

Humidtropics Evaluation Report



Authors

Rosern K. Rwampororo, Ph.D: Evaluation Team Leader
Christine Negra, Ph.D: Evaluator, Sustainable Intensification
Eric Kueneman, Ph.D: Evaluator, Institutional Innovation

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Humidtropics, a [CGIAR](#) Research Program led by [IITA](#), seeks to transform the lives of the rural poor in tropical Americas, Asia and Africa. It uses integrated systems research and unique partnership platforms for better impact on poverty and eco-systems integrity. Core program partners are: AVRDC, Bioversity International, CIAT, CIP, FARA, *icipe*, ICRAF, IITA, ILRI, IWMI, and WUR.

The Program partners would like to acknowledge the [CGIAR Fund Donors](#), and other donors and investors for their provision of core and project-specific funding without which the Program could not deliver results that eventually positively impact the lives of millions of smallholder farmers in tropical Americas, Asia and Africa.

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
ECA	East and Central Africa
FAO	Food and Agriculture Organization of the United Nations
FARA	Forum for Agricultural Research in Africa
FTA	CGIAR Research Program on Forests Trees and Agriculture
IAC	Independent Advisory Committee
<i>icip</i>	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
IWMI	International Water Management Institute
L&F	CGIAR Research Program on Livestock and Fish
MAIZE	CGIAR Research Program on Maize
N2Africa	Nitrogen Fixation Research for smallholder farmers in Africa
QAAP	Quality Assurance Advisory Panel
RBM	Results-Based Management
SLO	System Level Outcome
SO	Strategic Objective
SRF	Strategy and Results Framework
SRT	Strategic Research Theme
WA	West Africa
WLE	CGIAR Research Program on Water, Land and Ecosystems
WUR	Wageningen University and Research Center

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EXECUTIVE SUMMARY

Background and Context

Humidtropics is a CGIAR Research Program (CRP) on Integrated Systems for the Humid Tropics. The program, first approved according to the original proposal of August 15, 2012, was seeking to transform the lives of the rural poor in the humid lowlands, moist savannas and tropical highlands in three major Impact Zones of sub-Saharan Africa and tropical America and Asia, and expected to impact a population of 2.9 billion people, mostly poor smallholder farmers. Research was guided by a Global Hypothesis, which stipulates that “A range of livelihood strategies exists within the humid tropics where poverty reduction, balanced household nutrition, system productivity and natural resource integrity are most effectively achieved and contribute best to human welfare.” There were several other related Component Hypotheses and Research Questions, based upon which the Program was to address integrated production system interventions, expand livelihood options, and build the capacity of institutions to take these interventions to scale by targeting rural poverty, ecosystem integrity and gender equity outcomes.

A dynamic program structure was built around three complementary Strategic Research Themes (SRTs); Systems Analysis and Synthesis (SRT1), Integrated Systems Improvement (SRT2), and Scaling and Institutional Innovation (SRT3) supported by a Monitoring and Evaluation Framework. The program adopted in 2014 a new programmatic framework with one crosscutting and four area-based Flagship Projects. It retained the overarching theory of change and the SRTs but now located within the area-based Flagship Projects. It introduced an overarching impact pathway that contributed to four strategic objectives and six intermediate development outcomes. Humidtropics also initiated a Results-Based Management (RBM) pilot project to track progress, improve learning and manage performance.

Purpose and Objectives of the Evaluation

This report provides the key findings from the CRP-Commissioned External Evaluation (CCEE) of Humidtropics, which was conducted between April and September 2015. The purpose of the evaluation was to review and provide an overview and critical analysis of the relevance of the program, the plausibility of its approach for achievement of intended results, and the extent to which Humidtropics, within its mandate, responded to key aspirations underlying the CGIAR reform. The CCEE was expected to provide essential formative evaluative information for decision-making by Humidtropics management, partners, and investors in view of the upcoming 2nd generation of CRPs. Based on the CCEE Terms of Reference (ToR), the evaluation findings were meant to reinforce the principle of mutual accountability and responsibility among program leaders, donors, and partners for improving relevance and efficiency and to promote learning among Humidtropics’ partners and stakeholders.

Evaluation Design, Key Assumptions & Methodology

EVALUATION APPROACH

The CCEE took place in five sequential phases, started on April 13, 2015, with an Inception Phase, which entailed virtual and face-to-face meetings between the CCEE Team and the evaluation manager to discuss the ToR and evaluation expectations and process. The outcome was an approved Inception Report, which specified the timeframe and methodology to respond to the agreed upon overarching question and sub-questions during the Inquiry Phase.

The Inquiry Phase, entailed several stages in terms of the document review, field visits to the selected Action Areas, the writing workshop, and submission of the draft report. The field visits started in Nicaragua in June, followed by Uganda, Rwanda, DRC, coupled with administering an online questionnaire survey among the main methods of inquiry. This was concluded with a “write-shop” at IITA headquarters in Nigeria in August. A draft CCEE Report was submitted to IEA through the evaluation manager on September 15, 2015. The CCEE Team Leader also made a presentation of the key findings to the IEA, Fund Council and Consortium Office via Skype in October 2015. Incorporation of feedback from the IEA on the draft report took place between December 2015 to February 2016 through several iterations to produce and submit the Final CCEE Report.

EVALUATION TEAM

The CCEE team included three members: Dr. Rosern K. Rwampororo (Team Leader), Dr. Christine Negra, and Dr. Eric Kueneman. As shown in the short biographies in the standalone **Annex 8**, the team combines different areas of expertise relevant to the Humidtropics CCEE and specified in the ToR: Results-Based Management and Evaluation, Sustainable Intensification, and Institutional Innovation, respectively. The evaluation manager, Dr. Eric Koper from the Humidtropics Executive Office, supported the team.

KEY ASSUMPTIONS AND PROPOSITIONS OF THE EVALUATION APPROACH

The CCEE approach was informed by the following summary of the key assumptions and propositions, whose details are provided in the main body of the report:

- ✓ **Assumption 1:** The key assumption of the CCEE Team is that the evaluation will need to take a research for development perspective or lens when evaluating the implementation status of Humidtropics rather than a research only lens. In this perspective, the production of high quality research outputs is still important but their relevance to development and society are paramount.
- ✓ **Assumption 2:** The CCEE Team assumes that Program implementation needs to be evaluated holistically in terms of the multi-stakeholder, and disciplinary processes and engagement inclusive of farmers and institutions and the potential for growth.
- ✓ **Assumption 3:** The CCEE Team assumes that often used linear models of research to impact such as from discovery to delivery to scale is flawed when looking at the systems as a whole. It would make more sense to evaluate how the systems change in relation to addressing the challenges and the contribution being made to the anticipated development outcomes and look for the contributing elements.
- ✓ **Proposition 1:** Following on from Assumptions 1 and 2, it could be argued that integrated systems research is a form of applied research that encompasses a “holistic understanding of innovation”. Therefore, the CCEE team makes the proposition to evaluate Humidtropics inclusively by taking into consideration:
 - Research to develop tools, methods and approaches that develop a systems capacity to innovate at farm and institutional levels to identify problems and opportunities (systems analysis);
 - Research that invests, tests and experiments with alternative social and technical systems interventions;
 - Learning from and exchange experiences, with a focus on women and youth to participate.
- ✓ **Proposition 2:** Considering Assumption 3, evaluation of integrated systems programs can be better conducted in relation to how a particular system has changed its potential to achieve anticipated development outcomes, and how the various changes within the components that constitute the system may have contributed.

Main Proposition: Given the above assumptions and propositions, it would be too early to assess systems change results as envisioned by Humidtropics in the long-run (15 years). Therefore given the timing of the evaluation (after only 2 1/2 years of implementation), the main proposition is to evaluate its processes that may contribute to system changes in the future and relate it to its implementation of Results-Based Management (RBM).

EVALUATION QUESTIONS & METHODOLOGY

The CCEE addressed the following evaluation criteria: relevance, efficiency, quality of research, and effectiveness. A preliminary list of twenty-six questions proposed in the CCEE ToR was reviewed by the CCEE Team and reduced to one main and eight sub-questions (detailed in **Table 1** in the main body of the report) by eliminating overlap and focusing on the primary objectives of the CCEE. These eight questions were further refined in consultation with the Humidtropics Executive Office. Each evaluation criteria was reviewed with a focus on the following: Relevance (i.e. alignment, coherence; program design); Efficiency (i.e. institutional arrangements; governance and management; program implementation); Quality of Research (i.e. research design; research outputs, tools, and approaches); and Effectiveness (i.e. integrated production systems, and enabling innovations in institutional processes, supporting farmer/ stakeholder adoption of knowledge-intensive technologies, and adoption of organizational processes that empower stakeholders and build capacity to innovate at all levels).

EVALUATION METHODS

To answer the evaluation questions, the CCEE Team used a mixed methods approach that entailed both quantitative and qualitative data collection. In order to collect relevant information and ensure that the evaluation findings fully respond to the purpose of the evaluation, the Team also used triangulation of data generated from the various methods. Methods included:

- i) Document reviews;
- ii) Key Informant Interviews (KIIs);
- iii) Focus Group Discussions (FGDs);
- iv) Site visits;
- v) An online survey of program staff/ implementers.

In addition, the Team conducted Case Studies, from both the Area-Based and Crosscutting Flagship Projects to provide detailed information on how the Humidtropics concepts played out in the different contexts.

Key Findings

The CCEE Team found evidence of progress in Humidtropics with regard to the four evaluation criteria that relate to the main evaluation question:

“To what extent does Humidtropics’ integrated systems approach add value to the CGIAR portfolio?”

The criteria for which most progress was achieved, given the short period under review (less than three years), was relevance of Humidtropics to the various contexts in terms of its alignment to CGIAR priorities and national programs, as well as the Program design. One of the challenging areas is broadening the scaling up of innovations under the criteria of effectiveness. Based on the data generated as evidence to answer each of the eight overarching questions, key findings for each of the evaluation criteria are presented below.

RELEVANCE OF HUMIDTROPICS

Alignment and Program Coherence

Across all the Area-Based Flagship Projects, design of the Program was found to be in alignment with both the CGIAR System Level Outcomes (SLOs) and national priorities. The strategies identified by Humidtropics for achievement of Intermediate Development Outcomes (IDOs) appropriately consider biophysical and socio-economic dimensions (e.g. yield, soil fertility, gender, markets) and systems components. The CCEE Team with the note that interventions create trade-offs and possible synergies between achieving the IDOs from the onset. However, while the IDO targets are ambitious, it is also too early to measure contribution, attribution and progress against achieving them to assess their feasibility.

Program Design

The Humidtropics' partnership design and targeting for integrated systems improvement is functionally appropriate for engaging diverse partners in ways that best fit their capacity and interest, including integrating available tools and analytic capabilities from international research partners and mobilizing local knowledge and innovation. Multi-level, formal and informal engagement mechanisms were engaged, which can plausibly deliver on the objectives including identifying, testing, and scaling best-fit and best-bet systems interventions for sustainable intensification and diversification. The CCEE Team observed this during site visits through confidence and satisfaction among local stakeholders participating in R4D Platforms and Innovation Platforms (IPs) with regard to collective accomplishments.

Humidtropics works with other CGIAR Centers and diverse partners including government, universities, private sector, NGOs, and other CRPs (e.g. RTB, CCAFS), but the degree of collaboration varied depending on multiple factors such as Centers' institutional priorities, government contexts, and available budgets. It was difficult at this early stage to assess the plausibility to delivery results in terms of area-wide adoption and replication of technologies and processes stemming from multi-stakeholder platforms (R4D and IPs), especially because the Action Sites where at different stages of development. The team could also not assess at what frequency the localized approaches such as IPs need replicating to ensure that the social and technical options for the larger extrapolation domains would be the best-fit. Through work led by WUR, Platform performance assessment is underway, which will inform the utility of scaling the Humidtropics multi-level Platform model.

Overall: The evaluation team found ample evidence in the field that Humidtropics implementation reflects its research for development design, which is largely place-based and tailored to the needs within specific research sites that are representative of the Action Area extrapolation domains that focus on the social and technical interventions at farm, institutional and landscape levels. The CCEE Team also found that Humidtropics largely followed the principles it set out in its design to enhance the relevance of the research in addressing the specific challenges identified as part of the research process through systems analysis (SRT1) and those prioritized by the multi-stakeholder platforms, including processes it initiated or transformed such as R4D and IPs. This evidence is found in the large number of situational analysis reports and in the bespoke tools, methods and approaches the Program developed and reported on in its annual reports, which was corroborated by the interviews and site visits of the CCEE Team. Humidtropics' implementation was also found to build on experiences of previous farming and livelihood systems approaches and early innovation platform functioning as in the SSA-CP and addresses one of their main deficits in relation to the need for research that helps social-technical regimes to change in conjunction with innovations at the farm level.

EFFICIENCY OF IMPLEMENTATION OF HUMIDTROPICS

Governance, Management and Program Implementation

Humidtropics management has tried to foster delegated decision-making at the lowest appropriate levels to accommodate for the significant political, cultural, social, geographical and agro-ecosystem differences between the Action Areas and Action Sites. However, this also increases the dependency on management capacities and investments of the partner organizations, including the non-core partners in the Action Sites, which may result in variable commitments, delivery, and quality of reporting putting more pressure on the small management teams with a risk of reducing efficiency.

There were mixed results with regard to effective management. For example: work plans have generally been built from “bottom-up”. However, use of funds was influenced by individual core partner priorities despite Executive Office financial guidelines and principles and strong promotion of integrated planning and budget allocation. The transition from center-led to situation-led collaboration and investment still needs to improve. However, it is promising that when very disruptive financial cutbacks were required due to externalities (i.e. shortfalls in overall CGIAR funding), the importance of transparency in achieving agreement to focus on Cluster 4 activities was broadly supported despite painful cuts to other Program components.

Management maintained focus on Program objectives and delivery while responding adaptively to emerging realities such as budget changes and CGIAR reforms. Several mechanisms were instituted to increase coordination among core partners, although budget gaps reduced their effectiveness. For example: prioritization of Cluster 4 funding for platform-generated research projects was a response to the need for better fund allocations to the array of partners engaged in platform research initiatives beyond the core partners.

Key observations on Efficiency include:

- Funding for community-led initiatives under Cluster 4 encouraged Centers to work together in the same spaces although this still is work in progress. Management structure fostered stakeholder engagement, and IP management shared by multiple partners.
- Development of RBM processes (especially for Cluster 4 projects) were observed including: formulating sub-objectives (results), selecting indicators for outputs, and collecting data to monitor progress on implementation; but not yet on results performance. Data is entered in DevResults an online RBM&E system <http://humidtropics.devresults.com>. There is varied capacity to handle RBM across Flagship Projects and a need to move beyond process and output level data to outcome level data. Some of the indicators may be at too aggregate or conversely to specific levels to accommodate project level tracking.

