwe, CRS, EPR, etc.)
- Government (Gir'inka program, Send a Cow, MINAGRI, etc.)
- International NGOs (Gardens for Health, etc.)
- Private sector representatives

Box 2: Rwanda Agricultural Board (RAB) Contributions to R4D in Rwanda

RAB was chosen as the national facilitator and has played a major role in driving activities of the R4D Platform ever since. RAB's involvement included identifying the national facilitator (or Action Site Facilitator, ASF) to initiate and facilitate the (platform) process and assisting in implementation of research for development (R4D) activities. RAB was assisted in its role by representatives of the Program's Lead Center IITA. This small group of people can be considered as the facilitation team of Humidtropics in Rwanda.

The Custer 4 project proposal development process involved multiple phases of robust partner involvement in identifying challenges, solutions to investigate, and select top priority topics, as well as making commitments for in-kind contributions to the implementation of the research. The Program leaders reviewed outcome data from legacy programs (e.g. CIALCA had demonstrable effects on poverty reduction) to inform Humidtropics implementation.

How does the partnership assist with the realization of the objectives & scaling up of the interventions?

The diverse partnerships of the R4D Platform and two IPs are the essence of the Humidtropics process in Rwanda, which is used to address integrated systems innovations. These working partnerships, which have a shared ownership and vision, determine what will be done, by whom, when and where. The partnership also determines the strategy which will be used for scaling (both "incremental" and broader scaling) of IPs in new zones.

The partnership has also been instrumental in bringing about opportunities for co-financing, e.g. in collaboration with the government, there is potential for scaling Humidtropics activities in the new project that is going to be implemented in the Southern Province to cover five districts.

By using the RAAIS tool **(**see **Box 3),** which involved the different stakeholder groups, all participants agreed on the most important constraints in relation to productivity research, NRM research, institutional research and nutrition research. Building on this information, entry points were selected to guide the R4D activities (Schut & Hinnou, 2014).

In order to address the prioritized constraints agreed upon for the two Field Sites of Kadahenda and Kayonza, the following entry themes were selected for each site:

- "Irish potato-tree-livestock integration" for the highlands of Kadahenda.
- "Banana and maize-legumes-livestock integration" for the lowlands of Kayonza.

Box 3: Rapid Appraisal of Agricultural Innovation Systems (RAAIS)

RAAIS is a diagnostic tool for integrated analysis of complex problems and innovation capacity. RAAIS workshops facilitate different stakeholder groups (farmers, private sector, NGOs, government and research) to systematically identify their constraints and opportunities for innovation to address complex agricultural problems. Participants analyze these constraints and opportunities with regard to different problem dimensions (biophysical, technological, socio-cultural, economic, institutional and political) and different levels involved (national, regional, local) and subsequently prioritize them. In this way, participants jointly create an abstract representation of the agricultural system that provides a comprehensive basis for selecting context specific entry points for innovation to sustainably intensify the agricultural system and improve livelihoods as well as increases awareness of how their challenges are interrelated and require collective action. Key to RAAIS is that the process is both visual and dynamic. Using large papers, tables and colored cards stakeholders literally group around the problems they identify and discuss their various options to resolve these (Schut et al., 2015).

In terms of realization of objectives and scaling up, the Humidtropics Platform conducted reflection meetings in 2015 and selected the top three priority activities as having been undertaken based on the ranking by R4D Platform members as follows:

- Planning research activities;
- Attending Platform meetings;
- Identifying needs, challenges, opportunities, etc. of stakeholders.

The reflection workshops built on the ToC – the impact pathway – as outlined in the Humidtropics results framework to identify aspects in relation to process, content and outcomes. One of the key challenges noted was the lack of potato seed storage, to which local authorities provided free space for farmer collective potato storage to ensure high quality seed quality.

In addition to local authorities and farmers, a financial institution – SACCO bank – started to become increasingly involved in the IP activities. Farmers opened accounts at the SACCO and some even took loans (e.g. to finance the inputs for the multiplication trials). The IP also opened a group account and agreed with SACCO that if they would take a group loan, they could refund this after harvesting – an innovative arrangement that was very convenient for the farmers as this was their only period in which they were able to earn income.

2.2 Efficiency (Management; Institutional & Governance Arrangements; Budget Analysis)

2.2.1 Humidtropics Management in the Rwanda Action Site

The Rwanda Action Site is managed by a Facilitator, Desire Kagabo, Ph.D., from RAB, who provides management oversight of research in the two Field Sites. In either site, he leads a team of partners including researchers that manage the IP projects in the Field Site.

For specific “Research Themes” as outlined in Table 14 above, scientific leadership, oversight, and guidance for the research is provided by the partners concerned such as RAB, University of Rwanda, ICRAF, IITA, Bioversity International, CIP, CIAT, etc. These researchers are part-time and are supported and employed by their host organization. They ensure that the research is appropriately planned, implemented, and monitored. They work with the Field Site Facilitator to support technical quality and rigor in research for the Action Site.

On decision-making mechanisms to optimize use of resources

Through the adoption of the Results-Based Management framework, the performance matrix outlines specific outputs to be achieved, which have to have budgets linked to them. Each partner is accountable to the IP through this output-based budgeting and reporting mechanism.

On decision-making power on research activities

Research activities implemented under Humidtropics in Rwanda differ between Kadahenda IP and Kayonza IP, but can both be traced back to the entry points identified during the RAAIS workshops in March 2014. In this way, local stakeholders in the regions where the IPs are based have been able to give their input in the field work (Schut & Hinnou, 2014).

After RAAIS, the assumption for the IP in Kayonza was that since CIALCA had been active there and local stakeholders had again expressed needs related to some of its activities, the R4D Platform had already sufficient information to directly proceed to planning and implementation of field work.

In contrast, Kadahenda was still an unfamiliar area and the national Facilitator first went there to fine tune the entry point selected during RAAIS with farmers on the ground. Afterwards – but before research plans were actually articulated in detail – the IP itself was established and the entry points were again discussed, providing IP members with another chance to give input in R4D activities. During this meeting they clearly voiced Irish potato as their main entry point and availability of Irish potato seeds as the main challenges they wanted to tackle.

Comparing these two approaches indicates that IP members in Kadahenda have had more opportunities to influence R4D activities.

2.2.2 Institutional & Governance Arrangements in the Rwanda Action Site

Linkage, communication and feedback

Humidtropics operates on different levels, which makes communication and feedback between these levels essential elements for well-coordinated and meaningful collaboration and scaling of innovation. When reflecting on communication at IP level, differences as well as similarities can be pointed out between the two IPs.

In Kadahenda, the IP consists of different stakeholder groups (with farmers being the biggest group) who meet every month to discuss progress, challenges and next steps to be taken. Moreover, additional sub-group meetings are held every time there is a need for those concerned about discussing their other issues. In this way, the IP members make sure that everybody remains updated and that issues are discussed in a timely manner. In addition to IP meetings, information from individual members to the rest of the IP or the researchers or extension officers working on the experiment, is often communicated through the IP chairperson by means of phone calls or face-to-face interaction. For example, when farmers have a problem with their fields which they cannot solve on their own, they often first call the chairperson, who in turn contacts RAB if necessary.

Likewise, farmers involved in research activities in Kayonza also interact with their close colleagues as well as contact the extension officers or RAB either directly or indirectly through their farmer leader in case of problems they cannot solve on their own. In contrast, in Kayonza the IP does not meet as a Platform and farmers involved in the different sectors hardly communicate.

Communication between the IPs and between IPs and R4D Platform takes place through the facilitation team headed by the national Facilitator, the researchers involved in field experiments and IP representatives that are invited for R4D Platform meetings. Communication channels include real-life interactions, reports, presentations, monthly updates and/or protocols. In addition, in Kadahenda, the IP sometimes informs RAB about their upcoming meeting and RAB in turn informs R4D Platform members who sometimes decide to attend the IP meeting if deemed relevant for them. Moreover, there are some R4D Platform members that are simultaneously members of the Kadahenda IP (e.g. the representative of Rwanda Farmers Federation IMBARAGA).

Within the R4D Platform, communication mainly takes place in meetings that are often geared towards providing updates of what has happened and what needs to be done. Additional communication occurs outside the formal meetings, e.g. through phone calls, emails, short text messages (SMS), subgroup meetings (e.g. to follow-up on action plans) or via WhatsApp.

2.3 Quality of Research

2.3.1 Research Design, Systems Tradeoffs & Synergies

The selection of Field Sites (scaling domain, partners) and identification of broad entry themes based on soft and hard criteria (market access, poverty, NRM) was based on “ground-truthing” by conducting Focus Group Discussions (FGDs) at village levels after the situation analysis at national level.

Through use of the RAAIS methodology, which prioritized the constraints in the lowlands of Kayonza and the highlands of Kadahenda, key entry points were identified as follows:

- Crop (potato)-tree-livestock integration;
- Maize-legume-livestock integration;
- Banana-legumes-livestock integration.

The use of the RAAIS methodology was used to identify major challenges (e.g. limits on appropriate inputs, knowledge/skills, finance for reinvestment, small farms, weak farmers’ organizations, need for fodder/animal feeds).

The R4D planning was informed by national government report, which identified major challenges and opportunities (e.g. strong correlation between child malnutrition and high potato production areas).

There is evidence of Platform evolution in the following key elements of an integrated system:

- The work on processes, which builds on tools, methods and especially empowering participation, is making progress:

- **For processes**: The situation analysis and baseline survey conducted prior to selecting entry points is a case in point;
- **Use of the RAAIS tool** in each of the IPs.

➢ Narrower mandates of legacy projects couldn't respond to broader set of issues raised by farmers, but Humidtropics convened Platforms returned to the same areas for a more comprehensive systems assessment.

Comparing Kadahenda and Kayonza, farming systems are similar. In the former, while there are three different types of farming systems, in the latter there are more challenges and the IP is slower to achieve focus and agreement on initial research projects.

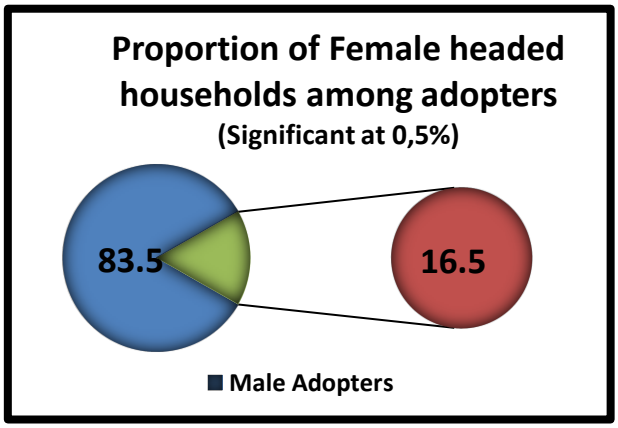
2.3.2 Research Leadership & Quality

Several different research themes are articulated based on leadership of the research design and implementation, which ranges from "scientists are catalyzing the process" to "participation of farmers from the inception to the evaluation" for example in the Kadahenda IP, which is now fully operated by farmers.

The field research was clearly led by senior scientists from RAB and from the University of Rwanda, in collaboration with all the other partners.

2.3.3 Research Priorities & Relevance for Women and Youth

In setting research priorities and making them relevant for women, the key findings from the baseline with regard to gender differences have been taken into consideration to inform the research agenda. For instance, the findings indicated that:



➢ In comparisons of households (HHs) that adopt and those that do not, female-headed HHs show high rates of adoption;
➢ Out of 52 female-headed HHs, 41 (~80% of all female HHs) adopted a CIALCA technology, which suggests that uptake is high;
➢ Those HHs that adopt technologies generally cultivate larger land sizes than those that do not adopt a technology;
➢ Adopter's average land size was 0.76 ha; non-adopters average land size is 1.19 ha;
➢ Joint ownership is the most common type of land ownership among all HHs;
➢ Husbands own land 10% more often in HHs that do not adopt than those that adopt;

- There is a slight but insignificant difference between those who adopt and those who do not. In those HHs that adopt a technology, wives have higher rates of ownership of land and joint ownership is higher than in HHs that do not adopt.

In general, research activities have been tailored to community needs and concerns, e.g. the potato seed multiplication and seed storage within Kadahenda community is addressing the constraint of 'lack of clean planting materials'. Farmers have been trained on best practices of potato seed production and negative potato seed screening for quality assurance. Farmers visit seed storage facilities to learn and adopt better post-harvest handling techniques.

2.3.4 Building on Legacy Projects

Humidtropics was built on legacy projects, especially the on CIALCA results. The contribution by the legacy projects enhanced the Program experience especially in areas where CIALCA activities existed. There are also several examples in which researchers had to follow farmers' lead, e.g. growing of climbing beans, application of sheep manure, which was pre-existing.

2.3.5 Integrated Systems Improvement

There is strong evidence of institutionalization of system integration. For instance, there is strong buy-in by diverse organizations in the R4D Platform who guide and even plan concrete actions based on inputs from the two IPs at the Action Sites. The community as a whole was involved in deciding on the entry points. Some of the research initiatives in Kadahenda include:

- Assessment of potato variety yield potential (30 farmers in 2 seasons);
- Rotation effect of maize and beans in potato systems (10 farmers in 2 seasons);
- Interaction of improved varieties and mineral fertilizer on potato yields (10 farmers in 2 seasons);
- Use of Alnus biomass as N source for potato and bean production (5 farmers);
- Determination of nutrient limiting factor for potato production with or without Alnus biomass (5 farmers).

For Kayonza, the research initiatives include:

- Maize/soybean intercrop rotated with bush beans (12 farmers);
- Banana/bean intercropping (16 farmers);
- Introduction of vitamin A rich banana varieties (8 farmers);
- Cassava/bean intercropping (5 farmers).

The new initiatives by R4D partners vary and they include but are not limited to kitchen gardens, use of green manure, introduction of vitamin A rich bananas by GHI, mobilization of farmers by IMBARAGA, field monitoring and data-collection by

EPR, expanded activities on Alnus trees by ICRAF, and introduction of Vernonia for fodder production.

2.3.6 Scaling and Institutional Innovation

There were possibilities of private and public sector scaling up; and in some cases a hybrid of both. Although it is too early to know how scaling up will unfold, the engagement of the Director General of Planning for the Ministry of Agriculture opens many possibilities for eventual government-led scaling up of innovations, including – hopefully – the process innovations that foster ownership.

The information sharing platforms (Researchers Innovation networks), which are characterized with strong documentation and information sharing capacity with all stakeholders facilitates both scaling and institutional innovation.

2.4 Effectiveness

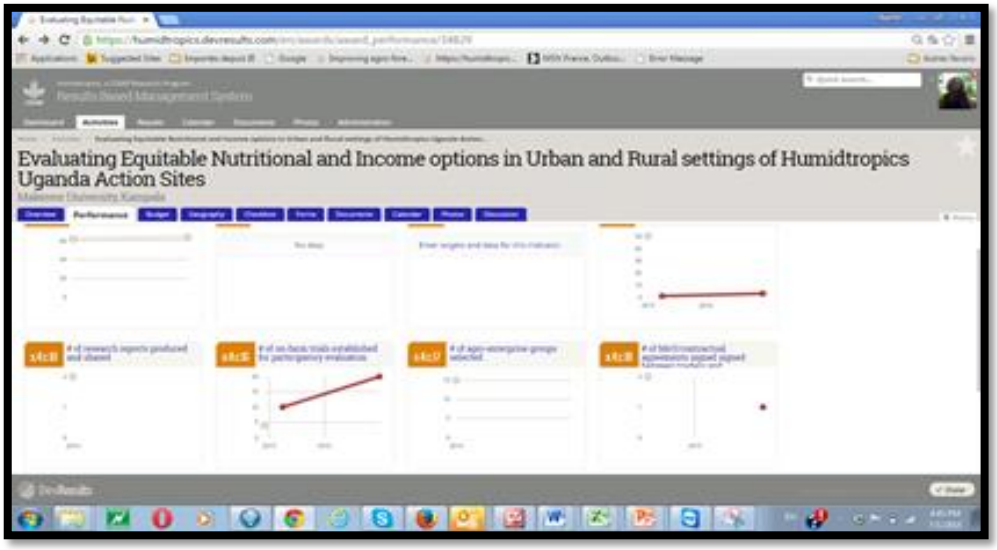
2.4.1 Translation of ToC and Impact Pathway into Site-Relevant Processes and R4D

There were several key achievements in both Field Sites, which demonstrate translation of the ToC into site-relevant processes. For instance, in Kadahenda, the following activities were implemented which represent some of the key outputs stipulated within Humidtropics (Rwanda) ToC:

- Multiplied seeds;
- Storage of clean seed within local government facilities in Kadahenda;
- Introduction of new varieties;
- Trainings – positive selection;
- Participation of women;
- Institutional involvement – at R4D Platform and IP Level.

For the Kayonza IP, the conduct of mainly field trials on farmer fields (5 treatments) also indicate relevant site-specific processes required to achieve the key outputs.

2.4.2 Tracking Progress Towards Planned Outputs & Outcomes



Rwanda, as part of the ECA Flagship piloted the use of M&E data collection tools for linking into the DevResults system, which was shared with all other areas.

2.4.3 Draft M&E Framework: Humidtropics Implementation Outputs & Outcomes

The milestones and outputs are clearly articulated and tracked through DevResults. On the ground, the achievement of these outputs were enforced through three-level signed MoUs with specific deliverables between i) IP & R4D Platform; ii) IP & Sector or Local Government; and iii) IP & SACCO.

Enforcement at community level was also done through performance contracts signed with local administration. Program leaders tracked and reflected on Platform performance (e.g. frequency of different types of stakeholder meetings). Platform research projects are good examples of integration aligned with Humidtropics' IDOs based on farmer-driven priorities (e.g. expanded Cluster 4 proposal on Irish potato to include gender and nutrition).

3.0 CONCLUSION

Report card on "Systemness" of the Rwanda Action Site:

Key elements of 10 Points "systemness" not as evident on the ground:

i. Systems mindset: Yes, embedded in government structures
ii. Inter-disciplinary Research team: Yes
iii. Stakeholder Engagement (IP): Yes
iv. Integrated systems research & tradeoffs: Yes
v. Innovation: Process, Social & Institutional
vi. Scaling up/out: High Potential
    a. Example 1: Start by increasing the number of IPs per District, which can be replicated or copied by neighboring districts;
    b. Example 2: Through the Local Government, use the performance contracts to require expansion in terms of coverage;
    c. Example 3: Building on the legacy project for SSC – the potato model and bringing in new components such as Nutrition and Gender;
    d. Piggy backing on the existing policies, e.g. "one cup (milk)"; "one-egg per child" policy;
    e. The self-reliance extension model which groups 15 neighboring farmers to consolidate land, receive extension, etc. Can use that avenue to channel the IP innovations.
vii. Gender research – Women & Youth - Yes
viii. Capacity Building: Yes
ix. Development orientation (IDOs): Yes
x. Learning: Yes

4.0 ANNEXES

4.1 List of Persons Interviewed Especially at the Field Sites

List of People Interacted with via KIIs, FGDs & Site Visits											
Name	Institutional affiliation	Title	Location	CCEE Method					Gender	
				KII (in person)	KII (skype)	KII (email)	FGD	other…	Female	Male
Action Site Stakeholders										
RWANDA SITE VISITS										
Rugerero Joseph Desire	RAB		Rwanda				X			X
Charles Kajanziki	University of		Rwanda				X			X
Joseph Garanga	IMBARGA famers federation		Rwanda				X			X
Felix Nzeyimana	RAB		Rwanda				X			X
Athanese Mukuralinda	ICRAF		Rwanda				X			X
Beatrice Glesa (Bioversity)	Bioversity		Rwanda				X		X	
			Rwanda							
			Rwanda							
Kadahenda IP			Rwanda							
Rugerero Joseph Desire			Rwanda				X			
Noheri Theomeste			Rwanda				X			
Nsengimana Jean Defieu			Rwanda				X			
Tunowukwere			Rwanda				X			
Nyiramuzoro Ziripa			Rwanda				X			
Kankundiye Hirarie			Rwanda				X			
Kamanzi Celestia			Rwanda				X			
Runyakwambi Jean Basptiste			Rwanda				X			
Yankurije Theogeine			Rwanda				X			
Habiolana Bonowemtuze			Rwanda				X			
Karangwa Thiwnoteo			Rwanda				X			
Nisgororano Eudie			Rwanda				X			
Uwamungu Cesar			Rwanda				X			
Ndarifitie Emmauli			Rwanda				X			
Umamahoro Oriua			Rwanda				X			
Uwwokeli Bernard			Rwanda				X			
Niyitegeka Gilbert			Rwanda				X			
Nzemwehimona Anne Marie			Rwanda				X			
Ntamuhanga Innocent			Rwanda				X			
Kauero Emmanuel			Rwanda				X			
Niyitegeka Jean De Dieu			Rwanda				X			
Nukawgwiga Chinance			Rwanda				X			
Yad Faihife Josephine			Rwanda				X			
Jusabewaniya Agnes									X	

Case Study 3:

THE DRC ACTION SITE REPORT

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1.1 The DRC Country Context

Established as an official Belgian colony in 1908, the then-Republic of the Congo gained its independence in 1960, but its early years were marred by political and social instability. Col. Joseph Mobutu seized power and declared himself president in a November 1965 coup. He subsequently changed his name – to Mobutu Sese Seko – as well as that of the country – to Zaire. Mobutu retained his position for 32 years through several sham elections, as well as through brutal force. Ethnic strife and civil war, touched off by a massive inflow of refugees in 1994 from fighting in Rwanda and Burundi, led in May 1997 to the toppling of the Mobutu regime by a rebellion backed by Rwanda and Uganda and fronted by Laurent Kabila. He renamed the country the Democratic Republic of the Congo (DRC), but in August 1998 his regime was itself challenged by a second insurrection again backed by Rwanda and Uganda. In January 2001, Kabila was assassinated and his son, Joseph Kabila, was named head of state. In October 2002, the new president was successful in negotiating the withdrawal of Rwandan forces occupying the eastern DRC; two months later, the Pretoria Accord was signed by all remaining warring parties to end the fighting and establish a government of national unity. A transitional government was set up in July 2003; it held a successful constitutional referendum in December 2005 and elections for the presidency, National Assembly, and provincial legislatures took place in 2006.

Box 1: DRC Quick Facts

- Population: 79,4 million, with a population growth rate at 2.45% (2015 est.)
- GDP of $700 (2014 est.), with a real growth rate at 8.6% (2014 est.)
- GDP Composition: Agriculture: 40.4%, Industry: 23%, Services at 36.6% (2014 est.)
- Infant mortality rate of above 126/1000 in South Kivu
- 84% population below poverty line (national statistics)
- Low rate of literacy
- About 80% of population primarily engaged in agriculture
- Kivu Province produces marketable surplus of cassava, banana, beans, and maize
- Youths involved in non-farm activities

The economy of DRC – a nation endowed with vast natural resource wealth – is slowly recovering after decades of decline. Systemic corruption since independence in 1960, combined with countrywide instability and conflict that began in the mid-90s has dramatically reduced national output and government revenue and increased external debt. With the installation of a transitional government in 2003 after peace accords, economic conditions slowly began to improve as the transitional government reopened relations with international financial institutions and international donors, and President Kabila began implementing reforms. Progress has been slow to reach the interior of the country although clear changes are evident in Kinshasa and Lubumbashi. Renewed activity in the mining sector, the source of most export income, has boosted Kinshasa's fiscal position and GDP growth in recent years. An uncertain legal framework,

corruption, and a lack of transparency in government policy are long-term problems for the large mining sector and for the economy as a whole. Much economic activity still occurs in the informal sector and is not reflected in GDP data.

DRC signed a Poverty Reduction and Growth Facility with the IMF in 2009 and received $12 billion in multilateral and bilateral debt relief in 2010, but the IMF at the end of 2012 suspended the last three payments under the loan facility – worth $240 million – because of concerns about the lack of transparency in mining contracts. In 2012, DRC updated its business laws by adhering to OHADA, the Organization for the Harmonization of Business Law in Africa. The country marked its twelfth consecutive year of positive economic expansion in 2014.

The climate of DRC is tropical; hot and humid in equatorial river basin; cooler and drier in southern highlands; cooler and wetter in eastern highlands; north of equator – wet season (April to October), dry season (December to February); south of equator – wet season (November to March), dry season (April to October). The main agricultural products include coffee, sugar, palm oil, rubber, tea, cotton, cocoa, quinine, cassava (manioc, tapioca), bananas, plantains, peanuts, root crops, corn, fruits, and wood products.

1.2 Establishing Local Level IPs in DRC

The process of establishing the R4D Platform and IPs in DRC entailed the organization of an Action Site launch meeting in May 2013, which was followed by several informal meetings from June to October 2013. Then field visits were undertaken in November 2013, and later in February 2014 to identify entry points using the RAAIS tool.

Two criteria were considered relevant and important for site selection:

- Building on existing initiatives such as CIALCA experience and the Challenge Program;
- Consideration for agro-ecological zones: low altitude plains, average and high altitude forest areas.

Based on the above criteria, three potential sites were identified, namely Walungu axis; Rusizi Plain axis; and Masisi-Rutshuru axis in North Kivu. Some of the challenges identified through the RAAIS were poor livestock management and land degradation.

In addition, there was low support for agricultural sector research, a weak extension system, and difficult access to agricultural credit. This was in a post-conflict region, which had a presence of humanitarian actors, with low collaboration and coordination of actors.

The establishment of the R4D Platform took place on 25 April 2014. The IP was operating at the community level called “groupement” with no formal rules and procedures. At this stage two people were facilitating, the chair of the local CBO and an NGO staff of Food for the Hungry (FH). The key stakeholders represented included: farmers, NGO, inputs dealer, transporter, local leader, health centers, and traders. There were 21 women and 13 men, with farmers being the most represented group (75%). There has since been a reflection meeting, in January 2015, which has been followed by the adoption of internal rules and regulation in the R4D Platform, in April 2015.

Some lessons learned in establishing an IP is that leadership is an essential key ingredient to its success, which requires competencies in good analytical skills, ability to think strategically, excellent interpersonal skills, ability to quickly create good relations with the community. It is also important to involve the various key players in the area during the constitution of the IP, which remains very crucial. True ownership of IP by different members depends on how this dynamic is made.

Table 15 below summarizes the more detailed Humidtropics research being undertaken under the leadership of each CGIAR Center within each site.

Table 15: Humidtropics Research at Each Field Site Linked to the Six IDOs - DRC

DRC				
Field Site Mushinga (Mushinga, Lubona, Burhale and Mulamba)	Participatory experiments on banana Xanthomonas wilt (BXW)	Bioversity	IITA, CIAT, SENASEM, IPAPEL, CIAT, FAO, DIOBASS, FH, Mushinga Cooperative	For productivity, NRM , income, ongoing
	Initial assessment of the comparative advantage of expanded/newly introduced crops/cropping systems	Bioversity	IITA, CIAT, SENASEM, IPAPEL, CIAT, FAO, DIOBASS, FH, Mushinga Cooperative	For productivity, Nutrition, NRM , income- ongoing
	Introduction and testing of the best fodders completed Soybeans-cassava-leucaena intercropping trial system	IITA/LegumeChoice	UCB, Mushiga farmer groups	For productivity, NRM , income- ongoing
	Dissemination activities on inoculate legumes Integration of legumes in the banana system Soybeans-cassava integration system	IITA/N2Africa	CIDEMU, DIOBASS, PAD,	For productivity, income, nutrition, NRM- ongoing
	Improvement of Cassava-Grain Legumes Production Systems through Livestock Integration	INERA/Cluster4	FH, IITA, FAO, UEA, DIOBASS, BIOVERSITY	For productivity, income, nutrition, NRM- ongoing
	Banana-legume livestock integration ongoing	IITA/CIALCA	SENASEM, IPAPEL, CIAT, FAO, DIOBASS, FH, Mushinga coop	For productivity, NRM, income-ongoing
	Cassava-Legume intensification system Multiplication of cassava cuttings	IITA/IFAD	IITA, Farmer groups	For productivity, income, nutrition, NRM- ongoing
	Mapping out the current and potential nutrition impact pathways, from farming systems to household diet and the gender and social implications (FGDs and HHLD surveys)	Bioversity/ CIALCA	Platforms	For nutrition, productivity, income- ongoing
	Social network analysis of partners in 3 platforms tracing relations on themes relevant to action site theory of change	Bioversity/CIALCA	Platform	For operational platform processes- ongoing

2.0 KEY FINDINGS FROM THE DRC ACTION SITE

2.1 Relevance of Humidtropics in the DRC Action Site

In examining relevance, the CCEE team assessed the extent to which Humidtropics was coherent and consistent with CGIAR's Strategy and Results Framework including its focus on gender and capacity development priorities. In addition, the team was also looking out for the extent to which the Program on the ground was trying to develop different systems actors' capacities to innovate, especially the involvement of women and youth to achieve the expected results. The third key element of relevance required examining the Program design in terms of whether Humidtropics' ToC and impact pathway that takes into account gender, youth and trade-offs between multiple objectives, among other things.

2.1.1 Alignment of System-Level Outcomes to the CGIAR & Country Strategies

The implementation of the Integrated Soil Fertility Management (ISFM) in mixed legume systems including external nutrient inputs and improved manure use is aligned towards achieving key IDOs of Productivity and Environment.

While the implementation of the Cluster 4 project on banana-legume-livestock integration, and soybeans-cassava integration system based on locally-adapted technologies (incl. varieties) for beans, cassava, banana and livestock focuses on the IDOs of Income and Nutrition.

In the Mushinga Field Site, farmers are being linked to markets (business plan, value chains), market support services and micro-finance, which is in alignment with achieving the IDO on increasing incomes. The project that is focused on nutrition and post-harvesting work to enhance dietary diversity and promote agro-processing activities is also aligned to the IDOs on Income and Nutrition.

Through the projects being implemented in Lubona, there is evidence that an NGO-led bean storage project was initiated before a market potential study was done. Through Humidtropics, this facility has since been used to bulk beans for the farmer group. They have also proposed a more efficient system of weighing as opposed to using a "bowl" so that farmers can secure better pricing from the buyers. The buyers were exploiting the farmers by paying them a price for one kilogram, when the quantity weighs two kilograms. Under Humidtropics, market studies are being undertaken as well as exploration of marketing to humanitarian food organizations. Farmers are also being linked and accessing micro-finance for land rental and seeds through PAIDEK.

A. For Gender & Youth

Gender and youth in this Action Site have been considered from the beginning when the Situation Analysis was undertaken. These issues were further articulated in the household studies which were conducted.

Youth involvement was high from the onset. The Youth Agripreneurs Project led by IITA in Kalambo, whose objectives is to create employment and income for youth through agribusiness, is a good success story for achieving Humidtropics objectives and scaling up. On one hand, the youth are focused on producing for market, and on the other hand they are also actively involved in the research taking place at the various Field Sites either as data collectors, or working with the lead organizations to manage the research:

- The Youth are also involved in mass production of cassava, cereals and legumes; their processing and marketing;
- Also involved in fisheries and provide other services to the other IP members such as trainings and conducting surveys;
- Youth provide other services to Platform members such as training, surveys, field activities, etc.

The youth offer trainings on processing and value addition. They train youth and women in their respective sites and provide high quality and nutritional soya and cassava products. Being part of the IP, they also benefit in several ways such as:

- Linkages with other agricultural stakeholders and donors;
- Information based of experience;
- Market for developed product;
- Opportunity to scale up their innovations in the rest of the Action Area.

B. Innovation Capacity

There was training for IP members to strengthen their capacity to diagnose and take appropriate actions, and to of further develop the capacity of youth to innovate at farm and national levels.

Alignment with National Strategy

In terms of alignment with the national strategy, Humidtropics is well aligned with the national policies through the Republic of Congo National Development Plan 2012-2016, dated January 2012, which focuses on the following blocks:

- Block one, on growth “vectors” (agriculture, forestry, mines and hydrocarbons, tourism, etc.), which create national wealth, transform and strengthen the economic fabric, and create jobs.
- The second block, which includes the development strategies for the production “factors” (infrastructure, human and financial resources). These relate to

production costs and therefore the economy's overall competitiveness, which Humidtropics is also trying to address by building the capacity of all key stakeholders including farmers but more importantly by supporting the government research infrastructure.

- The third block comprises of empowerment and inclusion strategies targeting the social sectors (education, health, gender, social welfare, etc.). The aim of these strategies is to improve the productivity of economic actors, facilitate their access to production factors, and increase their share of the distribution of income. Thus, they enhance the capacity of populations to contribute to growth and their relative power to benefit from its positive effects. Humidtropics in DRC is aimed at ultimately increasing people's incomes by addressing the productivity of the economic actors and their access to production factors such as credit.

2.1.2 Program Design

Humidtropics in the DRC Action Area was launched May 2013. It began by identifying teams, then held several meetings with Platform members before defining the entry points by using the RAAIS tool in February 2014. Thereafter, the R4D Platform was formally established in April 2014. A reflection meeting was held in January 2015 to assess progress and status of the Platform, which resulted in bringing about some changes in the R4D organization including new internal rules (April 2015) and election of expanded committee for the sub-platforms (June 2015).

Box 2: List of Key Partners in the Platform

Organizations	Type
IPAPEL	Public service
IITA	CGIAR Center
Field Site representative	Farmer Organization
FH	International NGO
DIOBASS	National NGO
UCB	University
BIOVERSITY	CGIAR Center
FAO	UN Agency
INERA	National Research Iinstitution
UEA	University
ISDR	National High School
Ministry of Agriculture	Public Service
N2 AFRICA (IITA	IITA project
SENASEM	Public Service
ICCO-Cooperation	International NGO
PAD	National NGO
ADVS	Agrodealer
SARCAF	National NGO

The IP's stage of development can be said to be in advanced stages, with fully operational committees, but there is still low collaboration among some of the key actors. However, the Youth Agripreneurs are very active members in the Platform.

How does the partnership assist with the realization of the objectives & scaling up of the interventions?

The Action Site has achieved partnerships through the R4D Platforms and IPs. Partners involved include:

- Involvement of key policy makers, farmer organizations, national and international NGOs, Universities, and the private sector (**Box 2** above).
- The role of the private sector has also been key in production. For instance, having agro-dealers as part of the Platform who have been involved in training people on how to use inputs:
  - The agro-dealers have also established an inputs shop in Mushinga to supply inputs to farmers;
  - They extend credit to farmers to purchase inputs and then they pay after harvest.

2.2 Efficiency (Management; Institutional & Governance Arrangements; Budget Analysis)

2.2.1 Humidtropics Management in the DRC Action Site

The overall management of the Action Site is under the leadership of Sylvain Mapatano, as the Platform Coordinator. Sylvain works closely with Chris Okafor, the ECA Action Area Coordinator, who is also based in IITA-Bukavu.

On decision-making mechanisms to optimize use of resources

Through the adoption of the Results-Based Management framework, the performance matrix outlines specific outputs to be achieved, which have to have budgets linked to them. Each partner is accountable to the IP through this output-based budgeting and reporting mechanism. This is only applicable to Cluster 4 Project.

2.2.2 Institutional & Governance Arrangements in the DRC Action Site

In the DRC Action Site, management of the Platform also involves other key players in the area such as the local leadership in the community, NGOs and the church in order to encourage ownership. The active participation of researchers has also helped to reduce bias against the appropriate use of fertilizers promoted mainly through NGOs and the Church. The Church has contributed land and facilities, and has very broad reach among rural farmers through priests who provide agriculture training (which is being improved under Humidtropics).

2.3 Quality of Research

2.3.1 Research Design, Systems Tradeoffs & Synergies

The Action Site conducted a Situational Analysis, which revealed the following challenges: poor livestock management, land degradation, very low production (banana, etc.), and malnutrition. Also, low support for agriculture research sector, weak extension

system, and difficult access to agricultural credit and inputs. The Field Sites locations are faced with climate change challenges as well.

Research activities are addressing all of these challenges including in-field research (livestock integration, soil improvement, access to improved varieties, increased production); partnering on research with NGOs and Catholic Church which are positioned to deliver extension-type services; engaging agro-dealers who have expanded fertilizer distribution and which now provide fertilizer on credit.

The baseline survey was also completed and showed the need to focus on production and food availability, which is very low in this part of DRC. There is a marketable surplus of cassava, banana, beans and maize but poor market organization and linkages. Several food improvement initiatives are underway such as the banana-livestock integration.

Prior to identifying the entry points needed to address the challenges, the RAAIS tool was used which helped in identifying the most relevant agricultural innovations. These included:

- Introduced forage;
- Disseminated fortified varieties of beans, cassava and banana.

The process of research project development appears to be initiated when researchers inquire about farmer challenges, then researchers propose multiple options which farmers can choose from. The research implementation is then based on agreed protocols and shared work (e.g. researchers do the field preparation and planting; and farmers do weeding). Pre-harvest participatory evaluation is designed to effectively elicit opinions of male and female farmers.

For gender consideration in selecting key research projects, the group decides as an IP, which involves both men and women farmers. Through the R4D Platform in Bukavu, researchers, NGOs, farmers and agro-dealers, discussed how the research trials were going to be implemented. They also took into consideration that the women's group used to grow beans and that is why beans were selected in some of the trials.

For instance, the Legume Choice project is a joint partnership between IITA and the Catholic University, which is conducting research in collaboration with the farmers. Some of the research includes but is not limited to the following:

- Conducting 13 research trials with 5 treatments, which choice is left to the farmers;

- Conducting participatory evaluation with the farmers in order to select the best performing varieties. The best practices were selected in secret by independent groups of men and women farmers, then where they do not agree are brought together to reach a consensus. This was done at maturity of common bean intercropped with cassava. The farmers were given a chance to select the three best treatments among five that were implemented.

The IP has assisted in building synergy between different NGOs that work in the same area. Previously, there would be about nine NGOs working in the same area to promote different aspects of the same crop such as cassava. The NGOs now work together to deliver a unified message. For example, FAO, UNDP, FH and IITA are developing a joint plan to work together in one site during the next season although they will be delivering different services.

2.3.2 Research Leadership & Quality

Research is led by senior researchers. For example, improving legume cassava intercropping system and assessing options for livestock integration is led by Dr. Katunga of INERA. The research is focused on the following:

- **Problem identification**: The cultivated varieties are susceptible, low yielding and of limited nutrition and market value;
- **Understanding the causes**: Farmer access to quality planting material and knowledge on soil conservation measures is limited;
- **Providing possible solutions**: Introducing and evaluating improved varieties in integrated production systems and improving their market value.

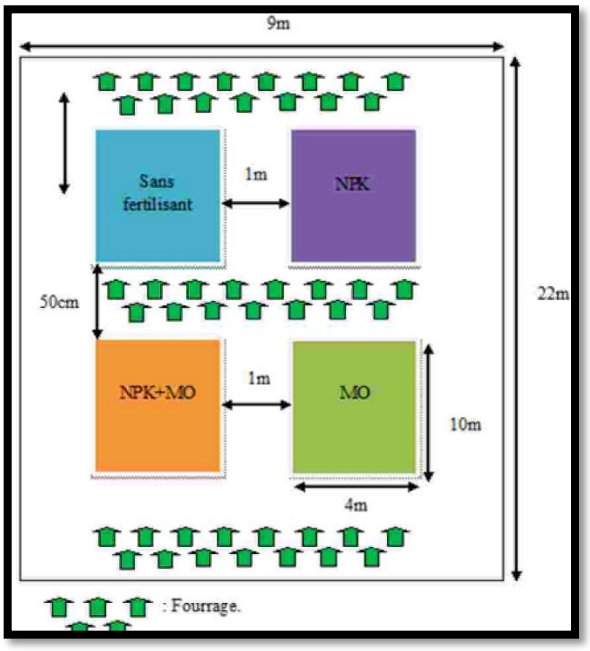
The justification of the experimental trials undertaken is based on the following:

- Intercropping is one of the available options in agricultural production to maintain soil fertility and crop yields. It is also promoted to overcome risk of crop failure, reduce pest and disease incidence and in controlling weeds and soil erosion;
- Cassava and banana are important sources of economic and social capital for the farming population in the action area.

The methodology used ensures high quality research because it is based on the following approaches:

- Beans-banana/cassava intercrop is evaluated in smallholders' production systems through R4D Platform and IPs;

- Planting material was brought in from Burundi (banana), INERA (cassava) and Harvest Plus (beans), then each banana trial has two improved varieties and one preferred local cultivar. While for the cassava trial, there is one improved variety under different fertilizer types;
- Associated activities include planning meeting with farmers, mobilization of stakeholders around the IP, M&E, field days and feedback to R4D Platform.



The experimental layout is as follows and includes the following treatments:

1. No fertilizer;
2. Manure (MO);
3. NPK;
4. Manure + NPK.

2.3.3 Research Priorities & Relevance for Women and Youth

In the R4D Platform discussion, it was indicated that the "number of women in the Platform is very low" although we met women involved in field trials, Youth Agripreneurs work, etc. In Mushinga, a woman farmer indicated that with introduction of improved production practices, "the women were now better-off."

The IP has identified a Gender Focal person from the Women's Organization, who is currently also the Chair of the IP. The IP members were part of the three countries (Rwanda, DRC and Uganda) who were trained on gender mainstreaming. As a result of the training, the IP has developed a gender work plan, based upon which the trainings for the other members and sensitization workshops have been conducted.

Their vision for gender entails including gender in all activities of Humidtropics, in which they have encouraged men, women, and youth to adopt technologies and become involved in the different stages of the value chains. The IP is also working on a strategy to see how women can have access to more land and gain control over their resources. The R4D Platform recognizes that involving women optimally and dealing with gender issues is a central goal for improving livelihoods of the rural poor and smallholders.

2.3.4 Building on Legacy Projects

The Platform has built on legacy projects such as the adoption of CIALCA technologies, which had contributed to reducing poverty from 2006-2014. However, there are dynamics underneath the trends assessed, which is not due to the high poverty-reducing technologies. CIALCA cassava intercropping project acquired improved planting material and compared it to preferred local cultivar.

The Program benefitted from major contribution by the legacy projects such as N2Africa and CIALCA. However, in some cases there is evidence that the narrower mandates of these projects inhibited progress in some areas (e.g. introduction of climbing beans without addressing fertilizer needs).

2.3.5 Integrated Systems Improvement

The integrated systems improvement is being achieved through the projects currently being implemented at the Mushinga IP such as Legume Choice, which began with listing of problems based on farmer discussions. The project demonstrates legume intervention trials with improved seeds (13 trials with 5 treatments of mono- and inter-cropping with soy, cassava, common bean and local farmer practices) with lead farmers. As part of this trial, Calliandra was included for soil stabilization and bean stakes (20,000 seedlings distributed to farmers), in a joint project of IITA and the local university. Other trials include:

- Integrated system crop-livestock-forage;
- Participatory trial on integrated systems (cassava-bean), including forage;
- Soil and Water Conservation to reduce erosion and improve water availability (incl. drought) to test the cassava-legume effect on erosion, whereby the test is shifting from rotation to intercrop and the effect on steep slope erosion (different spatial arrangements) with strong focus on demonstration (e.g., innovative pin-in-trench erosion monitoring makes scale of erosion visible to farmers).

2.3.6 Scaling and Institutional Innovation

Scaling is envisaged to be achieved through the different partnerships. Scaling up of innovations is mainly through information sharing platforms (Researchers Innovation networks). The Program has strong documentation and information sharing capacity. Scaling up is also mainly perceived through the Youth Agripreneurs but also the NGOs such as FH who have a membership of over 24,000 farmers across the country.

For market innovations, there are several change agents or coalitions (partners, entrepreneurs) who are part of the innovation network, which are good examples of upcoming market innovations. For example, the agro-dealer who established an inputs

supply shop close to the farmers in Mushinga. In addition, the Zabika-Lubona Farmer group decided to make use of an existing storage structure which was previously constructed by an NGO, Programme Agricole pour le Développement (PAD), to bulk produce, improve post-harvest handling and selling together to fetch better prices. The latter represents both an institutional as well as a market innovation.

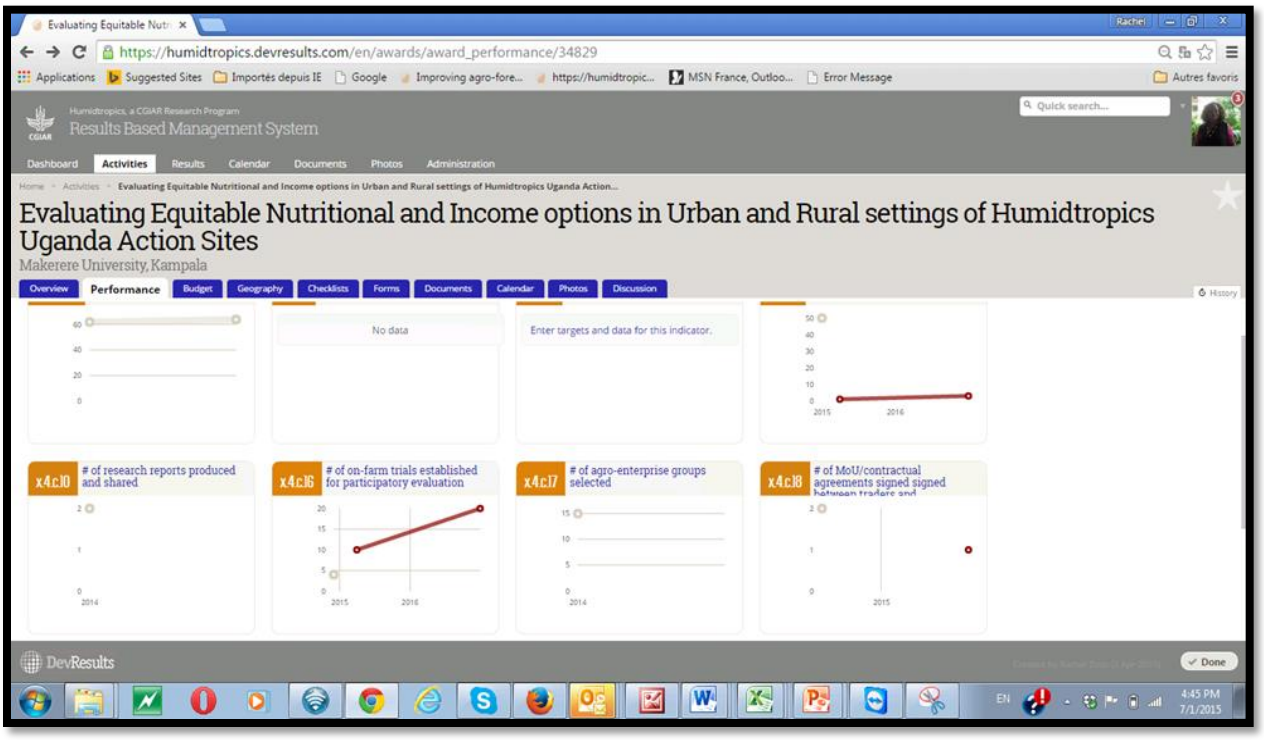
2.4 Effectiveness

2.4.1 Translation of ToC and Impact Pathway into Site-Relevant Processes and R4D

The evidence of Platform evolution is in the following key elements of an integrated system:

- The research processes were built based on tools, methods and especially empowering participation like in other ECA countries:
  - The processes included: using a Situation Analysis and baseline survey prior to selecting entry points;
  - Use of the RAAIS tool in each of the IPs.
- Ideas generated within the R4D Platform were also run by the community through Focus Group Discussions (FGDs) involving both men and women;
- The M&E system developed for Cluster 4 is geared towards tracking results according the Humidtropics ToC aimed at achieving the various IDOs as previously outlined in Table 15.

2.4.2 Tracking Progress Towards Planned Outputs & Outcomes



Monitoring of data

Each partner has selected a person in charge of data collection. The exercise started by training in Humidtropics M&E tools and protocols. Data collected by each partner is sent in excel to Humidtropics staff, who enter it in the Performance Monitoring Matrix (PMM) to assess progress achieved and make the necessary recommendations to R4D Platform and to IITA M&E Focal Point.

Other M&E activities include but are not limited to the following:

Based on past experience, Paulin Njingulula was appointed as the M&E focal point for R4D Platform. Three others persons were elected by partners to build an M&E team for Humidtropics. Each individual institution designated one person in charge of data collection but work in a collaborative network to exchange research for development data.

- Tools on data collection were designed.
- A training of all (15) data collectors was organized on data collection tools and modalities.
- The basic tool of Humidtropics M&E is the project PMM which states type of data, indicators, data sources, method of data collection, frequency, etc.
- Technical and financial data are collected by data collectors in the field.

Draft M&E framework

Humidtropics tracks its implementation outputs and outcomes through the PMM. The specific outputs and outcomes to be achieved are clearly articulated in the draft M&E framework.

2.4.3 Integrated Systems Approach & Achievement of Impact at Scale

Through a group of associations (Zabila) who have come together to bulk their produce by utilizing an existing storage structure built by PAD prior, this initiative has a potential impact at scale because of not only the improved post-harvest handling practices but also the ability to fetch higher prices for the farmers' produce.

The initiative also involves the integration of a value chain approach (production, linked with agro-dealers for supply of inputs, post-harvest handling techniques, marketing, grading of produce to get better quality, etc.), which will definitely result in better livelihoods for the farmers involved. Farmers interviewed indicated that they see this initiative as central to their future.

The integrated systems approach has also helped to articulate specific additional improvements, e.g. improved livestock varieties, community pasture areas, etc.

2.4.4 Capacity to Deliver Relevant International Public Goods that Lead to Impact

The researcher-led trials with farmer participation will lead to the production of international public goods in the form of publications and lessons learned.

3.0 CONCLUSION

Report Card on "Systemness" of the DRC Action Site:

Key elements of 10 Points "systemness"

i. Systems mindset: Yes, evident at farmer level
ii. Inter-disciplinary Research team: Yes
iii. Stakeholder Engagement (IP): Yes
iv. Integrated systems research & trade-offs: Yes
v. Innovation: Process, Social & Institutional
    a. Examples: Mostly social and institutional innovation through the involvement of Youth Agripreneurs and agro-dealers in the R4D Platform
vi. Scaling up/out: Has potential
    a. Through the NGOs and Youth

- Partnerships with the Provincial government: provincial agriculture minister has gone on site visits to field trials.

b. Sectoral committee on agriculture: president has recognized the R4D; 30 person field visit to Mulamba research and demonstration site.

vii. Gender research – Women & Youth: Yes
viii. Capacity Building: Yes
ix. Development orientation (IDOs): Yes
x. Learning: Yes

4.0 ANNEXES

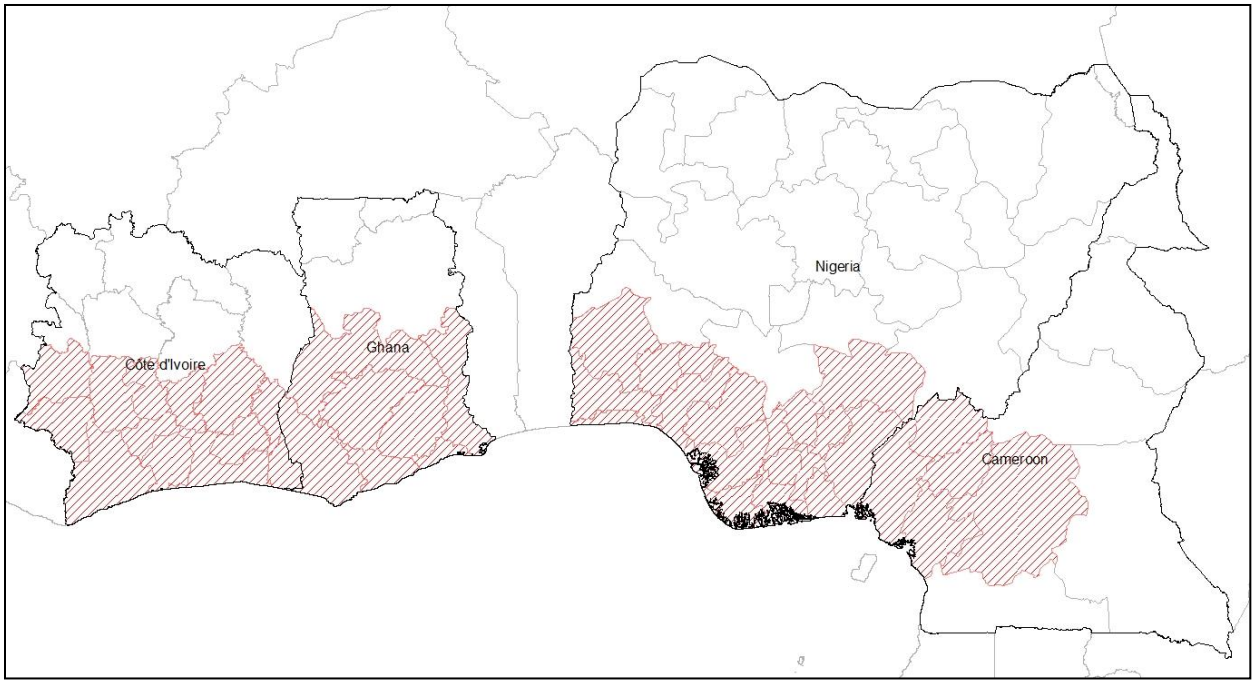
4.1 List of Persons Interviewed Especially at the Field Sites

List of People Met in DRC Innovation Platform & Field Site Meetings					
N.O	NOMS & POST NOMS	SEX	ADDRESS	ORGANISATION	TEL N.O
1	Ntabala Cikwanine Freddy	M	Mushinga	Diobass	376625164
2	Ishingwa Bashige Janvier	M	Lubona	Chokola	99728284
3	Imani Kayaga Blaise	M	Lubona	Chokola	996718989
4	Ntanwenge Mimashal	F	Lubona	F.O.D	994929786
5	Murhula Casinga	M	Burhale	Enseignema	998817251
6	Bonawe Balezi	M	Lubona	See I.P	973706399
7	Kalembiriro Patient	M	Mulamba	Chokola	993500798
8	Georges Kalomo	M	Mulamba	CLD	990965641
9	Horhuciri Kabindi	M	Lubona	Zabika	993680699
10	Naubandwa Telesphor	M	Lubona	Zabika	999562891
11	Sebastein Nyakura	M	Mushinga	SECONA	997785593
12	Ghorha Baganda Florentin	M	Mulamba	AJDI	974965486
13	Wabiwa-M'Nyanga	F	Mulamba	Chokola	993021044
14	Venant Bahati	M	Burhale	ASEVAM/IFAD	997788911
15	Ivonne Mimange	F	Mulamba	V.T.R.C.L.D	
16	Felix Kashumo	M	Mushinga	Pres.Copnofer	997789337
17	Chishnngu Martin	M	Mushinga	Chokola	993186946
18	Lweze Kalinga Jean	M	Mushinga	Chokola	974379789
19	Wswekala Ladiolas	M	Mulamba	Pres.Noyale	998672433
20	Kusinza Praxcene	F	Mushinga	Chokola	994922146
21	Nyakarhema Diendonne	M	Lubona	Chokola	994143362
22	Nungiorhee Kemgwa	M	Lubona	Chef de gpt	993453529
23	Kwacibe Cerungowe	M	Burhale	Chef de gpt	990087759
24	Bisinwa Jean-ruuie	M	Mulamba	Chef de gpt	993355887
25	Tito Obuir'oyunva.K	M	Mushinga	Chef de gpt	997787207
26	Nichel.K.Cidigo	M	Mushinga	Chokola	994267228
27	Diroka Owbabesha	M	Mushinga	Chokola	997093895
28	Ruboneka Kashenwa	M	Nyawera	ACOSYF	997500085
29	Ndamuso Clarisse	F	Bukavu	IITA	991837548
30	Martin Muzusa	M	Mubumbao	Fh.Rde	998888597
31	Muhuba Claude	M	Nyawera	IITA	992589583
32	Paulin Bwira Hubert	M	Bukavu	IITA	994090337
33	Elisee Masheka	M	Bukavu	ASOP	997770406
34	Simbeko Sadi	M	Bukavu	IITA	993423730
35	Rehani Jumaine	M	Burhale	IITA	997865252
36	Masirika Amato	M	Bukavu	IITA	999649722
37	Musanganya Ruhoya	M	Burhale	CPEA	997762109
38	Paul Dontsop Nguezet	M	Bukavu	IITA	998697326
39	Domitilla Luganywa	F	Burhale	Ntukalamo	990958152
40	Despuwe Bamuleke	F	Bukavu	IITA	990955615
41	Emmanuel-Nyamugale	M	Mushinga	G.E	997835453
42	Roseli Ne Bashige	F	Burhale	Mbuka-Kalara	999154884
43	Malume-Barhadosa	M	Burhale	A.N.R	990855695
44	Lacrae-M-Matobaro	F	Lubona	Zabika	991096850
45	Beatrice M'Karubandika	F	Mushinga	ARSHAM	995430140
46	Evelyne-M'Nshonbo	F	Lubona	Chokola	974286816
47	Nbimize-M'Karubandika	F	Mushinga	CIDEMO	977838920
48	Canyanne M'Kadeke	F	Lubona	Zabika	992488452

List of People Met in DRC Innovation Platform & Field Site Meetings Contd.					
49	Bishikwabo Buhira	M	Mushinga	CIDEMO	975857535
50	Kasereka Bishikwabo	M	Bukavu	IITA	994966147
51	Paulin Ujingulula	M	Bukavu	INERA	822216046
52	Jean Pierre Bahati	M	Bukavu	ADVS	998858306
53	Jean-Pierre Mizinzi	M	Bukavu	CHARKI	993355400
54	Byakonre Nazanra Foucfham	M	Bukavu	SONASON	994401235/853136862
55	Nono Nwavita R	F	Bukavu	SARCAF & R&D	99426119
56	Rogu Karazo	M	Burhale	Nfuka-Kala MO{I.A}	977326333
57	Baguma Xavier	M	Burhale	Coup Ntakabiko	993513683
58	N. Bafunyembaka Venantin	F	Burhale	Coup Ntakabiko	997838961
59	Chizunsu Jean	M	Bukavu	Diobass	998610844
60	Rusakuhira Bigaruza	M	Mushinga	Coup Ntakabiko	992206060
61	Magambo Constantin	M	Mulamba	V/sec NIP	993333106
62	Katunga Musale	M	Bukavu	INERA	995676459
63	Ardien Kashemnwa	M	Bukavu	PAIDEK	997679525/0853452155
64	Baba Kissa	M	Bukavu	LOBIKO	997706106
65	Jean Marie Sanginga	M	Bukavu	Nq Africa	998666101
66	Augustin Basimane	M	Cikamba	Radio Maendelesoc	990483834
67	Bahati Ytongwa	M	Mubumbao	FHIDRC	997129292
68	Sabastian Lubala	M	Bukavu	PAD	998674728
69	Julie Lunzihirwa	F	Bukavu	IITA	977597972
70	Sylvair Mafratom	M	Bukavu	Diobass	
71	Dr Muhunzuka Desire	M	Mubumbao	Chokola	993479955
72	Rachel Zuzo	F	Bukavu	IITA	995796996

Annex 10.3:

Case Study on West Africa Flagship



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1. Introduction

1.1 West Africa Flagship Context

There are 120 million people living on 206 million hectares of the West African humid tropics, where an estimated 58% of the land area is degraded. About 28% of the population lives on less than USD 1.25 per day and the average market access is three hours. In the Humidtropics-designated West Africa Action Area, 89 million people live on 51 million hectares, where average rainfall of 1,727 millimeters supports tree-crop production on 68% of the land area.

Nigeria. Cocoa is a major source of livelihood for many rural households as well as the main agricultural export in Nigeria, however the preeminence of oil development combined with prevailing economic policies had, until recently, diminished the government's focus on cocoa production. Concentrated in southwestern Nigeria, approximately 30,000 farmers produce an average of 500 kilograms of cocoa on an average of 2.5 hectares. Traditional farming with hand tools, on communal or family lands, is the major occupation of the primarily Yoruba-speaking people. Factors of low cocoa productivity include lack of improved planting materials, numerous pests and diseases, and old age of cocoa farms and cocoa farmers.

Cameroon. Despite relatively high literacy (65% for women, 78% for men), GDP (USD $2,400 per capita), and socio-political stability, poverty among subsistence farmers is widespread with one-third of people living on less than USD 1.25 per day. Agriculture employs approximately 70% of the population and represents one-fifth of GDP. Major cash crops include coffee, sugar, tobacco, banana, cocoa, oil palm, rubber, and tea are grown extensively. Livestock production is common, and fishing and bushmeat are important for income and diet. Large rainforest areas are at risk from agricultural expansion.

Cote D'Ivoire. As the world's largest cocoa producing nation, deforestation (300,000 hectares annually) and land degradation in western Cote D'Ivoire are driven by production of cocoa, coffee, and rubber as well as shifting cultivation of food crops (e.g. cassava, maize, plantain, vegetables). Where agricultural commercialization is on the rise, women farmers are largely excluded from livelihood and food security benefits due to land competition between cash and food crops and poor access to farming inputs, new productive technologies, high-yielding plant materials, and extension support.

Ghana. Recognized for its high quality cocoa, Ghana is one of the top producers globally. Classified as a middle-income country, the agriculture sector is complemented by significant energy, minerals, manufacturing, and services sectors. School enrollment is nearly universal, with balanced representation across genders.

1.2 Overview of the West Africa Flagship

In the West Africa Flagship, there are four Action Sites operating in the humid and sub-humid regions of Nigeria, Cameroon, Cote D'Ivoire, and Ghana.

Table 1. Basic description of Action Sites and Field Sites in West Africa Flagship

Field Site	Farming System	Cluster 4 Sites
Nigeria Action Site: Tree crop systems are primarily cocoa, as well as oil palm, coffee, cashew, banana, plantain, and kolanut, associated with crops such as cassava, maize, yam, beans, millet, and rice. Southwestern Nigeria transitions from rainforest in the South to guinea savannah in the upper North.		
Ido-Ibarapa (Oyo state)	Savanna zone where arable crops dominate	Akindele village
Ori-Ire & Ogo-Oluwa (Oyo state)	Savanna zone where arable crops dominate	Lagbedu village
Iwo & Ayedire (Osun state)	Transition zone between tree crop farming system (Ondo) and arable crop farming system (Oyo)	Osunwoyin village
Ife East & Atakumosa East and West (Osun state)	Transition zone between tree crop farming system (Ondo) and arable crop farming system (Oyo)	Iwara village
Cameroon Action Site: Agriculture-dependent communities dominated by tree-crop systems, primarily cocoa, complemented by coffee, oil palm, rubber, banana, and plantain, mixed with cassava, maize, vegetables, etc.		
Southwest and Littoral	Agroforestry and mixed cropping farming systems with monomodal rainfall (one rainy season and one dry season per year)	Moungo, Fako, Meme divisions
Central	Agroforestry and mixed cropping, primarily cocoa, with bimodal rainfall	Mefou/ Afamba, Nyong/ Mfoumou, Lekie, Mbam/ Inoubou divisions
West and Northwest	Mixed and shifting cultivation farming systems in savannah with a monomodal rainfall	Menoua, Noun, Mezam, Momo divisions
Cote D'Ivoire Action Site: A humid forested zone with two rainy seasons and two dry seasons extending from the southern part of the country up to the center, and from the East to the western part of the country.		
Soubré region	Producing ~40% of all cocoa in Cote D'Ivoire, a tree-crop dominated zone that also produces rubber, coffee, and timber (cash crops) as well as food crops such as plantain, cassava, maize, rice, yam, grain legumes, and vegetables	Krohon, Petit-Bondoukou, Wonsealy villages
Tiassalé-Agboville region	Relatively high level of natural resource degradation in an old cocoa production zone where food crops are also produced	n/a
Ghana Action Site: Producing >60% of Ghanaian cocoa, cocoa-based farming systems in Ashanti and Western regions (moist evergreen and semi-deciduous forests) also produce food crops such as plantain, cassava, cocoyam, vegetables, and maize. Unlike the Ashanti region, forest patches remain in the Western region.		
Offinso municipality (NW)	The main cash crop produced is cocoa. Food crops for the local market such as maize, yam, cocoyam, cassava, plantain, banana, oranges, and tomatoes are also produced. Vegetables e.g. pepper, garden eggs, cabbage and carrots are produced on small scale	Offinso
Adansi South district (SE)	80% of the active working population is engaged in the production of various crops,	New Edubiase

Field Site	Farming System	Cluster 4 Sites
	which include cocoa, coffee, oil palm, maize, cassava, rice, cocoyam, plantain and the rearing of livestock. Cocoa production is the most dominant cash crop grown, and employs a greater number of the people	
Sefwi Wiawso district (SW)	About 66% of the economically active population are in agriculture. Cocoa is the most dominant cash crop with high productivity. Other major crops cultivated include maize, cassava, plantain, cocoyam, maize and oil palm	Sefwi Wiawso

1.3 Case Study Methodology

As specified in the Inception Report, the CCEE Team used mixed methods including desk reviews and key informant interviews (KIIs) to gather evidence on the status of Humidtropics in West Africa. KIIs were used to understand (1) perceptions of Humidtropics, (2) partner involvement in priority-setting, identifying entry points, and research implementation, and (3) perceived benefits of participating in the stakeholder platforms. Findings for this case study are presented according to eight evaluation questions organized under four criteria.