Overall: The Program is in its formative stage, and while the institutional and management arrangements and related processes are still developing, it is plausible at this stage to find that progress made has justified the investment to date.

QUALITY OF RESEARCH

Research Design

The CCEE Team’s perspective on the overall quality of research for Humidtropics is that its design and approaches have been grounded in theory of integrated systems research for development, with a focus on developing the necessary capacities at both farmer and institutional levels through multi-stakeholder processes such as R4D and Innovation platforms that constitute partnerships and broad stakeholder participation that will make it sustainable.

Overall, Humidtropics' integrated systems research design is guided by hypotheses that are clearly linked to major global challenges including improving livelihood opportunities for women and youth. Research is deliberately directed toward important and difficult knowledge frontiers such as multi-stakeholder processes, trade-off analysis and farmer-focused society driven research. Humidtropics' affiliated researchers are gaining valuable experience with balancing the concerns of global donors, international researchers, national leaders, and local stakeholders in research priority-setting as well as effectively engaging multi-disciplinary knowledge sets and resources. High-quality scientists from core partner institutions were assigned research leadership roles and delivered to the best of their availability, but were commonly constrained by limited time allocations by their organizations (many work in more than one CRP). Most platform-driven research design focused on locally-relevant research questions that are focused on integrated systems research at the dominant types of farming systems, while research on using R4D Platforms for societal priorities and scaling/ adoption processes has both local and broad (beyond Humidtropics) implications.

There is high quality scientific leadership, oversight, and guidance for the research provided by the core partners with the involvement of local universities and national research institutes. Given a very complex and dynamic context, Humidtropics' R4D activities have been appropriately prioritized and effectively coordinated with the following caveats:

- Mismatches between initial Program ambitions and actual available resources created pressure for real-time adaptation, which created confusion and often frustration among the large number of geographically separated program partners;
- Adaptation of initial Program design concepts to on-the-ground realities required a transition period;
- Funding through W1/W2 often required very long periods of pre-financing by partners with some partners falling behind such as FARA. This caused instability and may have affected the moral of researcher and their ability to produce a larger number of publications and or initiate research on integrated systems interventions.

All Flagship Projects build on one or more legacy projects (generally part of one or more Centers' work) that are endorsed by the R4D Platforms as worthy of entry-point activity.

Quality of Research Outputs, Tools, and Approaches

It is evident to the CCEE Team that the program produced a large number of research outputs, tools and approaches that are of varying quality and level of completeness covering a broad range of disciplines. This is inherent to research following an incubator design that spawns many initiatives but it is too early to tell if these lead to better outputs and processes, are cost-effective and lead to development change beyond acknowledging that more options may result in more choice and change. The program is trying to synthesize its early experiences also in view of potential portability to 2nd generation CRPs. Research on systems social and technical systems interventions, only started to take shape beyond the legacy work after systems analysis was concluded and covers priorities mainly through platform research initiatives funded in Cluster 4 of the area-based Flagship Projects. The team found many examples of both researcher-led and participatory initiatives and use of for example baby-mother models of experimentation in the field on cassava-legume integration. In preparation of improved scaling of promising research outputs to the extrapolation domains the CCEE found that the program has conducted significant work to better understand multi-stakeholder processes that influence decision-making, investments and adoption. and recorders to ensure that all activities and are documented. This documentation process enables the conduct of research on processes themselves and will inform scaling-up and eventually on the broader lessons.

Quality of Publications

In addition to the assumptions and propositions made the CCEE Team only partially used the rather narrow traditional scientific view to gauge research through a quantitative assessment of peer-reviewed published output supported by bibliometric analysis with citation tracking. With support of the CGIAR Independent Evaluation Arrangement (IEA), a bibliometric analysis was conducted on selection of publications that mostly were indexed by Thomson Reuters with related impact factors where applicable. The CCEE Team also looked at the bibliometric analysis commissioned by the CGIAR (2014) to Elsevier, which uses SCOPUS and alternative citation index. Both bibliometric analyses on first sight seem objective and unbiased using straightforward methods based on simple counting. However, the team is aware that objectivity has been generally challenged as for example number of citations depend on number of researchers in the same domain, which is not necessarily conducive to reflect originality and intrinsic quality of the research, especially in view of multi- and interdisciplinary research that is typical for integrated systems.

From the Elsevier analysis in 2014: 131 Humidtropics Researchers were matched to the SCOPUS author profiles representing the largest number. Looking at the Humidtropics staffing (Section 4.3.2) which represents FTEs, this seems realistic, as there may be a large engagement of part-time researchers. This may also explain why the H index at 6.0 was the lowest among CRPs, indicating low level of publications per researcher as some may have published their research under another CRP where their proportion of time was higher. The CCEE Team thus found that interpretation of the metrics need to be considered in the context of a systems program where researchers from multiple disciplines work together but may prefer to publish in journals renowned in their domain and as part of their engagement in other CRPs.

The analysis by IEA showed that there were 104 publications presented of which 20 were book chapters and 73 were spread over 55 Journals with the remaining publications in other outlets. The maximum number of publications in a particular Journal was four (2x), followed by three (2x), two (8x) and one (43x). Of the journal articles, 102 were cited in Google Scholar and the top 10 by Thomson Reuters were cited from 15-46 times related to publications in 2013 (3) and 2014 (7) mainly related to livestock and soil fertility publications. It would be too early to signal if this is of worry or not since the number of publications is within expectations, but it may also signal that the Program has more emphasis on non-scientific outlets, which seems more plausible given the large number of guidelines, reports, blog-posts, etc. This may also be due to the early stages of the Program and the gradual development of an integrated systems research community.

Knowledge production as measured in peer-reviewed papers as illustrated by the bibliometric analysis would not do justice nor suffice to gauge the quality of research of Humidtropics. As such other findings in the evaluation report on capacity development (in wider sense including capacity to innovate), product and or policy development, credibility of impact pathways and potential for wider societal benefits would in the view of the CCEE Team be necessary to give better insight in the need for and quality of integrated systems research.

EFFECTIVENESS OF HUMIDTROPICS

Likelihood of Achievement of Results

There is anecdotal evidence presented throughout this report and the accompanying Case Studies (**Annex 10.1 – 10.8**) that demonstrates that the activities being implemented will contribute to all the six IDOs, with some being more pronounced in some Flagship Projects than others. It is important to note that the current results framework based on the IDOs only

started in 2014, and that Humidtropics is one of few CRPs piloting RBM. The CCEE Team verified progress in development of RBM processes especially for Cluster 4 projects.

There is sufficient evidence to demonstrate that collaboration among the multiple types of Humidtropics partners has resulted in important Program outputs, but not yet in outcomes. It has generated synergies, and has enhanced partners' capacities, with the following caveats:

- 1 The capacity of government or other essential institutional partners to engage in multi-stakeholder decision-making is a critical factor of success;
- 2 Platform processes require dedicated budgets and staffing to function effectively as a crucible of partnership-based R4D research;
- 3 Cross-Flagship analysis is needed to understand key factors in order to systematically achieve synergies.

Adoption of Integrated Production Systems & Knowledge-Intensive Technologies

The approach that Humidtropics' initiated and the way implementation is progressing was found by the CCEE Team in this formative stage to be plausible to potentially support the development and use of technological and process innovations that contribute to achieving holistic livelihood improvement at scale in rural agricultural contexts and gives credence to CGIAR's pursuit of outcome-oriented R4D. The Program's particular strengths include a robust conceptual framework, emphasis on multi-level stakeholder convening, and a place-based, multi-disciplinary action research model. Challenges have included slow uptake of systems concepts within global research communities, a highly uncertain budget context, and limited resources for crosscutting synthesis. In terms of progress of Humidtropics towards livelihoods improvement, some of the key outputs and outcomes (results) as stipulated in its Results Framework, it is too early to quantify the achievement to date. This is because the evolution of the process from conducting of the situation analysis, the baseline, to establishing the IPs, and making them functional, which in and of itself required a timeframe of about 2-3 years, and implement all the activities identified to address the challenges, is yet to yield tangible results.

Adoption of Organizational Processes & Capacity to Innovate at all Levels

The application of the Humidtropics Theory of Change (ToC) and Impact Pathway has yielded many proofs of concept, e.g. conducting the situational analysis prior to implementation of any research activity, was both a product and a process, which was instrumental in informing comprehensive site characterization and entry point identification. The careful development of stakeholder platforms has generated synergistic, collaborative R4D research. These examples provide important lessons for future implementation related to effective convening, trust-building, and ongoing Platform support.

Platform evolution is evident as far as the partnership model is concerned, which has brought together multi-sector actors (government agencies, national institutions, private sector entities, and international development organizations) within R4D Platforms and IPs. The wide stakeholder involvement is central for sustainable intensification research and enhances shared leadership for setting and achieving objectives (platform outputs and outcomes). As a result, the platforms have achieved synergies such as serving as a useful link among local Action Site partners and other core partners.

Conclusions

This section presents eleven major synthetic observations based on the Key Findings from this evaluation based on the four criteria:

1 Relevance of Humidtropics

- 1. Alignment of Humidtropics' Program design with CGIAR and national strategies.**
Program guidance emphasizes alignment and collaborative decision-making across diverse institutions, including government, through stakeholder platforms, although sites vary in the nature and extent of conceptual and operational alignment around integrated systems approach. Partners' commitment of financial and staff resources and capacity to shift institutional priorities to implement collaborative R4D endeavors ranged widely in the face of Humidtropics budget cuts.
- 2. Use of Theory of Change and Impact Pathway to define Action Site priorities.**
The CCEE Team particularly liked the simplicity of an overarching ToC and related generic Impact Pathway, which were made specific, based on Action Site level priorities and entry points. The generic Impact Pathway shows the interdependence and relatedness of the IDOs and the possible synergies and trade-offs that interventions may result in when site- or system-specific priorities and entry points are established. Notwithstanding the foregoing, the development and quality of more site-specific Impact Pathways could improve, especially when more evidence of progress can be found.
- 3. Partnership design** used by Humidtropics was instrumental in forging Program coherence and providing a sense of ownership between its multiple stakeholders. The researchers sought an appropriate balance between encouraging local relevance and ownership, and promoting a prescribed framework influenced by Humidtropics' ToC that focuses on the IDOs and preferred methods in alignment with CGIAR strategy. There were strong partnerships with other CRPs, especially the two systems CRPs (Dryland Systems, and Aquatic Agricultural Systems), which helped the Program to share experiences and sharpen the perspectives on systems and stakeholders' capacity to innovate and ability to address issues of sustainable intensification. There was also diverse institutional partnerships, within and beyond the CGIAR, to design and deliver R4D research which brought together representatives from the public sector (government, policy, NARES), civil sector (CSOs, CBOs, NGOs), and private sector (farmer organizations, agri-dealers, traders, agro-food companies, financial institutions) across Action Sites, which was instrumental in linking R4D Platforms and IPs actors, and helped generate interest and enhanced ownership.

2 Efficiency

- 4. Decision-making:** Humidtropics management was efficient in terms of decision-making and provision of proper guidelines when the Program faced with multiple financial cutbacks. The decision to prioritize Cluster 4 projects, designed with inputs from the Field Site communities, ensured that the Program was still able to deliver societal needs while still in line with the CGIAR strategy. The small management structure also enhanced timely decision-making, especially when budget cuts were announced and change of direction was needed, it made it possible for the new guidelines to be communicated and quickly acted upon.
- 5. Use of Research for Development and Innovation Platforms:** Humidtropics' approach to integrated systems research does not necessarily reduces costs of research and development activities. It could be argued that scaling the IPs within

extrapolation domains would significantly increase development delivery costs. However, it is clear that Humidtropics' use of IPs was restricted to few within large extrapolation domains serving as social and technical innovation incubators whereby the role of R4D Platforms will help to scale the resulting innovations. The latter is yet to be tested but is an important element of the design that should be further explored. More importantly, the approach helps to improve the relevance of the social and technical interventions to particular scenarios, for example helping to transform best bet solutions developed by other projects such as RTB to become best fit options.

3 Quality of research

6. **Employment of place-based research:** Humidtropics employs a place-based “integrated system research” model that is attempting to conduct research within a whole-farm integrated perspective and to shift institutional emphasis from research outputs to research outcomes. The model seeks to mobilize knowledge and technology resources from partners in commodity and other non-systems CRPs in response to stakeholder-identified research needs. The Program has generated multiple proofs of concept demonstrating traditional and participatory research in Action and Field Sites. CGIAR research partners exhibit willingness to collaborate when this is facilitated by individual Center priorities and co-location of bilateral projects. However, full commitment by CGIAR partners in this integrated systems model of collaboration and research has been uneven.

4 Quality of research outputs

7. **Implementation of multi-stakeholder processes:** Humidtropics has learned from traditional farming systems research as carried out in the seventies and eighties and through more recent projects such as CIALCA, STCP, Learning Alliances and other initiatives, especially in relation to the need for multi-stakeholder processes at different levels. However, the Program should probably have experimented with more approaches and moved quickly from systems analysis and priority setting to systems interventions, especially as the Program design (Geels' model on multilevel processes) allows for successes and failures in experimenting with different solutions.
8. **Research beyond publications:** Following the assumptions and propositions made in Section 2.3, the CCEE Team is aware that traditionally, the success of academic research is judged usually by an assessment of peer-reviewed published outputs. This is normally supported by bibliometric analyses that quantify published outputs and quality in measurements such as impact factors, and the extent to which the outputs have influenced others in the same field by citation tracking. Although this analysis has been provided in this report¹, it became apparent that this in and of itself would not do justice to the Program. The CCEE Team argues that a systems Program deserves to be assessed from both the science and development lenses. As such, the quality of its outputs goes beyond the publications mentioned herein but includes all the processes, tools, social and technical innovations that have been documented throughout the report.

5 Effectiveness

9. **Implementing Results Based Management (RBM):** implementing a Results Based Management System requires significant changes in managing, thinking and working for core and other implementing partners. The CCEE Team concludes that Humidtropics made significant progress and shows promise to manage multiple

¹ From the bibliographic analysis, there were 104 publications presented of which 20 were book chapters and 73 were spread over 55 Journals with the remaining publications in other outlets.

partners and processes across a large geographical spread at the various levels of Program implementation.