2. Key Findings on the West Africa Case Study

2.1 Relevance of the Humidtropics West Africa Flagship

2.1.1. Alignment of West Africa Flagship with Intermediate Development Outcomes (IDOs)

To what extent is Humidtropics' Theory of Change strategically coherent and consistent with the CGIAR Strategy and Results Framework (SRF), considering its crosscutting issues of gender and capacity development priorities and the rationale and coherence of Flagship Projects?

The CGIAR SRF specifies that all CGIAR Research Programs (CRPs) designate Strategic Objectives (SOs) to be accomplished through Intermediate Development Outcomes (IDOs). The Humidtropics IDOs derive directly from its four SOs[1]. The table below indicates how the West Africa Flagship seeks to achieve the six IDOs.

Table 2. Humidtropics Strategic Objectives (SOs), Intermediate Development Outcomes (IDOs), and strategies for achieving them in West Africa Flagship

Intermediate Development Outcomes	West Africa Flagship Strategies
SO Livelihoods Improvement	
IDO Income focuses on increased and more equitable income as a result of Humidtropics system interventions, earned by smallholders in the value chain.	Improvement of farmers' livelihoods through improvement of tree crop and food crops systems with consideration to gender and age and improving the incomes of marginal populations.

[1] Source: http://humidtropics.cgiar.org/at-a-glance/

Intermediate Development Outcomes	West Africa Flagship Strategies
IDO Nutrition monitors the increased consumption of diversified and quality foods by the poor, especially among nutritionally vulnerable women and children.	Research for the diversification of high quality crops and livestock leading to enhanced consumption of diverse nutritious foods by the poor.
SO Sustainable Intensification	
IDO Productivity focuses on the total farm-level productivity (food, feed, fiber, livestock products), through sustainable intensification and diversification. The overall aim is to optimize the returns from the farm, while respecting the natural resource integrity.	Increased productivity of tree crop systems through intensification (e.g., use of appropriate inputs; improved yield through crop management) and diversification (e.g., best crop and livestock associations; rotations within systems).
IDO Environment concerns reversing land degradation trends and the adverse environmental effects of integrated systems intensification by guiding the transition to sustainable management. This IDO focuses on the ability of the land to remain productive for present and future generations through the conservation and management of biodiversity, soil fertility and ecosystem services.	Improvement of soil fertility management and access to land to sustainably support intensification and diversification.
SO Women and Youth Empowerment	
IDO Gender focuses on empowering women to have better control over and benefit from integrated production and marketing systems through specific interventions, and ultimately to transform women's status and position. The IDO also addresses youth and marginalized groups' empowerment as an essential component to ensure their improved access to and control over the benefits from integrated systems interventions.	Improvement of women farmers' livelihoods through better design of interventions to enhance cocoa productivity supported by increased knowledge of the socio-economic characteristics and gender dimensions of cocoa-farming households.
SO Systems Innovation	
IDO Capacity to Innovate is an enabling IDO supporting systems interventions towards achievement of impact at scale. It involves building innovation capacity among the actors within a defined agro-ecological and livelihood system, and facilitating and guiding innovation processes by influencing the socio-technical regimes at work in the various impact domains. The IDO also aims to shift discourse of actors operating at the socio-technical regime level, in support of systems thinking and innovation.	Identification of institutional 'bottlenecks' (e.g. policies on land tenure and market access) to improving land use and inputs availability for productivity improvement. Targeting market access through sharing of appropriate market information among stakeholders (within platforms and beyond) involved in different value chains. Strategy development for scaling and for engagement with development partners and policy makers.

The set of Humidtropics IDOs and the strategies identified for achievement of IDOs in the West Africa Flagship appear to appropriately consider biophysical and socio-economic dimensions and systems components (e.g. yield, soil fertility, income, gender, nutrition, markets, policies) and to suitably anticipate their dynamic interactions.

2.1.2. Partnership Design and Targeting for Results

Is the partnership design and targeting based on plausible assumptions for Program delivery of results?

There are three levels to the Humidtropics partnership strategy: (1) Core partnerships form among the eleven founding institutions[2], which undertake core areas of work under Program Participant Agreements with IITA (Humidtropics' Lead Center); (2) Through sub-contracting agreements with a core partner, other institutional partners provide active leadership in Research for Development (R4D) Platform coordination, Action Site facilitation, implementing a research sub-component, etc.; (3) A large set of collaborating partners engage in the R4D Platforms and participatory research in Action Sites[3].

Partnership development and cooperative implementation of the Humidtropics research agenda in the West Africa Flagship emphasizes establishment of stakeholder platforms. These platforms foster stakeholder interactions including: sharing knowledge, information, and expertise; undertaking systems analysis; identifying entry points that require social and technical innovations; and defining and implementing an integrated systems research agenda. For each of the four Action Sites in the West Africa Flagship, a R4D Platform has been convened and mandated to address strategic issues for the agricultural sector and beyond. For ten of the twelve Field Sites, an Innovation Platform (IP) has been convened and mandated to address agricultural, value chain, social, and other issues and to undertake assessment and research activities at the Field Site level.

Table 3. Mandated activities of R4D and Innovation Platforms in West Africa Flagship

Activities	R4D Platforms	Innovation Platforms
Engagement	Identify, develop, and test entry themes through site characterization and participatory workshops. Ensure that local knowledge holders from public, private, civil, and research sectors are represented in co-production of knowledge and innovation. Empower vulnerable groups such as women and ethnic minorities.	Engage diverse Field Site stakeholders in a "space for learning and change".
Systems Analysis	Use appropriate tools to undertake situational analyses and baseline studies, to identify entry points, systems interventions, and to analyze tradeoffs.	Collaboratively diagnose problems, identify opportunities, and set and achieve goals. Innovation and extension institutions address constraints jointly with farmers.
Implementation of systems research	Mobilize funds to stimulate joint action research and testing of interventions for systems intensification and diversification. Develop and disseminate outputs such as journal articles, policy briefs, and practical advisory materials. Support to IPs, as needed. Apply Results-Based Management (RBM).	Design and implement research/ other activities or coordinate activities by individual members. Determine social and technical best-bet system innovation options. Train farmers in sustainable agricultural systems (e.g., upland farming; home-based food production).
Scaling	Train R4D Platform members on set up and operation of IPs. Engage scaling partners in public, private, and civil sectors.	Build local capacity through development and agricultural extension actors.

[2] Seven CGIAR centers (IITA, ILRI, ICRAF, CIP, IWMI, Bioversity International, CIAT) and four non-CGIAR institutions (FARA, *icipe*, WUR, AVRDC).
[3] Source: http://humidtropics.cgiar.org/at-a-glance/

Core partners are central to delivering on the programmatic objectives of the West Africa Flagship. Of the eleven core Humidtropics partners, seven are actively engaged in West Africa: IITA, ILRI, ICRAF, Bioversity International, AVRDC, FARA, and WUR. Roles vary based on expertise and capacity (see Annex 4.3 for detailed activities). For example, in the four Nigerian IPs, FARA has supported timely access to improved cocoa seedlings and procurement of quality agrichemicals and will consider providing loans to support IP business plans for ongoing supply of necessary inputs. In Mbalmayo, Cameroon, ICRAF has provided training on tree nursery establishment and vegetative propagation techniques. IITA is developing appropriate cocoa establishment technologies for cocoa germplasm in West and Central Africa. Beyond core partners, a large set of partners has been engaged in the West Africa Flagship (see Table 4). Establishment and facilitation of R4D Platforms and IPs have benefitted from the experience of the West and Central African Council for Agricultural Research and Development's (CORAF/WECARD) in Integrated Agricultural Research for Development Platforms, as well as FARA's experience in the Platform on Dissemination of New Agricultural Technologies in Africa.

Table 4. Major partners in Action Sites in West Africa Flagship

Action Site	Major Partners
Nigeria	CRIN, OEDP/Osun State, ADP, OSSADEP, OYSADEP, OAU, UI, NISER, OFFER Centre, Odu'a Investment, LGs, and West African Farmers Organization. *Core partners*: IITA, ILRI, FARA.
Cameroon	IRAD, CIRAD, NOWEFOR, CNOP-Cam, University of Dschang, University of Yaounde II, University of Buea, CASD ONG, MINADER, MINERESI, and key farmers organizations. *Core partners*: IITA, ICRAF, AVRDC.
Cote D'Ivoire	ESA/INPHB, CRE/University Nagui Abrogoua, University Peleforo Gon Coulibali, Centre Suisse de Recherche Scientifique, ANADER, CNRA, and Organisations feminines de l'Anawa. *Core partners*: IITA, ICRAF, FARA.
Ghana	IFDC, ADB, CRI, CRIG, MoFA, CHED, UoG, SRI, and key farmers organizations. *Core partners*: IITA, ICRAF, FARA, Bioversity International.

Membership of West Africa Flagship Action Site R4D Platforms include international development organizations (i.e. CIRAD, CARE, GIZ, SNV, Catholic Relief Services, AFD), government agencies (e.g. ministries), national institutions (e.g. universities, research and education centers), private sector entities (e.g. farmer organizations, agri-dealers, traders, agri-food companies, financial institutions), and donor organizations. Private sector partner, Mars Inc., has funded the bilateral research and development project Vision for Change (V4C) being implemented in Soubré, Cote D'Ivoire. IPs bring together individuals who represent various formal and informal institutions and bring different backgrounds and interests (e.g. biophysical, socioeconomic and political factors) including farmers, traders, food processors, researchers, government officials, and others.

At all four of the West Africa Action Sites, R4D Platforms and core research teams have been established and are undertaking research activities. In 2015, ongoing research and system interventions are planned. The partnership design and targeting in the West Africa Flagship appear plausible for Program delivery of results. The multi-level stakeholder platform model is appropriate for engaging diverse partners in ways that best fit their capacity and interest.

2.2 Efficiency of the Humidtropics West Africa Flagship

2.2.1. Humidtropics Management in West Africa Flagship

Is Humidtropics effectively managed with appropriate internal processes and conditions (including research staff and leadership quality, institutional arrangements, and governance and management arrangements) for assuring high quality research outputs, considering different genders and generations, documenting and disseminating both positive and negative findings, and monitoring and reporting progress?

Efficient delivery of research outputs and outcomes relies on fit-for-purpose institutional and governance arrangements and suitable budgets levels and allocations. In the West Africa Flagship, these arrangements need to account for different national contexts and local partnership opportunities, as well as the variable numbers and types of staff and bilateral projects of core partners across Action Sites.

Table 5. Selected examples of effective management in West Africa Flagship

	Examples of Effective Management
Research/ leadership quality	• ICRAF is studying nutritional status, diet, and dietary score of women and children in cocoa producing communities of Soubré, Cote D'Ivoire. • AVRDC is evaluating best-bet combinations of crop varieties and sustainable methods of crop management toward diversification of cocoa-based systems with vegetables.
Institutional arrangements	• The Institut de Recherches Agricoles pour le Développement (IRAD) and the Government of Osun State in Nigeria are facilitating R4D Platforms for the Cameroon and Nigeria Action Sites, through assigned representatives serving as Action Site Facilitators.
Governance arrangements	• Bioversity International is facilitating partnerships with communities and private sector for sustainable supply of inoculants and fertilizer, legume seed systems, and agri-business clusters around legume marketing and value addition. • IITA is undertaking a comparative analysis across all four countries for public-private R4D partnership programs that seek to scale and institutionalize cocoa farmer field schools.
Management arrangements	• In early 2014, the West Africa Flagship organized joint planning meetings in each Action Site to plan activities to be carried out in the Action Site during the year. In Nigeria this was done at the Stakeholder Workshop held in January, in Cameroon it was done at the inception workshop held in February, and in Cote D'Ivoire it was done during the scoping visit of a team of the West Africa Flagship held in June. In November, a Flagship Program of Work and Budget meeting was organized to plan activities to be carried out in 2015 in the Action Sites.
Budget management	• For 2014, the financial contribution of partners to Humidtropics activities is valued at USD $450,000. • Cluster 4 projects in Nigeria, Cameroon, and Cote D'Ivoire are slated to be delivered on slim budgets (USD $50,000/year). However, with early 2015 starting dates, none of the budgeted funds were expended as of May 2015. CGIAR-level budget cuts have delayed disbursement of funds for the Cameroon Cluster 4 project[4].

Despite relatively recent initiation of Humidtropics in West Africa, as well as significant limitations in available funds to support research activities, there is evidence of progress on regionally relevant research for development. Annex 4.3 presents a complete set of reported

[4] Source: Cluster 4 Overview, May 2015.

2014 activities by core partners active in the West Africa Flagship. Research partners have made progress in generating reports and journal articles. While these do not yet constitute a comprehensive body of knowledge for the West Africa Flagship – there is clear influence of core partners' capacities and priorities – all listed outputs align well with the central objectives of Humidtropics.

Table 6. Publications emerging from R4D activities in the West Africa Flagship.

Publication[5]	Status
Samireddypalle A. **Simulation of small ruminant system productivity in the humid tropics of South Western Nigeria.**	2015 ILRI Report.
Ayantunde A. **Transhumance pastoralism, sustainable management of natural resources and endemic ruminant livestock in the sub-humid zone of West Africa.**	Environment, Development & Sustainability. (https://cgspace.cgiar.org/handle/10568/51355)
Ayantunde A. **Nutrient management in livestock systems in West Africa Sahel with emphasis on feed and grazing management.**	Special issue in Nutrient Cycling and Agro-ecosystems (publication pending).
Ayantunde A. **Evaluation of feed resources in mixed crop-livestock systems in Sudano-Sahelian zone of Mali**.	Animal Science Journal. In production.
Ayantunde A. **Price and quality of livestock feeds in suburban markets of West Africa's Sahel: Case study from Bamako, Mali.**	CIRAD report (http://remvt.cirad.fr/revue/notice_fr.php?dk=574558)
Asare R, Afari-Sefa V, Osei-Owusu Y, Pabi O. **Cocoa agroforestry for increasing forest connectivity in a fragmented landscape in Ghana.**	Agroforestry Systems. 2014. (http://link.springer.com/article/10.1007%2Fs10457-014-9688-3)
Yang R-Y, Afari-Sefa V. **Situational analysis of the food and nutritional diet in Cameroon Action Site.**	Report.
Afari-Sefa V. **Horticultural crops value chains analysis within the cocoa-based farming systems in Cameroon Action Site.**	Report. In production.
Jacob B, Samireddypalle A, Ayantunde A, Duncan A. **Characterization of livestock and farming production systems using feed assessment tool (FEAST) in selected local government areas of Oyo state, Nigeria.**	ILRI Report. Publication expected in 2015.
Jacob B, Samireddypalle A, Ayantunde A, Duncan A. **Characterization of livestock and farming production systems using feed assessment tool (FEAST) in selected local government areas of Osun state, Nigeria**.	ILRI Report. Publication expected in 2015.
Ayantunde A, Duncan A. **Assessment of livestock feed value chains in Iddo and Ogu olowa Local Government areas of Oyo state in South Western Nigeria.**	ILRI Report. Publication expected in 2015.
Afari-Sefa V, Ijang P, Idrissou L, DeGrande A, Kirsh H, Cadhillon J. **Agricultural farming systems in the context of rural and urban demographics trends in humid zone of Cameroon.**	In production.
Bidogeza J-C, Afari-Sefa V. **Situational analysis of food and nutritional assessment in Ghana.**	Report. In production.
Bidogeza J-C. **Empirical application of Efficiency and Productivity Analysis on Vegetable Farms within the Dominated Cereals Farming System in humid tropic zone of**	In production.

[5] Source: Humidtropics Publication Table 2013-2014-2015.

Publication[5]	Status
Cameroon.	
Afari-sefa V. **Multivariate Analysis of the Heterogeneity in Goals and Preferences of Vegetable Farms in humid tropic regions of Cameroon.**	In production.
Bidogeza J-C, Afari-Sefa V. **The changing patterns of the African family farming system, increasing nutritional and economic roles of vegetables in the peri-urban zone of the humid tropic zone of Cameroon.**	In production.
Ayanwale BO, Olarinde L. **Overview of major crop commodities in Humidtropics agro-ecologies of Cameroon: Implications for socioeconomic benefits on the Innovation platforms.**	To be published (date tbd).
Ayanwale BO, Olarinde L. **Overview of major crop commodities in Humidtropics agro-ecologies of Ghana: Implications for socioeconomic benefits on the Innovation platforms.**	To be published (date tbd).
Frelat R, Douxchamps S, Silvestri S, Rufino M, Herrero M, Giller K, Lopez-Ridaura S, Teufel N, Paul B, van Wijk MT. **Application of a rapid food security analysis across a diverse set of smallholder farming systems: an example from East and West Africa.**	Agriculture and Food Security. To be submitted for peer-review in 2015.

Given initial expectations for long-term and robust support for Humidtropics when it was launched, the rapidly deteriorating financial situation and resulting cuts to program activities generated uncertainty among participating researchers. One important casualty was adequate resourcing to research design and planning among core partners and across Action Sites, which could have increased efficiency. Over time, efforts by the Executive Office and Flagship Manager improved communication and coordination. Strong commitment to transparent decision-making was instrumental in building buy-in among Humidtropics-affiliated researchers for difficult programmatic choices (e.g. prioritizing funding of Platform-driven research through Cluster 4).

2.3 Quality of Research in the Humidtropics West Africa Flagship

2.3.1 Quality and Relevance of Integrated Systems Research Design in West Africa Flagship

To what extent does the integrated systems research design (problem-setting and choice of approaches) reflect high quality, up-to-date scientific thinking and knowledge and innovation in the areas of research, including relevance for women and youth?

The overarching hypothesis of Humidtropics, tested in the various Field and Action Sites, is that a region's inherent potential is best realized through an integrated systems approach, built around sustainable intensification and diversification, involving participatory action across stakeholder groups and enhanced capacity to innovate at farm, institutional, and landscape levels[6]. Humidtropics' integrated systems research approach emphasizes identifying multiple, system-specific intervention pathways and assessing tradeoffs and synergies among competing use of resources and benefits, based on different entry points and priorities[7]. In the West Africa Flagship, progress toward testing this overarching hypothesis has primarily emphasized site

[6] Source: http://humidtropics.cgiar.org/at-a-glance/
[7] Source: http://humidtropics.cgiar.org/impact-pathway/

characterization and identification of entry themes, as well as participatory research trials through IPs.

All four Action Sites are operational and characterization studies continue. As stakeholder platforms have been convened and site characterization has progressed, emphasis has been placed on research on improvement of tree crop systems through production, post-harvest, and marketing interventions. Integrated systems research, focused on enhancing total factor productivity, is planned or underway at selected Field Sites through Cluster 4 and bilateral research projects. The major entry points for the Actions Sites are:

- **Nigeria**: cocoa rejuvenation, rehabilitation, and diversification for increased productivity and livelihoods;
- **Cameroon**: cocoa production diversification with other fruit trees, food crops, and vegetables;
- **Cote D'Ivoire**: insufficiency of food crop production in cocoa growing areas and integration of cassava, maize, and grain legumes to attain food security and cash income;
- **Ghana**: long-term sustainability of relatively young plantations, financial services provision, and youth and women involvement in agriculture.

An explicit component of research design in the West Africa Flagship is characterization of the Action Site or Field Site, through situational analysis and baseline studies, prior to any system improvement activity or research activities. Studies of poverty status, ecosystem and natural resources integrity, productivity, and institutional effectiveness are intended to inform decision-making (e.g. initial Field Site selection; entry point identification; research priorities) as well as foster engagement among stakeholders and partners. In practice, pressure to advance to research implementation led to use the Rapid Appraisal of Agricultural Innovation Systems (RAAIS)[8] and other tools to collaboratively identify specific research directions, before SRT1 (Systems Analysis and Synthesis) work was completed.

The table below compares defined objectives related to Systems Analysis and Synthesis in the West Africa Flagship[9] with evidence of progress toward these objectives.

Table 7. Examples of progress toward Systems Analysis and Synthesis objectives in West Africa Flagship

Systems Analysis and Synthesis Objectives	Progress Toward Objectives
To quantitatively and qualitatively position the integrated tree crops systems in the Action Sites and research sites in relation to the poverty and ecosystem integrity axes in the Humidtropics overarching Theory of Change (ToC).	Site-specific detailed baseline studies of Field Sites, including household typology survey, to inform Ghana R4D Platform. Baseline data collection and cluster analysis for Cocoa Eco: typology of cocoa farming systems Ghana.
To develop specific ToCs and related Impact Pathways using main entry points in integrated tree crops systems in the Action Sites with indicators and metrics related to the IDOs for	Initial situational and research gap analysis of available data, databases, and studies on diversified and/ or intensified cocoa-based farming systems.

[8] RAAIS is a participatory, diagnostic, multi-method tool that facilitates integrated analysis of interactions among different dimensions, levels, and stakeholder dynamics (including innovation capacity) in complex agricultural systems. Critical triangulation and validation of data emerges from combination of qualitative and quantitative data collection techniques (workshops, interviews, questionnaires, secondary data analysis).
[9] Source: POWB 2014.

Systems Analysis and Synthesis Objectives	Progress Toward Objectives
results-based Monitoring and Evaluation (M&E).	
To characterize integrated tree crops systems in the Action Sites at farm, socio-technical regime, and landscape levels for their production, natural resources, nutrition and livelihoods components and analyzed for potential interventions considering gender empowerment and household priorities.	Situational analysis of food and nutritional diet in Cameroon and Ghana Action Sites completed. Gender and value chain analysis in Nigeria assessed farmers' time, labor, and level of involvement as well as value addition and beneficiaries[10].
To identify specific entry points for integrated tree crops systems improvement at a range of scales and levels focusing on gender, markets, production systems, natural resource management, nutrition, institutions and policy in the Action Sites.	Cote D'Ivoire, participants in the R4D-led situation analysis agreed that research domains should focus on gender-differentiated access to and control of key productive resources (i.e. land, technologies, input supply, labor, credit and extension support).
To analyze tradeoffs between multiple systems interventions per integrated tree crops system in the Action Sites.	Development of modeling tools for ex-ante identification of interventions that reduce tradeoffs and increase synergies for system productivity and other ecosystem services within heterogeneous farming systems.

There is evidence that findings from characterization studies are used to inform design of integrated systems research projects in Field Sites (see table below).

Table 8. Study findings inform research designs in West Africa Flagship

Study Finding	Research Design
Cultivated land: 47% tree crops; 30% root crops; 23% cereal-root crops.	Farming system improvement research to target primarily tree crop systems.
Entry theme: diversification and/or intensification of tree crop based production systems and soil fertility management systems.	Research undertaken to improve cocoa production systems in Nigeria, Cameroon, and Ghana Action Sites. • IITA and SNV undertaking Cocoa Eco project in Cameroon and Ghana Action Sites to increase farmer incomes through cocoa intensification/ diversification while reducing deforestation and ecosystem degradation. • Study of intercropping in cocoa production systems to understand the tradeoffs between cocoa and other tree and arable crops, as well as between on-farm and off-farm activities.
Most farmers no longer have old forest available to thin out and plant cocoa as was traditionally done.	To support producing hybrid cocoa, research trials on best cocoa establishment approach (in degraded land, with/ without shade provision; with/ without dry season irrigation; with/ without biochar) undertaken by IITA in collaboration with CRIN (Cocoa Research Institute of Nigeria) and State of Osun.
Entry theme: food crop systems intensification.	In Nigeria, IFAD-supported project develops household typologies; evaluates livelihood enhancement from cassava, yams and legume production and from rural cassava processing centers; and assesses of soil nutrient capacity.
Nigeria RAAIS: constraints to increased cocoa productivity are	Cluster 4 study: Increasing total farm productivity by optimal farm enterprise combinations to efficiently allocate resources to increase cocoa productivity in Southwestern Nigerian cocoa-based farming systems (to replace traditional

[10] The study concluded that dynamics within the identified value chains of cocoa, cassava, and plantain were not really affected by gender of the farmers.

Study Finding	Research Design
socio-economic, institutional, technological. Government seeks diversified exports.	and trial-and-error approaches). Includes identifying innovations by cocoa-relevant institutions and stakeholders and gender-differentiated socio-economic characteristics.

Progress cited by Flagship leaders on institutional and gender constraints include:

- Linking IPs to markets: developing market information and support systems with ICT (financial services, agro-inputs and agricultural products);
- Post harvest and value addition;
- Enhancing the capacity and involvement of women in Platforms' decision-making processes;
- Capacity development of Platform members on agricultural innovations.

2.3.2. Research Priority-Setting, Coordination, and Implementation

Have Humidtropics research for development activities been appropriately prioritized, and effectively coordinated and implemented, given key contextual factors (such as: diverse sources and types of funding; the on-going reform of CGIAR structures and processes; changing resource availability), legacy projects, and financing needs for long-term research programs and key partnerships?

Characterization studies and entry point identification for West Africa Action Sites supported development of the following Cluster 4 research projects, which were initiated in January 2015:

Increasing total farm productivity by optimal enterprise combinations in the cocoa-based farming systems in Southwestern Nigeria. (IITA, FARA, ILRI, WUR)

- Focused on six states in southwestern Nigeria (almost 78 square kilometers, home to nearly 28 million people), research activities will be conducted in four villages within Field Sites in Oyo and Osun states. The project responds to a set of identified challenges including: pests/ disease, weak supply/ high cost of agrochemicals, low utilization of improved production practices, low mechanization, trial-and-error farm enterprise combinations, and poor linkages between farmers and knowledge centers (e.g., agricultural research and extension institutions).
- Participants in the RAAIS process and in IPs unanimously agreed that poor institutional support and technological challenges were the main constraints to integrated cocoa farming systems.
- The project will include: (1) formation of IPs with diverse stakeholder representation in the four villages to facilitate farmers' uptake of research outputs; and (2) a survey of cocoa-based farming households to determine biophysical, socioeconomic, political, and institutional (formal, informal) conditions and to characterize current farming systems (i.e. enterprise combinations, pre- and post-harvest issues, land area cultivated, number of farm plots, types of crops grown, distance to farm).
- Of the 200 farmers to be engaged, 40% will be women to ensure that project outputs are relevant to the circumstances of both genders. Research design is guided by farming household resource allocation theory, which assumes that the objective of farm production is to achieve satisfactory levels within the context of diverse, conflicting objectives and utility functions in farm households (rather than high-efficiency production as indicated by the theory of production economics). A linear programming model approach will be used to analyze farmers' resource (i.e., land, labor, agrichemicals, capital) allocation behavior and to generate constrained optimal resource allocation solutions to maximize returns across farm enterprises. Improved income, employment, natural

resource management, biodiversity, and healthy living are anticipated (i.e., progress toward income and productivity IDOs), should farmers broadly adopt these optimal enterprise combinations.

Improvement of integrated tree-crop systems in Cameroon, through production, post-harvest, and marketing interventions. (IITA, ICRAF, AVRDC, FAFA, ILRI, WUR, Bioversity International)

- Focused on cocoa and oil palm systems with various annual crops (i.e., maize, cassava, yam), research will be conducted in 14 divisions within Field Sites in Littoral/ South-West, Central, and Western regions.
- Participants in the RAAIS process agreed that research domains should focus on institutions, productivity, and natural resource management with attention to the following challenges: low soil fertility, access to improved seeds and planting material, pests/ diseases, mastery of appropriate agricultural practices (i.e. processing, storage), and market access (i.e. weak producer coordination, inability to influence prices). IP members contextualized the research focus to the major crops in the research sites.
- The project will include: (1) characterization of soils and identification of/ training in most promising Integrated Soil Fertility Management (ISFM) practices; (2) establishing on-farm trials for participatory, gender-differentiated evaluation; (3) rapid, gender-differentiated diagnosis of existing seed/ seedling supply system and participatory strategies to improve access to improved planting material, including community-based seed multiplication units and nurseries; (4) assessing crop-specific, gender-differentiated training needs, including post-harvest techniques; (5) developing extension materials and delivering training; (6) assessing functioning of producer groups/ cooperatives and value chains; (7) enhancing market access and commercialization through engagement and training of producer groups and traders.
- Of 75 farmers to be trained in suitable practices (i.e., ISFM, seed multiplication, nursery techniques), at least 25% will be women.

Sustainable intensification of food crops production for nutrition and food security in tree crop-based farming systems in Soubré region in Cote D'Ivoire. (ICRAF, IITA, FARA)

- Focused in the Nawa region of western Cote D'Ivoire where cash crop (cocoa, rubber) production by men dominates and land is scarce for food crop (cassava, maize) production by women, research activities will be conducted in three villages within the Soubré Field Site[11].
- Participants in R4D-led situation analysis agreed that research domains should focus on gender-differentiated access to and control of key productive resources with attention to the following challenges: low soil fertility, low crop productivity, and access by women and youth to productive resources (i.e., land, technologies, input supply, labor, credit, extension support). IP members reviewed the situational analysis and set priorities for crop and treatment combinations relevant to women's values and circumstances.
- To develop intensification pathways and identify best farmer resource allocation options, the project includes: (1) survey-based, gender- and age-differentiated characterization of farm resources, management, products, and markets; (2) local and regional engagement workshops and participatory diagnosis to prioritize crops of nutritional and economic importance for women's livelihoods; (3) selection of farming intensification pathways (i.e. crop and treatment combinations) to be jointly implemented, monitored (emphasizing soil fertility status), and evaluated with women's community groups.
- Specified outcomes of the project include: (1) introduction of innovative technologies for food crop production and intensification in Soubré; (2) valorization of food crop production through diversification for nutrition improvement; (3) development of internal market for food crops.

An additional Cluster 4 project is approved in Cameroon on "Enhancing cocoa-based farming system management in Cameroon – Connecting sustainable crop production with post-harvest

[11] Activities are implemented in cocoa development centers, which are the village clusters defined in the framework of the ICRAF-led, Mars-funded V4C project.

technologies for nutrition and gender sensitive interventions". A Cluster 4 project is also under development for Ghana[12].

In addition, bilateral projects have been mapped onto Humidtropics in several Field Sites.