10. **Developing the TOSA toolbox:** Humidtropics collaborated with Livestock and Fish CRP to develop the well-curated TOSA toolbox, which combines an array of tools in novel ways to support systems research. Toolbox development reflects creativity and clarity of purpose in reviewing the universe of existing resources to select appropriate tools for application in Action Sites. More consistent testing and cross-comparison of tools across diverse local contexts could have resulted with stronger Humidtropics guidance. Tools for testing the performance of IPs are still under development.
11. **Exploring Systemness:** in its early stage of development, international partners not directly involved in Action Sites have perceived the Humidtropics “systemness” trajectory as slow to mature toward tangible interventions. Progress can be difficult to detect during the “incubation period” needed to build effective stakeholder platforms and to identify systems entry points before initiating tangible activities and outputs. The Humidtropics model anticipates that early stage investments in system characterization and partnership development will lead to impact at scale, but the level of scaling will depend on both strategy (generally governmental) and human and financial resources for replication of the process.

Key Recommendations

Recommendations to Manage Risks

The evaluation was designed to inform future Humidtropics implementation. However, now that Humidtropics will no longer continue as a standalone Program, the CCEE highlights the following risks that need to be managed:

- The loss of trust built with national and local partners and forfeiture of investments in specific sites are a risk if the CGIAR system fails to plan comprehensively and in a timely manner for staff, projects, and partnerships that are advancing innovation capacity, empowerment of women and youth, and other central Humidtropics objectives;
- Humidtropics has served as an incubator for innovative thinking about integrated systems approaches (e.g. mobilization of place-based knowledge and stakeholder platforms to identify multiple intervention pathways) and this incubator function will disappear unless appropriately embedded within other CRPs;
- A topic that needs additional attention is understanding the essential elements for scaling the wide adoption of the process/ approach by development partners; there is a risk in the premature closure of the CRP that these important lessons will not be “harvested”;
- The CCEE Team is concerned that in addition to significant loss of investment there is a significant risk to the credibility and reputation of CGIAR and core partners if activities such as Cluster 4 projects by R4D and Innovation Platforms are terminated by the end of 2016. Especially, when they show good promise to deliver outcomes and constitute strong and enthusiastic partnerships that could be used by the Agri-food CRPs, Site Integration initiatives and/or other projects in 2017 and beyond. Humidtropics with other CRPs, Centers and Consortium Office therefore need to explore option show best to transit these elements of integrated systems research for development.

Specific Recommendations

The specific recommendations presented in the table below presume ongoing implementation, in some form, of all major Humidtropics components and elements.

Recommendations	Action Required	Responsible Entity (ies)
RELEVANCE OF HUMIDTROPICS		
1. The CGIAR Strategy and Results Framework could be modified to show for its IDOs and sub-IDOs a similar generic interdependencies and relatedness diagram that could be used to develop more specific CRP related ones.	Produce a generic diagram that reflects interdependences between CRPs and their contribution to sub-IDOs and IDOs.	CGIAR and Humidtropics managers
2. Inform future research design by robustly assessing mechanisms for effectively linking research for development models to achieve SLOs using a set of biophysical and socio-economic metrics that comprehensively characterize system change.	Conduct assessment on the biophysical and socio-economic metrics that characterize system change.	Humidtropics managers
EFFICIENCY		
3. Due to lack of capacity at the local level, there is need to establish more cost-effective approaches for replicating the Humidtropics Platform-based process. This can be done by marshalling the current multi-disciplinary expertise of Humidtropics-affiliated researchers and practitioners to analyse the cost-effectiveness of diverse methods used in Action and Field Sites across Area-Based Flagship Projects.	Produce a report that presents analysis and proposes most cost-effective methods for convening stakeholder Platforms.	Humidtropics managers and core partners
4. The CCEE Team recommends that Humidtropics translates its experiences with developing, funding and managing Platform research initiatives through widening participation of local partners into guidelines that can be used by other projects and 2 nd generation CRPs.	Produce guidelines on developing, funding and managing research initiatives.	Humidtropics managers and core partners
QUALITY OF RESEARCH		
5. The underlying approach encourages experimentation with various social and technical systems interventions at farm and institutional levels. As such, it is recommended to reduce the investments in systems analysis and baselines in favour of experimentation.	Encourage experimentation with various social and technical interventions.	Humidtropics managers and core partners
6. Humidtropics' approach to integrated systems research should be considered by other projects and 2 nd generation CRPs to help improving the relevance of social and technical interventions for specific agro-ecological systems through multi-stakeholder processes such as IPs and enhance the potential for their scaling to large extrapolation domains through multi-stakeholder processes at country and regional levels such as R4D Platforms.	Document lessons learned and evidence-based analysis to demonstrate the benefits of using integrated systems research for specific agro-ecological systems through multi-stakeholder processes.	Humidtropics managers and core partners

Recommendations	Action Required	Responsible Entity (ies)
7. There remains a systematic challenge to have genuine onsite collaboration between CGIAR partners. The trial with Cluster 4 projects shows promise but it should be modified to ensure further collaboration and sharing, especially with local and non-CGIAR Partners.	Encourage or require clear collaboration between CGIAR, non-CGIAR and local partners in site integration countries.	Humidtropics Managers, Agrifood System CRPs & Site Integration Countries
EFFECTIVENESS		
8. Continue to document effective elements of the systems research process tested by Humidtropics (e.g. co-location, cooperation, and collaboration among CGIAR and non-CGIAR partners through farmer-driven R4D projects). Emphasis should be on the multiple benefits such as improvements in productivity, better nutrition, scaling of IP concept, the benefits of using an integrated approach.	Produce evidence-based analysis documents. Then revise them based on independent review.	Humidtropics managers and core partners
9. Humidtropics, has generated a lot of tools, processes, technical, institutional innovations as new research outputs on integrated systems, which should be recognized as a body of knowledge that contributes to IPGs, demonstrating their potential for reaching the CGIAR goals.	Some if not all the Humidtropics processes such as situation analysis, the tools in TOSA and listed publications, should be tabled for recognition as IPGs.	Humidtropics managers
10. Experiences and current implementation of RBM in Humidtropics should not only be shared but where possible transition it to site integration efforts because the Program already is doing a similar thing in five of the six site integration ++ countries and in the vast majority of the 20 site integration countries.	Document lessons learned from using RBM to implement and manage programs.	Humidtropics managers and core partners
11. In Platform-based entry point identification, research planning and M&E, there is need to increase attention to widely accepted features for a sustainable intensified agricultural system (e.g. livestock, ecosystem services).	During 2015-16, develop and test mechanisms to increase scientist participation in Action Sites by the relevant systems scientists in Platform meetings in order to integrate explicit knowledge and tools from counterpart CRPs (e.g. Livestock and Fish; Water, Land, and Ecosystems). Integrate tested mechanisms in future systems R4D programs.	Humidtropics Action Area Coordinators; Lead Centers of post-2016 Systems Flagship Projects

1 Introduction

1.1 Evaluation Context

Humidtropics was approved by the CGIAR Fund Council in October 2012, financed since July 2012, launched in December 2012, and started by end of January 2013 when the Executive Office Team was put in place. Therefore, the Program effectively has been under implementation for about two and a half years when the CRP-Commissioned External Evaluation (CCEE) started in April 2015.

CRPs were initiated as part of the CGIAR reform process that was agreed in Maputo at the CGIAR Annual General Meeting in 2008. The CRPs were conceived as large, long-term, multi-center and results-oriented research programs that place the link between research and development at center stage. The System-Level Outcomes (SLOs) to which the CRPs should contribute, are formulated in CGIAR's Strategy and Results Framework (SRF), initially approved in 2011. During this evaluation, the CGIAR Funders Forum approved a revised framework in May 2015 for the period 2015-2025 after a decision in the Fund Council Meeting in Bogor at end of April 2015. The new SRF identifies three main goals: reduce poverty; improve food and nutrition security for health; and improve natural resource systems and ecosystem services. The CCEE Team observed that this remains consistent with the Humidtropics main entry points of improving poverty status and ecosystem integrity status in the Humidtropics ToC.

At its meeting in May 2010, the Consortium Board approved 11 then so-called Mega Program (MPs) concept notes, which were developed into full proposals². The original planning timeframe for MP1.2 (Humidtropics) was 20 years with an initial six-year period to establish an operational framework with essential management, communication, baseline information, monitoring and evaluation mechanisms. When the Humidtropics Proposal final version of August 15, 2012, was approved by the Fund Council in October 2012, it became one of the 15 CRPs (number 1.2) and its anticipated timeline was reduced to 15 years with an initial phase of three years and budgets subject to annual fund allocations based on availability. The CCEE Team observed that the time from concept note to actual implementation was almost 3 years. The core aspirations related to poverty reduction and environmental degradation remained throughout the various draft proposals into the final version but the final version compromised the originally anticipated time needed to establish the operational framework and start implementing this complex and ambitious Program.

Humidtropics is one of three "systems" CRPs led by the International Institute of Tropical Agriculture (IITA). The Program is implemented by eleven institutional partners including AVRDC, Bioversity International, CIAT, CIP, FARA, *icipe*, ICRAF, IITA, ILRI, IWMI, and WUR. The core partners and governance arrangements remained the same since 2013, but the Program structure continues to change dynamically in response to evolving guidance from the CGIAR Consortium Office (CO).

1.2 CCEE Purpose, Objectives and Scope

At the CGIAR Fund Council (FC) meeting in November 2013 in agreement with the CGIAR Consortium Board (CB), it was decided; "that the call for the second round of CGIAR Research Programs and full proposal development should not be initiated until after the Mid-Term Review has been completed and all current CRPs have undergone **some form of external evaluation**". This evaluation has taken place about 2.5 years after the start of the

² <http://bit.ly/1nbicXB>

program and as per the ToR. It is therefore mainly formative³⁴, evaluating whether processes, activities and outputs are on track and the likelihood that they will lead to envisioned results rather than a summative form of evaluation that looks at the achieved results in terms of short and medium term changes that resulted directly from Program interventions.

The specific purpose and objectives of Humidtropics' CCEE were to:

1. Provide useful evaluative information to Humidtropics relevant for assessment of performance leading into a full proposal for the second CRP funding cycle. All CRPs are undergoing mid-term evaluations to inform the upcoming second call for CRP proposals in early 2016, which will result in a substantially revised set of CRPs to be initiated in 2017.
2. Inform Humidtropics' appraisal process by Humidtropics partners, CO, ISPC, and Fund Council in particular with respect to:
 - a) Verification of the plausibility of achieving results through Humidtropics' ToC, related Impact Pathways, and main research areas, as these have been manifested since the program's approval in 2012, and through subsequent programmatic adjustments made in response to ongoing CGIAR system reforms.
 - b) Assessment of the adequacy of systems in place for good organizational performance and responsiveness related to governance, partnerships, collaboration, staff, management, planning, monitoring, finance, and accountability.
 - c) Assessment of the plausibility of the integrated systems approach adopted by Humidtropics. This includes research on new methods, approaches, and tools designed to: improve the capacity to innovate among systems actors; enhance the ability of women and youth to participate in identifying and prioritizing problems and opportunities; experiment with social and technical systems innovations; share knowledge that improves the sustainable intensification of dominant production systems; and support scaling up of innovations towards achieving IDOs and long-term impact.

As the Lead Center of Humidtropics, IITA contracted this CCEE similar to five other CRP evaluations with support from the IAE to assess progress in implementation of Humidtropics, and to verify the plausibility that the approach, ToC, impact pathways, partnerships, finance, governance and management arrangements will deliver the expected results that lead to impact on poverty status and ecosystem integrity. The main purpose of the CCEE is to evaluate how the Program is being implemented and to enhance the contribution that Humidtropics is likely to make towards reaching the CGIAR SLOs through its integrated systems research approach and unique partnership platforms in tropical Americas, Asia and Africa. Based on the ToR, the evaluation findings are meant to reinforce the principle of mutual accountability and responsibility among Program leaders, donors, and partners for improving Program relevance and efficiency, and to promote learning among Humidtropics partners and Program stakeholders. However, with the recent development that Humidtropics will discontinue as independent CRP but where elements of systems research will be included in a series of new Agri-food System CRPs and possibly as part of "site-integration", the CCEE scope changed to include evidence about the merits of pursuing key elements of the Humidtropics approach.

The scope of the CCEE covered the implementation of Humidtropics research activities and

³ Definitions of different types of evaluations (p. 9) by L.G. Morra-Imas, R.C Rist (2009), *The Road to Results: Designing and Conducting Effective Development Evaluations*, The World Bank are used which are similar to IEA.

⁴ The IEA Glossary of Evaluation Terms defines the terms formative and summative as follows: "Formative evaluation focuses on program/project implementation and is improvement - oriented". "Summative evaluation focuses on assessing worth of the program/project lessons learnt (results and consequences), for instance to enable assessments with respect to change, continuation or enlargement of the program/project." (CGIAR Standards for Independent External Evaluation, 2015, p. 21).

related processes, funded through Window 1⁵, Window 2⁶, Window 3⁷ and Bilateral⁸, but focused primarily on Windows 1 and 2, while taking into consideration the effect of the chronology of the Program evolution and budget cuts experienced during the course of implementation. Windows 3 and Bilateral programs are based on contractual Agreements between a donor and a CGIAR Center, and have their own objectives, management arrangements and reporting requirements beyond the control of CRP leadership, and are mainly mapped onto Humidtropics, especially when not operational in its four Action Areas such as in the case of Africa RISING. As the CCEE looks at the current processes and implementation of the Program, it limited its scope to Windows 1 and 2 although it found during the course of the CCEE (see later) that in cases of co-location such as with CIALCA, and integration such as SSA-CP, there are mutual benefits and close collaboration at the Action Site level.

Humidtropics' core partners include seven CGIAR and four non-CGIAR organizations in an expanded global formalized knowledge network that includes a large number of local and national partners that tap into the combined strengths of the different core disciplines the partners with their recognized expertise. Emphasis was also placed on the plausibility of the integrated systems approach and its potential to deliver research from development outputs that contribute to development outcomes that lead to expected development impact.

The dimension of this evaluation that will focus on the new programmatic approach is formative and process-oriented, and was taken to assess the relevance and efficiency of Humidtropics and the likelihood of its effectiveness in contributing to the CGIAR SRF. It will seek answers to the question of whether Humidtropics is well designed and positioned to help the CGIAR contribute to the achievement of the SLOs at scale. The CCEE looked at the process, research and analytical rigor in the development of impact pathways including the plausibility of linkages between outputs and outcomes to the IDOs, and beyond towards the SLOs, and the assumptions including those that relate to external factors that are crucial for the planned outcomes and impact. This dimension seeks answers to the question of whether the ToC is plausible and implementable, and if there is a comparative advantage of the CGIAR in this area. The evaluation examined the extent to which the challenges for linking research outputs to development outcomes and scaling out promising results are addressed. The evaluation also takes into account the extent to which gender analysis is incorporated into research design and targeting, dissemination strategies and future analysis of results.