Table 9. Bilateral research projects in West Africa Flagship

Research Project
Nigeria: Sustainable intensification and diversification in Nigeria: Cocoa plantations rejuvenation/ diversification. *On-farm "mother and baby" trial of improved planting materials, on-site production of cocoa seedlings, and cocoa production with other crops.*
Nigeria: Sustainable intensification and diversification in Nigeria: Cassava-legume intensification trials.
Nigeria: Achieving development impact and environmental sustainability through intensification of pro-poor cropping systems based on cassava, yams and legumes (donor: IFAD).
Nigeria: Sustainable intensification and diversification in Nigeria: Plantain innovation cluster for value chain development.
Cameroon: Sustainable intensification and diversification in Cameroon: Cocoa production diversification with other fruit trees, food crops and vegetables. *Research trial involving combinations of cocoa, plantain, cassava, okra, and pepper.*
Cote D'Ivoire: Sustainable intensification and diversification in Cote D'Ivoire: sustainable intensification of cocoa production (V4C).
Ghana: Sustainable intensification and diversification in Ghana: sustainable intensification of cocoa-based farming systems. *Objectives: Enhance the capacity of farmers on Integrated Crop Pests Management (ICPM); Develop institutional linkages/ arrangements to enhance farmers' financial management capacity and access to credit; Identify challenges and opportunities for greater participation of youth and women in the cocoa-based farming systems.*

Research for development activities in the West Africa Flagship have been somewhat piecemeal with the overall portfolio of work influenced by available funds, bilateral projects, and core partner priorities, however individual projects appear to be appropriately designed and delivered in ways that align with Humidtropics' emphasis on active stakeholder participation in research design and implementation.

2.4 Effectiveness of the Humidtropics West Africa Flagship

2.4.1. Partnerships for Outcomes, Synergies, and Capacity-Building in West Africa Flagship

Does Humidtropics effectively collaborate with its partners to achieve planned outputs and outcomes, maximize synergies, and enhance partner capacity?

The table below compares defined objectives related to R4D partnership development in the West Africa Flagship[13] with evidence of progress toward these objectives.

[12] Source: Cluster 4 Overview, May 2015.
[13] Source: POWB 2014.

Table 10. Examples of progress toward R4D partnership development objectives in West Africa Flagship

Partnership Development Objectives	Progress Toward Objectives
To develop R4D Platforms and IPs that prioritize, initiate, develop, test, monitor and evaluate gender-sensitive social and technical integrated systems interventions in the research sites.	Four R4D Platforms and ten IPs established. Entry themes identified through platforms.
To widen participation including non-traditional and other CRP partners in the development and implementation of strategic research activities on integrated systems development in the West Africa Action Area.	Strong engagement with national research partners and increasing collaboration among core Humidtropics partners. Solid engagement of civil sector, but more modest with private sector.
To coordinate research for development contributions of the various stakeholders in the Action Sites.	Local contributions to research leadership apparent through R4D Platforms and IPs.
To support the communication within and beyond Humidtropics.	Several reports and journal articles in production.
To reduce platforms' dependency on Humidtropics support and improve capacity mobilize resources and generate income in the Action Sites.	Emphasis among platform participants on short-term benefits encourages selection of platform activities that encourage shared ownership.
To engage platforms in piloting results based management in selected research sites.	Through Cluster 4 projects.

In addition to Humidtropics research activities prioritized by R4D Platforms, other issues of concern are being addressed through linkages to related in-region projects including identifying strategies to integrate yam into intensification processes through the Yamsys research project, and plantain and wetland rice through the West African Agricultural Productivity Program.

2.4.2. Translation of Theory of Change to West Africa Flagship Sites

To what extent does the overarching Theory of Change and Impact Pathway translate into site-relevant processes and research for development?

Humidtropics' area-based Flagships are designed to result in improvements in livelihoods and productivity for poor smallholder farming communities based on development of site-specific ToCs, Impact Pathways, entry points, and social and technical interventions relevant to the dominant integrated systems specific to their area[14]. To optimize tradeoffs at the farming systems and socio-technical regime level, analysis is undertaken of the interactions among different components of the system in relation to the interventions proposed.

The Humidtropics overarching Impact Pathway begins with development of change coalitions[15]. The IDOs on Income, Nutrition, Productivity, and Environment are achieved when livelihoods and ecosystem integrity are improved through uptake of multiple, site-specific social and technical innovations that stimulate increased farm system productivity, diversification, and environmental sustainability. The IDOs on Innovation and Gender are achieved when livelihoods, equity, and empowerment status of men, women, and youth are enhanced as systems actors at farm, institutional, and landscape levels have increased capacity to learn about, prioritize, and experiment with systems interventions. In the West Africa Flagship, there is early evidence of alignment with the Humidtropics Impact Pathway and progress toward IDOs (see Annex 4.3 for more detailed list):

[14] Source: POWB, 2015.
[15] Source: http://humidtropics.cgiar.org/impact-pathway

- Functioning stakeholder platforms engaging with situational analyses;
- Numerous research activities related to improved productivity (e.g., planting materials), sustainability (e.g., pest management), and profitability of tree crop systems and promotion of diversification (e.g., vegetables, livestock);
- Significant foundations laid for integrating gender and age considerations into interventions;
- Targeted training activities and development of tools for decision-making and tradeoff analysis;
- Focus on value chain characterization and interventions;
- Activities designed to increase scaling ability through public and private sector partners.

Table 11. Indicators of research progress in West Africa Flagship

Sites	Innovation platforms	Baseline study	Tools	Initiated projects	Completed projects	Non-CGIAR partners
Nigeria: Ido-Ibarapa; Ori-Ire & Ogo-Oluwa; Iwo & Ayedire; Ife East & Atakumosa East and West	4	yes	RAAIS	4 (cassava intensification; cocoa establishment; gender; tradeoffs)	0	10
Cameroon: Southwest and Littoral; Central; West and Northwest	3	yes	RAAIS	2 (gender; value chain)	0	12
Cote D'Ivoire: Soubré	1	no		0	0	9
Ghana: Offinso	0	ongoing	RAAIS	2 (vegetables/ cocoa; agrobio-diversity)	0	12
Ghana (southern): Ashanti, Brong Ahafo, Central and Western Region	0	no		1 (cocoa/ ecosystem services)	0	5

2.4.3. Plausibility of Holistic Impact at Scale and Added Value in West Africa Flagship

To what extent does Humidtropics' integrated systems approach plausibly lead to better and more holistic results, impact at scale and provide additional value to the CGIAR's capacity to deliver relevant international public goods that lead to impact?

Scaling and Institutional Innovation Objectives in the West Africa Flagship[16] include:

- To assess the contribution of R4D Platforms and IPs to social, technical, and institutional systems innovations, and explore conditions and configurations that enable these platforms to be effective in fostering such innovations in the Action Sites;
- To assess pathways, patterns and success factors for responsible scaling including adoption and adaptation of social and technical systems innovations accounting for gender equity and sustainability tradeoffs in the Action Sites;
- To improve the current systems' capacity to innovate at farming systems, socio-technical regime and landscape levels in the West Africa Action Area;

[16] Source: POWB, 2014.

- To enhance institutional innovation capacity and responsible scaling approaches.

Humidtropics in West Africa is at a relatively early stage of development and progress toward these objectives is only now emerging, inhibiting full assessment of plausibility. The Program's conceptual framework and primary emphasis on multi-stakeholder convening for R4D research is perceived positively by research leaders and experience with R4D Platforms is generally seen in that light with the caveat of significant time required. There is evidence of uptake of "systemness" concepts by participating researchers, but there is also recognition of the challenge of scaling the platform model in the West Africa region.

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4. Annexes

4.1 List of persons interviewed

Individuals contacted for information regarding their experience and perceptions regarding the West Africa Flagship and Humidtropics.

Name	Affiliation/ Role	Mode	SRT 1	SRT 2 *	SRT 3	Manager	CGIAR Researcher	Partner
Latifou Idrissou	**IITA, Area-based Flagship Manager (Nigeria)**	**In person**				**X**		
Stefan Hauser	**IITA, former Humidtropics focal point (Nigeria)**	**In person**		**PE, NRI**			**X**	
Augustine Ayantunde	**ILRI (Burkina Faso)**	**skype**	**X**	**PE, NRI**			**X**	**X**
Ann Degrande	**ICRAF (Cameroon)**	**skype**			**X**		**X**	**X**
Charles Staver	**Bioversity (France)**	**skype**	**X**	**PE**			**X**	
Victor Afari-sefa	**AVRDC, SRT2.1 focal point (Tanzania)**	**skype**	**X**	**MI**	**X**			**X**
David Obisesan	**IITA/ Humidtropics, M&E Officer (Nigeria)**	**In person**					**X**	
Gaya Ibrahim	**IITA, Gender PostDoc (Nigeria)**	**In person**						**X**
Christine Kreye	**IITA (Nigeria)**	**In person**		**PE**				**X**
Marijn Poortvliet	**WUR (Netherlands)**	**skype**			**X**			
Mark Lundy	**CIAT**	**skype**		**MI**		**X**		
Bernard Vanlauwe	**IITA**	**skype**		**PE**		**X**		
Edmundo Barrios	**ICRAF**	**email**		**NRI**		**X**		

** MI: Markets and Institutions (SRT2.1); PE: Productivity Enhancement (SRT2.2); NRI: Natural Resource Integrity (SRT2.3)*

4.2 List of persons participating in Focus Group Discussions

Partners and stakeholders participating in Focus Group Discussion in Osunwoyin, Osun State, Nigeria on August 11, 2015.

Partner/ Stakeholder	Affiliation/ Role
Aphrodite J. Oti	OFFER Centre/ Administrator
Adeolu B. Ayanwale	OAU/FARA – Plantain IP facilitator
Olajumoke Iromini	OAU/ Humidtropics MSc Student
Ilahu Kareem	Cocoa and Food Crops Farmer
Amujoyegbe B.J.	OAU/ Nigeria R4D Platform facilitator
Benjamin Idowu	Cocoa and Food Crops Farmer
Adio Bode	Cocoa Farmer/ Input Dealer

Partner/ Stakeholder	Affiliation/ Role
Asafa Samuel	Cocoa and Food Crops Farmer
Rasaki Buhari	Cocoa and Food Crops Farmer
Kamilu Kudirat	Cocoa and Food Crops Farmer
Suarao Akeyo	Cocoa and food crops Farmer
Michael Okunola Idowu	Cocoa, Food Crop Farmer &Trader
Suruola Timmisiyu	Cocoa & Food Crop Trader
Akinkunmi Isaiah	Piggery, Fish, Cocoa & Cassava Farmer
Tumo Olubayo O.	Oyo ADP, Lagbedu Facilitator
Adewusi Elkanah Adesoji	Cocoa & Cassava Farmers' Group
Kehinde Kareem	Cocoa & Cassava Farmer
Raphael Idowu	Cocoa and Food Crops Farmer
Rasaki Ishola	Cocoa, Plantain & Cassava Farmer
Oyewale Abayomi Yusat	OAU/ Humidtropics MSc Student
Ajibola O.V	OAU/ Humidtropics MSc Student
Ajibade Rasaq Ola	OAU Entomologist
Suli Ganiyu	Cocoa & Food Crop Farmer
Liadi Tahiru	Cocoa & Food Crop Farmer
Lateef Wasiu	Cocoa & Food Crop Farmer
Akin Agunbiade	ECOWAS Farmers Organisation
Udeme Oti	OFFER Center
Basaru Atanda	Cocoa and Food Crops Farmer

4.3 Core Partners' Activities in 2014 in West Africa Flagship

Planned 2014 Outputs	Partners' 2014 Activities
West Africa Flagship Cluster Outputs	** FARA: Conduct contextual study and draw lessons on the effect of gender relations on innovation, from the different IPs. To provide insight in the contribution of different scaling strategies (ranging from classical extension, mobile technology, internet platforms and mass media) in scaling of both IPs and specific experiences. Facilitate scaling out activities of the IPs in Southwest Nigeria and Cameroon. ** WUR: Research proposal written for PROMIS study on scaling up cocoa agroforestry in Cameroon through the Sustainable Tree Crops Program. The ex-ante, paper-based study will be conducted in the first half of 2015 in partnership with Sander Muilerman (IITA), with Seerp Wigboldus and Katharina Schiller.
2.2.1 Whole-system productivity gaps and risk/ resilience, including identification of major limiting factors for system components, analyzed and documented for each main system in the research sites.	** FARA: Network stakeholders and facilitate joint identification of technological research issues on the Platforms. Source existing solutions and/ or commission research activities to respond to identified technological issues.
2.2.3 Integrated systems value chain analysis conducted in each research site.	** FARA: Identification, analysis and documentation of policy issues that could be addressed at the different governance levels on the systems or commodity of interest of the IPs. Facilitation of active engagement and participation of the policy makers on the IPs.
2.2.5 Basket of best-fit options, respecting gender differentiation,	** ILRI: Conduct feed resource analysis using FEAST in Southwest Nigeria. Develop feed price and quality database. Identify

Planned 2014 Outputs	Partners' 2014 Activities
for the sustainable intensification of systems.	technologies and combinations for increasing systems productivity.
2.2.7 Models developed to quantify and analyze the effect of NRM interventions on tradeoffs and synergies between system productivity and other ecosystem services.	** FARA: Conduct research activities to generate IP-demanded knowledge, technologies and inventions on different NRM and productivity issues around the system of interest and commodities in the action sites. ** WUR: To identify, adapt, and/ or develop a set of modeling tools for the ex-ante identification of the productivity enhancement potential of system components within the heterogeneity of targeted farming systems.
2.2.11 Tools/ models to guide implementation of approaches that enhance natural resource integrity and resilience validated, implemented and documented.	** WUR: To identify, adapt, and/ or develop a set of modeling tools for the ex-ante identification of the NR&AB interventions that reduce tradeoffs and increase synergies between system productivity and other ecosystem services within the heterogeneity of targeted farming systems. Specific demands from SRT2.2 related to soil health and soil-mediated ecosystem services will be prioritized.
2.3.1 Concepts, indicators, methods and tools developed for assessing the effectiveness of innovation and R4D Platforms tested and documented in the Action Sites.	** FARA: Conduct activities to mainstream Humidtropics research consideration into the countries CAADP process (implementation plan).
2.3.4 Report on the capacity of systems to innovate in the Action Area, reflecting gender dimensions, used.	** FARA: Organize and facilitate training on IP set-up and management for members of the IPs and facilitators. Organize additional training for researchers and scientists.
3.1.1 Systems analysis report for each Action Site produced.	** AVRDC: Implement the situational analysis for the Cameroon Action Site. ** ICRAF: Scoping study including field visit and stakeholder mapping, and status meeting in order to create Cote D'Ivoire R4D Platform nucleus and agree on standard system analysis tools and ways forward to undertake situational analyses. Assess available secondary data and data from bilateral projects and other CRPs located in the same area. ** IITA: Farming systems analysis.
3.1.2 11 Field Sites in four Action Sites characterized including the identification of entry points and baseline data.	** AVRDC: Contribute to the design of the baseline survey for systems intensification (focusing on components involving the integration/ diversification of horticultural crops into staple-based systems) in Cameroon. ** Bioversity: Characterization of the diversity of cocoa production systems. Baseline surveys (productivity, intensification, rehabilitation, diversification, gender issues, socioeconomics). Analysis of data and characterization of coffee systems in Action Sites. The activities would involve data cleaning and analysis, validation workshop and report writing. ** ICRAF: Situational analysis of cocoa production system in Soubré, Cote D'Ivoire.
3.1.3 Entry points identified in Systems Situation Analysis used by four R4D Platforms with six best-bet initiatives developed	** Bioversity: Initial situational and research gap analysis of available data, databases and studies on diversified and/ or intensified cocoa-based farming systems. Site-specific detailed baseline studies of 2-4 action Field Sites selected during the

Planned 2014 Outputs	Partners' 2014 Activities
and tested in trial interventions in at least three Action Sites.	process of setting up the Ghana Action Site National Platform. Household typology survey. ** IITA: Cocoa Eco: Situational Analysis of Kuapa Kokoo and typology of cocoa farming systems using electronic data collection in Ghana. Baseline data collection and cluster analysis.
3.1.4 Baseline and foresight data documented for field site selection and results based monitoring and evaluation purposes in each research site.	** IITA: Deploy survey teams in the Ashanti area of Ghana.
3.1.5 Gender strategies in relation to specific integrated systems innovations documented for targeted Action Sites.	** IITA: Cocoa Eco: A new generation of cocoa farmers/ labour issues.
3.1.8 A report on nutritional/ dietary quality situation in the targeted Action Sites available.	** ICRAF: Nutritional status, diet and dietary score of women, children in the cocoa producing communities of Soubré, Cote D'Ivoire. ** IITA: Baseline surveys.
3.2.1 Whole-system productivity gaps and risk/ resilience, including identification of major limiting factors for system components, analyzed and documented for each main system in the research sites.	** AVRDC: Identify the institutional bottlenecks to intensification/ diversification of horticultural crops into cocoa-based production systems with a focus on seed systems, crop protection practices, marketing and food safety concerns in Cameroon. AVRDC will identify suitable models to encouraging public-private sector investment in seed production and distribution systems in Cameroon via sub-R4D Platforms. ** Bioversity: Create widespread awareness on N2Africa technologies and interventions. ** ICRAF: Cote D'Ivoire, Soubré. Starting with baseline characterization of cocoa diversification. Testing options for cocoa diversification, shade trees, etc. ** IITA: Research collaboration on augmentative biological control using parasitoids and the development and testing of endophytic strains of entomopathogenic fungi well underway with CRIG. Conduct one refresher Training of Trainers (ToT) for 40 agric. extension agents on GAP/ICPM, conduct one ToT on OSH, develop extension materials on GAP for cocoa cultivation in Ghana. Conduct ToT on planting replanting and diversification (PRD) in cocoa for 40 extension agents, supervise creation of 10 demonstration farm plots in 10 community clusters.
3.2.2 Toolkits developed and shared, including ranking tools, value chain, business development services, business model tools, policy analysis tools.	** IITA: Develop framework and methodology for rigorous value chain analysis, business/ value chain finance model analysis, and the identification of markets for business development services.
3.2.3 Integrated value chain alternatives analyzed in three Action Sites and piloted to reform organizational and marketing models, approaches and policies.	** Bioversity: Develop farmer decision tools/tool box on choice of different strategies for sustainable intensification. Develop and organize pilot on non-subsidized fertilizer brokerage systems. Develop farmer decision toolbox on (1) appropriate rehabilitation method depending on farm(er) profile (2) food crops considerations, (3) tree crop diversification in cocoa systems. Develop farmer decision tools/tool box on choice of different

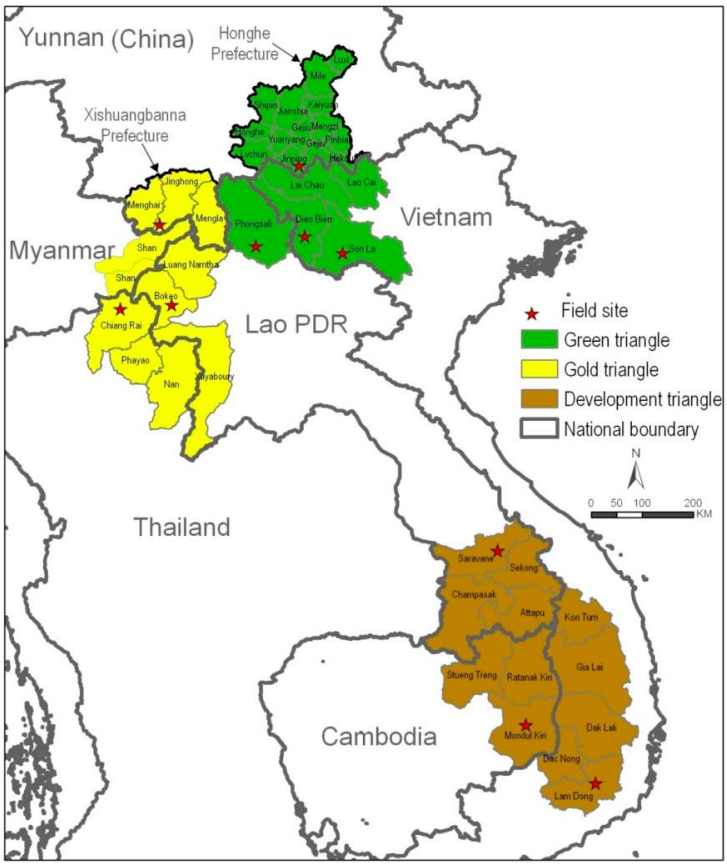
Planned 2014 Outputs	Partners' 2014 Activities
	strategies for sustainable intensification. ** ICRAF: Cote D'Ivoire, Soubré. Cocoa value chain and market analysis. Survey on involvement of women in priority value chains in the three IPs in Cameroon.
3.2.5 Basket of best-fit options, respecting gender differentiation, for the sustainable intensification of systems.	** AVRDC: Identify vegetables that could contribute to the sustainable intensification and diversification of farming systems in Cameroon and Ghana (in Ghana with W3 funding from Africa RISING). AVRDC will study the diversification of cocoa-based systems with vegetables (best-bet combinations of crop varieties and sustainable methods of crop management). ** FARA: Provide insight in the key processes and factors that hinder or enable the spreading and institutionalization of IP concepts, discourses and practices following the SSACP program. ** IITA: Validation of cassava intensification options for improved livelihoods including tradeoff assessment with other crops and farm enterprises. Development of appropriate cocoa establishment technologies for a range of cocoa germplasm in West & Central Africa. Situational analysis of cocoa farming systems in the Cameroon Action Site. Development of IPM options for aphids on cabbage and okra. Mass trapping combined with bait sprays developed for the control of fruit flies on mango and guava; and parasitoids released and evaluated for the biological control of fruit flies. Development of behavioral and microbial control of cocoa mirids. Cocoa farm rehabilitation and diversification. Farmer training in sustainable cocoa production practices. Identification of major biotic constraints of cassava, plantains, and maize within the Cameroon Action Site. Inventorizing innovations.
3.2.6 NRM Tool Box to identify, classify, prioritize and integrate local and technical knowledge on NR Integrity.	** ICRAF: Action Area SRT2 team to participate in global training workshop on methods, tools and approaches where SRT2 methods were agreed, including NRM toolkit for integrated system improvement.
3.2.7 Models developed to quantify and analyze the effect of NRM interventions on tradeoffs and synergies between system productivity and other ecosystem services.	** IITA: Finalize two articles on tree diversity and shade in cocoa systems in Ghana.
3.2.8 Local and technical knowledge on natural resources condition, including agro-biodiversity, and ecosystem services provision status assessed.	** ICRAF: Cote D'Ivoire, Soubré. Include nutrient use efficiency, effects of shade tree typology on water and nutrient dynamics. ** IITA: Analyzing local land use conventions in Mali.
3.2.12 Approaches and models developed and documented to empower women and youth with greater access to and control over resources and benefits.	** IITA: Data analysis from gender case studies and reports related to West Africa gender norms.
3.3.1 Concepts, indicators, methods and tools developed for assessing the effectiveness of R4D Platforms and IPs tested and documented in the Action	** Bioversity: Assessment of all relevant IPs on the ground in southern Ghana for any crop and livestock value chain with relevance to the Action Site and cocoa-based farming systems. Cocoa intensification analysis in order to design smallholder investment strategies. Facilitate partner-led dissemination

Planned 2014 Outputs	Partners' 2014 Activities
Sites.	campaigns with specific attention to gender. Facilitate private-public partnerships towards the sustainable supply of inoculants and fertilizer. Evaluate the effectiveness and efficiency of various D&D approaches for legume intensification. Facilitate the establishment of private sector-led and/ or community-based legume seed systems. Engage agro-dealers and other last-mile delivery networks in supplying legume agro-inputs. Establish agri-business clusters around legume marketing and value addition. Assess the effective and efficiency of various input delivery and marketing systems especially for women. ** WUR: Operationalize and contextualize indicators across different Action Areas.
3.3.2 The dynamics and success factors for responsible scaling operating in the Action Sites analyzed, documented and shared across Humidtropics.	** IITA: Three case studies on defining processes in a public-private R4D partnership program that attempts to scale and institutionalize cocoa Farmer Field Schools (FFS) in four West African countries, including a comparative analysis of all four countries.
3.3.3 Interventions translated into practical guidelines for use by farming communities and development agencies within the Action Area.	** ICRAF: Training course on tree nursery establishment and vegetative propagation techniques for IP in Mbalmayo.
3.4.1 Social network analysis reports of selected R4D Platforms in the Action Areas disaggregated by gender, social influence and power.	** Bioversity: Launching the Ghana Action Site IP and R4D Platforms. ** IITA: Collect and analyze data on the R4D Platforms' social categories with emphasis on the different gender categories and the interactions among them such as power relations and social influence that emerge.
3.4.2 Platforms established and participants engaged in priority setting and research activities in selected Action Sites.	** AVRDC: Organize a status meeting to create the R4D Platform nucleus and agree on standard system analysis tools and way forward to undertake situational analysis. Foster the identification and/or establishment of R4D Platforms in Cameroon. ** Bioversity: Constitution of core pre-inception team, identification of stakeholders and organization of southern Ghana Action Site inception workshop to organize and support the implementation and process leadership of R4D Platforms and IPs. Formal Humidtropics launch event including media coverage, widen participation, improve coordination in the sector and support communication though R4D Platforms. Data collection (total farm productivity, enterprise combination, etc). Data analysis. Report writing. Support to three interns to support the research. Workshop on validation of results by stakeholders. Capacity development on input utilization. Map relevant institutions and policies within the cocoa-based system. Monitoring and Evaluation. ** ICRAF: Actively took part and helped facilitate the Cote D'Ivoire R4D Platform formation and functioning. ** IITA: Organize stakeholder workshops with key national partners for Action Area and Sites R4D Platforms and Field Sites IPs establishment and Humidtropics alignment with national priorities and their inclusion in research activities in the Action Area. Organize information and training meetings for R4D Platform members on Humidtropics partner centers' activities at Action and Field Sites levels. Backstop the Action Sites R4D Platforms and

Planned 2014 Outputs	Partners' 2014 Activities
	Field Sites IP members on Humidtropics partner centers activities.
3.4.3 Guidelines for Platforms initiation and management developed.	** IITA: Prepare practical guidelines for platform establishment and management.
3.4.4 Other CRPs engage in Platforms and research potential interventions.	** ICRAF: Landscape analysis in Soubré, Cote D'Ivoire. Evolution of land uses change using low resolution satellite imageries: non-cocoa trees in cocoa farms and perception of farmers, farmers willingness to diversify non cocoa trees in their cocoa farms, drivers of trees presence and density, mapping CSSV in cocoa farms, effect of land uses changes on trees diversity, small mammals and soil microfauna. ** IITA: Facilitate collaboration between Humidtropics and others CRPs and undertaking joint platforms and research activities in the Action Area.
3.4.8 Gender training is conducted for R4D Platform and IP members and facilitators.	** IITA: Compile a training curriculum to sensitize platform members on gender issues.
4.2.3 Integrated systems value chain analysis conducted in each research site.	** ILRI: Conduct value chain assessment in southwest Nigeria.

Annex 10.4:

Case Study on Central Mekong Flagship



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1. Introduction

1.1 Central Mekong Flagship Context

Two-thirds of the 300 million residents of the Central Mekong region depend on agriculture, which contributes 23% of regional GDP, for their livelihoods and nearly a third live in poverty[1]. Landscapes, cultures, farming systems, and economies vary widely, however land degradation and poverty are widespread[2]. The Central Mekong region is confronting: negative environmental consequences of unsustainable agricultural intensification; weak market access; declining productivity in upland smallholder systems; low farm income; nutritional insecurity; and unequal access to natural resources[3]. Powerful regional drivers are creating dramatic change for the land and resource base (e.g., forest loss, climate change, urban-rural competition), agricultural markets (e.g., new mechanisms, infrastructure development), and diets[4].

In the Humidtropics-designated Central Mekong Action Area, which encompasses portions of six countries, 25 million people inhabit 40 million hectares, where average rainfall of 1,834 millimeters supports upland intensive mixed crops (39% of the land area), highland extensive mixed crops (29%), and lowland rice (26%).

1.2 Overview of the Central Mekong Flagship

In the Central Mekong Flagship, there are three cross-border Action Sites – the Green, Golden, and Development Triangles – where Humidtropics works in rice and non-rice farming systems of the non-flood prone lowlands, uplands, and highlands of the Mekong and Red River watersheds. Agro-ecosystems and climatic conditions are similar within each Action Site.

Table 1. Basic description of Action Sites in Central Mekong Flagship

Action Site	Geographic area
Green Triangle	Triangle area of Southern China (Honghe Autonomous Region), North East Laos and North West Vietnam (Son La and Dien Ben).
Golden Triangle	Quadrangle area of Southern China (Xishuangbanna), North West Laos, Eastern Myanmar and Northern Thailand (Nan).
Development Triangle	Triangle area of Cambodia, Southern Laos and Central (Highland) Vietnam

Within each of the three Action Sites, initial Humidtropics activities have focused on individual countries to accommodate differences in language, culture, governance structure, development status, and agricultural practices. The intention is to make use of within-Site variation to compare uptake and effectiveness of interventions in different socio-economic and political contexts as well as to investigate the potential of cross-border value chains. In 2015-2016, the Central Mekong Flagship will focus on systems interventions and analysis of tradeoffs. Platform establishment is planned for new locations in Cambodia, Northern Laos, and Myanmar.

[1] Source: http://humidtropics.cgiar.org/at-a-glance
[2] Source: Update from Central Mekong Action Area, 2015.
[3] Source: Flagship Summary – Central Mekong, 2014.
[4] Source: Update from Central Mekong Action Area, 2015.

1.3 Case Study Methodology

As specified in the Inception Report, the CCEE Team used mixed methods including desk reviews and key informant interviews (KIIs) to gather evidence on the status of Humidtropics in Central Mekong. KIIs were used to understand: (1) perceptions of Humidtropics, (2) partner involvement in priority-setting, identifying entry points, and research implementation, and (3) perceived benefits of participating in the stakeholder platforms. Findings for this case study are presented in Section 3, according to eight evaluation questions organized under four criteria.

2. Key Findings on the Central Mekong Case Study

2.1 Relevance of the Humidtropics Central Mekong Flagship

2.1.1. Alignment of Central Mekong Flagship with Intermediate Development Outcomes

To what extent is Humidtropics' Theory of Change strategically coherent and consistent with the CGIAR Strategy and Results Framework (SRF), considering its crosscutting issues of gender and capacity development priorities and the rationale and coherence of Flagship Projects?

The CGIAR SRF specifies that all CGIAR Research Programs (CRPs) designate Strategic Objectives (SOs) to be accomplished through Intermediate Development Outcomes (IDOs). The Humidtropics IDOs derive directly from its four SOs[5]. The table below illustrates how the Central Mekong Flagship seeks to achieve the six IDOs through the example of Northwest Vietnam.

Table 2. Humidtropics Strategic Objectives (SOs), Intermediate Development Outcomes (IDOs) and strategies identified for achieving them in the Northwest Vietnam Action Site in the Central Mekong Flagship

Intermediate Development Outcomes	Northwest Vietnam Strategies
SO Livelihoods Improvement	
IDO Income focuses on increased and more equitable income as a result of Humidtropics system interventions, earned by smallholders in the value chain.	Increased farm income through improving and stabilizing yields and profits from crops and animals and increasing farmer capacity in product marketing through training in household finance.
IDO Nutrition monitors the increased consumption of diversified and quality foods by the poor, especially among nutritionally vulnerable women and children.	Improved nutrition through increasing consumption of diversified and quality foods based on enhanced knowledge of farmers on diet diversification through training in household nutrition.
SO Sustainable Intensification	
IDO Productivity focuses on the total farm-level productivity (food, feed, fiber, livestock products), through sustainable intensification and diversification. The overall aim is to optimize the returns from the farm, while respecting the natural resource integrity.	Improved farm productivity through increased input use efficiency based on development and use of models of integrated systems
IDO Environment concerns reversing land degradation trends and adverse environmental effects of integrated systems intensification by	Increase in farmer adoption of sustainable sloping land, home garden farming, and waste management practices based on development

[5] Source: http://humidtropics.cgiar.org/at-a-glance/

Intermediate Development Outcomes	Northwest Vietnam Strategies
guiding the transition to sustainable management. This IDO focuses on ability of land to remain productive for present and future generations through the conservation and management of biodiversity, soil fertility, and ecosystem services.	and use of models of integrated systems.
SO Women and Youth Empowerment	
IDO Gender focuses on empowering women to have better control over and benefit from integrated production and marketing systems through specific interventions, and ultimately to transform women's status and position. The IDO also addresses youth and marginalized groups' empowerment.	Women have better control over and benefit from integrated production and marketing systems through empowerment in decision-making.
SO Systems Innovation	
IDO Capacity to Innovate is an enabling IDO supporting systems interventions towards achievement of impact at scale. It involves building innovation capacity among actors within a defined agro-ecological and livelihood system, and facilitating and guiding innovation processes by influencing the socio-technical discourse and regimes at work in impact domains, in support of systems thinking and innovation.	Households apply sustainable practices based on training and extension materials. Improved awareness of local authority and stakeholders on sustainable and integrated farming.

The set of Humidtropics IDOs and the strategic approach illustrated by the Northwest Vietnam Action Site appear to appropriately consider biophysical and socio-economic dimensions (e.g. yield, soil fertility, gender, markets) and systems components and suitably anticipate their dynamic interactions.

2.1.2. Partnership Design and Targeting for Results

Is the partnership design and targeting based on plausible assumptions for Program delivery of results?

There are three levels to the Humidtropics partnership strategy: (1) Core partnerships form among the eleven founding institutions[6], which undertake core areas of work under Program Participant Agreements with IITA (Humidtropics' Lead Center); (2) Through sub-contracting agreements with a core partner, other institutional partners provide active leadership in Research for Development (R4D) Platform coordination, Action Site facilitation, implementing a research sub-component, etc.; (3) A large set of collaborating partners engage in the R4D Platforms and participatory research in Action Sites[7].

Partnership development and cooperative implementation of the Humidtropics research agenda in the Central Mekong Flagship emphasizes establishment of stakeholder platforms. These platforms foster stakeholder interactions including: sharing knowledge, information, and expertise; undertaking systems analysis; identifying entry points that require social and technical innovations; and defining and implementing an integrated systems research agenda.

[6] Seven CGIAR Centers (IITA, ILRI, ICRAF, CIP, IWMI, Bioversity International, CIAT) and four non-CGIAR institutions (FARA, *icipe*, WUR, AVRDC).
[7] Source: http://humidtropics.cgiar.org/at-a-glance/

For each of the three cross-border Central Mekong Action Sites, one or more national R4D Platforms have been convened and mandated to address strategic issues. Three R4D Platforms were established in 2014: Nan, Thailand (Golden Triangle) led by AVRDC; Central Highlands, Vietnam (Development Triangle) led by CIAT; and Xishuangbanna, China (Golden Triangle) led by ICRAF. A fourth R4D Platform in Northwest Vietnam (Green Triangle), led by ICRAF, was revitalized in early 2015. All four R4D Platforms have held launch meetings as well as one or more core group/ management team meetings, and have formulated Cluster 4 project proposals[8]. Only one Innovation Platform (IP) has been established.

Table 3. Mandated activities of R4D Platforms in Central Mekong Flagship

Activities	R4D Platforms
Engagement	Identify, develop, and test local entry themes through site characterization and participatory workshops. Ensure that local knowledge holders from public, private, civil, and research sectors are represented in co-production of knowledge and innovation. Empower vulnerable groups such as women and ethnic minorities.
Systems Analysis	Use appropriate tools to undertake situational analyses and baseline studies, to identify entry points, systems interventions, and to analyze tradeoffs.
Implementation of systems research	Mobilize funds to stimulate joint action research and testing interventions for systems intensification and diversification. Determine social and technical best-bet system innovation options. Develop and disseminate outputs such as journal articles, policy briefs, and practical advisory materials. Train farmers in sustainable agricultural systems, such as upland farming and home-based food production. Apply Results-Based Management (RBM).
Scaling	Train R4D Platform members on set up and operation of IPs. Engage scaling partners in public, private, and civil sectors.

Core partners are central to delivering on the programmatic objectives of the Central Mekong Flagship, specifically working together to strengthen research to diversify the farming systems to include trees, vegetables, and livestock, increase market opportunities, improve dietary diversity, and reduce land degradation through strategic land management and use[9]. Of the eleven core Humidtropics partners, eight are actively engaged in Central Mekong: AVRDC, Bioversity International, CIAT, CIP, ICRAF, ILRI, IWMI, and WUR. Membership of Central Mekong Flagship Action Site R4D Platforms include CGIAR Centers, international and regional organizations, national research organizations, and groups or people representing smallholder farmers and vulnerable ethnic groups.

Table 4. Major partners in Action Sites (Triangles) in Central Mekong Flagship

Action Site	Major Partners
Green Triangle	Northwest Vietnam (Son La and Dien Ben): Soils and Fertilizers Research Institute (SFRI); Centre for Agrarian Systems Research and Development (CASRAD); Fruit and Vegetable Research Institute (FAVRI); Northern Mountainous Agriculture and Forestry Science Institute (NOMAFSI); CARES - Center for Agriculture Research and Ecological Studies (Hanoi Agriculture University); HealthBridge Foundation Canada; Vietnam National Institute of Nutrition; Thai Nguyen National General Hospital; The Institute for Social Development Studies. *Core partners:* ICRAF, AVRDC, Bioversity International, ILRI, IWMI, WUR.

[8] Source: Central Mekong Flagship Summary Report, June 2015.
[9] Source: POWB 2015.

Action Site	Major Partners
	Southern China (Honghe): Yunnan Academy of Agriculture. *Core partners*: Bioversity International, CIP.
Golden Triangle	Southern China (Xishuangbanna): Nabanhe Nature Reserve; Yunnan TropResearch Institute; Xishuangbanna Bio-Industrial Office. *Core partners:* ICRAF, WUR. Northern Thailand (Nan): Chiang Mai University (CMU); Mae Fah Luang University (MFU). *Core partners:* AVRDC, ICRAF, IWMI, WUR. Northwest Laos: IRD, ALUPC. *Core partners*: IWMI.
Development Triangle	Central (Highlands) Vietnam: Western Highlands Agriculture and Forestry Science Institute (WASI); Tay Nguyen University (TNU). *Core partners*: CIAT/WUR, ICRAF, ILRI. Cambodia: Royal University of Agriculture (RUA). *Core partners*: CIAT, ICRAF, WUR. Southern Laos: National Agriculture and Forestry Research Institute (NAFRI). *Core partners*: CIAT, WUR.

For those areas where R4D Platforms have been established, there appears to be targeted engagement of national and international research partners with more modest engagement of civil society and private sector actors. While a more diverse set of partners would be ideal, this has been challenging within in Central Mekong where centralized government is common and activity within the civil sector (e.g. independent NGOs) tends to be weak. National research partners generally have strong ties to government, which can be an asset for scaling.

2.2 Efficiency of the Humidtropics Central Mekong Flagship

2.2.1. Humidtropics Management in Central Mekong Flagship

Is Humidtropics effectively managed with appropriate internal processes and conditions (including research staff and leadership quality, institutional arrangements, and governance and management arrangements) for assuring high quality research outputs, considering different genders and generations, documenting and disseminating both positive and negative findings, and monitoring and reporting progress?

To pursue major programmatic objectives, a set of expected outcomes by 2016 and associated reporting outputs have been developed for the Central Mekong Flagship. Clearly stated outcomes and reporting mechanisms are important for coordinating activities across a large set of core institutional partners and for establishing accountability for assigned leadership roles. These mechanisms may not have been sufficient in all cases to counteract some fragmentation of effort given core partners' high level of autonomy in choosing how to deliver on contracted Humitropics obligations (e.g. selection of research priorities, methods, and staff).

Table 5. Expected outcomes and reporting outputs for Central Mekong Flagship

Expected outcomes 2015-16	Reporting outputs
Partner organizations use specific Theory of Change (ToC) and related quantified and qualified Impact Pathways to guide systems intervention research.	Partner organization reports
Field Sites characterized including the identification of entry points and baseline data	Reports of situational analysis, entry point identification, and baseline/ household surveys
Entry points identified in Systems Situation Analysis used by R4D Platforms with SRT2 initiatives to	Refereed publications and/ or Action Area reports on participatory Rapid Appraisal of

Expected outcomes 2015-16	Reporting outputs
develop and trial interventions in Action Sites	Agricultural Innovation Systems (RAAIS) and / or progress reports of SRT2 on R4D Platforms
Results of systems tradeoff and synergy analysis in Action Sites used by partner organizations as input for research on scaling and institutional innovation	Research reports on scaling and institutional innovation
Introduced best-bet social and technical system innovation options transformed into best-fit options by households in Action Sites	Refereed articles on transformation of best-bet to best-fit options and/ or progress research reports on best-fit options
Total Farm Productivity, Income and Natural resources status of different household typologies assessed for each dominant farming system and used as baselines by R4D partners in Action Sites	Monitoring and Evaluation (M&E) report on utilization of farm typology data by R4D partners
Integrated value chain alternatives analysed in Action Sites and piloted to reform organizational and marketing models, approaches and policies	Reports on analysis of alternative integrated value chains and/ or refereed articles
Integrated systems in Action Sites use interventions that make them more diverse and resilient to changing social, political, economic, cultural, technical and ecological contexts	Reports on integrated systems that use interventions that make them more diverse and resilient to changing social, political, economic, cultural, technical and ecological contexts
Selected development institutions use tools, guidelines and publications on systems productivity, natural resources and institutional development explicitly considering the gender dimension	Reports on selected development institutions using tools, guidelines, and publications on systems productivity, natural resources and institutional development explicitly considering the gender dimension for their intervention
R4D Platforms, IPs and other change coalitions used by partner organizations to widen collaboration and research implementation among stakeholders	Report on use of R4D Platforms, IPs and other coalitions by partners to widen collaboration and research implementation among stakeholders
Stakeholder mapping and social analysis reports used by partner organizations in Action Sites to prioritize, initiate, and manage gender-sensitive social and technical systems interventions	Reports on the use of stakeholder mapping and social analysis reports by partners to prioritize, initiate, and manage gender-sensitive social and technical systems interventions

Annex 4.2 presents a complete set of reported 2014 outputs by core partners active in the Central Mekong Flagship. Despite relatively recent initiation of Humidtropics activities in Central Mekong, as well as significant limitations in available funds to support research activities, research partners have made progress in generating reports and journal articles. While these do not yet constitute a comprehensive body of knowledge for the Central Mekong Flagship, all listed work aligns well with the central objectives of Humidtropics.

Table 6. Publications emerging from R4D activities in Central Mekong Flagship

Publication[10]	Status
Cadilhon J. **A situational analysis of agricultural production and marketing, and natural resources management systems in northwest Vietnam.**	Report (https://humidtropics.cgiar.org/openaccess/?did=222)
Riwthong S, Schreinemachers P, Grovermann C, Berger T. **Land use intensification, commercialization and changes in pest management of smallholder upland agriculture in Thailand.**	Environmental Science & Policy, 45: 11-19. (http://dx.doi.org/10.1016/j.envsci.2014.09.003)

[10] Source: Humidtropics Publication Table 2013-2014-2015.

Publication[10]	Status
Schreinemachers P, Srinivasan R, Wu M-H, Bhattarai M, Patricio R, Yule S, Quang VH, Hop BTH. **Safe and sustainable management of legume pests and diseases in Thailand and Vietnam: a situational analysis.**	International Journal of Tropical Insect Science, 34(2), 88-97. (http://dx.doi.org/10.1017/s174275841400023X) **Not a Humidtropics publication.**
Quang DV, Schreinemachers P, Berger T. **Ex-ante assessment of soil conservation methods in the uplands of Vietnam: An agent-based modeling approach.**	Agricultural Systems 123: 108-119. (http://dx.doi.org/10.1016/j.agsy.2013.10.002). **Not a Humidtropics publication.**
Lacombe G. **Impacts of rapid land-use changes on downstream flows in 3 upland agricultural catchments of Southeast Asia.**	Draft to be submitted in 2015 to Agriculture, Ecosystems and Environment.
Lacombe G. **Hydrologic effects of the expansion of teak trees plantations (Tectona Grandis) in a tropical catchment.**	Draft to be submitted in 2015 to Agriculture, Ecosystems and Environment.
Schreinemachers P, Hy HC, Douangsavanh L, Dung PTM, Praneetvatakul S, Ramasamy S. **A situational analysis of the institutional constraints to sustainable pest management in the central region.**	Draft to be submitted for AVRDC internal review in 2015.
Ha TTT, Wang J-F, Hanson P, Kumar S, Van DT, Thuy LT, Chau HM, Schreinemachers P. **Sustainable intensification with vegetable systems in Northwest Vietnam.**	In production.
Ha TT, Schreinemachers P. **Opportunities and constraints for sustainable agricultural development in northern Thailand.**	Report. Unpublished (Data collection started in December 2014).
Jaitiang D, Luther GC, Schreinemachers P, Takagi C. **Analysis of the Nan, Thailand, Innovation Platform.**	Report or paper on stakeholder preferences. In production (intend to publish in 2015).
Karimov A, Nguyen TT, Tung HT, Hai D et al. **Value chains assessment for maize, pigs, plum and tea in Northwest Vietnam.**	In production (to be published in 2015).
Karimov A, Nguyen TT et al. **Value chains assessment for cassava, beef, avocado and pepper in Central Vietnam Highlands.**	In production (to be published in 2015).
Karimov A, Nguyen TT et al. **The business model of the Eakar District cattle farmer club for linking smallholder farmers to dynamic Vietnamese markets.**	Draft to be submitted in 2015 to Supply Chain Management: an international journal.
Cadilhon J-J, Raneri J et al. **Situational analysis of nutrition, agricultural production, marketing and natural resources management systems by the ethnic minorities of Northwest Vietnam.**	Draft to be submitted in 2015 to Agricultural Systems.

The internal processes and conditions in the Central Mekong Flagship became increasingly effective over time, especially with the establishment of a permanent Flagship Manager and regular cross-Flagship meetings. Strong commitment to transparent decision-making was instrumental in building buy-in among Humidtropics-affiliated researchers for difficult programmatic choices (e.g., prioritizing funding of Platform-driven research through Cluster 4).

2.3 Quality of Research in the Humidtropics Central Mekong Flagship

2.3.1 Quality and Relevance of Integrated Systems Research Design in Central Mekong Flagship

To what extent does the integrated systems research design (problem-setting and choice of approaches) reflect high quality, up-to-date scientific thinking and knowledge and innovation in the areas of research, including relevance for women and youth?

The overarching hypothesis of Humidtropics, tested in the various Field and Action Sites, is that a region's inherent potential is best realized through an integrated systems approach, built around sustainable intensification and diversification, involving participatory action across stakeholder groups and enhanced capacity to innovate at farm, institutional, and landscape levels[11]. Humidtropics' integrated systems research approach emphasizes identifying multiple, system-specific intervention pathways and assessing tradeoffs and synergies among competing use of resources and benefits, based on different entry points and priorities[12]. In the Central Mekong Flagship, progress toward testing this overarching hypothesis has primarily emphasized site characterization and identification of entry themes. In the three Central Mekong Action Sites, major entry themes include[13]:

- Integrated crop-livestock systems (including erosion control, soil fertility management, and integrated pest management);
- Improved, diversified tree-crop systems;
- Sustainable intensification of rice rotations with vegetables and potatoes;
- Gender-enabling sustainable agroforestry development;
- Tackling malnutrition through increasing dietary diversity;
- Enhancing value chains, cross-border trade;
- Boosting market access for key commodities targeted for marginalized groups;
- Agroforestry policy analysis and dialogues.

An explicit component of research design in the Central Mekong Flagship is characterization of Action and Field Sites, through situational analysis and baseline studies, prior to any system improvement activity or research activities. Studies of poverty status, ecosystem and natural resources integrity, productivity, and institutional effectiveness are intended to inform decision-making (e.g. initial Field Site selection; entry point identification; research priorities) as well as foster engagement among stakeholders and partners. In practice, the pace of progress on site characterization and entry theme identification (SRT1) has been slow, delaying the onset of integrated systems research activities (SRT2)[14], leaving the focus on bilateral projects[15]. Available secondary data gathered for situation analysis was not sufficient in all cases for research design (e.g. not gender-disaggregated).

[11] Source: http://humidtropics.cgiar.org/at-a-glance/
[12] Source: http://humidtropics.cgiar.org/impact-pathway/
[13] Source: Flagship Summary – Central Mekong, 2014.
[14] Participating researchers have had "mixed messages" regarding following the indicated sequence of activities but also demonstrating early impact of participatory research projects.
[15] Source: Central Mekong Flagship Summary Report, June 2015.

Table 7. Activities and Entry Themes in Action Sites in Central Mekong Flagship

Activities[16]	Entry Themes[17]
Green Triangle: Honghe, China; Northeast Laos; Northwest Vietnam	
Northwest Vietnam: ▪ Action Site officially launched (August 2013 in Sapa). ▪ R4D Platform launched (December 2013 in Hanoi). Facilitator identified. ▪ Situational analysis completed (December 2013). ▪ Value chain assessment implemented in Son La. ▪ Baseline survey of 400 households in Son La and Dien Bien[18]. ▪ EX-ante Tool for Ranking Policy Alternatives (EXTRAPOLATE)[19].	▪ **Northwest Vietnam**: Disparity between urban and rural populations; Poor agricultural productivity (degrading soils; mono-cropping); High child malnutrition; Low prices and constrained market access (poor infrastructure, difficult terrain); Pollution of waterways; Poor implementation of policies; Increasing provision and access to rural credit; Introducing innovative farming practices; Better linking value chain actors; Diversifying farming activities; Creating off-farm jobs.
Golden Triangle: Xishuangbanna, China; Northwest Laos; Eastern Myanmar; Nan, Thailand	
Nan, Thailand: ▪ Situational analysis launched (May 2014). Xishuangbanna: ▪ Situational analysis completed[20]. ▪ RAAIS[21] implemented. Xishuangbanna, Laos, Thailand, Myanmar: ▪ Research on alternative agroforestry options for rubber and the viability of green rubber.	▪ **Xishuangbanna**: Changing the structure of agricultural production (Rubber); Nature reserve and surrounding community development; Eco-tourism: Maintaining nature and minority cultures; The impacts of land use policy on minority groups; International cooperation; Corporate social responsibility.
Development Triangle: Cambodia; Southern Laos; Central (Highlands) Vietnam	
Central Vietnam: ▪ Stakeholder workshop held in May 2014. ▪ Situational analysis initiated. ▪ EXTRAPOLATE implemented. Laos: ▪ Situational analysis ongoing.	▪ **Central Mekong**: Sustainable diversification of production connected to market for food, nutrition and income; Integrated livestock systems for animal food products; Sustainable intensification for productivity and NRM.

The table below lists defined objectives related to Systems Analysis and Synthesis in the Central Mekong Flagship[22] and provides examples of progress toward these objectives.

[16] Source: Flagship Summary – Central Mekong, 2014.
[17] Source: Update from Central Mekong Action Area, 2015.
[18] Led by ILRI, this methodology will be used for other sites and the database will be used to investigate research questions that target IDOs.
[19] EXTRAPOLATE (EX-ante Tool for Ranking Policy Alternatives) is used to understand how to get from an entry point to an impact on the livelihoods of stakeholders including policy issues that need to be addressed and impacts of policy interventions on different stakeholders.
[20] Source: Hammond et al. 2015.
[21] RAAIS is a participatory, diagnostic, multi-method tool that facilitates integrated analysis of interactions among different dimensions, levels, and stakeholder dynamics (including innovation capacity) in complex agricultural systems. Critical triangulation and validation of data emerges from combination of qualitative and quantitative data collection techniques (workshops, interviews, questionnaires, secondary data analysis).
[22] Source: POWB 2014.

Table 8. Examples of progress toward Systems Analysis and Synthesis objectives in Central Mekong Flagship.

Systems Analysis and Synthesis Objectives	Progress Toward Objectives
To quantitatively and qualitatively position the integrated upland intensive mixed, highland extensive mixed, and lowland rice systems in the Action Sites and research sites in relation to the poverty and ecosystem integrity axes in the Humidtropics overarching ToC.	▪ Situational analysis in Northwest Vietnam identified challenges: marginalized peoples (ethnic minorities, women); poor nutrition; degraded soil due to poor agricultural practice on sloping land; poor access to market for produce.
To develop specific ToCs and related Impact Pathways using main entry points in integrated upland intensive mixed, highland extensive mixed, and lowland rice systems in the Action Sites with indicators and metrics related to the IDOs for results-based monitoring and evaluation.	▪ Situational analysis of safe, sustainable management of legume pests and diseases in Thailand and Vietnam. ▪ Situational analysis of the institutional constraints to sustainable pest management in the central region.
To characterize integrated upland intensive mixed, highland extensive mixed, and lowland rice systems in the Action Sites at farm, socio-technical regime, and landscape levels for their production, natural resources, nutrition and livelihoods components and analyzed for potential interventions considering gender empowerment and household priorities.	▪ Study: Impacts of rapid land-use changes on downstream flows in three upland agricultural catchments of Southeast Asia. ▪ Ex-ante assessment of soil conservation methods in the uplands of Vietnam.
To identify specific entry points for integrated upland intensive mixed, highland extensive mixed, and lowland rice systems improvement at a range of scales and levels focusing on gender, markets, production systems, natural resource management, nutrition, and institutions in the Action Sites.	▪ Value chain assessment based on LINK methodology for four agricultural products in Son La: maize, pigs, plums and tea. ▪ Value chains assessment for cassava, beef, avocado and pepper in Central Vietnam Highlands.
To analyze tradeoffs between multiple systems interventions per integrated upland intensive mixed, highland extensive mixed, and lowland rice system in the Action Sites.	▪ Use of EXTRAPOLATE tool. ▪ Study: Opportunities and constraints for sustainable agricultural development in northern Thailand.

2.3.2. Research Priority-Setting, Coordination, and Implementation

Have Humidtropics research for development activities been appropriately prioritized, and effectively coordinated and implemented, given key contextual factors (such as: diverse sources and types of funding; the on-going reform of CGIAR structures and processes; changing resource availability), legacy projects, and financing needs for long-term research programs and key partnerships?

Characterization studies and entry point identification for Central Mekong Action Sites supported development of three Cluster 4 research projects, which were initiated in December 2014. In addition, existing projects have been mapped onto Humidtropics in two Field Sites.

Table 9. Research projects in Central Mekong Flagship

Research Project	Cluster 4	Other
Development Triangle: Enhanced livelihoods and better natural resource management through appropriate integration and diversification on smallholder farms in the Central Highlands of Vietnam. Led by CIAT with involvement by ICRAF, ILRI, WUR. A CIAT bilateral project fully mapped on. Initiated December 2014. USD 32,700 available to June 2015.	X	
Golden Triangle: Assessment of different opportunities for agricultural diversification in Nan, Thailand. Led by AVRDC with involvement by ICRAF, WUR. Initiated December 2014. USD $49,940 available to June 2015.	X	
Green Triangle: Development of appropriate technical innovations in integrated farming systems for scaling up in Northwest Vietnam. Led by ICRAF with involvement by all other core partners. Initiated December 2014. Two bilateral projects at ICRAF and CIAT partially mapped on. USD $50,000 available to June 2015.	X	
Green Triangle: Research to test agroforestry practices and product value chains (e.g. fruits) in Son La and Dien Bien Provinces, Northwest Vietnam.		X
Golden Triangle: Research that links the relationships between fungal diversity, land use systems or forest types, and improved rural livelihoods in Laos, Thailand, and Yunnan Province, China.		X
Golden Triangle: 'Green Rubber' Alleviating poverty and enhancing environmental integrity through restoring ecosystem services in a tropical plantation crop in the Upper Mekong[23].		X

Other examples of research activities in the Central Mekong Flagship include[24]:

- Rainwater harvesting for home gardens. To support home-based vegetable gardening during dry seasons, a study was undertaken in Northwest Vietnam on opportunities to improve rainwater collection. Project elements included a feasibility study for irrigation of vegetable gardens with stored rainwater; tools to estimate optimized reservoir size; and vegetable irrigation trials designed to identify inexpensive rainwater storage facilities and techniques for roof water collection.
- Mushroom diversity and trade. To enhance this important livelihood component, a study was undertaken to test new edible mushrooms, domesticate them for sale, assess chemical properties of new species, and provide trainings for local communities on mushroom growing methods. Hotspot mapping for mushroom diversity was undertaken in Xishuangbanna (China), Nan (Thailand) and Northern Laos including overlaying fungal distribution maps with key biotic and abiotic factors.
- Agroforestry for smallholder livelihoods. In a context of predominantly maize monoculture, soil degradation, and high poverty in Dien Bien, Son La, and Yen Bai, Northwest Vietnam, the AFLI project seeks to identify best-bet agroforestry systems, enhance quality germplasm supply, improve agroforestry value chains, and improve agroforestry policy and extension. Farmer Demonstration Trials tested agroforestry practices with fruit trees, fodder grass, and maize.

[23] The green rubber project is funded by BMZ, Humidtropics, FTA, and national sources and has participation by a large set of partners including ICRAF, WUR, Mae Fah Luang Univ Thailand, National University of Laos, Myanmar Forestry University, Göttingen University, University of Hohenheim, and CIFOR.
[24] Source: Update from Central Mekong Action Area, 2015.

- Integrated livestock feeding strategies. A scoping exercise was used to identify integrated livestock feeding technologies and strategies for pilot testing. Focus was on increasing both system and livestock productivity through feed integrated with other system components (e.g. leguminous forages intercropped with trees/ crop) and supporting NRM and livelihoods.
- Dietary diversity and gender. A cross-sectional study was initiated in August 2014 in selected Thai Villages in Mai Son to determine dietary diversity and nutrient intake of women (reproductive age) and children (12-23 months) and to detect links to locally available biodiversity[25]. Using household and market surveys, water and soil sampling, focus group discussions, KIIs, and participatory consultative workshops to identify best-bet interventions and entry points, the study will produce new tools for assessing knowledge, practices, and behavior towards nutrition and define barriers and opportunities for dietary diversification.

While individual projects appear to be appropriately designed and delivered, research for development activities in the Central Mekong Flagship have been somewhat piecemeal with the overall portfolio of work influenced by bilateral projects and core partner priorities.

2.4 Effectiveness of the Humidtropics Central Mekong Flagship

2.4.1. Partnerships for Outcomes, Synergies, and Capacity Building in Central Mekong Flagship

Does Humidtropics effectively collaborate with its partners to achieve planned outputs and outcomes, maximize synergies, and enhance partner capacity?

The table below compares defined objectives related to R4D partnership development in the Central Mekong Flagship[26] with evidence of progress toward these objectives.

Table 10. Examples of progress toward R4D partnership development objectives in Central Mekong Flagship

Partnership Development Objectives	Progress Toward Objectives
To develop R4D Platforms and IPs that prioritize, develop, test, and evaluate gender-sensitive social and technical integrated systems interventions.	Four R4D Platforms and one IP established. Entry themes identified through platforms.
To widen participation including non-traditional and other CRP partners in development/ implementation of strategic research activities on integrated systems development in the Central Mekong Action Area.	Strong engagement with national research institutions and increasing collaboration among core Humidtropics partners. Relatively weak engagement with civil and private sectors.
To coordinate research for development contributions of the various stakeholders in the Action Sites.	Local contributions to research leadership primarily from national research institutions.
To support communication in/ beyond Humidtropics.	Several reports and journal articles in production.
To reduce platforms' dependency on Humidtropics support and improve capacity to mobilize resources and generate income in the Action Sites.	Emphasis among platform participants on short-term benefits encourages selection of platform activities that encourage shared ownership.
To engage platforms in piloting RBM in selected	Through Cluster 4 projects.

[25] Source: Raneri et al., 2014.
[26] Source: POWB 2014.

Partnership Development Objectives	Progress Toward Objectives
research sites.	

Beginning in June 2014, representatives of core partners have been convened three times by the Flagship Manager to undertake region-wide planning. Some projects involving collaboration among CGIAR Centers, including use of core funds, have emerged (e.g., nutrition cross-cutting work involving AVRDC, Bioversity International, WUR)[27]. Cluster 4 projects have robust participation by numerous national research organizations and are catalyzing increased engagement between core partners and local partners especially in Northwest Vietnam and Central Highlands of Vietnam. Of the eight core CGIAR and non-CGIAR partners active in the Central Mekong Flagship, some (most notably AVRDC) have used core Humidtropics funds to complement Cluster 4 projects, while others have relied on bilateral projects (e.g. ICRAF in Northwest Vietnam and CIAT in Central Highlands Vietnam) to implement complementary research in the Cluster 4 research sites.

Table 11. Core partners involved in Action Sites in Central Mekong, 2014-2015

Action Site	AVRDC	Biov-ersity	CIAT	CIP*	ICRAF	ILRI	IWMI	WUR
Green Triangle								
NW Vietnam	X	X	X		**L**	X	X	X
Honghe, China		X		X				
Golden Triangle								
Thailand	**L**				X		X	
Laos			X		X		X	
Xishuangbanna, China					**L**			
Development Triangle								
Central Highlands, Vietnam			**L**		X	X		X
Cambodia	X	X	X		X	X		

L indicates lead partner. * Indicates involvement in Central Mekong is unclear at this point.

Stakeholder-driven research priority-setting is influenced by the representativeness of those convened for R4D Platforms and IPs. Core partners' bilateral projects that are mapped to Humidtropics set the frame for tangible action in terms of available funding and associated research objectives. Local and national stakeholders bring their own set of core concerns and vested interests.

2.4.2. Translation of Theory of Change to Central Mekong Flagship Sites

To what extent does the overarching Theory of Change and Impact Pathway translate into site-relevant processes and research for development?

Humidtropics' area-based Flagships are designed to result in improvements in livelihoods and productivity for poor smallholder farming communities based on development of site-specific ToCs, Impact Pathways, entry points, and social and technical interventions relevant to the dominant integrated systems specific to their area[28]. To optimize tradeoffs at the farming

[27] Source: Central Mekong Flagship Summary Report, June 2015.
[28] Source: POWB 2015.

systems and socio-technical regime level, analysis is undertaken of the interactions among different components of the system in relation to the interventions proposed.

The Humidtropics overarching Impact Pathway begins with development of change coalitions[29]. The IDOs on Income, Nutrition, Productivity, and Environment are achieved when livelihoods and ecosystem integrity are improved through uptake of multiple, site-specific social and technical innovations that stimulate increased farm system productivity, diversification, and environmental sustainability. The IDOs on Innovation and Gender are achieved when livelihoods, equity, and empowerment status of men, women, and youth are enhanced as systems actors at farm, institutional, and landscape levels have increased capacity to learn about, prioritize, and experiment with systems interventions. In the Central Mekong Flagship, there is early evidence of alignment with the Humidtropics Impact Pathway and progress toward IDOs (see Annex 4.2 for more detailed list):

- Adapting the stakeholder platform and situational analysis model to the socio-cultural context in Central Mekong with attention to stakeholder mapping and platform configuration;
- Numerous research activities related to improved productivity (e.g. gaps in whole system productivity), sustainability (e.g. green rubber, pest management), and profitability of farming systems and promotion of diversification (e.g. vegetables, agroforestry);
- Baseline surveys and other information gathering to support improvements in nutrition and agro-biodiversity with attention to gender;
- Attention to seed supply and value chain characterization;
- Targeted training activities and development of decision-making tools.