Partnership approaches, capacity development and communication strategies were examined regarding their efficiency for overcoming constraints to adoption and sustainability of results and enhancing the likelihood of impact. Organizational performance was primarily evaluated on efficiency and effectiveness with a focus on Program design, structure, partnerships, finance, collaboration and processes from the organizational and management point of view. The evaluation team tried to provide answers as to whether Humidtropics has the resources and capacity to implement the Program. The evaluation also tried to assess how learning helps to influence improvements, especially with regard to research, partnerships, governance and management, skills, and resource requirements, and how the Program allows the engagement of key partners in a dialogue to increase ownership and common understanding about how goals were to be achieved.

5 Window 1 = donor funds provided to the Fund Council, which allocates them to the CRP.

6 Window 2 = donor funds provided to the Fund Council, earmarked for the CRP.

7 Window 3 = donor funds allocated directly to a CGIAR Center for specific activities, which maps them to the CRP.

8 Bilateral = donor funds allocated directly to a CGIAR Center mapped onto the CRP.

1.3 CCEE Report Structure

The CCEE report proceeds as follows. The next chapter presents the CCEE evaluation process, introduces the CCEE Team, outlines the key evaluation assumptions and propositions used by the team to inform the design and approach to the evaluation, explains the main evaluation criteria, lists the main and sub evaluation questions, describes the evaluation methods, and concludes with the site selection criteria. Chapter 3 gives an overview of Humidtropics interlaced with CCEE Team perspectives where applicable. The Chapter introduces Humidtropics' approach and advancement to integrated systems research progressing from its evolving theory from the eighties, shows the development of its goals, lists the main hypotheses and research themes, presents the programmatic framework, and describes the implementation arrangements in response to the changing context. Chapters 4 provides in much greater detail with examples from the field, the achievements that have been made by the Humidtropics under each evaluation criteria of Relevance, Efficiency, Quality of Research, and Effectiveness according to the CCEE Team findings. Chapters 5 and 6 provide the conclusion and recommendations respectively, related to the eight evaluation sub-questions clustered under the four main evaluation criteria. The team considered alternative presentations as a matrix either by research question or by evaluation criteria but decided that there is merit in showing the logical progression to recommendations allowing easy comparison between the evaluation questions and categories.

The report is accompanied by two “standalone” ANNEX documents, one that contains all the relevant CASE STUDY REPORTS, which provide details about the four Area-Based Flagship Projects in CAC, ECA, WA and CM, and four case studies under the Crosscutting Flagship covering: global synthesis, strategic nutrition research, systems innovation and gender research. The CCEE Team conducted the two types of case studies, one focused on specific Action Sites, and the other on crosscutting research issues such as gender and capacity to innovate (**See Annexes 10.1 – 10.8**). The list of Case Studies includes:

A. **Area-Based Flagships:** Focus on the following selected countries:

- ECA: Uganda, Rwanda and DRG;
- WA: Nigeria;
- CAC: Nicaragua;
- CM: Vietnam, China, Thailand (less detailed because these were based on document review and virtual in-depth interviews since no site visits were undertaken).

B. **Crosscutting Flagship:** Focus on a synthesis of key issues that have been addressed because of Humidtropics interventions with respect to each crosscutting issue:

- Global Synthesis;
- Strategic Nutrition;
- Systems Innovation;
- Gender.

The second standalone annex (**Annex 11**) contains a detailed list of all Humidtropics staff in all the Flagships, their qualifications, years of experience, time allocation to Humidtropics, etc. The latter is summarized in the main body of the report as a Bar Chart and a Summary Table outlining the same in Section 4.3.2 under Research Leadership and Staffing.

A detailed bibliometric analysis is available in **Annex 9**, which also provides a list of publications and book journals produced by Humidtropics.

2 Evaluation Process, Design and Methodology

2.1 Evaluation Process

The CCEE took place in five sequential phases. It started on April 13, 2015, with a preparatory phase including a virtual meeting with the evaluation manager to bring the team members together for the first time to discuss the ToR and evaluation expectations and process. Then the team met in Nairobi at end of April during the Inception Phase to develop the Inception Report that included an Evaluation Matrix based on the ToR, some key informant interviews online and in person and initial document review, which specified the timeframe and methodology to respond to the agreed-upon overarching question and sub-questions during the Inquiry Phase.

The Inception Phase ran from April to May and concluded with an Inception Report in consultation with Humidtropics management. Upon the Inception Report approval that took into consideration the comments by IEA and its consultants, the team initiated the Inquiry Phase with further document review and field visits to the selected Action Areas. The field visits started in Nicaragua in June, followed by Uganda, Rwanda and DRC, and concluded with a “write-shop” at IITA headquarters in Nigeria in August. The Inquiry Phase was concluded in September 2015, and besides the field visits, included virtual and face-to-face in-depth interviews, documentation review, and online questionnaire survey among the main methods of inquiry. The Draft CCEE Report was submitted to IEA through the evaluation manager on September 15, 2015. The CCEE Team Leader also made a presentation of the key findings to the IEA, Fund Council and Consortium Office via Skype in October 2015. Incorporation of feedback from the IEA on the draft report took place between December 2015 to February 2016 to produce and submit the Final CCEE Report.

2.2 Evaluation Team

The CCEE team included three members: Dr. Rosern K. Rwampororo (Team Leader), Dr. Christine Negra, and Dr. Eric Kueneman. As shown in the short biographies in the standalone **Annex 8**, the team combines different areas of expertise relevant to the Humidtropics CCEE and specified in the ToR: Results-Based Management and Evaluation; Sustainable Intensification; and Institutional Innovation, respectively. The evaluation manager, Dr. Eric Koper from the Humidtropics Executive Office, supported the team.

2.3 Key Assumptions and Propositions of the Evaluation Approach

The CCEE approach was informed by the following key assumptions and propositions:

Assumption 1: The CGIAR reform in 2008 placed the link between research and development at center stage for its future set of results-oriented research programs. The subsequent assumption is that this shift towards a research for development paradigm will become the main basis for investments. As such, the delivery of research outputs that primarily contribute to the development of a body of knowledge subject to expert-review alone is not sufficient to warrant the investments when emphasis is on change of development status with accountability to donor and recipient societies. This is also congruent with the CGIAR SLOs and IDOs expressed in the recently approved SRF that is in close alignment with the 2030 agenda for Sustainable Development and the Sustainable Development Goals⁹. The key assumption of the CCEE Team is that the evaluation will need to take a research for

⁹ Final details of the Sustainable Development Goals at <https://sustainabledevelopment.un.org/sdgs>

development perspective or lens when evaluating the implementation status of Humidtropics rather than a research only lens. In this perspective, the production of high quality research outputs is still important but their relevance to development and society are paramount.

Assumption 2: Integrated systems research as implemented by Humidtropics looks at all the components of the farming system: the related institutional environment encompassing whole and various value chains and the social and environmental living environment and their possible needs for improvement. CGIAR's international research efforts can synergistically rather than competitively benefit from and contribute to research and development at site, local, national, and regional levels. This also requires more and closer engagement with large sets of stakeholders and different research and development disciplines and sectors as integrated systems such as cocoa-based systems often cross boundaries, which could serve as extrapolation domains. It is thus assumed that investments in multi-stakeholder programs such as Humidtropics has the potential for comparative advantage in terms of investments towards the agricultural sector as a whole inclusive of CGIAR but not exclusive to it. The Program could also be initially focused on a local problem but with potential to scale to a much larger extrapolation domain, especially when designed as such and with the engagement of stakeholders that operate at wider geographical levels. Therefore, the key assumption is that Humidtropics' implementation is positioned at a higher level of aggregation that is closer to development action than traditional farming systems and commodity-oriented research whose research outputs could be part of an integrated set of systems interventions at farm and single value chain levels. Consequently, the CCEE Team assumes that Program implementation needs to be evaluated holistically in terms of the multi-stakeholder, and disciplinary processes and engagement inclusive of farmers and institutions and the potential for growth.

Assumption 3: Research for development is iterative by default where one solution may create another problem or create another initiative. The complexity increases when more problems and solutions compete for resources such as money, land and time typical in most smallholder production systems in the humid tropics. Trade-offs and synergies are thus inherent when trying to change a farming system. For example, the introduction of a new maize variety for cash may compete with introduction of cassava for food security while both may negatively affect the environment. The assumption is thus that often used linear models of research to impact such as from discovery to delivery to scale is flawed when looking at the systems as a whole. It would make more sense to evaluate how the systems change in relation to addressing the challenges and the contribution being made to the anticipated development outcomes and look for the contributing elements.

Proposition 1: Following on from Assumptions 1 and 2, it could be argued that integrated systems research is a form of applied research that encompasses a "holistic understanding of innovation"¹⁰. Whereby: a) technological product research and development applied to innovations at farm and institutional levels; b) technological process research focused on value addition; c) non-technological process research is aimed at institutional innovation; and d) non-technological product research on new type of services. Therefore, the CCEE Team makes the proposition to evaluate Humidtropics by taking into consideration:

- Research to develop tools, methods and approaches that develop a system's capacity to innovate at farm and institutional levels to identify problems and opportunities (systems analysis);
- Research that invests, tests and experiments with alternative social and technical systems interventions;
- Learning from and exchange experiences, with a focus on women and youth to participate.

¹⁰ Adapted from Fraunhofer Institute for example (p. 11) at <http://www.isi.fraunhofer.de/isi-wAssets/docs/i/en/pi-mitteilungen-en/pi33e.pdf>

Proposition 2: Considering Assumption 3, evaluation of systems programs are better conducted in relation to how a particular system has changed its potential to achieve anticipated development outcomes, and how the various changes within the components that constitute the system may have contributed. Given the above assumptions and propositions, for Humidtropics, it would be too early to assess such systems change results. Therefore, the main proposition is to evaluate its processes that may stimulate systems change in the future, which relates to its implementation of RBM.

2.4 Evaluation Criteria and Questions

The CCEE addressed the following evaluation criteria: (A) relevance, (B) efficiency, (C) quality of research, and (D) effectiveness. Crosscutting Program areas related to gender, partnerships and capacity development apply to all four but with different emphasis and are also addressed throughout the report where relevant. During the inception phase, the CCEE Team reviewed an initial list of twenty-six possible evaluation questions proposed in the ToR (**Annex 7.1**) and reduced it to one main question relating to eight sub evaluation questions in order to focus the scope of the evaluation.

The main evaluation question is:

“To what extent does Humidtropics’ integrated systems approach add value to the CGIAR portfolio?”

The eight sub-questions (**Table 1**) relate to the four evaluation criteria as follows:

Table 1: Data types and sources used to answer the eight sub evaluation questions

Sub-Evaluation Question	Data Type	Data Sources
RELEVANCE		
1. To what extent is Humidtropics strategically coherent and consistent with CGIAR’s SRF, considering its crosscutting issues of gender and capacity development and the rationale and coherence of Flagship Projects?	<ul style="list-style-type: none"> Alignment of IDOs with CGIAR Strategy and Portfolio. Listed expected outcomes linked to IDOs. Alignment with country strategies. Relevance of research activities to specific problems in the targeted four Action Areas and Action Sites in the humid tropics. 	<ul style="list-style-type: none"> CGIAR SRF Revised Humidtropics Programmatic Framework Action Area and Action Site project records National strategies Systems Analysis Partner POWB and Annual Technical Reports Cluster 4 Proposals Interviews
2. To what extent is the partnership design and targeting based on plausible assumptions for program delivery of results?	<ul style="list-style-type: none"> List of partners engaged in the Action Areas and Action Sites – both local & international List of partners & their engagement at Action Area and Action Site levels 	<ul style="list-style-type: none"> IITA and core partner records Flagship presentations Focus Group Discussions Interviews
EFFICIENCY		
3. To what extent is Humidtropics effectively managed with appropriate staff, governance and	<ul style="list-style-type: none"> Resources allocated to projects activities within the Flagship & Action Area 	<ul style="list-style-type: none"> Program & financial records Findings from Focus

Sub-Evaluation Question	Data Type	Data Sources
management, institutional arrangements, and internal processes and conditions, for assuring high quality research outputs, considering gender and generations, funding, documenting and disseminating both positive and negative findings, and monitoring and reporting progress? ¹¹	<ul style="list-style-type: none"> Decision-making mechanisms to optimize use of resources Institutional & governance arrangements over time in response to external demands and internal insights Funds allocation and performance 	<ul style="list-style-type: none"> Group Discussions Interviews Partner POWBs and Annual Financial & Technical Reports
QUALITY OF RESEARCH		
4. To what extent does Humidtropics' research approach, design and outputs reflect high quality, up-to-date scientific thinking, knowledge, and innovation, relevant to integrated systems problems and opportunities, including these for women and youth?	<ul style="list-style-type: none"> Plausible integrated solutions and integrated system research outputs Systems trade-off 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 	<ul style="list-style-type: none"> Workshop summaries Annual Reports Publications in the wider sense, including journal articles (ISI and other), book chapters, reports, guidelines, blogs, videos and presentations. R4D partner records Interviews & direct observations of research trials
5. To what extent have Humidtropics research for development activities been appropriately prioritized, effectively coordinated, and implemented, given key contextual factors, legacy projects, and financing needs for long-term research programs and key partnerships?	<ul style="list-style-type: none"> Prioritization of research needs in line with resource availability Quality of research outputs Involvement by senior scientists in research Contribution to global leadership role in integrated systems research 	<ul style="list-style-type: none"> Final and Extension Proposal Annual Reports Financial alignment to "systems" approach Partner POWBs and Reports Systems' Analysis Reports Field visit & IP discussions In-depth Interviews Staff lists
EFFECTIVENESS		
6. To what extent does Humidtropics effectively collaborate with its partners to achieve planned outputs and outcomes, maximize synergies, and enhance partner capacity?	<ul style="list-style-type: none"> Role of partners at R4D and IP levels Capacity to innovate at farm, institutional & landscape levels Scaling up of innovations Information sharing platforms Change agents or coalitions Key Humidtropics implementation activities 	<ul style="list-style-type: none"> Core partner records Findings from Focus Group interviews In-depth Interviews Other such as Consortium Office and IEA studies, reports and records.
7. To what extent does the overarching ToC and Impact Pathway translate into site-relevant processes and research for development?	<ul style="list-style-type: none"> Platform evolution in the key elements of an integrated system Gender & Youth livelihood profiles 	<ul style="list-style-type: none"> Final and Extension Proposal Area-based Flagship Projects records Core partner records

¹¹ Note that the concurrent CGIAR internal audit of Humidtropics addressed related issues in consultation with CCEE as appropriate.