Table 12. Indicators of research progress in Central Mekong Flagship

Sites	Platforms	Baseline study	Tools	Initiated projects	Completed projects	Cluster 4 projects	Non-CGIAR partners
Thailand: Nan	R4D	yes	no	2 (crop/ water management; multi-stakeholder innovation)	0	1 (diversifica-tion oppor-tunities)	2
China: Xishuangbanna	R4D	yes	RAAIS; InPaC-S	8 (soil health; mushroom; rubber-tea-flamengia-pig systems; rubber pollution monitoring; government-research-farm communication; ecosystem service use/ access; multi-stakeholder innovation)	1 (scaling up green rubber)	0	3
Laos: Luang Prabang	no	no	no	1 (erosion/ runoff)	0	0	2
Vietnam: Central Highlands	R4D	yes	no	0	0	1 (smallholder integration/ diversifica-tion)	2

[29] Source: http://humidtropics.cgiar.org/impact-pathway

Sites	Platforms	Baseline study	Tools	Initiated projects	Completed projects	Cluster 4 projects	Non-CGIAR partners
Cambodia: Ratanakiri	no	no	no	2 (forage systems; multi-stakeholder innovation)	0	0	1
Laos: Southern	no	no	no	0	1 (forage systems)	0	1
Vietnam: Northwest	R4; 1 IP	yes	IMPACT-Lite; EXTRAPO-LATE; PIIA	4 (off-season vegetables; multi-stakeholder innovation; nutrition; crop/ water mana-gement)	0	1 (integrated farming innovations)	9
China: Honghe	no	yes	no	5 (mini-tuber methods; banana-based farms; CIP germplasm; potato cultivation; rice-potato productivity)	0	0	1

To mainstream local, market, government hybrid knowledge into explicit "new normal" practices, application of the Humidtropics Impact Pathway in Central Mekong has emphasized: (a) working with local people to understand system adaptations; (b) integrating scientific knowledge to identify and test pro-local, pro-poor practices for efficient widespread use; and (b) incorporating evidence-based results into practical guidelines to support local, regional, and national decision makers. Emphasis on local knowledge acknowledges the complex ethnicity (over 70 ethnic groups) and diverse set of coping strategies evolved by local communities in Central Mekong, which have been only weakly translated into government policies and extension systems[30].

2.4.3. Plausibility of Holistic Impact at Scale and Added Value in Central Mekong Flagship

To what extent does Humidtropics' integrated systems approach plausibly lead to better and more holistic results, impact at scale and provide additional value to the CGIAR's capacity to deliver relevant international public goods that lead to impact?

Scaling and Institutional Innovation Objectives in the Central Mekong Flagship[31] include:

- To assess the contribution of R4D Platforms and IPs to social, technical and institutional systems innovations, and explore the conditions and configurations that allow these platforms to be effective in fostering such innovations in the Action Sites;
- To assess pathways, patterns and success factors for responsible scaling including adoption and adaptation of social and technical systems innovations accounting for gender equity and sustainability tradeoffs in the Action Sites;
- To improve the current systems' capacity to innovate at farming systems, socio-technical regime and landscape levels in the Central Mekong Action Area;
- To enhance institutional innovation capacity and responsible scaling approaches in the Central Mekong Action Area.

[30] Source: Flagship Summary – Central Mekong, 2014.
[31] Source: POWB 2014.

Humidtropics in Central Mekong is at a relatively early stage of development and progress toward these objectives is only now emerging, inhibiting assessment of plausibility. The Program's conceptual framework and primary emphasis on multi-stakeholder convening for R4D research is perceived positively by research leaders, although experience with R4D Platforms has been mixed both in terms of operational delivery and traction with stakeholders. There is evidence of uptake of "systemness" concepts by participating researchers; yet, there is recognition of the challenge of applying the model in the Central Mekong Action Area.

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4. Annexes

4.1 List of persons interviewed

Individuals contacted for information regarding their experience and perceptions regarding the Central Mekong Flagship and Humidtropics.

Name	Affiliation/ Role	Mode	SRT 1	SRT 2 *	SRT 3	Manager	CGIAR Researcher	Partner
Lisa Hiwasaki (L.Hiwasaki@cgiar.org)	**ICRAF, Area-based Flagship Manager (Vietnam)**	**skype**				**X**		
Steve Staal (s.staal@cgiar.org)	**ILRI (Philippines)**	**skype**	**X**	**NRI**			**X**	
Pepijn Schreinemachers (pepijn.schreinemachers@worldveg.org)	**AVRDC (Thailand)**	**skype**	**X**	**MI**	**X**			**X**
Tassilo Tiemann (t.tiemann@cgiar.org)	**CIAT**	**skype**		**PE**			**X**	
Adrian Bolliger (a.bolliger@cgiar.org)	**CIAT**	**email**		**PE**			**X**	
Marijn Poortvliet (marijn.poortvliet@wur.nl)	**WUR**	**skype**			**X**			**X**
Jessica Raneri (j.raneri@cgiar.org)	**Bioversity International**	**email**					**X**	
Chau Thi Minh Long (longchau76@yahoo.com)	**Western Highlands Agriculture and Forestry Science Institute (Vietnam)**	**email**		**PE**				**X**
Jim Hammond (J.Hammond@cgiar.org)	**ICRAF**	**email**				**X**		
Dr. Hoi Pham (phamhoi@gmail.com)	**CARES (Vietnam)**	**email**						**X**
Dr. Xundong Li (xundonglee@sina.com)	**YAAS (local partner in Honghe, China, Green Triangle)**	**email**						**X**
Mark Lundy	**CIAT**	**skype**		**MI**		**X**		
Bernard Vanlauwe	**IITA**	**skype**		**PE**		**X**		
Edmundo Barrios	**ICRAF**	**email**		**NRI**		**X**		

** MI: Markets and Institutions (SRT2.1); PE: Productivity Enhancement (SRT2.2); NRI: Natural Resource Integrity (SRT2.3)*

4.2 Core Partners' Activities in 2014 in Central Mekong Flagship

Planned 2014 Outputs	Partners' 2014 Activities
Central Mekong Flagship Cluster Outputs	** CIP: Identification of key constraints for introducing high value potato crop into the rice-based system. Introducing new potato varieties into the cereal-based production system. Conserving the introduced CIP germplasm for further evaluation and distribution. Participate in the yield gap analysis and limiting factors study.
2.1.6 Report on tradeoff/ synergy analysis for targeted Action Sites available.	** WUR: Tradeoff/ synergy analysis of identified baskets of technologies/ system innovations - Verification of entry points identified in participatory processes.
2.2.1 Whole-system productivity gaps and risk/ resilience, including identification of major limiting factors for system components, analysed and documented for each main system in the research sites.	** WUR: To analyze whole system productivity gaps and identify the major limiting factors underlying these gaps, as a basis for identifying entry points towards enhancing system productivity.
2.2.7 Models developed to quantify and analyse the effect of NRM interventions on tradeoffs and synergies between system productivity and other ecosystem services.	** WUR: To identify, adapt, and/ or develop a set of modeling tools for the ex-ante identification of the productivity enhancement potential of system components within the heterogeneity of targeted farming systems.
2.2.11 Tools/ models to guide implementation of approaches that enhance natural resource integrity and resilience validated, implemented and documented.	** WUR: To identify, adapt, and/ or develop a set of modeling tools for the ex-ante identification of the NR&AB interventions that reduce tradeoffs and increase synergies between system productivity and other ecosystem services within the heterogeneity of targeted farming systems. Specific demands from SRT2.2 related to soil health and soil-mediated ecosystem services will be prioritized.
4.1.1 Systems analysis report for each Action Site produced.	** AVRDC implemented the situational analysis for the northern Thailand Action Site. AVRDC helped to coordinate the other situational analyses in the Golden Triangle (jointly with ICRAF and ILRI). Agro-ecosystem analysis for Honghe Prefecture, Yunnan. ** CIAT organized stakeholder meeting with application of EXTRAPOLATE tool. In Vietnam, based on the produced Situational Analysis Report, combined with site selection trips, a stakeholder consultation workshop and an Action Site planning meeting involving all interested national and international partners, sites were selected and activities were planned. The process was: secondary data collection; stakeholder consultation meeting to get more detailed information get feedback and create awareness; field trips to all four provinces to visit potential work sites; assessment of site suitability; Platform meeting (with field visit) for international and local partners to discuss potential future activities, create partnerships and select sites. In Laos first data have been collected while in Cambodia activities were outlined based on the information derived from CIAT's existing CLV-project. So far, for Laos and Cambodia, no reports are ready for sharing but expected for 2015. ** CIP: Agro-ecosystem analysis for Honghe Prefecture,

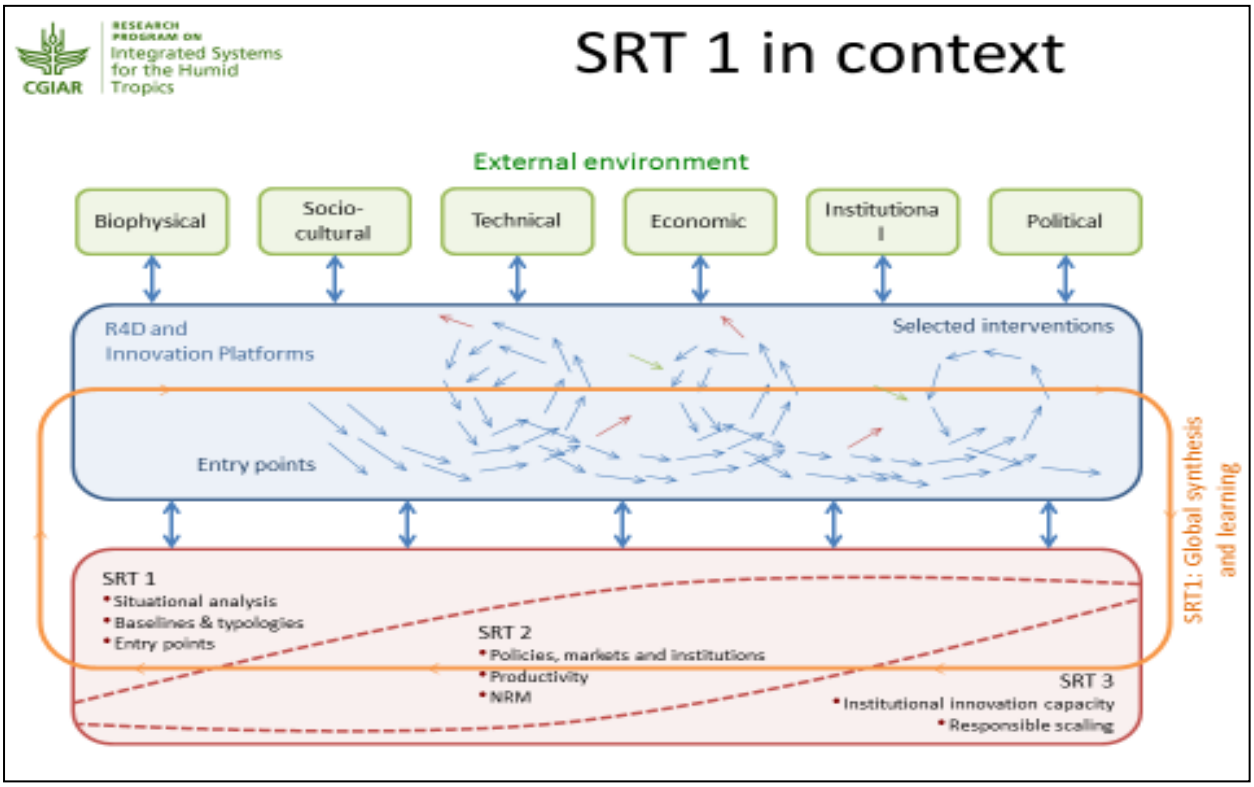
Planned 2014 Outputs	Partners' 2014 Activities
	Yunnan. ** ICRAF: Carried out situation analysis on Golden Triangle - Xishuangbanna, Yunnan, China. Desk study with local partners. Contributed to situation analysis in NW Vietnam - Green Triangle. Field survey and desk studies with local partners. Field survey and desk studies with local partners. ** ILRI: Complete Situational Analysis NW Vietnam Green Triangle.
4.1.2 Baseline report that quantifies and analyzes the current production systems and natural resource management for their contribution to rural livelihoods.	** AVRDC: Contributed to the design of the baseline survey for Son La, Vietnam. ** CIAT: Baseline surveys with 300-500 HH per country. ** ICRAF: Carried out in Xishuangbanna, Yunnan. Contributed in NW Vietnam. ** ILRI: Conducted IMPACT-Lite baseline survey in NW Vietnam, Green Triangle. Conduct IMPACT-Lite baseline survey in Central Highlands Vietnam, Development Triangle.
4.1.3 Household typologies documented.	** ICRAF: Carried out in Xishuangbanna, Yunnan, to complement existing data. Contributed in NW Vietnam.
4.1.4 Baseline and foresight data documented for field site selection and results based monitoring and evaluation purposes in each research site.	** ICRAF: Carried out in Xishuangbanna, Yunnan, to complement existing data. Contributed in NW Vietnam.
4.1.5 Gender strategies in relation to specific integrated systems innovations documented for targeted Action Sites.	** ICRAF: PhD study on gender aspects of green rubber started, Xishuangbanna Platform. See comment 'Explain difference'.
4.1.7 Baseline IDO indicator values established and documented for each Action Site.	** ICRAF: Recruitment of M&E officer to work with Flagship Manager together with R4D Platforms - Humidtropics core partners and local partners.
4.1.8 A report on nutritional/ dietary quality situation in the targeted Action Sites available.	** AVRDC collect data on the food habits and dietary diversity of poor households in the Action Sites in Vietnam.
4.1.9 Inventory of focal groups, local expert panels and partner networks including those of other CRPs for each Action Site.	** ICRAF: To be done for the Central Mekong Action Area in general and in particular the three Action Sites.
4.2.1 Whole-system productivity gaps and risk/ resilience, including identification of major limiting factors for system components, analysed and documented for each main system in the research sites.	** AVRDC: Documented the current regulations governing the safe use of agricultural pesticides in Cambodia, Laos, Thailand and Vietnam. This should provide entry points for the introduction of safe and sustainable methods of crop pest management. ** ICRAF: Factors influencing rubber yield in Xishuangbanna, Yunnan. NW Vietnam.
4.2.3 Integrated systems value chain analysis conducted in each research site	** ICRAF: NW Vietnam. Xishuangbanna, Yunnan. ** ILRI: Conduct value chain assessment in NW Vietnam, Green Triangle. Conduct value chain assessment in Central Highlands, Development Triangle.
4.2.4 Scenarios for intensification for varying typologies, socio-technical regimes, and other Action Site/ area-specific drivers, developed and	** CIP: Intensification of cereal-based systems with the introduction of winter potato production. ** ICRAF: PhD study using green rubber in Xishuangbanna as a case study. Aim to improve ex-ante farm characterization

Planned 2014 Outputs	Partners' 2014 Activities
documented.	tools so that interventions can be better targeted to end users during the early stages of R4D projects. PhD study on gender aspects of green rubber started, Xishuangbanna Platform.
4.2.5 Basket of best-fit options, respecting gender differentiation, for the sustainable intensification of systems.	** AVRDC: Identified tomato, French bean, radish and sweet pepper as vegetables with a high potential to contribute to the sustainable intensification and diversification of farming systems in Son La, Vietnam and these were tested in the field. Implemented field testing of sustainable methods of vegetable production based on ecological intensification in Son La. ** CIAT: Identification and testing of integrated agroforestry options for livelihood improvement. Tree-forage-livestock assessment; field analysis and PR. ** CIP: Empowering local seed producers to guarantee high quality seeds for cereal-based production system. Participatory on-farm experiments to test the suitability NDVI-derived rice-potato productivity study, with ground things and interviews and tradeoff analysis of introducing potato into rice systems. Better management on multiplication of high quality G2 and G3 seed potatoes. ** ICRAF: Agroforestry demonstration on-farm trials in x sites, fruit tress and grass strips along contour lines of sloping land (under maize). Mushrooms for diversified income, resilience and improved livelihood. Green rubber: Quantification of Rubber seed yield in Xishuangbanna and estimation of rubber seed oil based biodiesel potential in Southeast Asia. ** ILRI: Conduct EXTRAPOLATE exercise to identify preliminary entry points in NW Vietnam, Green Triangle, in Central Highlands, Development Triangle, and in China, Golden Triangle. Perform a tree-forage-livestock assessment in the Green Triangle using a combination of field analysis and PRA.
4.2.6 NRM Tool Box to identify, classify, prioritize and integrate local and technical knowledge on NR Integrity.	** ICRAF: Global training workshop and development of SRT2 tools, methods and approaches. The NRM toolkit (score card) was piloted in Central Mekong.
4.2.8 Local and technical knowledge on natural resources condition, including agro-biodiversity, and ecosystem services provision status assessed.	** ICRAF: NW Vietnam and Xishuangbanna, Yunnan.
4.2.9 Effects of NRM interventions on tradeoffs and synergies between system productivity and other ecosystem services modelled.	** ICRAF: Xishuangbanna, Yunnan. ** WUR: Operationalise and contextualise indicators across different Action Areas.
4.3.1 Concepts, indicators, methods and tools developed for assessing the effectiveness of innovation and R4D Platforms tested and documented in the Action Sites.	
4.4.1 Social network analysis reports of selected R4D Platforms in the Action Areas disaggregated by gender, social influence and power.	** AVRDC: Analyzed the configuration of R4D Platforms in northern Thailand. ** ICRAF: Stakeholder mapping carried out and national and local partners to invite the emerging R4D Platforms identified

Planned 2014 Outputs	Partners' 2014 Activities
	and contacts established. Leading in NW Vietnam (Green Triangle), and Xishuangbanna, Yunnan (Golden Triangle), and supporting in Nan, Thailand (Golden Triangle) and Central Highlands (Vietnam). Flagship Manager assisted and helped facilitate in all four Action Sites/ Platforms.
4.4.2 Platforms established and participants engaged in priority setting and research activities in selected Action Sites.	** AVRDC: Coordinated launch of the R4D Platform for northern Thailand. One follow-up meeting was organized in 2014. ** ICRAF: R4D Platform established in NW Vietnam (Green Triangle), Xishuangbanna, Yunnan (Golden Triangle), Nan, Thailand (Golden Triangle), and Central Highlands of Vietnam (Development Triangle). Leading/ backstopping Platform facilitation in NW Vietnam and Xishuangbanna, and took active part and supported in Nan and Central Highlands of Vietnam. Flagship Manager assisted and helped facilitate in all four Platforms. R4D Platform facilitators training workshop, November 2014 in Xishuangbanna, participants from all four R4D Platforms.
4.4.7 RBM approach piloted.	** ICRAF: M&E officer recruited and three Platforms initiated and national/ local partner-led Cluster 4 projects developed and started to be implemented.

Annex 10.5

Case Study on Global Synthesis



Slide from Tim Robinson's Presentation to the IITA Board of Trustees Meeting in Livingstone, Zambia: April 2015

Author(s)

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1.0 Introduction:

1.1 Background on Strategic Research Themes

The Humidtropics dynamic program structure was built around three Strategic Research Themes (SRTs):

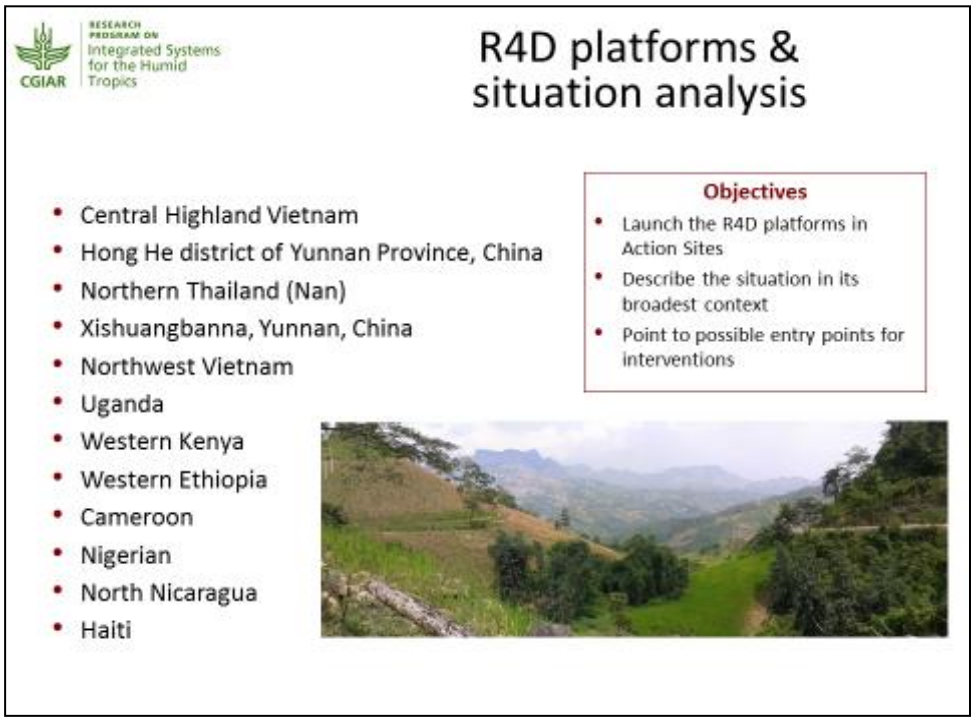
- SRT1: Systems Analysis and Synthesis;
- SRT2 Integrated Systems Improvement;
- SRT3: Scaling and Institutional Innovations.

SRT1 Objectives:

- To characterise the production systems in Humidtropics;
- To define Action Sites and support selection of Field Sites;
- To identify constraints and opportunities and potential entry points to intervene;
- To understand the potential scope of interventions (scaling out);
- To ensure global learning and capacity development across Humidtropics;
- To inform policy formulation and decision making.

SRT1 was designed to provide an analytical framework covering institutions, stakeholders, and rural communities and households for identifying alternative trajectories, bottlenecks, and opportunities to address System Level Outcome (SLO) targets. The starting point was considered to be undertaking a Situation Analysis in order to build a baseline including established baselines of the identified Action Areas.

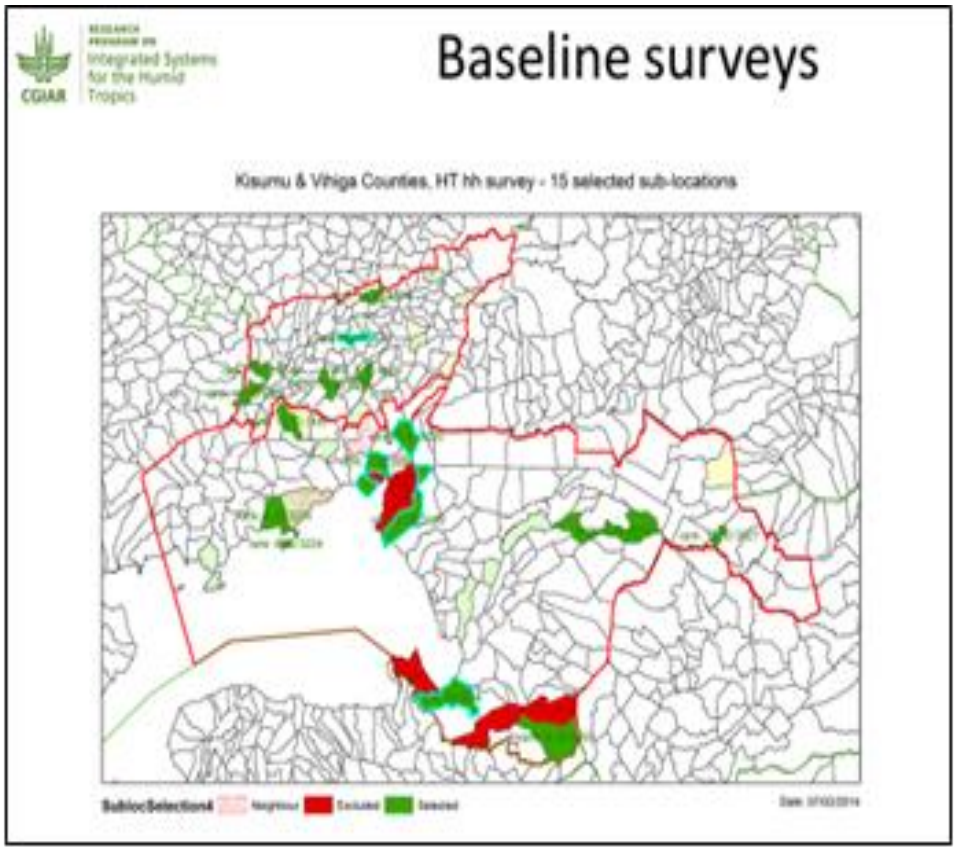
A. The Situation Analysis was to provide the basis for identifying specific needs and understanding household typologies, prioritizing technological interventions (specific entry points and actions under SRT2), and for assembling the R4D innovation network, all of which are expected to vary among areas and sites.



Source: Slide from Tim Robinson's Presentation to the IITA Board of Trustees

B. Baselines and typologies Objectives

- To collect baseline data for field sites – particularly in relation to IDO indicators.
- To explore typologies of households.
- To use a systems analysis approach to identifying constraints, entry points and potential interventions.
- To help formulate and sharpen our research questions.



Source: Slide from Tim Robinson's Presentation to the IITA Board of Trustees

1.2 Progress on Situation Analysis, Baselines & Typologies

The situation analysis and baseline surveys were conducted and several tools developed; which were instrumental in the process of identifying entry points. Some of these include their comparative analysis between households in Africa based on data from a sample size of 16,000 households. The other interesting analysis entails conducting the foresight and systems analysis using a multi-scale approach presented in **Section 2.3** below.

Example of Baseline surveys and household typologies:

- Baseline survey in Western Kenya – Vihiga and Kisumu (Slide above).
- Household survey in Tanzania on the Food Security Ratio.
- Household typologies have been developed using household data from Tanzania, which were applied to Humidtropics datasets.

2.0 Global Synthesis Objectives

- To assemble, compare and analyse tools, data and results from the Area-Based Flagships, under the three Strategic Research Themes, into a synthesis of experiences with interventions and scaling-out, ranging from Action Area to Program levels.

- To generate innovative multi-area research outputs focusing on Humidtropics-wide insights into the roles of diversity as well as into improving sustainability, nutrition and gender equality.

- To place Humidtropics in its broader context amidst drivers of change in order to anticipate future opportunities and challenges that will be presented to farming households in these areas.

2.1 SRT1 Systems Analysis and Synthesis

One of the primary outcomes of Humidtropics was to understand the status of and variation in the existing agricultural, social, economic, natural, institutional, and policy situation, including gender, within and between Action Areas. This understanding should have informed the correct framework for priority-setting and identifying the appropriate blend of productivity improvement, natural resource management, market development and institutional strategies. Since these rural communities, and stakeholder groups within them, are affected by population growth, climate change, weak rural infrastructure, and difficult commodity markets, an understanding of these drivers and their potential impact on people's lives was crucial information towards priority setting or improved integrated systems performance.

Humidtropics delivered on its goals, by putting in place Research for Development (R4D) and Innovation Platforms (IPs) as key program structures through which partnerships would engage to deliver on an agreed set of objectives, which were specific to each Action Sites. The latter within Action Areas are indeed currently operational and served as starting points with some transitioning to a more systematic set of activities within the project's first three years.

SRT1 was mandated with developing and utilizing priority setting tools and procedures towards the identification of Action Site-specific opportunities for enhancing system performance and merge existing and new partnerships towards common place-based effort for implementing, evaluating, and disseminating priority opportunities. The role of policy and institutions affecting poverty and natural resource integrity was to be assessed in both the Action Sites (SRT2 Research Outputs) and Action Areas (SRT3).

As such, developmental outcomes through the Systems Analysis and Synthesis and the resulting Monitoring and Evaluation (M&E) Framework were to be considered within the Global Synthesis. Specific attention was given to policies and institutions affecting collective action towards marketing and natural resource management, input and output value chains, agricultural service provision, and capacity enhancement. The identification of major drivers affecting livelihoods at the Action Area level was mapped using geo-referenced baseline data, available secondary information from IFPRI, national ministries, and development agencies and other available geo-referenced databases including the Millennium Ecosystem Assessment (http://www.maweb.org/en/). Four partners, CIAT, ICRAF, IITA, and ILRI took the lead in these research activities. Bioversity International was involved in

strengthening the Systems Analysis and Synthesis of the status of agro-biodiversity and its role in production, nutrition, system risk, and resilience. All this work has been evident across the Area-Based Flagships although to a varying degree.

Partnership formed were based in some cases on existing initiatives, as opposed to a criterion for the identification of Action Areas, which would have aimed at lesson learned in terms of effectiveness and efficiency, gaps and need analysis, and eligibility criteria (including interest in co-support for Humidtropics activities), and identification of specific roles and responsibilities.

The full Systems Analysis and Synthesis, leading to a Global Synthesis, is led by all core partners and is intended to analyze issues beyond their site-specific dimensions. This synthesis contributed to the coherence of the program in terms of approach and studies aimed at enhancing the common vision within Humidtropics.

For generating household typologies, meta-analysis based on data collected in the Action Sites and Areas was used to measure the effects of different interventions. Both econometric and systems modeling has been employed to further understand changes and factors that affect those changes. However, documenting and tracking adoption of the technologies introduced and tested in each site in order to inform what leads to better adjustment and replication of impact pathways is yet to be accomplished.

Global Synthesis is meant to expresses lessons useful to future projects and contributes to research tools and knowledge in the other CRPs. This synthesis was expected to result in methods and models for assessing interventions on systems productivity and diversity, NR integrity, biodiversity, and institutional effectiveness, including gender equity. This would have led to a framework for defining extrapolation domains and targeting systems interventions beyond Action Sites; comparison of development trajectories, and identifying innovations and institutional policies supporting system's changes. The Global Synthesis has helped define key system indicators for NR improvement and poverty reduction, and developed models for assessing system interventions based upon these indicators. Special attention is yet to be paid to institutional policies and practices that support changes evaluated across Action Areas and strengthening capacities for scaling up complex interventions.

2.2 The Tools for systems analysis

These include but are not limited to the following:

- Humidtropics tools include RAAIS and EXTRAPOLATE;
- 26 Tools for Systems Analysis (TOSA) tools currently catalogued under Humidtropics at http://data.ilri.org/tools/group/humidtropics2 (summarized **Table 1** below). The tools are under review for their gender-relevance but are accessible and being used by in R4D Platforms and IPs;
- One of these, the FEAST tool, was developed by ILRI for characterizing the feed production systems in western Kenya Action Site in five districts. The tool helped to highlight problems and opportunities as well as indicate potential interventions areas. More details about the tool can be found at: (http://feast59.rssing.com/chan-14291033/latest.php). In addition to developing the tool, ILRI has successfully launched a learning development initiative to support adoption of the FEAST tool by helping practitioners develop the necessary skills (computer literacy, data analysis, report writing, research methods) to effectively apply the tool in their work. This has been accomplished through developing blended e-learning training materials that

are available in both classroom and online formats found at http://www.ilri.org/feastmethodology. The use of these materials is yet to be followed up, as well as engendering the FEAST tool. A number of outputs related to FEAST can also be found at: https://cgspace.cgiar.org/handle/10568/16490/browse?value=Poster&type=output.

- Another tool is showcased in **Annex 4.1**, which provides "A conceptual framework to evaluate the impact of innovation platforms on agrifood value chains development". This has been tested in Burkina Faso and Ghana.