Sub-Evaluation Question	Data Type	Data Sources
	<ul style="list-style-type: none"> Trade-offs Documenting Systems Analysis tools such as the RAAIS 	<ul style="list-style-type: none"> Cluster 4 design & performance data Findings from Focus Group interviews In-depth Interviews
8. To what extent does Humidtropics' integrated systems approach plausibly lead to better and more holistic results, and provide additional value to the CGIAR's capacity to deliver relevant IPGs that lead to impact at scale?	<ul style="list-style-type: none"> Evidence of synergies within and among domains Global Synthesis of data and results from: <ul style="list-style-type: none"> Synthesis of experiences with interventions and scaling-out, ranging from action area to program levels Diverse interventions Lessons learned across the Flagship Projects 	<ul style="list-style-type: none"> Area-based Flagship Projects records IITA and core partner records Findings from Focus Group interviews with R4D & IPs In-depth Interviews

2.4 Evaluation Methods

The CCEE Team used mixed methods to generate and triangulate the findings presented in this report as evidence in answering the evaluation main and eight sub-questions. As the evaluation was mainly formative, methods applied provide insight and evidence into the current processes and activities Humidtropics uses that eventually deliver results as per the Impact Pathway and related ToC. Of special mention is that the CCEE Team decided to develop a series of case studies that would provide richer detail and form part of the evidence-base used in this report. The CCEE Team therefore advises to read the case study reports in conjunction with this evaluation report in order to enhance the understanding of the perspectives and conclusions presented here. The following methods¹² were used to gather information for the CCEE:

- i. **Desk Review:** Quantitative and qualitative information gathered through review of literature and other secondary sources such as the Elsevier Bibliometric Analysis of CRPs in a targeted manner to respond in specified ways to the eight sub questions (Detailed list of documents reviewed in **Annex 7.5**). This also includes a Humidtropics specific Bibliometric Analysis of the quality of a sample of mainly journal publications produced since the start of the program (see **Annex 10**).
- ii. **Key Informant Interviews (KIIs):** Qualitative information related to the relevance and quality of research, likely effectiveness, and aspects of partnership management gathered through formal interviews with the members of the Humidtropics managers, cluster leaders, researchers, core partners, and public and private sector stakeholders (Detailed list of people interviewed in **Annex 7.4**).
- iii. **Site visits:** The CCEE Team visited selected Action Sites in Area-Based Flagship Projects as well as IITA Headquarters. Site visits included direct observation of project activities, meetings with Flagship managers and Humidtropics staff, and interviews with system actors. The detailed criteria used for site selection is in **Section 2.3** below.
- iv. **Case Studies:** The CCEE Team used two types of case studies: (i) case studies focused on specific Action Sites, and (ii) case studies focused on crosscutting research issues such as gender and systems innovations (See Case Study **Annexes 10.1-10.8**).
- v. **Focus Group Discussions (FGDs):** During site visits, the CCEE Team conducted FGDs with over 200 people, who included Platform members of targeted stakeholders such as producer organizations, researchers, universities, and NGOs that participate in

¹² Detailed in the CCEE Inception Report.

the Action Site research activities. The FGDs were useful to assess their general perceptions about awareness of Humidtropics' contribution, and the overall satisfaction, or not (See detailed list of people interviewed in **Annex 7.4.3-7.4.6**).

- vi. **Online Survey:** A targeted online survey using SogoSurveytm was sent to 262 Humidtropics researchers across all the Flagship Projects. The findings were used to triangulate the prevalence on the ideas and perceptions on key issues identified through the KIIs and FGDs. A total of 260 questionnaires were successfully delivered and 152 people (23% female, 76% male) completed the survey (of which three were incomplete), which represents a 58% response rate. The majority of respondents (73%) were either Directors/ Managers/ Team Leaders or Principle Investigators/ Senior Scientists/ Scientists; and the other 27% were Post Doc or Research Fellows (See **Annex 7.2** for the detailed online survey results).

Table 2 below summarizes the number of KIIs, FGDs, Site visits & number of people surveyed during this evaluation.

Table 2: Documents Reviewed and People Interviewed through KIIs, FGDs & Survey

Category	Evaluation Method	Numbers Reviewed/ Interviewed
Number of documents reviewed	Since Inception Meeting	Over 100
Number of people interviewed through FGDs	FGDs during site visits	Over 200
Number of KIIs	Face to face & via SKYPE KIIs	40
Number of R4D and IP Facilitators met	Site visits	5 (R4D) & 14 (IPs)
Number of Senior Researchers	KIIs & FGDs	Over 30
Number of Lead Center Heads	SKYPE-KIIs	10
Humidtropics Management – Executive Office	Face to Face: KIIs	3
IITA Management as Lead Center	KIIs	5
Number of survey respondents	Online questionnaire	152
Total number of people interacted with as part of this evaluation through all the various methods	All mixed methods	Over 400

2.5 Site Visit Selection Criteria

The following criteria, agreed upon by the CCEE Team with the assistance of the Humidtropics Executive Office, were used to select four Humidtropics Action Sites that the Team visited:

- Sites influenced by legacy projects mentioned in the Program proposal where there was likely to be more integrated system research' progress to observe;
- Sites where there was a broad array of Program partners, which would allow for assessment of the extent to which the core concepts and processes of integrated systems research as promoted by Humidtropics are understood and/ or adopted;
- Sites where R4D and IPs are operational and/ or where Cluster 4 projects¹³ have been initiated, which helps to evaluate the plausibility of the Humidtropics approach to prioritize and address development needs and opportunities as per the Impact Pathway and ToC;
- Sites where there has been noticeable work on gender and generations, which would allow for assessment of how this crosscutting theme has been implemented;

¹³ Cluster 4 projects receive grants issued directly to Action Sites to support research from R4D Platforms.

- Sites where document review and virtual interviews produce divergent information and perspectives, suggesting a need for direct observation.

Application of these criteria was complemented by considerations of cost effectiveness in planning field visits (e.g. proximity of multiple field sites, especially as most Humidtropics Field Sites are remote requiring significant travel on difficult roads). This consideration supported the decision that, where possible, two or more CCEE Team members participated in all site visits, both to maximize the value of ground transport and other costs, and also to ensure balanced attention to different aspects of the CCEE. The following site visits were made for the CCEE:

- **Central America and the Caribbean (6-11 June 2015):** All CCEE Team members visited sites in Nicaragua for several days, including Managua where the CAC Flagship Management Team is based. The findings on this case study are in **Annex 10.1**.
- **East and Central Africa (24 June to 5 July 2015):** Rwampororo & Kueneman visited sites in Uganda for several days; all CCEE Team members visited sites in Rwanda for two days; and Rwampororo & Negra visited South Kivu sites in DRC for two days, including Bukavu, the base of the ECA Flagship Management Team. The findings on these Action Sites case studies are in **Annex 10.2**.
- **West Africa (9-14 August 2015):** Kueneman & Negra visited for one day the Osun site in Nigeria prior to a writing workshop in Ibadan, while the Team Leader stayed behind in Ibadan to focus on tying up loose ends to do with the CCEE budget and the survey. The findings on this Action Site case study are in **Annex 10.3**.

While time and resources did not permit a site visit to the Central Mekong Area-Based Flagship, Klls and document reviews were used to develop a case study, which is available in **Annex 10.4**.

3 Humidtropics Overview

3.1 Integrated Systems Multi-Level Perspective

The Consortium Office concluded the original portfolio of 15 CRPs in 2010, which included three systems programs: CRP1.1 Drylands, CRP1.2 Humidtropics and CRP1.3 AAS (Aquatic Agricultural Systems). This signaled recognition to revisit the need for research for development that better understands the reality of most rural households who derive their marginal livelihoods from agricultural systems that constitute a variety of crops, with some farm animals often on degraded land and with monetary, labor and water challenges. Some of the Humidtropics Action Areas were identified based on earlier initiatives that had started engaging in systems R4D activities and continued under or were mapped onto Humidtropics such as the Sub-Saharan Challenge Program (SSA-CP) implemented by FARA with support from the EU (W1/W2), the Consortium for Improving Agricultural Livelihoods in Central Africa (CIALCA) with support from Belgium (W3/Bilateral), and Africa RISING under USAID's Feed the Future Initiative (W3/Bilateral). It is evident that Humidtropics has benefited from progress made through these projects, including the establishment of effective partnerships towards the development and validation of innovations for improving livelihoods. Humidtropics itself has added value to these projects by (i) broadening the range of themes to address, including crop-livestock intensification, (ii) enhancing the effectiveness of partnership platforms, and (iii) diversifying the technical skill sets with more emphasis on the social sciences.

CGIAR has a long history with so-called farming systems research (FSR) and the principles, approaches and concepts are well known¹⁴ and progressed to Livelihoods Systems approaches¹⁵ addressing some of the shortfalls and moving away from production of single commodities to whole farms with a nexus between livelihoods and the environment. All these are incorporated in the design and approach of Humidtropics. The Program also incorporates lessons learned from CIALCA, STCP and SSA-CP, which include experiences with IPs and Farmer Field Schools as some were merged. Humidtropics was designed with these experiences and lessons, and added the need for inclusion of research on institutional processes and co-development of social and technical innovations at so-called socio-technical regime level, which refers to the semi-coherent set of rules that orient and coordinate the activities of the social groups that reproduce the various elements of socio-technical systems.

The multi-level perspective on socio-technical transitions¹⁶ (see **Figure 1**) provides Humidtropics' theoretical foundation underpinning its ToC. This ToC views transitions as non-linear processes that results from the interplay of developments at three analytical levels: (1) niches/incubators (the locus for radical innovations); (2) socio-technical regimes (the locus of established practices and associated rules that stabilize existing systems); and (3) an exogenous socio-technical landscape. The Program should thus help systems to experiment with multiple social and technical innovations supported by changes in mainstream regime, changes related to science, knowledge, markets, etc. (**A in Figure 1**). Some of these options shape into more accepted innovations such best-fit technologies (**B in Figure 1**), which in turn influence the need for regime changes (**C in Figure 1**) resulting in a new regime (**D in Figure 1**). This is a continuous and dynamic process that translates into systems integration by encouraging research that helps not only spawn farm or livelihoods innovations (**A in Figure**

¹⁴ There are numerous studies recording experiences with FSR such as by E.W. Gilbert et al (1980). Farming Systems Research: a Critical Appraisal at <http://bit.ly/1nkDqBR>, M. Collins (2000), History of Farming Systems Research, FAO.

¹⁵ D.W. Norman (2002). The Farming Systems approach: A Historical Perspective, presentation at 17th Symposium of the *International Farming Systems Association*, Florida, available at <http://bit.ly/200wviW>

¹⁶ F.W. Geels (2004). From sectoral systems of innovation to socio-technical systems: insights about dynamics and change from sociology and institutional theory. *Research Policy* 33, 897–920.

1), but also needs to influence institutional changes at socio-technical regime level. The latter can accelerate initiation, uptake and scaling of the more promising innovations.

This multi-level perspective is also reflected in the Program design of IPs functioning as multi-stakeholder innovation incubators and R4D Platforms as representative for socio-technical regime institutional systems actors necessary for initiation and prioritization of such innovation incubators, while developing themselves as well. Recent research by Humidtropics advocates the use of multi-stakeholder processes as the distinction between platforms, but also between platforms and other multi-stakeholder groups such as corporations and think tanks is often arbitrary. The essence is that research on multi-stakeholder processes that help to improve these would directly enhance the capacity for systems innovations that lead to development impacts.

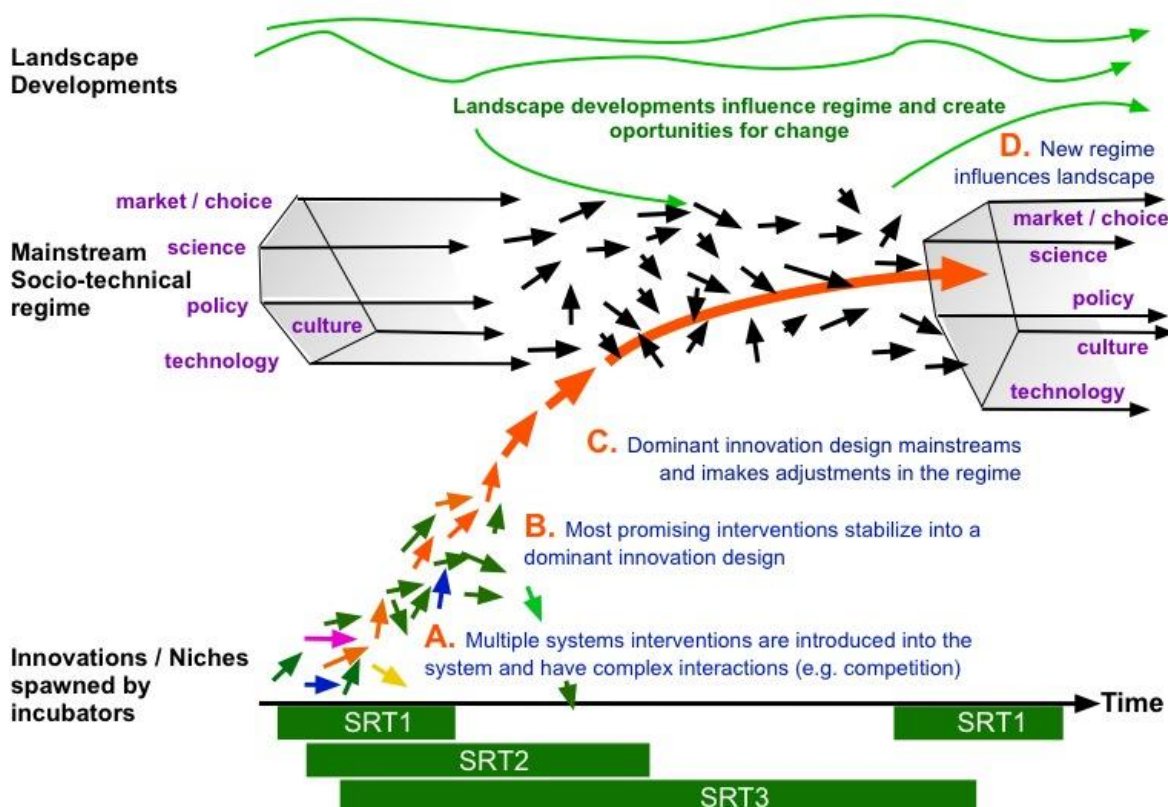


Figure 1: Multi-level perspective on socio-technical transitions adapted from Geels (2004).

A, B, C and D depict the process of innovation development and mainstreaming of most promising ones. The diagram shows that these mainstreamed innovations also reconfigure (different shape) the relative stable but dynamic socio-technical regime. The SRTs refer to Humidtropics' Strategic Research Themes:

- **SRT1: Systems Analysis and Synthesis** is important at beginning and end of innovation processes to find out what exists, what needs to change and what has changed;
- **SRT2: Integrated Systems Improvement** is about experimentation and development of social and technical innovations/niches and support to initial mainstreaming;
- **SRT3: Scaling and Institutional Innovation** researches the processes, especially social interactions and regime changes necessary for an innovation/niche to mainstream and achieve scale towards impact.