Table 1: Tools used for Systems Analysis in Humidtropics[1]

Tool	Purpose
Humidtropics Similarity Analysis	Find areas with similar characteristics to a study site.
ICRAF Local Knowledge Toolkit (AKT5)	Gather local ecological knowledge.
Humidtropics Situational Analysis Checklist	Ensure attention to three primary objectives of the Humidtropics situational analysis.
Tool for Monitoring and Evaluation of Innovation Platforms	Provide a conceptual framework for monitoring and evaluation of innovation platforms.
Agricultural Biodiversity 4-Cell Focus Group Methodology	Identify and rank species regarding their availability and use on-farm, in the wild, in markets, in diets.
InPaC-S	Guide application of participatory approach and methodologies.
Women's Empowerment in Agriculture Index	Measure women's empowerment, agency and inclusion in agriculture in five domains.
LINK Methodology	Guide multi-stakeholder processes to promote engagement of smallholder producers with modern markets.
CIAT's Method for Value Chain Assessment	Delineate a strategy for addressing agro- entrepreneurial development needs of institutions.
Area-based Approach for Rural Agroenterprise Development	Provide the starting point for addressing the entrepreneurial development needs of institutions that support rural communities.
Identifying Market Opportunities for Rural Smallholder Producers	Support agencies implementing a anticipatory approach to rural agro-enterprise development.
RAAIS (Rapid Appraisal of Agricultural Innovation Systems)	Specify a participatory, diagnostic method for integrated analysis of complex agricultural problems.
Polyscape	Guide ecosystem service mapping using both local and expert knowledge to generate a representation of local landscape structure.
IMPACT Lite	Capture critical data by surveying farming households to generate farm household typologies.
DAPA's Linking Farmers to Markets Research Group	Investigate how to establish market linkages through comprehensive processes that promote rural agribusiness development.
Participatory Market Chain Analysis for Smallholder Producers	Enable service providers to work with market chain actors and design interventions that initiate systemic changes in the marketplace.
Dietary Diversity and Quality Scores	Gather data on women and children's dietary diversity via questionnaire.
FEAST (Feed Assessment Tool)	Assess local feed resource availability and use.
Livestock Geo-Wiki	Provide a central viewer, validation tool, and repository for livestock distributions and production systems data to develop a comprehensive global livestock information system.
Site Selection Guidance for Humidtropics	Disaggregate Action Areas into geographical units, called 'development domains', in which similar agricultural development problems or opportunities are likely to occur, based on the spatial layers population density, agricultural potential and market access.
COMPASS (Co-innovation and Modeling Platform for Agro-eco System Simulation)	Integrate modeling tools at field, farm and landscape scales.
NUANCES–FARMSIM (Nutrient Use in Animal and Cropping systems – Efficiencies and Scales FARM SIMulator	Enable scenario analysis based on application of secondary data, expert knowledge, and empirical agronomic experiments in component subsystem models: for agricultural fields (FIELD), livestock (LIVSIM), and manure / organic residue (HEAPSIM).
TAGMI (Targeting AGwater Management	Facilitate targeting and scaling-out of three different Agricultural Water

[1] Humidtropics' Tools for System Analysis (TOSA): http://data.ilri.org/tools/group/humidtropics2

Tool	Purpose
Interventions)	Management (AWM) technologies in the Limpopo and the Volta River Basins.
CCAFS Climate Analogues tool	Support adaptation in farming systems based on identifying characteristics of other sites or years with analogous climate conditions to those predicted.
EXTRAPOLATE (EX-ante Tool for RAnking POLicy AlTErnatives)	Assess the impact of different policy measures by disaggregating the effects of policy interventions.

According to a Key Informant Interview (KII) conducted with ILRI, the partnership that was envisaged in developing these tools has been tricky. They held SRT1 meetings every year and had good collaboration with IITA, and WUR among others. However, some partners came on board more strongly than others.

The difficulty associated with the tools was coming up with standardized tools across the different sites. Therefore enforcing their standard was hard. One of the key lessons learned was providing guidelines, which has helped the different Action Sites to customize them to their contexts.

One of the tools that have been used the most by Action/Field Sites is the RAAIS methodology because of the level of advocacy. Marc Schut developed it and has been at the forefront in advocating for its use. Extrapolate has not been used as much within Humidtropics but has been applied in other programs.

Beyond ILRI's involvement in the development of tools, the livestock component did not seem to get much attention across the Action/Field Sites. Going forward, the livestock integration issue will be taken up in the Livestock CRP based on the SALT tool.

For the transition period: Up to 2016, it is important to make sure that systems research is firmly taken up and the need to generate "Good Case studies" such as:

- Household survey analysis & data;
- Use of the FEAST Implementation – Kenya.

2.3 Foresight and systems analysis

2.3.1 Multi-scale approach

The projections will set the broad scene on several issues such as: How are markets changing? How are growing conditions changing? Systems Analysis will set the boundaries for change and model plausible futures.

Community foresight will explore the hopes, concerns and expectations of the communities themselves. Through facilitated discussion with R4D Platforms, partners will arrive at a set of interventions (technical, institutional, policy) that will lead to desirable outcomes, within the bounds of plausibility, in the context of broader, on-going drivers and changes.

2.3.2 Looking forward

There will be reduced emphasis on Site Selection and Situational Analysis (unless new sites are to be included). The natural evolution of baselines, typologies and entry point analysis into SRT2 type activities will lead to increasing emphasis on Global Synthesis and lesson learning.

3.0 Status on Creating International Public Goods

The CGIAR has set a goal of improving livelihood and reducing poverty through the interventions of Centers and their partners. At a global level, it is of interest to understand how R4D contributes to achieving these objectives. Humidtropics was positioned to intervene through its achievements across the humid tropics of Africa, Asia, and Americas.

There is emerging evidence in all three regions, that there is progress towards diverse, and in some cases common, issues related to poverty reduction, ecosystem integrity, systems productivity, institutional effectiveness, natural resources management, and gender inclusion, all of which affect people's lives and livelihoods. Through Humidtropics, it was important to understand these issues at the global level and provide solutions that will not only apply to Action Sites but for scaling up and out program results to Action Areas and the humid tropics regions of the world.

The evidence that has been presented in the CCEE Main Evaluation report, coupled with the research that has been conducted through SRT1, SRT2 and SRT3, all contribute to the body of knowledge needed to create not only International Public Goods (IPG) but also provide a platform for understanding trajectories of changes. Through DevResults (http://www.devresults.com), which is the first web-based M&E framework designed to capture these trajectories, this constitutes an IPG. Humidtropics' research and development partners will draw on this and other resources such as CGSpace (shown in picture) in order to redirect these trajectories (or their drivers) by prototyping flexible combinations of proven solutions, first tested in the Action Areas. Alternative approaches by household and community typologies that emerge from the Global Synthesis will produce the next generation of IPGs through development partner scaling activities.

Synthesis of such IPGs based on cross-site analyses of Action Areas is yet to be fully accomplished. Untangling the effects of different system components is best performed at a higher level through meta-analysis across time and space. In addressing natural resource integrity, the Global Synthesis and IPGs resulting from it will guide diagnostics of natural resource degradation and provide site-specific responses to it.

Clearly, the design of IPG packages must be built upon technological know-how and its promotion to farm households, proven approaches within different production systems and along the entire agricultural value chain at innovations systems level. In this way, IPGs range from practical guidelines directing land mangers' response to production and natural resource management challenges to complex survey and analysis intended to partition and redirect drivers of change.

4.0 Annexes:

Annex 4.1 A conceptual framework to evaluate the impact of innovation platforms on agrifood value chains development

Show full item record

Title:	A conceptual framework to evaluate the impact of innovation platforms on agrifood value chains development
Author:	Cadilhon, J.-J.
AGROVOC Keywords:	MARKETING
Date:	2013-09-12
Publisher:	ILRI
Citation:	Cadilhon, J.-J. 2013. A conceptual framework to evaluate the impact of innovation platforms on agrifood value chains development. Presented at the 138th seminar of the European Association of Agricultural Economists on pro-poor innovations in food supply chains, Ghent, Belgium 11-13 September 2013. Nairobi, Kenya: ILRI.
URI:	http://hdl.handle.net/10568/33708
URL:	http://www.slideshare.net/ILRI/a-conceptual-framework-to-evaluate-the-impact-of-innovation-platforms-on-agrifood-value-chains-development
Status:	Open Access
Country Focus:	BURKINA FASO, GHANA
Region Focus:	AFRICA, WEST AFRICA
CGIAR research program:	POLICIES, INSTITUTIONS, AND MARKETS
Subject Focus:	VALUE CHAINS, IMPACT ASSESSMENT, INNOVATION SYSTEMS, MARKETS, RESEARCH

Annex 10.6:

Case Study on Strategic Nutrition Research

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1 Strategic Nutrition in the Humidtropics Context

The Humidtropics Crosscutting Flagship conducts research that is relevant to all of the Area-Based Flagship Projects and includes the synthesis of lessons learned through the entire program. Clusters of activities under this Flagship include: (i) Global synthesis; (ii) Strategic nutrition; (iii) Systems innovation; (iv) Gender research; and (v) Capacity development. In the Crosscutting Flagship, research activities are meant to support, synthesize, learn from, and mainstream methods, tools, technologies, and approaches developed in Area-Based Flagships thereby creating an integrated portfolio of knowledge and best practices[1].

Within the Crosscutting Flagship, Strategic Nutrition focuses on ensuring incorporation of nutrition dimensions within production and livelihood systems. Strategic Nutrition work is directed toward all Area-Based Flagships, but with special emphasis on the Central Mekong and

[1] Source: POWB 2014.

East and Central Africa Flagships. Gender is a central concern for Strategic Nutrition research, which seeks to develop nutrition-option frameworks with gender priorities and to promote their use to define dietary diversity points and investment. Gender-specific questions are built into study designs, with primary focus on women and young children in food and diet diversity studies, and gender is an explicit element of deliverables related to food, agro-biodiversity, whole farm modeling, and other relevant topics.

2 Objectives and Activities of Humidtropics Strategic Nutrition Research

As a crosscutting endeavor, work on Strategic Nutrition is intended to provide the strategic underpinning that supports Area-Based Flagships in relation to the nutrition IDO in collaboration with the CRP A4NH[2]. Table 1 lists specific objectives and major planned activities.

Table 1. Planned Strategic Nutrition activities for Humidtropics, 2015-2016.

Objectives	Activities 2015	Activities 2016
To develop and apply approaches to determine the availability, accessibility, and composition of local food biodiversity, and the use of local foods to address dietary gaps.	1. To develop and apply approaches to identify nutrition-specific entry points and best-bet interventions to address dietary gaps as based on results from W Kenya and NW Vietnam. 2. To test best-bet nutrition interventions to improve dietary diversity and quality in W Kenya and NW Vietnam. 3. To determine the availability, accessibility, and composition of local food biodiversity, and the use of local foods to address dietary gaps in N Thailand and Uganda. 4. To share the tools developed from the nutrition cluster activities and to develop capacity in using them to scale out nutrition-sensitive activities across the area-based Flagships.	1. To test best-bet nutrition interventions to improve dietary diversity and quality in W Kenya and NW Vietnam. 2. To develop and apply approaches to identify nutrition-specific entry points and best-bet interventions based on results from N Thailand, Uganda. 3. To test best-bet nutrition interventions to improve dietary diversity and quality in N Thailand and Uganda. 4. To determine the availability, accessibility, and composition of local food biodiversity, and use of local foods to address dietary gaps in Cameroon and Guatemala. 5. To build capacity to use nutrition cluster tools to scale out nutrition-sensitive activities across Flagships.
To develop and implement a conceptual approach for evaluation of dietary and nutritional needs in whole-farm models and to find options for	To develop and implement a conceptual approach for evaluation of dietary and nutritional needs in whole-farm models and to find options for improvement in N Thailand and Uganda.	To develop and implement a conceptual approach for evaluation of dietary and nutritional needs in whole-farm models and to find options for improvement in Cameroon and Guatemala.

[2] Source: POWB 2014.

improvement.		
To map the potential nutrition impact pathway from improved farming systems to household diet, and to identify appropriate nutrition targets and indicators to monitor and evaluate the change.	To map the potential nutrition impact pathway from improved farming systems to household diet, and to identify appropriate nutrition targets and indicators to monitor and evaluate the change in N Thailand and Uganda.	To map the potential nutrition impact pathway from improved farming systems to household diet, and to identify appropriate nutrition targets and indicators to monitor and evaluate the change in Cameroon and Guatemala.

The overall approach of Strategic Nutrition research is to map specific nutrition pathways and to develop a community of practice on dietary diversity approaches[3]. The following methods are used:

- Literature reviews and secondary data collection;
- Participatory engagement and information gathering methods involving systems stakeholders;
- Household survey, dietary diversity score and consumption survey with emphasis on systems components' contribution to nutrition;
- Systems stakeholder participatory workshop sessions;
- Linear programming with new methods to compare integrated systems components;
- Whole integrated farming systems models advancing whole farm modeling;
- Case study farm household consumption analysis emphasizing systems components.

3 Expected Outcomes of Strategic Nutrition Research

The Humidtropics IDO on Nutrition monitors the increased consumption of diversified and quality foods by the poor, especially among nutritionally vulnerable women and children. Expected outcomes for 2015 and 2016 are listed in Table 2.

Table 2. Expected outcomes and means of verification for Humidtropics Strategic Nutrition.[4]

Expected Outcomes 2015	Expected Outcomes 2016	Means of verification
Outcome 1.2.a Nutrition option framework considering gender priorities used by 14 Research and 14 Development partner organizations in seven Action Sites of the four Action Areas for definition of dietary diversity entry points and potential interventions.	**Outcome 1.2.a** Nutrition option framework considering gender priorities used in seven new Action Sites by seven new Research and 14 new Development partner organizations in the four Action Areas for definition of dietary diversity entry points and potential nutrition sensitive interventions.	**1.2.a** Research partner and Development Partner Reports on use of nutrition option framework and tools that consider nutrition and gender priorities.
Outcome 1.2.b The potential nutrition	**Outcome 1.2.b** The potential nutrition	**1.2.b** Nutrition impact

[3] Source: POWB 2015.
[4] Source: POWB 2015.

impact pathway from improved farming systems to household diet mapped for at least one Action Site in each Action Area.	impact pathway from improved farming systems to household diet mapped for at least two Action Sites in each Action Area.	pathways for each of the Action Sites.
Outcome 1.2.c A community of practice with at least 14 Research and 14 Development partner organizations (two per Action Site of 2015) on dietary diversity approaches to nutrition established and facilitated across Action Areas in collaboration with other CRPs.	**Outcome 1.2.c** A community of practice on dietary diversity approaches to nutrition expanded with at least 21 of Research and 28 of Development partner organizations, and facilitated across Action Areas in collaboration with other CRPs (cumulative from 2015).	**1.2.c** Humidtropics with other CRPs' website for Nutrition Community of Practice.
Outcome 1.2.d At least one R4D Platform and two IPs monitor and evaluate nutrition sensitive interventions for gender transformational potential and scaling out strategies in each of the four Action Areas.	**Outcome 1.2.d** At least an additional other R4D Platform and an additional two IPs monitor and evaluate nutrition sensitive interventions for gender transformational potential and scaling out strategies in each of the four Action Areas.	**1.2.d** Monitoring and evaluation reports mentioning nutrition sensitive intervention available for R4D Platforms and IPs

Important anticipated outputs include:

- Methods to determine the availability, accessibility, and composition of local food biodiversity developed and shared;
- Whole-farm models with nutrition modules developed documented and shared;
- Nutrition targets along the impact pathways and outcome indicators identified, mapped, and monitored;
- Roles of women, men and youth in addressing issues of food biodiversity and dietary diversity, and options for strengthening nutrition at household level identified and documented.

4 Strategic Nutrition Activities and Outputs

In 2014, USD $510,000 (all W1/2 funds) was allocated to Strategic Nutrition research, of which 63% was linked to gender research. Three Cluster 4 projects have strong relevance for Strategic Nutrition[5].

Table 3. Funding (in USD) for Cluster 4 projects related to Strategic Nutrition.

Cluster 4 project	Budgeted 2014	Budgeted 2015	Reserved 2016	Spent 2014	Start date
Uganda: Evaluating equitable nutritional and income options in urban and rural settings of Ugandan Action Sites	50,000	50,000	50,000	50,000	Oct 2014
Cote D'Ivoire: Sustainable intensification of food crops production for nutrition and food security in tree crop-based farming systems	49,999	49,999	49,993	0	Jan 2015

[5] Source: Cluster 4 Overview, May 2015.

in Soubré region in Cote D'Ivoire					
[*planned*] Cameroon: Enhancing cocoa-based farming system management in Cameroon – Connecting sustainable crop production with post-harvest technologies for nutrition and gender sensitive interventions		80,000	80,000		pending

The following reports and publications related to Strategic Nutrition have emerged from Humidtropics:

- Le Manh Dung, Nguyen Manh Cuong, Jessica Raneri. 2014. **Agriculture, Market and Diet biodiversity of Son La province, Vietnam: Results from the application of the 4-cell Methodology for Systems Oriented Participatory Action Research. Humidtropics**.
- Jessica Raneri. **Food System and Nutrition Knowledge, Attitudes & Practices: A Set of Focus Group Discussions for Systems Oriented Participatory Action Research. Humidtropics**.
- Humidtropics. 2015. **Idea Note on Diversification for resilience of livelihoods and diet quality in Humidtropics**.
- **Humidtropics Nutrition Cluster, Crosscutting Flagship**. Bioversity International, WUR, AVRDC.
- Humidtropics. 2014. **Important Factors in the Pathway to Increase Consumption of Diverse Foods**.
- Humidtropics. **Western Kenya: Diagnostic study agrobiodiversity and dietary diversity in Vihiga County**.

Several tools related to Strategic Nutrition have been developed through Humidtropics:

- Humidtropics. Market Diversity Survey.
- Humidtropics. Agrobiodiversity and Nutrition Survey: Market Survey.
- Humidtropics. Nutrition Knowledge, Attitudes and Practices Household Questionnaire.
- Humidtropics. Focus group Discussion on Complementary feeding practices, dietary diversity and locally available foods.
- Humidtropics. ABD assessment with additional diet and perception questions: Focus group discussion.

5 Strategic Nutrition in the Humidtropics Context

The objectives set by Humidtropics related to nutrition appear reasonable and well aligned to the overall Impact Pathway and integrated systems approach. Despite significant budget cuts faced by Humidtropics, there is evidence that attention to Strategic Nutrition objectives has been maintained and progress has been pursued through available mechanisms, especially Cluster 4

project funding. Going forward, increased emphasis on integrating lessons and tools from across area-based Flagships would be valuable, should appropriate funding become available.

Case Study:

Systems Innovations

The systems innovations of Humidtropics are intended to create capacity of stakeholders to innovate. The Humidtropics process is organized by creating linked R4D Platforms for higher-order strategic partnerships coupled to and Innovation Platforms (IPs) for community-level field site discovery, innovation testing, and eventually for scaling up of adoption.

Cees Leeuwis of WUR expressed this well, below:

"The essence of sustainability and resilience lies in the capacity of system actors to innovate and adapt. Communities whose livelihoods come at least partly from agriculture and natural resource management are in the midst of a rapidly changing world. This context requires continuous adaptation of technology, as well as of social and institutional arrangements, such as values, incentive systems, formal and informal rules, market organization, land-tenure systems, and policies. When actors at different levels in agricultural research and development—ranging from resource-poor women farmers to international agricultural research and development policymakers—can better interact, they can bring their different perspectives and insights into the process of understanding the dynamics of the system and exploring how to deal with them. This makes them better able to react quickly, flexibly and creatively to shocks, challenges and opportunities. Thus, the capacity to innovate is key for resilience—that is, for the survival and well-being of society.

Why is capacity to innovate important?

As indicated earlier, people and their actions and interactions play an important role in building and changing the coherence of a system. Focusing on increasing resource-poor and vulnerable people's capacity to innovate—that is, focusing on inclusive innovation—can change the power balance, so that these people can recognize more possibilities, unfold their innate creativity, and more confidently tackle newly emerging problems and opportunities in a more equitable world. Supporting such dynamics requires new capacities among a broader set of actors, including the CGIAR system."

The most unique dimension of Humidtropics is its systems innovations (processes & platforms) and their applications at the Flagship and Field Site levels. The tools to analyze and organize communities toward addressing constraints and opportunities in the context of sustainable intensification are robust and proven functional across the area-based Flagships and, the R4D Platforms, and IPs at Field Sites on three continents. Communities engage, and there is strong evidence from lateral and parallel initiatives that communities are building their own capacity to innovate. In addition, there is frequent and substantive evidence of farmer-to-farmer incremental scaling-up of adoption of specific 'good' practices that enhance their livelihoods (see also area/country case studies for details). Humidtropics' teams merit congratulations for work well done. These changes, however, while are essential and good, alone they probably are by themselves, not enough to meet impact goals. One needs to see interest and success in non-incremental scaling, and this implies the scaling of the 'approach' itself. Costs associated with running functional IPs are a central issue when approaching scaling up. Humidtropics may wish to explore less costly and skill demanding processes for replication in the 'development[1] or expansion domain' once a couple IPs have resulted in 'proof of concept' on farmer adoption of the bio-physical innovations under consideration.

There are, at this time, only a few examples of developments toward 'non-incremental' scaling of adoption. In Uganda there is an example of national district level development agents successfully inserting a line item in the district budget to contribute to the Humidtropics processes. Even more remarkable is that the Minister of Planning for Rural Development in Uganda was at the time of our visit strongly supporting the process, as were heads of two major national research stations.

We have under the Recommendations section drawn attention for the need of the CGIAR in projects like this that intend to scale knowledge-intensive innovations, to include, as an output, the assistance to governments and their partners in the development of strategies for scaling-up adoption; and in many cases CGIAR staff should work with others to elaborate 'investment-grade' project proposals to fund implementation of the strategies.

Humidtropics is engaged in research on the multi-stakeholder platforms effectiveness to catalyze institutional change. This research on development is of

[1] "The development domains in this example are defined using consistent data and criteria across the region, thus helping diagnose development constraints and formulate and evaluate strategic intervention options in comparable ways. These development domains permit consideration of the following issues: Where are those geographic areas within and across countries in which development problems and opportunities are likely to be most similar? Where will specific types of development policies, investments, livelihood options and technologies likely be most effective?" (from Jeannette van de Steeg, ILRI)

critical importance, but its completion is at high risk given the intention to close the systems-oriented CRPs at the end of 2016.

The three paragraphs from Humidtropics' Crosscutting SRT3 Report, WUR, Nov. 2014 provide clear vision of the research on platform effectiveness.

"In Humidtropics, multi-stakeholder platforms are seen as an important vehicle for catalyzing institutional change. In 2014, SRT3 initiated a number of synthesis studies and activities that contribute to developing and operationalizing a conceptual and methodological framework to assess the contribution of multi-stakeholder platforms to enhancing 'capacity to innovate', a key intermediate development outcome within Humidtropics. The conceptual framework has been tested and contextualized across Humidtropics Action Areas, and Humidtropics facilitators have been sensitized and trained on how to use the tools."

"Multi-stakeholder platforms (MSP) are seen as a promising methodology-based approaches for agricultural innovation by facilitating interactions between farmers, researchers and other agricultural stakeholders. The idea is that this can lead to integrated, systemic change, which is believed to be essential for achieving delivering development impact. We conduct action research aimed at both supporting and understanding the functioning in MSP in Agricultural Research for Development (AR4D) programmes. We study MSP implementation and opportunities and challenges that influence platform performance and impact: Social network analysis, participatory analysis of agricultural problems and priority setting, reflexive more systems-oriented approaches to agricultural innovation. This is combined with capacity development activities for MSP facilitators."

"PhD research project on measurement of the performance of multi-stakeholder platforms in delivering development outcomes aims to explore, identify and test the potential generic success factors by comparing multiple Humidtropics Action Sites in East and Central Africa with potential extension to other sites, namely West Africa or Central Mekong. The project will make a systematic assessment of the existing evidence base on the impact of the MSP on development outcomes using Cochrane guidelines and explore, identify and test a documentation and M&E system for better measuring the effectiveness."

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Leeuwis C, Schut M, Waters-Bayer A, Mur R, Atta-Krah K and Douthwaite B. 2014. Capacity to innovate from a system CGIAR research program perspective. Penang, Malaysia: CGIAR Research Program on Aquatic Agricultural Systems. Program Brief: AAS-2014-29.

Key Informant Interviews with Cees Leeuwis and Marc Schut of WUR also provided major insights.

Annex 10.8:

Case Study on Gender

Photo by Rosern Rwampororo, CCEE Team: Women who were part of a participatory evaluation in selecting the best yielding variety of cassava in one of the DRC Field Site

Author(s)

Rosern K. Rwampororo, Ph.D.: Evaluation Team Leader

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1.0 Introduction

1.1 CGIAR Strategy on Gender

The Consortium Level Gender Strategy by the CGIAR Consortium Board (CB), November 2011, states that:

> *"The strategy presents the Consortium its deliverables with respect to improving the relevance of its research to poor women as well as men and explains accountability for performance via contracts for the CGIAR Research Programs (CRPs) between Centers, the Consortium Board and the CGIAR Fund Council. Integration of gender in research will be implemented through cross-cutting research on gender and agriculture facilitated by a cross-program research network and by the CRPs. This strategy details guidelines for the development of a gender strategy by each approved CRP and provides the terms of reference for the Network. The strategy also commits to improving recruitment, retention, training and support to careers and promotion to improve the gender balance in research and decision-making."*

The CB identified gender as a priority issue at Consortium level and in 2010 requested the Consortium Office (CO) to commission a scoping study to analyze past CGIAR work on gender analysis. The study identified the lack of a system-wide gender policy embodying strategies and action plans for all research programs as a reason for the mixed success of past CGIAR efforts in gender analysis. It also recommended that mainstreaming gender analysis in the CRPs would be more effective than having a separate gender platform.

Goals, objectives and priorities of the Consortium Level Gender Strategy:

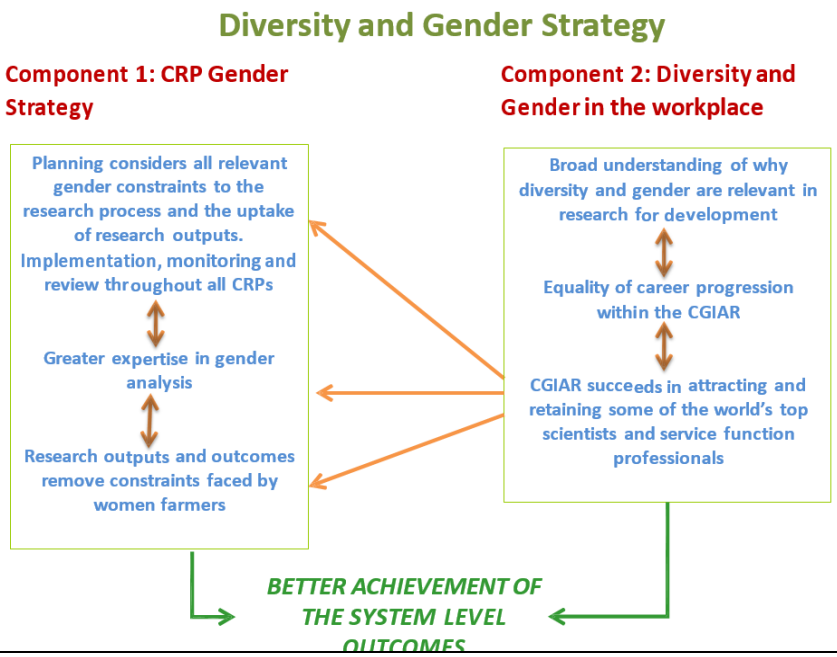
The CGIAR Consortium (CRPs, Centers, CB and CO) gender strategy is the first comprehensive CGIAR gender strategy driven by business principles (it contains clear and enforceable accountability mechanisms). The strategy builds on the scoping study's recommendations but is broader in its vision. It has two strategic components:

1) Mainstreaming gender research in the CRPs;

2) Diversity and gender in the workplace.

The overall goal is to strengthen the CGIAR research agenda and its impact on development challenges, through a rigorous integration of gender issues in the research carried out by the CGIAR. The implementation of this strategy is expected to result in more rapid progress towards the fulfillment of the System Level Outcomes (SLOs) of the CGIAR Strategy and Results Framework (SRF) of reducing poverty, strengthening food security, improving human health and nutrition, and enhancing environmental resilience, as shown in Figure 1.

Figure 1: Strategic component interactions and the links to the System Level Outcomes



1.2 Alignment of Humidtropics to the CO Level Gender Strategy

For Humidtropics, the strategy focuses on the following:

> *"Humidtropics seeks to transform the lives of the rural poor in the humid lowlands, moist savannas, and tropical highlands in the tropical Americas, Asia, and Africa. It is based on the premise that intensification of agricultural systems offers the best potential for poverty reduction, especially for women and other vulnerable groups, and meeting world food demand using an integrated systems approach."*

Proponents of the gender research in Humidtropics state that:

> *"The Theory of Change takes its starting point in a baseline situation, characterized by a certain combination of poverty status and ecosystem integrity, related to productivity, natural resources integrity and institutional effectiveness.*
>
> 1. *Gender-sensitive systems interventions and innovation.*
> 2. *Transform the baseline status to the idealized position.*
> 3. *Characterized by high productivity, high natural resources integrity and effective institutions."*

Source: Gender poster by Amare Tegbaru and Holger Kirscht.

Amare Tegbaru et al. in their paper on "*Resolving the Gender Empowerment Equation in Humidtropics*" argue that the empowering dimension of Humidtropics is quite distinct from that of commodity-focused value chain approaches and other traditional gender approaches within agriculture which have separated gender and development from system thinking. Therefore, they propose that gender empowerment in Humidtropics system research requires:

1. Transformation of social and gender relations, and
2. An approach that transcends disciplines and sectors establishing symbioses and coherence between the social and technical agenda in order to influence innovation and change as collective processes in complex systems.

This understanding of gender as a system of classification and social construct suggests that other complex and diverse conceptualizations of gender exist, and also change in the way gender is perceived over time.

Therefore the Humidtropics systems approach, which allows for integrating gender into agriculture in the complexity of systems, provides openings for advancing a more complex, systemic understanding of gender outcomes. It calls for a shift in gender integration approaches within agricultural research for development, from those that analyze but then accommodate the existing social system to those that seek to foster local efforts to exercise agency and transform those systems and structures at micro, meso and macro levels.

Humidtropics also sees the connections between innovation, women's empowerment and gender equality. It goes beyond defining the gender action and considerations to mainstreaming into all program activities. The gender empowerment equation could be resolved by taking a more transformative gender research approach with greater emphasis on "agency", and "innovation" in gender related program activities.

Kwesi Atta-Krah, in his paper on "*Systems Research and Humidtropics: a case of 'Systemness' in Research*" proposes some key prerequisites in the conduct of systems research, one of which is considering gender because a central dimension in systems is people. He argues that it is essential therefore to understand who the people within the system are, what roles they play, and how the system impacts on their lives. In this regard, the gender dimension cannot be over emphasized. A good systems research program must have a built in element of gender analysis and mainstreaming through all components of research and data gathering and analysis. This should include adequate involvement of women and youth in the research process, and the focus on sex disaggregated data as a fundamental aspect of the analysis of research.

This case study report therefore tries to highlight the extent to which gender has been integrated in research within the Flagships. It uses a few cases to demonstrate not only the inclusion of women in the research process right from the baseline stage, but also tries to show case how they have been empowered to participate in the decisions that affect their livelihoods. Examples of these different dimensions are drawn from the Field Site visits by the CCEE Team as well as the document review.

This case study is by no means exhaustive as far as issues of gender in systems research are concerned but it is an attempt to document some of the steps that have been taken regarding creation of gender-sensitive systems along the Impact Pathway if the Intermediate Development Outcomes (IDOs) stipulated in the SRF are to be realized.

2.0 Flagships Integration of Gender in their Research Designs

According to the Humidtropics 2014 Annual Report, Gender Norms, Agency, and Innovation in Agriculture and Natural Resource Management have been carried out in a total of five different sites of Humitropics:

- 2 in Oyo and Oshun States (Nigeria);
- 1 in Cibitoke (Burundi);
- 1 in Mushinga (DRC);
- 1 in Kayonza (Rwanda).

Data coding and analysis is underway and the first results of the study should be generated in 2015. The results of the case studies can help the CIALCA team on a local level to understand better the social contexts in which Humidtropics is working; results can feed into project and activity design for improved responsiveness to gender constraints and opportunities. In addition this data could be the basis to design projects and activities that go one step further.

Interventions that actively seek to change – transform – the gender norms and rules that are limiting the freedom and opportunities of women and young people to make choices about their livelihoods and access essential resources for development. Such interventions will be needed to achieve progress in the domain of empowerment of youth and women.

Being the lead institution for the implementation of Humidtropics, IITA took the initiative to conduct a survey to address gender in the workplace. The data analysis that is concluded recently will serve to develop a harmonized gender HR policy to guide the Program on how to address the challenges of gender relations in the workplace at all levels and create a culture of inclusiveness based on the values of equality and equity.

2.1 The East and Central Africa (ECA) Flagship Gender Focus

2.1.1 Uganda's Research Priorities & Relevance for Women and Youth

Throughout the Program, there is a strong explicit attention given to needs and opportunities for women and youth. For example, youth are especially involved in cell phone based IT on market information. The representation of women in the Focus Group Discussions was numerous and articulate.