The perspective presented here is considered mostly theoretical but the CCEE Team finds it helpful to present it because it informed our understanding of the dynamics, processes, disciplines and levels of interactions that stem from identifying systems' needs for which innovations can be developed that requires changes at multiple levels for mainstreaming and scaling to occur. Typical for models such as this is the simplification of reality, lack of expressed agency, and especially in the model above the starting point. In reality the starting point is some need or opportunity that stems from the socio-technical regime that spawns possible innovations. The subsequent linearity is thus a false representation as the regime continuously evolves and spawns new innovations/niches, which is more reflective of the realities of integrated systems research on the ground. Furthermore, it is innovation not necessarily change, oriented with the process of developing and prioritizing entry and exit points that is opaque. Validation of such a model with Humidtropics experiences and data in the future would improve its potential for practical use, but at this early stage of Humidtropics implementation, the system change would be stuck mainly at point A moving some into point B in **Figure 1**.

3.2 Goal and Hypotheses

Humidtropics implementation of the original proposal (15 August, 2012) effectively started at the end of January 2013 when the Executive Office was established with the Executive Director and Chief Officer Management in place, as mentioned in **Chapter 1**.

The original goal of Humidtropics in the original proposal was:

“To strengthen research and stimulate institutional innovation that increases economic and social returns among rural households adopting enhanced and sustained agricultural production and marketing strategies, while improving the biological and ecological integrity of their natural resource base.”

This was supported by a Global Hypothesis (H^0) and related Component Hypotheses (H^1 to H^{13}) where applicable related to the SRTs as follows:

Global Hypothesis

- **H^0** : A range of livelihood strategies exist across the humid tropics where poverty reduction, balanced household nutrition, system productivity, and natural resource integrity are most effectively achieved and contribute best to human welfare. Advancing these livelihood strategies through market development, productivity improvement, systems integration, and enterprise diversification will have a profound effect upon food and nutritional security, household incomes, and natural resource integrity relating to the 12 Component Hypotheses listed below.

Equity

- **H^1** : Targeted inclusion of vulnerable groups in rural economies, including women, indigenous minorities, youth and elderly, improves their equity, well-being, systems productivity and ecosystem integrity.

Policy, Institutions and Markets (SRT 2.1)

- **H^2** : Institutional and market innovations enable rural communities to adopt promising intensification practices that both improve their livelihoods and foster natural resource integrity (also SRTs 2.2 and 2.3).
- **H^3** : Policies providing security of tenure and enhanced income opportunities will increase rural household investments in improving their natural and biodiversity resource base.

System Productivity (SRT 2.2)

- **H⁴**: Intensification within the humid tropics necessarily involves balancing diversification and specialization at farm and community, and territory levels, trends that must be weighed against natural resource integrity.
- **H⁵**: Increasing productivity that retains and builds natural resource integrity at system level through agroecological intensification requires increasing understanding and knowledge of ecological processes in pest management, soil fertility, plant nutrition, organic and inorganic inputs, and the availability of seed of high-quality cultivars.
- **H⁶**: Well-managed integrated crop-livestock systems provide opportunities to increase income, to improve productivity through improved nutrient cycling, and to recover resource integrity, as feed resources become more available (also SRT 2.3).
- **H⁷**: Integration of high value tree crops and highly nutrient-dense vegetable species within smallholder agricultural production systems provide multiple productivity, income, and environmental and nutritional benefits (also SRT 2.3).

Natural Resource Integrity (SRT 2.3)

- **H⁸**: Providing adequate water through rainwater harvesting, storage, and supplemental irrigation and increasing water use efficiency through locally-adapted germplasm will improve productivity and reduce the market and climatic risks of farming in rainfed areas of the humid tropics (also SRTs 2.1 & 2.2).
- **H⁹**: Interventions aiming at enhancing NRM integrity require immediate benefits in terms of enhanced productivity or income to be broadly adopted (also SRTs 2.1 & 2.2).
- **H¹⁰**: The use and conservation of agro-biodiversity effectively foster greater systems productivity, ecosystem resilience, and livelihood opportunities (also SRT 2.2).

Scaling and Institutional Innovation (SRT 3)

- **H¹¹**: Mainstreaming of high potential socio-technical innovations is enhanced through the establishment of multi-sectoral and interdependent R4D platforms.
- **H¹²**: Multiple social influence, institutional innovations, and marketing strategies that change stakeholder behaviors, including all value chain actors, are required for the scaling of promising socio-technical innovations.
- **H¹³**: Inclusiveness of marginalized groups in scaling strategies requires specific interventions addressing the bias of power, and their limited access to resources and knowledge.

This suite of Component Hypotheses was intended to guide the design and analyses of integrative research activities. It was acknowledged from the onset that it may have varying relevance to different agro-ecologies and communities within the Program's research sites. The CCEE Team found this list of hypothesis helpful in understanding the wide array of research for development subjects that are relevant to Humidtropics' approach, design and implementation. The feedback from ISPC and others throughout the proposal development stages and as part of the annual reports highlight the complexity and ambitions the Program has set out to tackle, and was considered by the CCEE Team when limiting the evaluation's scope. The earlier referred to anticipated timeframe of six years to set Humidtropics up seemed realistic in this context in support of the mostly formative approach to the evaluation.

Although it is too early to gauge the validity of the hypotheses, the CCEE Team observed that Humidtropics engages in research for development relevant to most hypothesis as shown in this report, except for H⁶, H⁸, and H¹⁰. The team learned that crop-livestock work (H⁶) is carried out in some sites, but that much more demand has arisen from systems analysis for livestock improvement as part of systems improvement, and in the future needs much more attention probably as part of a flagship in the Livestock 2nd generation CRP starting 2017. Research on water resource management (H⁸) is mainly carried out by IWMI and largely confined to the sites in Ethiopia, and in retrospect probably better to have implemented this as

part of the WLE CRP. It was difficult to find explicit evidence of the Program's work on agrobiodiversity and eco-system services (H¹⁰) which may be a result of limited investments in these areas but nevertheless the CCEE Team found this something to look into pursuing in the next phase of CRPs by the resulting portfolio of work.

The revised goal in the extension proposal (April 27, 2014) is:

“To improve overall agricultural productivity in a sustainable manner, and transform the lives of the rural poor in the humid tropics.”

There is thus no real change in the essence of the Program from the original proposal to the extension proposal because it retains its main focus on reducing poverty and improving ecosystem integrity. The ToC in the original and extension proposals similarly evolved and was complemented in 2014 by an overarching Impact Pathway that showed the interdependence and hierarchy of the newly introduced IDOs.

Humidtropics' goal is to be achieved through integrated systems research for development with a focus on sustainable intensification, and farmer and institutional capacities to innovate, through partnerships and broad stakeholder participation. The Program brings together the aforementioned CGIAR Centers and non-CGIAR research partners to focus, develop and implement these integrated systems research approaches and undertakings, and engage with a broader set of partners at various levels towards their implementation. The intention is to go beyond individual research action and single component focus in research. This mode of operation brings groups of partners together to work on commonly identified challenges and opportunities in a way that exceeds individual partners' capacities for “systems research” to address complex constraints and opportunities.

The plan and budget for 2013, which was based on the SRTs, was approved in April 2013. However, just when implementation started, there was a call for programmatic restructuring by the CGIAR CO with focus on delivering IDOs. In response, Humidtropics was substantially restructured into the current programmatic framework (**Figure 2**) and included a ToC with Impact Pathway and five Flagship Projects, aiming to deliver on four Strategic Objectives (SOs) with six IDOs. This framework's implementation started in 2014. The four SOs include:

- **Livelihoods Improvement** addresses the issue of improved livelihoods in terms of income and nutrition for rural farm families, and the directly related IDOs concern Income and Nutrition;
- **Sustainable Intensification** concerns increased total farm productivity while respecting natural resources integrity. This is a central and over-riding theme with contributions and implications for the other IDOs. It is linked to IDOs on Productivity and Environment;
- **Gender Empowerment** concerns empowering women and youth with better control over, and benefit from integrated production systems, and it is directly linked with the IDO on Gender;
- **Systems Innovation** addresses the issue of enhanced capacity for systems innovation and corresponds to the IDO on Innovation (Capacity to Innovate).

In reviewing the research performance, the CCEE Team therefore put particular emphasis on the plausibility of the approach and the extent to which programmatic changes, made in response to major budget cuts, were appropriate. Specifically, the CCEE assessed how budget and Program changes affected the implementation of planned key activities, and the likelihood of achievement of Flagship-level results that ultimately are supposed to lead to expected impacts. The CCEE Team noted that the shift to IDOs actually brought more clarity to Humidtropics as also found by the ISPC and Consortium Office in their feedback in the June 2013 meeting and resulting documents. Similar to the earlier work by CGIAR on farming

systems, the shift from traditional reductionist thinking and approaches typical for the biological sciences is blended and enriched with an inclusive social sciences paradigm in systems research. This blend is reflected in most of the Humidtropics documentation and for those with reductionist affiliation may be considered too vague and ambiguous, and for those with inclusive affiliation too limiting. As such the CCEE Team observed that the Program progressively has been able to find a compromise, which helps to better understand what it tries to achieve, why and how.

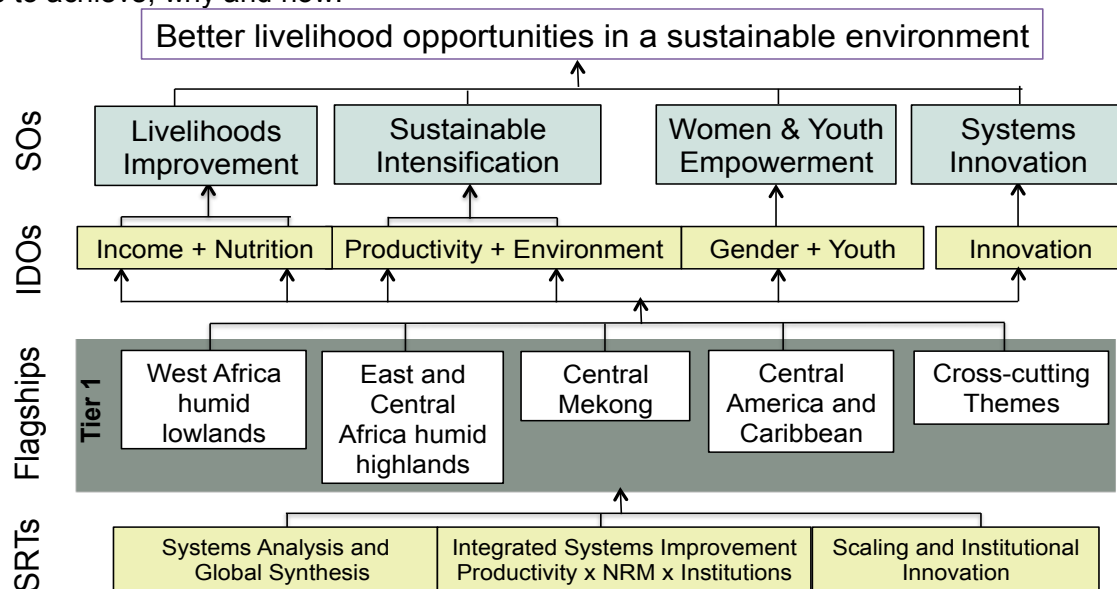


Figure 2: Humidtropics Programmatic Framework 2013 to date

The SRF 2010-2015 states that:

“...Research by CGIAR centers will generate research outputs, i.e., international public goods, for instance in the form of new understanding or technology. The CGIAR will be accountable, with its research partners, for the delivery and quality of these research outputs, both in relation to scientific standards and their potential for contributing to SLOs. These outputs, most often in some combination of technological, management and institutional innovations, will then be applied with partners who may include potential users. Research outcomes will include the performance of these outputs when applied locally and their degree of uptake...”

The CCEE Team’s opinion on the change of the Program design to the new Programmatic Framework is that it is well aligned to contribute to the CGIAR SRF. The Team supports the ISPC Commentary on the Humidtropics Extension Proposal 2015-2016, which states that:

“...The linkages have been well thought through, particularly between income and ecosystem integrity. Figures on levels of poverty and land degradation are compelling...”

“...This section of the proposal clearly shows how common IDOs will contribute to the CRP objectives and to the SLOs...”

During 2015-2016, emphasis is on supporting research initiatives that stem from IP research priorities, and on extended partnerships to enhance participation and uptake. The findings from the CCEE will help to inform management decisions to set a clear direction to structure research in the Flagship Projects.

3.3 Overarching Theory of Change

Humidtropics Overarching ToC (**Figure 3**) 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. As part of system analysis, specific Action Sites of Humidtropics could be mapped onto the (red circles) on the poverty/ecosystem integrity nexus inclusive of understanding the productivity, institutional effectiveness and natural resources status (implicit in the red circle). Systems interventions and innovations (white rectangle) need to be developed and introduced at the sites in order to transform their respective baseline situations to the idealized position (green circle). This desired position is characterized by high productivity, high natural resources integrity and effective institutions; leading to a better standard of living for smallholder farmers, and enhanced sustainability within the production system.

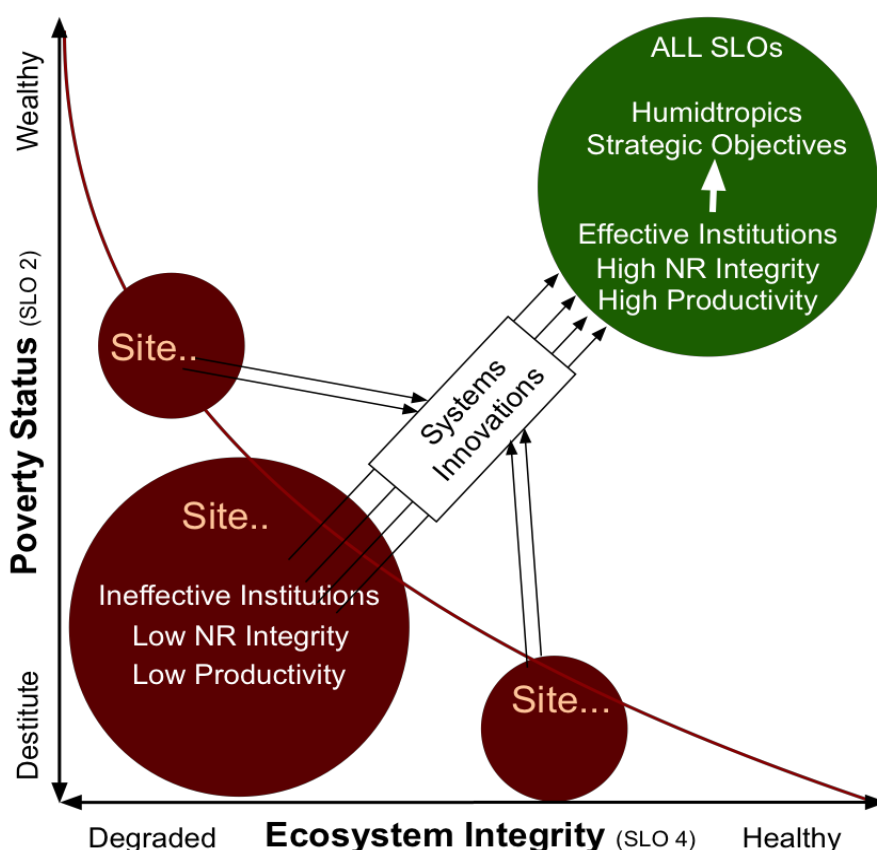


Figure 3: Humidtropics Overarching Theory of Change

The logic presented is compelling but the CCEE Team observed that there is a real challenge in quantifying and qualifying these “on the ground” although efforts have been made by the different teams to do so. It is important to note that the Program recently developed Key Performance Indicators for Poverty and NRM Status together with CIALCA using data in the Field Sites in the ECA Flagship Project, even though there is still a lot of refinement yet to be done. This will be important to consider transiting to the 2nd Generation of CRPs as the approach to capture and monitor progress of these development changes will help to explain the Program’s contributions.