There are on-going surveys focusing on women and youth engaged in production and marketing. The Mukono Zonal Agricultural & Development Institute (MUZARDI), which is an arm of the National Agricultural Research Organization (NARO), in collaboration with the District Local Governments, the Innovation Platform (IP) members and NGO Forum of Kiboga and Kyankwanzi districts organized and held two surveys in the two districts.

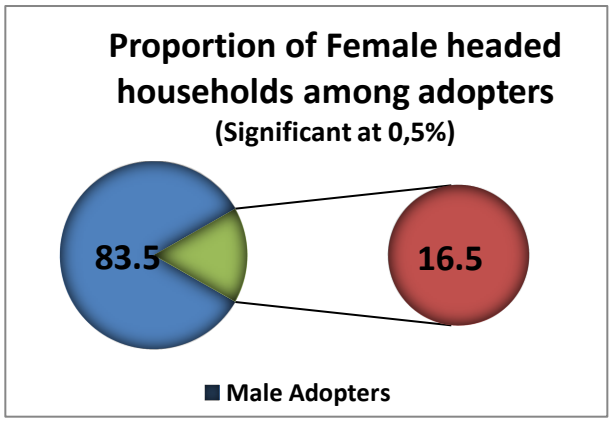
1. One survey targeted women and youth involved in soybean, maize, cattle, piggery and poultry production. This was aimed at obtaining information about their activities e.g. reasons for their choice of enterprises, challenges faced, major buyers, varieties/ breeds they grow/ rear.

2. A market survey was also conducted on soybean, maize, cattle, piggery and poultry products with the aim of understanding the sources and markets of their products and how women and youth access market information and challenges related to marketing their products among others. Highlights of this survey were given in the detailed CCEE Main report.

2.1.2 Rwanda's Research Priorities & Relevance for women and youth

In setting research priorities and making them relevant for women, the key findings from the baseline with regard to gender differences have been taken into consideration to inform the research agenda. For instance, the findings indicated that:

1. In comparisons of households (HHs) that adopt and those that do not; female-headed HHs show high rates of adoption;
2. Out of 52 female-headed HHs, 41 (~80% of all female HHs) adopted a CIALCA technology, which suggests that uptake is high;
3. Those HHs that adopt technologies generally cultivate larger land sizes than those that do not adopt a technology;
4. Adopters' average land size was 76 ha, non-adopters' average land size is 1.19 ha;
5. Joint ownership is the most common type of land ownership among all HHs;
6. Husbands own land 10% more often in HHs that do not adopt than those that adopt;
7. There is a slight but insignificant difference between those who adopt and those who do not. In those HHs that adopt a technology, wives have higher rates of ownership of land and joint ownership is higher than in HHs that do not adopt.



In general, research activities have been tailored to community needs and concerns, e.g. the potato seed multiplication and seed storage within Kadahenda community is addressing the constraint of "lack of clean planting materials". Farmers (both men and women) have been trained on best practices of potato seed production and negative potato seed screening for quality assurance. Farmers (both men and women) are encouraged to visit seed storage facilities to learn and adopt better post-harvest handling techniques.

2.1.3 DRC's Research Priorities & Relevance for Women and Youth

In the R4D Platform discussion, it was indicated that the "number of women in the Platform is very low" although we met women involved in field trials, youth agripreneurship work, etc. In Mushinga, a woman farmer indicated that, with introduction of improved production practices, "the women were now better-off".

The IP has identified a Gender Focal person from the Women's Organization, who is currently also the Chair of the IP. The IP members were part of the three countries (Rwanda, DRC and Uganda) who were trained on gender mainstreaming. As a result of the training, the IP has developed a gender work plan, based upon which the trainings for the other members and sensitization workshops have been conducted.

Their vision for gender entails including gender in all activities of Humidtropics, in which they have encouraged men, women, and youth to adopt technologies and become involved in the different stages of the value chains. The IP is also working on a strategy to see how women can have access to more land and gain control over their resources. The R4D Platform recognizes that involving women optimally and dealing with gender issues is a central goal for improving livelihoods of the rural poor and smallholders.

For youth, the Kalambo Youth Agripreneurs is one of the success stories in Humidtropics that demonstrates how involving youth in research and agriculture can generate employment. Below is the excerpt from the DRC Case Study on the Youth Group initiative led by IITA, whose objective is to create employment for youth through agribusiness.

They used IITA facilities to get started in their business from August 2013. Some of their activities include:

1. Mass production: cassava, cereals, legumes and vegetables;
2. Processing: cassava and soybean derived products;
3. Fisheries;
4. Youth provide other services to platform members such as training, surveys, field activities, etc.

The youth offer trainings on processing and value addition. They train youth and women in their respective sites and provide high quality and nutritional soya and cassava products. Being part of the Platform, they also benefit in several ways such as:

1. Linkages with other agricultural stakeholders and donors;
2. Information based on experience;
3. Market for developed products;
4. Opportunity to scale up their innovations in the rest of the Action Area.

2.2 The West Africa (WA) Flagship Gender Focus

A gender and value chains analysis was carried out in the four Field Sites in the Nigeria Action Site of Humidtropics. These field sites include:

1. Akindele village in Ido Local Government Area of Oyo State;
2. Lagbedu village in Ogo-Oluwa Local Government Area of Oyo State;
3. Osunwoyin village in Ayedire Local Government Area of Osun State;
4. Iwara village in Atakumosa East Local Government Area of Osun State.

The three most important ranked crops		**FIELD SITES**			
		Iwara	**Osunwoyn**	**Lagbedu**	**Akindele**
Male	1.	Cocoa	Cocoa	Cocoa	Cocoa
	2.	Plantain	Plantain	Plantain	Plantain
	3.	Cassava	Cassava	Cassava	Cassava

Female	1.	Cocoa	Cocoa	Cocoa	Cocoa
	2.	Plantain	Cassava	Cassava	Cassava
	3.	Cassava	Maize	Maize	Maize

According to this survey, as indicated in the table above, it was concluded that male farmers are mostly involved in the more tasking and energy sapping activities at the different knots within the value chains. The jobs that are considered more tasking and physical include land clearing, spraying of chemicals and harvesting. This pattern is similar across the Field Sites. A striking feature here is that there is no clearly defined roles for the men and the women as well as the youths within the value chains as there are evidences of some women and children carrying out those physical and energy sapping activities, even though there are considered as men's tasks.

However, the women and the youth (children) are as well involved in the cultivation of the crops and other knots within the value chains. They assist in doing some light weeding, supply of water during spraying and other post-harvest tasks. As in the case of the cocoa, while the men harvest the pods from the tree, the women slice these pods and scoop out cocoa seeds. The Focus Group Discussion participants unanimously agreed that transportation and marketing as well as other post-harvest knots in the value chains are mostly carried out by women.

The striking feature here is that the marketing of cocoa is basically done by the men folk as that is the highest income fetching enterprise across all the Field Sites, and the men are mostly the custodian of the income generated from such. It appears that role has been generally conceded to the men by the women and the youth (children).

2.3 The Central America and the Caribbean (CAC) Gender Focus: Nicaragua's Research Priorities & Relevance for Women and Youth

The organization SOPPEXXCA in Nicaragua works with women and youth and reported examples of programs which had leadership roles for women. However, the roles were split based on physical strength and quality control. At the Alliance level, some of the sampled farms are run by women. Women technicians are active in data collection.

Within the cooperatives, women membership was reported to be about 30% and women were generally more responsible with credit. The cooperative had a gender policy, which was aimed at the following:

1. Focused gender policy derives actions to involve women and youth in production activities;
2. Credit line aimed at women to purchase land;
3. The cooperatives export brands of coffee produced exclusively by women (women tend to be more responsible when paying back loans);
4. Women and youth participate in administration councils, leadership roles in base cooperatives.

3.0 Conclusions & Recommendations

3.1 Conclusion on Status of Gender Integration within the Flagships

1. Across all the Flagships, the integration of gender into Humidtropics research cannot be denied. However, it is the extent of participation of women along the value chains and/ or in leadership positions that tends to vary between the Flagships.
2. Tangible results from the Humidtropics strategy that seeks to transform the lives of the rural poor based on the "intensification of agricultural systems", especially for women and other vulnerable groups, to meet their food needs are yet to be fully realized.
3. There is anecdotal evidence presented in each of the detailed case studies that support the early benefits arising from using an "integrated systems approach". The benefits range from improved natural resource management, to better yield, and income and nutritional benefits. The latter benefits accrue more to women, who by virtue of their social and gender roles happen to be the caretakers in farming households.
4. The Humidtropics systems approach, which allows for a shift in gender integration approaches within agricultural research for development, has assisted women to exercise their agency through their participation in IPs.
5. Since the ToC considers as a starting point undertaking a baseline situation, Humidtropics which has used this approach to characterize its entry points is moving in the right direction. The poverty status and ecosystem integrity, related to productivity and natural resources integrity has been established in all the Flagships. What remains to be undertaken is an assessment of the IPs to understand their institutional effectiveness. Some key tools to measure the effectiveness of platforms have been developed but the results across the board are yet to be synthesized.

3.2 Recommendations on How "Systemness" of Gender in Agriculture can be Improved

Amare Tegbaru et al. propose that resolving the Gender Empowerment Equation in Humidtropics system research will require operationalizing inclusive, critical "systemness" in Humidtropics agriculture research for development that takes into consideration:

- Empowerment: an extension of agency;
- The role of innovation and its intersection with empowerment (1) technology use (2) social norm change and (3) economic resilience.

1. Since this case study is not exhaustive, one of the key recommendations during the transition period to the end of 2016, is to conduct an assessment to determine the extent to which some of the expected gender research and empowerment outcomes have been achieved. These include:
   - Gender-sensitive interventions;
   - Benefits derived from female farmers' activities;
   - Women in senior positions in research teams and/ or community organizations;
   - Availability of gender-disaggregated data for the selected performance indicators to measure the IDOs;

- Other gender equity and empowerment indicators.

2. There is a need to document and share lessons learned in terms of how women and youth have been involved across the various Flagships.

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39	Production and Benefit Analysis of Various Potato Cropping Patterns in Yunnan Province	Chinese Potato Journal 2014-02, 78-82	http://caod.oriprobe.com/articles/41667941/Production_and_Benefit_Analysis_of_Various_Potato_.htm	No	-	Chinese Potato Journal	2014	0
40	Role of Sweet Potato Industry in Mountain Farming in Yunnan	Xiandai Nongye Keji 2014-10, 317-319	http://caod.oriprobe.com/articles/42024592/Role_of_Sweet_Potato_Industry_in_Mountain_Farming_in_Yunnan.htm	No	-	Xiandai Nongye Keji	2014	0
41	*Superior performance of local maize varieties in Striga hermonthica infested soils of western Kenya*	*TBD (submitted to Crop Protection)*		Yes	1.49	NOT YET PUBLISHED		
42	RAAIS- Rapid Appraisal of Agricultural Innovation Systems (Part I). A diagnostic tool for integrated analysis of complex problems and innovation capacity	Agricultural Systems 132 (2015) 1–11 DOI: 10.1016/j.agsy.2014.08.009	http://www.sciencedirect.com/science/article/pii/S0308521X14001115	Yes	2.91	Agricultural Systems	2015	8
42	Challenges and Opportunities for Agricultural Intensification of the Humid Highland Systems of Sub-Saharan Africa	Book edited by Vanlauwe, Bernard, VanAsten, Piet, Blomme, Guy - Consortium for Improving Agriculture-based Livelihoods in Central Africa (CIALCA) (**2014**) ISBN 978-3-319-07662-1	http://www.springer.com/gp/book/9783319076614	No	-	BOOK/BOOK CHAPTER	2014	0
43	RAAIS- Rapid Appraisal of Agricultural Innovation Systems (Part II). Integrated analysis of parasitic weed problems in rice in Tanzania	Agricultural Systems 132 (2015) 12–24 DOI: 10.1016/j.agsy.2014.09.004	http://www.sciencedirect.com/science/article/pii/S0308521X14001255	Yes	2.91	Agricultural Systems	2015	7
44	Farm household models to analyse food security in a changing climate: A review	Global Food Security 3 (2014) 77–84 DOI: 10.1016/j.gfs.2014.05.001	http://www.sciencedirect.com/science/article/pii/S2211912414000133	No	-	Global Food Security	2014	3
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50	Challenges and opportunities for improving eco-efficiency of tropical forage-based systems to mitigate greenhouse gas emissions	Tropical Grasslands - Forrajes Tropicales (**2014**) Vol 1, No 2	http://www.tropicalgrasslands.info/index.php/tgft/article/view/80	No	-	Tropical Grasslands - Forrajes Tropicales	2014	5
51	Factors influencing household food security among smallholder farmers in the Mudzi district of Zimbabwe	Development Southern Africa Vol 31 Issue 4 **2014** DOI:10.1080/0376835X.2014.911694	http://www.tandfonline.com/doi/abs/10.1080/0376835X.2014.911694	Yes	0.557	Development Southern Africa	2014	1
52	Farm-Scale Tradeoffs Between Legume Use as Forage versus Green Manure: The Case of Canavalia brasiliensis	Agroecology and Sustainable Food Systems Vol 38 Issue 1 **2014** DOI:10.1080/21683565.2013.828667	http://www.tandfonline.com/doi/abs/10.1080/21683565.2013.828667	Yes	0.719	Agroecology and Sustainable Food Systems	2014	4
53	Exploring the Potentials of Integrated Agricultural, Research for Development in Southern Africa	Book published by the Forum for Agricultural Research in Africa (FARA) **2014**	http://faraafrica.org/wp-content/uploads/2014/07/ZMM_Exploring_potentials_of_IAR4D_in_SA_ver-2_60_13-14.pdf	No	-	BOOK/BOOK CHAPTER	2014	0
54	LivestockPlus — The sustainable intensification of forage-based agricultural systems to improve livelihoods and ecosystem services in the tropics	Tropical Grasslands - Forrajes Tropicales Vol 3, No 2 (**2015**)	http://www.tropicalgrasslands.info/index.php/tgft/article/view/262	No	-	Tropical Grasslands - Forrajes Tropicales	2015	1
55	Soil heterogeneity and soil fertility gradients in smallholder agricultural systems of the East African highlands	Soil Science Society of America Journal 77, 525-538 **2013** doi:10.2136/sssaj2012.0250	https://dl.sciencesocieties.org/publications/sssaj/abstracts/77/2/525	Yes	1.721	Soil Science Society of America Journal	2013	23
56	A fourth principle is required to define Conservation Agriculture in sub-Saharan Africa: the appropriate use of fertilizer to enhance crop productivity	Field Crop Research 155, 10-13 **2014** doi:10.1016/j.fcr.2013.10.002	http://www.sciencedirect.com/science/article/pii/S0378429013003511	Yes	2.976	Field Crops Research	2014	46
57	Understanding the process of agricultural technology adoption: mineral fertilizer in eastern DR Congo	World Development 59, 132-146 **2014** doi:10.1016/j.worlddev.2014.01.024	http://www.sciencedirect.com/science/article/pii/S0305750X14000254	Yes	1.965	World Development	2014	12
58	Effect of Delayed Cassava Planting on Yields and Economic Returns of a Cassava-Groundnut Intercrop in the Democratic Republic of Congo	World Journal of Agricultural Research, **2014** 2 (3), pp 101-108 DOI: 10.12691/wjar-2-3-3	http://pubs.sciepub.com/wjar/2/3/3/	No	-	World Journal of Agricultural Research	2014	0
59	Sustainable intensification and the smallholder African farmer	Current Opinion in Environmental Sustainability 8, 15-22 **2014** http://dx.doi.org/10.1016/j.cosust.2014.06.001	http://www.academia.edu/8030811/Sustainable_intensification_and_the_African_smallholder_farmer	Yes	3.491	Current Opinion in Environmental Sustainability	2014	19
60	Integrated Soil Fertility Management in sub-Saharan Africa: Unravelling local adaptation	SOIL 1, 491-508 **2015**	http://www.soil-discuss.net/1/1239/2014/soild-1-1239-2014.pdf	No	-	SOIL	2015	8
61	Ex ante appraisal of agricultural research and extension: a choice experiment on climbing beans in Burundi	Outlook on Agriculture 44, 61-67 **2015** DOI:10.5367/oa.2015.0199	http://www.ingentaconnect.com/content/ip/ooa/2015/00000044/00000001/art00007	Yes	0.478	Outlook on Agriculture	2015	1
62	Soil fertility declines at the base of rural poverty in sub-Saharan Africa	Nature Plants 1, 1 Article number: 15101 (**2015**) doi:10.1038/nplants.2015.101	http://www.nature.com/articles/nplants2015101	Yes	-	Nature Plants	2015	0
63	Beyond Conservation Agriculture	Frontiers in Plant Science (**2015**) 6, 1-14 doi: 10.3389/fpls.2015.00870	http://www.ncbi.nlm.nih.gov/pubmed/26579139	Yes	3.948	Frontiers in Plant Science	2015	0

64	Agro-ecological intensification of agricultural systems in the African Highlands	Book published by Routledge, Oxon, UK, 314 pp **2013**	https://www.routledge.com/products/9780415532730	No	-	BOOK/BOOK CHAPTER	2013	1
65	Enhancing Resilience and Productivity of Banana Systems in the Humid Highlands of Sub-Saharan Africa	Book published by CABI, Wallingford, UK, 248 pp **2013**	http://www.cabi.org/bookshop/book/9781780642314	No	-	BOOK/BOOK CHAPTER	2013	1
66	Integrated Soil Fertility Management – a concept that could boost soil productivity	Rural 21 3, pp. 34-37 **2013**	http://www.rural21.com/english/current-issue/detail/article/integrated-soil-fertility-management-a-concept-that-could-boost-soil-productivity-0000821.html	No	-	Rural 21	2013	0
67	Impact of interventions by Consortium for Improving Agriculture-based Livelihoods in Central Africa (CIALCA) on food and nutrition security of farmer households	International Journal of Agricultural Engineering (**2013**) 7, 42-50	https://www.researchgate.net/publication/258258192_Impact_of_Interventions_by_Consortium_for_Improving_Agriculture-based_Livelihoods_in_Central_Africa_CIALCA_on_Food_and_Nutrition_Security_of_Farmer_Households	No	-	International Journal of Agricultural Engineering	2013	0
68	Assessing the influence of farmers' field schools and market links on investments in soil fertility management under potato production in Uganda	In book: Challenges and Opportunities for Agricultural Intensification of the Humid Highland Systems of Sub-Saharan Africa, pp 281-294 Springer 2014	http://link.springer.com/chapter/10.1007%2F978-3-319-07662-1_22	No	-	BOOK/BOOK CHAPTER	2014	0
69	CIALCA Interventions for Productivity Increase of Cropping System Components in the African Great Lakes Zone	In book: Agro-ecological intensification of agricultural systems in the African highlands, Routledge, **2013**	https://www.routledge.com/products/9780415532730	No	-	BOOK/BOOK CHAPTER	2013	0
70	CIALCA's Efforts on Integrating Farming System Components and Exploring Related Trade-Offs	In book: Agro-ecological intensification of agricultural systems in the African highlands, Routledge, **2013**	https://www.routledge.com/products/9780415532730	No	-	BOOK/BOOK CHAPTER	2013	0
71	N2Africa: Putting Nitrogen Fixation to Work for Smallholder Farmers in Africa	In book: Agro-ecological intensification of agricultural systems in the African highlands, Routledge, **2013**	https://www.routledge.com/products/9780415532730	No	-	BOOK/BOOK CHAPTER	2013	4
72	Agricultural Technology Diffusion and Adoption in Banana and Legume Based Systems of Central Africa	In book: Agro-ecological intensification of agricultural systems in the African highlands, Routledge, **2013**	https://www.researchgate.net/publication/258243474_Agricultural_technology_diffusion_and_adoption_in_banana_and_legume_based_systems_of_Central_Africa	No	-	BOOK/BOOK CHAPTER	2013	1
73	Walking the Impact Pathway: CIALCA's Efforts to Mobilize Agricultural Knowledge for the African Great Lakes Region	In book: Agro-ecological intensification of agricultural systems in the African highlands, Routledge, **2013**	https://www.researchgate.net/publication/265525756_Walking_the_impact_pathway_CIALCA%27s_efforts_to_mobilize_agricultural_knowledge_for_the_African_Great_Lakes_region	No	-	BOOK/BOOK CHAPTER	2013	0
74	Handbook for integrated soil fertility management	Africa Soil Health Consortium **2012**	http://publications.cta.int/en/publications/publication/1853/agricultural-support-services/	No	-	BOOK/BOOK CHAPTER	2012	12
75	Managing Soil Heterogeneity in Smallholder African Landscapes Requires a New Form of Precision Agriculture	Advances in Soil Science, Special issue on Precision Agriculture (edited by R Lal, BA Stewart), **2015** 199-223 DOI: 10.1201/b18759-9	http://www.crcnetbase.com/doi/abs/10.1201/b18759-9	No	-	Advances in Soil Science	2015	0
76	Short- and medium-term impact of manual tillage and no-tillage with mulching on banana roots and yields in banana-bean intercropping systems in the East African Highlands	Field Crops Research vol 171 1-10 ISSN 0378-4290 **2015** doi:10.1016/j.fcr.2014.10.015	http://www.sciencedirect.com/science/article/pii/S0378429014003037	Yes	2.976	Field Crops Research	2015	0
77	Vegetable supply chains in Ghana: Production constraints, opportunities and policy implications for enhancing food and nutrition security.	International Journal of Tropical Agriculture **2015**: 33(3): 2113-2121	http://serialsjournals.com/articles.php?volumesno_id=910&journals_id=56&volumes_id=792	Yes	-	International Journal of Tropical Agriculture	2015	0
78	Safe and sustainable crop protection in Southeast Asia: Status, challenges and policy options.	Environmental Science and Policy **2015**: 54(1) 357-366 DOI:10.1016/j.envsci.2015.07.017	http://www.sciencedirect.com/science/article/pii/S1462901115300435	Yes	3.018	Environmental Science & Policy	2015	0
79	Pesticide use practices and perceptions of vegetable farmers in the cocoa belts of the Ashanti and Western Regions of Ghana	Advances in Crop Science and Technology **2015**: 3(3):174 doi:10.4172/2329- 8863.1000174	http://www.esciencecentral.org/journals/pesticide-use-practices-and-perceptions-of-vegetable-farmers-in-thecocoa-belts-of-the-ashanti-and-western-regions-of-ghana-2329-8863-	No	-	Advances in Crop Science and Technology	2015	0
80	New opportunities for integrated agricultural systems research in the Central Mekong region: Humidtropics - a CGIAR Research Program.	In: Hughes J d A, Kasemsap, P., Dasgupta, S., Dutta U.P., Ketsa, S., Chaikiattiyos, S., Linwattana, G., Kosiyachinda, S., Chantrasmi, V. eds (2015). Proceedings of the Regional Symposium on sustaining small-scale vegetable production and	http://avrdc.org/aarnet/publications/seaveg-conference-proceedings/	No	-	OTHER	2014	0
81	Improving rural livelihoods as a "moving target": trajectories of change in smallholder farming systems of Western Kenya	Regional Environmental Change. (**2015**) 5 1395-1407. doi:10.1007/s10113-014-0702-0	http://link.springer.com/article/10.1007/s10113-014-0702-0	Yes	2.628	Regional Environmental Change.	2015	3
82	Characterization of farming systems in Africa RISING intervention sites in Malawi, Tanzania, Ghana and Mali	Plant Sciences Group, Wageningen University, the Netherlands **2015**	https://www.researchgate.net/publication/280737196_Characterization_of_farming_systems_in_Africa_RISING_intervention_sites_in_Malawi_Tanzania_Ghana_and_Mali	No	-	OTHER	2015	1
83	Characterization of farming systems in Africa RISING SIMLEZA intervention sites in Zambia	Plant Sciences Group, Wageningen University, the Netherlands **2014**	http://library.wur.nl/WebQuery/wurpubs/493750	No	-	OTHER	2014	0
84	Sustainable extensification—breathing new life into Africa's sleeping giant	Proceedings of the 5th International Symposium for Farming Systems Design, Montpellier, 7-10 September **2015**	http://fsd5.european-agronomy.org/video/FSD/M_324_Mary%20Ollen/html5.html	No	-	OTHER	2015	0
85	Exploration of windows of opportunity for improved nutrition, productivity and resource management at the landscape level	Proceedings of the 5th International Symposium for Farming Systems Design, Montpellier, 7-10 September **2015**	http://fsd5.european-agronomy.org/video/FSD/M_274_Jeroen%20Gro/html5.html	No	-	OTHER	2015	0
86	Towards dynamic research configurations	Science and Public Policy (**2013**) (41) 207-218 doi:10.1093/scipol/sct048	http://spp.oxfordjournals.org/content/early/2013/08/10/scipol.sct048	Yes	0.992	Science and Public Policy	2014	15
87	Systems approaches to innovation in pest management: reflections and lessons learned from an integrated research program on parasitic weeds in rice	International Journal of Pest Management (**2015**) 61:4, 329-339	http://dx.doi.org/10.1080/09670874.2015.1066042	Yes	0.962	International Journal of Pest Management	2015	0
88	Integrated Soil Fertility Management in Central Africa: Experiences of the Consortium for Improving Agriculture-based Livelihoods in Central Africa (CIALCA)	In: Eco-efficiency: From vision to reality. Issues in Tropical Agriculture series. Eds: C.H. Hershey and Paul Neate. Centro Internacional de Agricultura Tropical (CIAT). **2012** CIAT Publication	http://ciat.cgiar.org/wp-content/uploads/2012/12/chapter_6_eco_efficiency.pdf	No	-	OTHER	2012	3

89	Ecological characteristics and cultivar influence optimal plant density of East African highland bananas (Musa spp. AAA-EA) in low input cropping systems.	Scientia Horticulturae **2012** 150: 299-311 doi:10.1016/j.scienta.2012.11.037	http://www.sciencedirect.com/science/article/pii/S0304423812005663	Yes	1.365	Scientia Horticulturae	2012	4
90	Ecological characteristics and cultivar influence optimal plant density of East African highland bananas (Musa spp. AAA-EA) in low input cropping systems.	Field Crops Research 08/**2012**; 135:126-136. DOI: 10.1016/j.fcr.2012.06.018	https://www.researchgate.net/publication/236882525_Ecological_characteristics_influence_farmer_selection_of_on-farm_plant_density_and_bunch_mass_of_low_input_East_African_Highland_banana_Musa_spp_cropping_systems	Yes	2.976	Field Crops Research	2012	4
91	Influence of plant density on variability of soil fertility and nutrient budgets in low input East African highland banana (*Musa* spp. AAA-EA) cropping systems	Nutrient Cycling in Agroecosystems 03/2013; DOI 10.1007/s10705-013-9557-x(2). DOI: 10.1007/s10705-013-9557-x	https://www.researchgate.net/publication/243973481_Influence_on_plant_density_on_variability_of_soil_fertility_and_nutrient_budgets_in_low_input_East_African_highland_banana_Musa_spp_AAA-EA_cropping_systems	Yes	1.897	Nutrient Cycling in Agroecosystems	2013	1
92	Nutrient imbalance and yield limiting factors of low input East African highland banana (Musa spp. AAA-EA) cropping systems	Field Crops Research (**2013**) 147: 68–78 doi:10.1016/j.fcr.2013.04.001	http://www.sciencedirect.com/science/article/pii/S0378429013001160	Yes	2.976	Field Crops Research	2013	4
93	Effect of Banana Leaf Pruning on Legume Yield in Banana–Legume Intercropping Systems in Eastern Democratic Republic of Congo	In: Banana systems in the humid highlands of sub-Saharan Africa: Enhancing resilience and productivity. CABI, Wallingford, Oxfordshire, UK **2013** pp. 158-165. ISBN: 978-1-78064-231-4	http://www.musalit.org/seeMore.php?id=15343	No	-	BOOK/BOOK CHAPTER	2013	1
94	Effect of banana leaf pruning on banana and legume yield under intercropping in farmers' fields in eastern Democratic Republic of Congo	Journal of Horticulture and Forestry, (**2014**) 6(9): 72-80. doi:10.5897/jhf2014.0360	http://www.scilit.net/article/10.5897/jhf2014.0360	No	-	Journal of Horticulture and Forestry	2014	0
95	Effect of banana leaf pruning on banana and legume yield under intercropping in farmers' fields in eastern Democratic Republic of Congo	The African Journal of Plant Science and Biotechnology (**2014**) 7(1):32-35.	https://www.researchgate.net/publication/274708026_Effect_of_Banana_Leaf_Pruning_on_Banana_and_Bean_Yield_in_an_Intercropping_System_in_Eastern_Democratic_Republic_of_Congo	No	-	The African Journal of Plant Science and Biotechnology	2014	0
96	Contribution of Bananas and Plantains to the Diet and Nutrition of Musa-dependent Households with Preschoolers in Beni and Bukavu Territories, Eastern Democratic Republic of Congo	In: Banana systems in the humid highlands of sub-Saharan Africa: Enhancing resilience and productivity. CABI, Wallingford, Oxfordshire, UK **2013** pp. 202-209. ISBN: 978-1-78064-231-4	http://www.cabdirect.org/abstracts/20133402671.html;jsessionid=2E1FA708C514872B547AF161489C5474	No	-	BOOK/BOOK CHAPTER	2013	0
97	Mitigating the impact of biotic constraints to build resilient banana systems in Central and Eastern Africa	In: Agro-Ecological Intensification of Agricultural Systems in the African Highlands. **2014** Earthscan from Routledge. pp. 85-104.	https://www.researchgate.net/publication/265210170_Mitigating_the_impact_of_biotic_constraints_to_build_resilient_banana_systems_in_Central_and_East_Africa	No	-	BOOK/BOOK CHAPTER	2014	0
98	Banana systems in the humid highlands of Sub-Saharan Africa enhancing resilience and productivity	Published by CABI, Wallingford, Oxfordshire, United Kingdom **2013**	http://www.musalit.org/seeMore.php?id=14859	No	-	BOOK/BOOK CHAPTER	2013	1
99	Overcoming challenges for crops, people and policies in Central Africa. The story of CIALCA stakeholder engagement.	In book: Innovation Platforms for Agricultural Development: Evaluating the Mature Innovation Platforms Landscape, Routledge **2015**	https://www.routledge.com/products/9781138181717	No	-	BOOK/BOOK CHAPTER	2015	0
100	Metrics for land-scarce agriculture Nutrient content must be better integrated into planning	Science (**2015**) 349 Issue 6245:238-240	http://static1.squarespace.com/static/53ea24a8e4b0b0caeecc2efb/t/55ac4daae4b099691c46daf8/1437355434028/DeFries+et+al+%28Science+2015%29.pdf	Yes	33.611	Science	2015	2
101	Evaluating heterogeneity in agroforestry adoption and practices within smallholder farms in Kenya.	Agriculture Ecosystem and Environment **2015**. 212:106–118	http://www.sciencedirect.com/science/article/pii/S0167880915002339)\	Yes	3.402	Agriculture, Ecosystems & Environment	2015	0
102	Landscape level constraints and opportunities for sustainable intensification in smallholder systems in the tropics (book chapter)	In: Climate-Smart Landscapes: Multifunctionality in Practice. **2015** Nairobi, Kenya: World Agroforestry Centre (ICRAF), 163-177	http://asb.cgiar.org/climate-smart-landscapes/index.html	No	-	BOOK/BOOK CHAPTER	2015	0
103	Discovering and domesticating wild tropical cultivatable mushrooms	Chiang Mai J. Sci. **2014**; 41(X): 731 - 764	http://epg.science.cmu.ac.th/ejournal/journalDetail.php?journal_id=5110	Yes	0.371	Chiang Mai J. Sci. 2014; 41(X): 731 - 764	2014	10
104	Mushrooms for Trees and People, a field guide to useful mushrooms of the Mekong region	Book (Field Guide) **2014**	https://humidtropics.cgiar.org/openaccess/?did=113	No	-	BOOK/BOOK CHAPTER	2014	0