3.4 Overarching Impact Pathway

Working and living in the humid tropics' environments and systems is inherently complex which should be embraced by integrated systems research if to effect real changes. As also referred to in **Section 3.1** there are multiple intervention possibilities (incubators/niches) with related pathways that display trade-offs and synergies between competing use of resources and benefits based on different entry points and priorities. The Program uses an overarching Impact Pathway incorporating all IDOs (**Figure 4**). The overarching Impact Pathway is the basis for more detailed Impact Pathways that result from priorities and entry points established for each research location as part of systems analysis and multi-stakeholder priority setting processes.

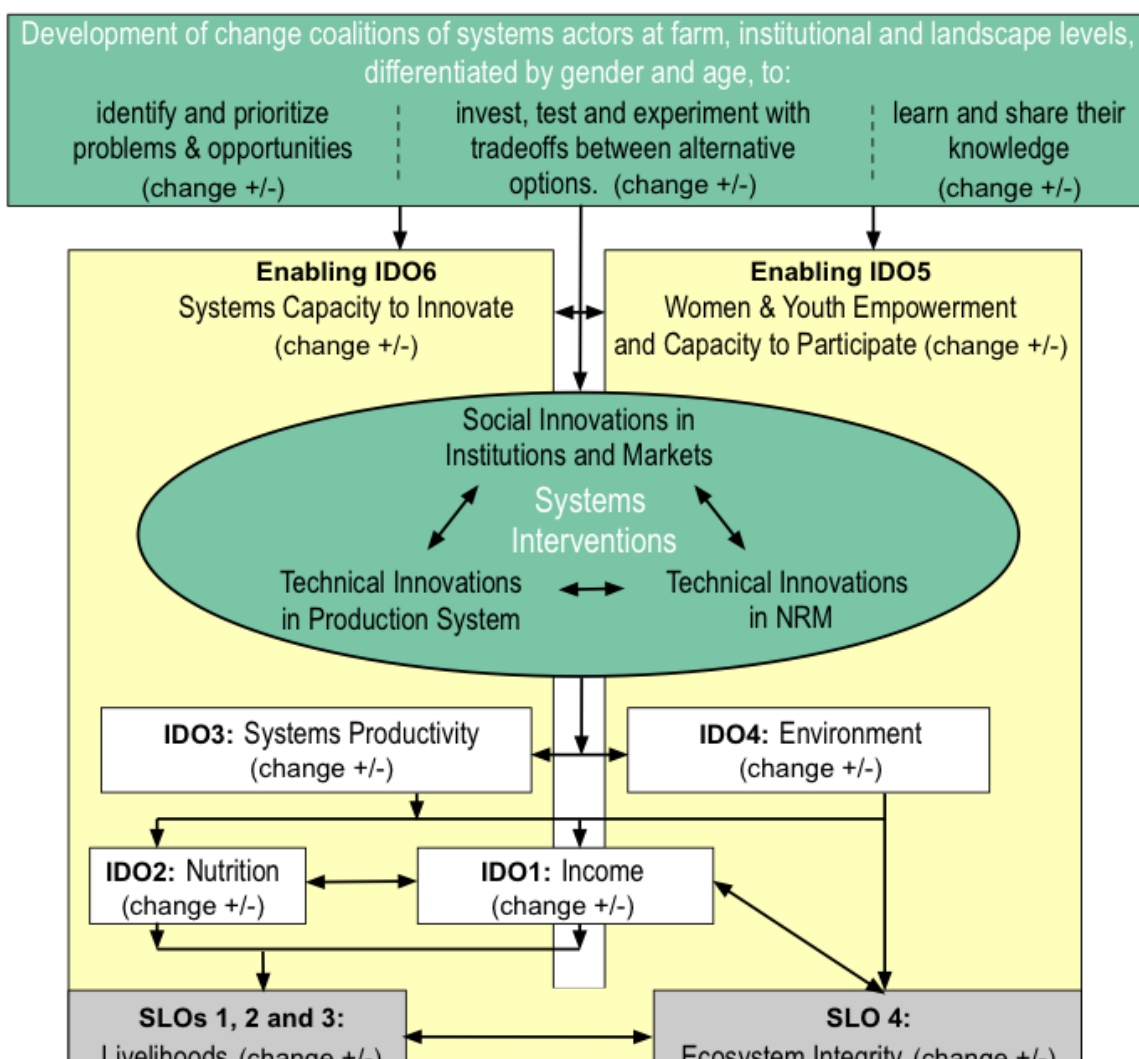


Figure 4: Humidtropics Overarching Impact Pathway

The starting point of the overarching Impact Pathway relates to activities needed to develop change coalitions of systems actors at farm, institutional and landscape levels such as R4D Platforms and IPs, and develop tools, methods and approaches that enhance their capacity to prioritize, experiment and learn. This improves the system's capacity to innovate (see IDO Innovation), empowers women and youth, and ensures their participation (see IDO Gender) to work on systems interventions. Based on the identified problems and priorities combined with desired development outcomes, a series of site-specific social and technical innovations will be developed through multiple, often-competing systems interventions. The innovations stimulate increased system productivity, which lead to the realization of IDOs on Income, Nutrition and Environment – all three contributing to improved livelihoods and ecosystem

integrity. The enabling IDOs on Innovation and Gender influence the other IDOs throughout and also result in changes in livelihoods, equity and empowerment status.

At the Flagship and field levels, the core of the Impact Pathway is the integrated systems research addressing key components and aimed at enhancing income, livelihoods and environment in respective locations. Partnerships, developed through R4D Platforms and IPs, will be central in this research.

The CCEE Team particularly liked the clarity and simplicity of **Figure 4** where the areas in green indicate Humidtropics research on: a) tools, methods and approaches to enhance a systems capacity to innovate and women and youth to participate, and b) specific systems interventions that change productivity, institutional effectiveness and natural resources. It clearly shows that the interdependence and hierarchy of the IDOs with possible trade-offs and synergies based upon which entry points are chosen. In addition, here the CCEE Team would like to comment that the realities on the ground are more complex and evidence of attempting to translate this generic pathway into more situation specific ones was mainly found in the platform research proposals within Cluster 4 of area-based projects, which are also more in line with the RBM implementation. The CCEE recommends that the CGIAR consider depicting similar sub-IDOs and IDOs in the new SRF as Humidtropics did, since this helps to explain the dynamics of multiple interventions that can lead to different results, and makes a strong case for taking an integrated systems lens.

The CGIAR SRF specifies the development outcomes to which Humidtropics research outputs and eventual outcomes are expected to contribute. Humidtropics has produced a comprehensive mix of research outputs as shown in its Annual Reports¹⁷, where Annex 1 provides a summary of outputs produced following the CO criteria, and where evidence is referenced and available online¹⁸. The CCEE Team valued the easy access to process and final documents in the Humidtropics Repository¹⁹, where it could easily sample reports, publications, spreadsheets, images and videos for review and evidence. It is evident to the CCEE Team that the outputs are of varying quality and level of completeness covering a broad range of approaches and disciplines. The Program has experimented with many different tools, methods and approaches as it set out to do to enhance systems stakeholders' (farmers and institutions) capacities to analyze their situation and system and set priorities. At this stage, the Program is trying to synthesize the experience into products that can be used by other projects to support their systems analysis and priority setting. As for the systems interventions research, this only started to take shape beyond the legacy work after systems analysis was concluded and covers priorities mainly through platform research initiatives funded in Cluster 4 of the Area-Based Flagship Projects. Research outputs on multi-stakeholder processes that are essential to eventual scaling of promising technologies and innovation processes are materializing in 2015 and expected to accelerate in the next few years²⁰, including as part of systems-related Flagship Projects in 2nd generation CRPs.

3.5 Humidtropics Flagship Projects in Short

The **Crosscutting Flagship Project** includes research that draws from and contributes to the other Flagship Projects on global synthesis, nutrition, institutions and scaling, gender and youth, and capacity development. Most research under the Crosscutting Flagship also takes place in and is funded by the other Flagship Projects, but in those instances more specific to the geographical locations and social, cultural, technological, ecological and other aspects.

¹⁷ Annual Report 2013 at <http://bit.ly/1or5ynN> and 2014 at <http://bit.ly/1nXmIJ7>

¹⁸ Annual Report Evidence 2013 at <http://bit.ly/1RoMjGT> and 2014 at <http://bit.ly/23WsifV>

¹⁹ Humidtropics uses Alfresco Community Edition 5.0d (open source) on a cloud server.

²⁰ For example "Experiences with RAAIS" at <http://bit.ly/1RoPq1q> (inserted in this report in February 2016)

The four **Area-Based Flagship Projects** are the testing grounds for the Humidtropics integrated systems research approach, which is coupled to stakeholder engagement designed to promote local leadership and capacity to innovate. Through multi-level R4D Platforms and IPs, the process mobilizes multi-stakeholder partnerships to identify entry points and to develop technologies and methods that improve productivity and livelihoods in poor smallholder farming communities. Each Area-Based Flagship Project has four research clusters include: (i) Systems Analysis and Synthesis, (ii) Integrated Systems Improvement, (iii) Scaling and Institutional Innovation, and (iv) R4D Partnership Development²¹.

3.6 Integrated Systems Research Value Proposition

The value proposition for integrated systems research involves the following elements²²:

- Developing and testing, with farming households, institutions, and research and development partners, feasible combinations of technical, market, governance, and policy options capable of improving agricultural livelihood systems;
- Building place-based knowledge of the social, financial, technical, and environmental context to enhance targeting and scaling of potential systems interventions;
- Closing yield gaps of system components with focus on smallholders' total farm productivity;
- Monitoring and evaluation to assess how systems approaches are working, for whom, where, to what extent, and how fast;
- Strengthening the science-policy interface and identifying diversified investment opportunities in the rural agricultural sector;
- Wrestling with “wicked” problems²³ productivity trade-offs and synergies, climate change, land degradation, gender inequities, and youth unemployment at necessary scales for impact;
- Systems research will directly improve the effectiveness of development spending at local scales, at the same time producing generalizable knowledge, and forging new partnerships to improve livelihood systems;
- Research on foresight, synergies, trade-offs, etc., are core components that help prioritize interventions and predict possible early successes.

3.7 Humidtropics' Response to Changing Context

Humidtropics' management has been challenged to develop a cohesive integrated systems program from a collection of pre-existing projects and activities operated by a variety of partners, while balancing a complex set of objectives, geographies, and institutional partners²⁴. In the years prior to inception of Humidtropics, the CGIAR reform process required the CGIAR Centers to map unrestricted funds²⁵ onto approved CRPs and increased the mandate for social science research and non-CGIAR partnerships. During 2010-2012, eleven Partner Organizations of which seven were CGIAR Centers collaborated to develop the original Humidtropics proposal, which organized legacy projects around three strategic research themes (SRTs) in four Action Areas covering countries in East and Central Africa, West Africa, Central Mekong and Central America and Caribbean. This proposal, was officially approved in September 2012 but remained inactive until the establishment of the

²¹ POWB, 2014.

²² Presentation by Richard Thomas on “Value proposition for systems research”, May 2015.

²³ A problem that resists clear definition and resolution due to complex and dynamic interdependencies.

²⁴ Report on the Inaugural Meeting of the Independent Advisory Committee (IAC). June 2014.

²⁵ Prior to 2010, unrestricted funds supported Center scientists, research lines, and labs and there was a requirement that 25% of budgets be directed to non-CGIAR partners.

Executive Office at end of January 2013. Since its inception in 2013, Humidtropics is implemented through the eleven core partners, operating through Agreements with the Lead Center, IITA, specifying each organization's role, obligations, and plan of work and budget (POWB).

The 2013 approved Humidtropics POWB, organized around SRTs, was upended in May 2013 when the CGIAR CO mandated a re-design of all CRP work around SLOs and IDOs, resulting in a totally revised CRP proposal that was approved in August 2013. While 2013 Humidtropics activities were organized around SRTs, beginning in 2014, the Program operates through five Flagship Projects. The first Flagship is crosscutting and organized research for development in clusters on global synthesis, gender, nutrition, institutional innovation and scaling, and capacity development. The other four Flagships are area-based, covering the four Action Areas where each manifests the SRTs through three clusters with an additional fourth cluster (Cluster 4) that funds systems research projects proposed by IPs²⁶. The move towards RBM was also initiated in 2014 through a pilot project co-sponsored by the CO, which intends to support a move to full RBM implementation of the CRP portfolio in 2017. During the first half of 2014, the eleven core partners also developed the Humidtropics Extension Proposal for 2015-2016.

As the CGIAR system experienced significant budget challenges, major W1 and W2 funding cuts were passed on to CRPs. Humidtropics' budget in 2013 was lower than expected and based on 90% of actual expenses calculated retroactively over 2012 allocations when the program was not operational. In October 2014, the 2014 Humidtropics W1 and W2 budget was cut from USD 17M to USD 14.9M, and the 2015 budget was cut from the USD 20M approved in the Extension Proposal to USD 12.3M. In March 2015, the Program experienced a further budget cut to USD 10.3M, with a final cut in October 2015 to USD 9M²⁷. Drastic budget cuts precipitated dramatic programmatic changes, agreed at a core partners meeting in December 2014, to protect funding for basic CRP coordination by the Executive Office and for Cluster 4 projects. The further cuts in March 2015 affected all operations for not only Humidtropics but also all the CRPs, although some more than others. According to KIIIs conducted with Heads of key Partner Centers, these cuts had significant effects on especially CGIAR partner organizations who even had to make some of their staff redundant. yet some of these were contributing significantly to implementation of Humidtropics activities in the various Area-Based Flagship Projects.

These CCEE findings on the changes in the Program design and timeline are also corroborated by the CGIAR Internal Audit Report, submitted to the CO on November 25, 2015. These changes are summarized in **Table 3** with the following comments:

- a) Humidtropics was approved by the Fund Council in October 2012 with a total budget of US\$144 Million (W1/W2 portion totaling US\$ 69.192 million) over a three year period from 1 July, 2012, to 30 June, 2015. The CRP was extended for a further two years to the end of 2016 (with a retroactive start date of 1 January, 2015) for an additional \$61.441 million (W1/W2 amounting to US\$25.2 million).
- b) The Program currently involves seven CGIAR Centers: IITA as the Lead Center and which, based on the proposal was to receive 24% of the CRP W1/W2 budget and six more: Bioversity International (3%), CIAT (10%), CIP (5%), ILRI (19%), IWMI (6%) and ICRAF (2%). The CRP proposal also included four non-CGIAR partners; AVRDC - The World Vegetable Centre (AVRDC), the Forum for Agriculture Research in Africa (FARA), the International Centre for Insect Physiology and Ecology (*icipe*) and Wageningen

²⁶ Initially, Cluster 4 provided relatively modest funding only accessible to non-CGIAR partners, but in 2014 this was expanded to 30% of the total Humidtropics budget and made accessible to CGIAR and non-CGIAR partners.

²⁷ The October 2015 budget cut was announced just after the CCEE inquiry phase was concluded and included in this overview but its consequences are not further reviewed.

University and Research Center (WUR).

- c) The total actual W1/W2 costs for the CRP in 2014 amounted to US\$14.9 million. These were split as follows: 44% for personnel, 23% for supplies and services, 10% for operational travel, 1% for depreciation and 14% indirect costs. The Executive Office at IITA incurred costs amounting to US\$0.85 million in the year. The **Table 4** below presents the cumulative actual vs. budgeted costs from 2012 to 2014.

Table 3: A Summary of the Program Changes and Timeline

Year	Date	Event
2012	24 January 2012	The CRP Proposal is submitted to the Consortium Board
	15 August 2012	Revised CRP Proposal is submitted to the Consortium Board
	1 November 2012	Fund Council approves CRP 1.2 Proposal
2013	15 January 2013	Program Implementation Agreement (PIA) signed between Bioversity International (on behalf of consortium) and IITA
	5 February 2013	The first tranche of W1/W2 funds (US\$7.084 Million) released by the CO to IITA
	18 February 2013	The first tranche of funds transferred to participating centers by IITA
2014	4 November 2014	Project document to request extension to 2015-2016 presented to Fund Council
	4 November 2014	Humidtropics extension request (2015 to 2016) approved by the Fund Council
2015	17 April 2015	Extension to the PIA signed between the Consortium and IITA

It is important to note that cumulative funding through W1 and W2 to Humidtropics (**Table 4**) reduced from the budgeted \$38 Million to about \$34 Million for the period 2012-2014, with the highest percent reduction affecting mainly partner collaborators costs. The latter share of the budget reduced from 11% to 7%.

Table 4: Cumulative W1/W2 Budget vs Actual (2012-2014)

In USD	Total Budget	% Share	Total Actual	% Share
Personnel	15,655,133	47%	14,469,315	50%
Collaborator Costs – CGIAR	1,185,555	4%	1,119,754	4%
Collaborator Costs – Partners	3,722,960	11%	1,964,835	7%
Supplies and Services	8,197,196	25%	8,070,664	28%
Operational Travel	3,496,652	11%	2,858,488	10%
Depreciation	722,019	2%	672,155	2%
Sub-total of Direct Costs	32,979,515	100%	29,155,211	100%
Indirect Costs	5,203,041	16%	4,758,532	16%
Total - all Costs	38,182,556	116%	33,913,743	116%

4 Key Findings from the CCEE Evaluation

In addition to interlacing the earlier sections with CCEE Team observations, this section presents the overall findings. These were informed by corroborating and triangulating information from the different methods described earlier for the CCEE Team to consider these as accurate representation of the situation on the ground. Therefore, the key findings are presented below as a synthesis with sample evidence where applicable across the Flagship Projects (both Area-Based and Crosscutting) to answer the evaluation main and sub questions under each evaluation criteria of Relevance, Efficiency, Quality of Research, and Effectiveness.

Each section below starts with the main questions with a summary of the key findings to facilitate skimming and scanning. Details with evidence for each of these findings are provided in the sections that follow.

4.1 Relevance of Humidtropics

This section focuses on coherence or the extent of alignment of Humidtropics with the CGIAR and national strategies, and with societal needs as identified in various Action Sites, its comparative advantage and the Program design. The evaluation sub questions (**Table 1**) relating to relevance are stated as follows:

Question 1) To what extent is Humidtropics strategically coherent and consistent with CGIAR's SRF, considering its crosscutting issues of gender and capacity development and the rationale and coherence of Flagship Projects?

Question 2) To what extent is the partnership design and targeting based on plausible assumptions for Program delivery of results?

SUMMARY FINDINGS ON RELEVANCE:

Sections 4.1.1 – 4.1.5: The Humidtropics IDOs appear to be coherent and consistent with the SLOs in the CGIAR SRF. The strategies identified by Humidtropics for achievement of IDOs appear to appropriately consider biophysical, social and economic dimensions and integrated systems components and partnerships. Of special mention is the recognition from the onset that interventions create trade-offs and possible synergies between achieving the IDOs. However, while the IDO targets are ambitious, it is also too early to measure contribution, attribution and progress against achieving them to assess their feasibility.

Section 4.1.4: Humidtropics research identified development challenges faced by each Flagship through situation analysis prior to identification of entry points and priority setting. These challenges include but are not limited to: soil erosion issues in the ECA Action Sites (especially Rwanda) by introducing soil retention practices on hillsides, and routinely monitoring the soil fertility status in order to enhance sustainability of the agricultural production system. In other cases, conducting market-oriented research informed the local value addition practices, such as the case on processing soybean into milk in Uganda and DRC, and facilitation of farmer groups to gain access to financial services in order to address the identified market challenges, such as high food prices that mainly affect the poor.

Section 4.1.5: Humidtropics partnership design and targeting for integrated systems improvement is functionally appropriate for engaging diverse partners in ways that best fit their capacity and interest, including integrating available tools and analytic capabilities from international research partners and mobilizing local knowledge and innovation. Multi-level,

formal and informal engagement mechanisms can plausibly deliver on the objectives including identifying, testing, and scaling best-fit and best-bet systems interventions for sustainable intensification and diversification. Confidence and pride in collective accomplishments was observed among local stakeholders participating in R4D Platforms and IPs. Through work led by WUR, Platform performance assessment is underway, which will inform the utility of scaling the Humidtropics multi-level platform model necessary for achieving impact at scale.

Overall: The CCEE Team found ample evidence in the field that Humidtropics' implementation reflects its research for development design, which is largely place-based and tailored to the needs within specific research sites that are representative of the Action Area extrapolation domains that focus on the social and technical interventions at farm, institutional and landscape levels. The CCEE Team also found that Humidtropics largely followed the principles it set out in its design to enhance the relevance of the research in addressing the specific challenges identified as part of the research process through systems analysis (SRT1), and those prioritized by the multi-stakeholder platforms, including processes it initiated or transformed such as R4D Platforms and IPs. This evidence is found in the large number of situation analysis reports and in the bespoke tools, methods and approaches the Program developed and reported on in its annual reports, which was corroborated by the interviews and site visits of the CCEE Team.

Humidtropics' implementation is found to build on experiences of previous farming and livelihood systems approaches, and early IP functioning as in the SSA-CP, and addresses one of their main deficits in relation to the need for research that helps social-technical regimes to change in conjunction with innovations at the farm level (see **Section 3.1**). This is supported by multi-level and multi-stakeholder processes, which are necessary to contribute to development outcomes that lead to impacts. At this stage in the implementation of Humidtropics, there is clear evidence in the field of developing platforms and other multi-level and multi-stakeholder processes that influence both the farm-level and socio-technical regime, social and technical innovations, but it could not be assessed at this early stage and the extent to which this contributes to development leading to impacts. However, the enthusiasm and commitment of stakeholders including researchers, farmers and other public and private sector actors that the CCEE Team met in the site visits throughout the evaluation process, confirms their engagement in Humidtropics, and at shows promise that implementation is relevant to their work and aspirations, which has the potential to lead to the desired changes and impacts.

4.1.1 Alignment to SRF

Across all the Area-Based Flagship Projects, Humidtropics was found to be in alignment with the SRF. The following are examples of alignment with the IDOs from the Action Sites visited and/ or reviewed by the CCEE Team:

East and Central Africa (ECA):

Uganda: Program activities are in alignment with the IDOs. For instance, the Mukono-Wakiso Field Site focuses on the vegetable and 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 environment, the Site has focused on using diversification and intensification of banana and coffee systems through soybean-maize intercropping, and through the agroforestry demonstration plots, which link it to livestock and soil fertility. In terms of its focus on gender and youth, the Platform is working with the Youth Agripreneurs Group, which also has a strong engagement of women.

Rwanda: There is alignment of projects currently implemented at the Kayonza and Kadahenda IPs Field Sites with the IDOs. For the Kayonza IP, the projects include: improved legume-banana intercropping with agroforestry, livestock integration and maize-soybean intercropping with climbing beans rotation, and improving cassava-legume/ agroforestry systems, which all link to the Productivity and Environment IDOs; assessing vitamin A rich banana varieties links more to income and nutrition. For the Kadahenda IP, the projects are assessing the response of beans to Alnus biomass, the response of potato to Alnus biomass and mineral fertilizers, both, linking to productivity and environment.

DRC: The implementation of Integrated Soil Fertility Management (ISFM) in mixed legume systems including external nutrient inputs and improved manure use is in alignment with achieving the Productivity and Environment IDOs. 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 increases in incomes. The Youth Agripreneurs Project in Kalambo is a good success story for achieving Humidtropics objectives and scaling up. On one hand, the youth are focused on producing for the 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, as well as their processing and marketing.

Central America and the Caribbean (CAC):

Nicanorte (three sub-action sites in Northern Nicaragua): The IPs related to value chains of both coffee- and cocoa-based systems have direct alignment with the government's goal to enhance rural incomes and livelihoods, which is also very much in line with the IDOs. For example, for the IDO on Gender, the Action Site has empowered women and youth to have better control over and benefit from integrated production systems through their participation in all components of the proposed work, including project and tools development, the field-based work and the monitoring and evaluation. Data analysis of the impacts of use of the tool on "decision-making processes" is disaggregated by gender, and characterizes the role of and impact on women in different crop and livestock management decisions and activities. The strengthening of regional innovation systems in coffee, cocoa, and maize-bean-livestock systems through knowledge mobilization and collective integration, analysis and adaptation of improved decision-making tools contributes to the Humidtropics strategic objective of Systems Innovation. The latter tool will be developed using an iterative design methodology incorporating feedback from diverse actors. The IPs have also focused on the integrated production system (Quesungal) that focuses on enhanced integrated crop/pasture/tree/ livestock systems in badly degraded hill-lands is in alignment with the government's goals on food security and protection of the natural resource base (soils and watersheds) for sustainable intensification. Again, there is a strong alignment with the IDOs. Across the three IPs, women and youth are given serious and effective consideration as key stakeholders and decision makers, which was especially prevalent in the value chains of coffee and cocoa.

4.1.2 Alignment to National Strategies

Below are examples of Humidtropics' alignment to national strategies derived from the Action Sites visited and/ or reviewed by the CCEE Team:

East and Central Africa (ECA):

Uganda: the Action Site through its projects is in alignment with the Uganda national policies through the Development Strategy and 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, and Humidtropics' projects within this Action Site are trying to address some of the main challenges that face the agricultural sector in Uganda in three out of the four investment programs. These include:

- 1) Increasing agricultural production and productivity through vegetable trials to assess rate of chicken manure and bio-slurry, 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) Strengthening agricultural institutions at the center and in local governments.

Humidtropics has a joint Agri-Investment Plan that brings together different stakeholders in the rice value chain to improve rice bunds technology and construction, through a multi-stakeholder IP that collaborates research between International Research Organizations and Partners (e.g. IITA; ICRAF; WUR; AVRDC, ILRI, and the National Agricultural Research Organization (NARO)). For example, Mukono Zonal Agricultural Research and Development Institute (MUZARDI), is one of the facilitators of Humidtropics' projects in Uganda together with Makerere University. For this reason, the Institute has been actively involved in facilitating various activities such as IP meetings, market innovations meetings and trainings among others. Details on the other Action Sites (Rwanda and DRC) are found in **Annex 10.2** for the ECA Case Study.

Central America and the Caribbean (CAC):

Nicanorte: Humidtropics is very much aligned with the Nicaragua Strategic Development Plan with respect to goals on: Rural Development; Farmer Empowerment; Market Access; Poverty Alleviation; and Food Security. The existing and proposed activities are focusing on increasing incomes for the rural poor through their work on farm profitability by applying the integrated management tool, intended to increase efficiency of farm resource use and improve management and productivity of marketable crops and livestock. The use of the crop and livestock management decision-making tool is aimed at increasing productivity. The use of this tool with agroecological approaches to intensification is aimed at increasing resource-use efficiencies and ecological services. The latter will also contribute to reduced adverse environmental effects of integrated systems intensification and diversification.

4.1.3 Alignment of Integrated Systems to SLOs & IDOs

Integrated systems improvement involves researching and mainstreaming promising systems interventions related to productivity, natural resource management, and markets and institutions. With sustainable intensification and diversification (e.g. integration of trees and livestock; crop rotations) as the key drivers, this theme also includes use of modeling tools and analysis, gender considerations, research-development interactions, and scaling-out dimensions.

Capitalizing on the relatively high production potential of humid and sub-humid tropical areas, Humidtropics is designed to investigate system-based options for increasing biomass for food, feed, fiber, energy, ecosystem services (especially soil fertility, water availability, and agrobiodiversity), and system resilience (to biophysical and socio-economic disturbances) through effective management of labor, land, natural resources, and capital. Smallholder families are the primary direct beneficiaries of Humidtropics activities with indirect benefits flowing to other value chain actors like input suppliers, processors, traders, and both rural and urban consumers.

The SRF specifies that all CRPs designate SOs to be accomplished through IDOs. The Humidtropics IDOs derive directly from its four SOs²⁸. **Table 5** below indicates Humidtropics' strategic approach to achieve the six IDOs.

Table 5. Humidtropics Strategic Objectives (SOs), Outcomes (IDOs) and Approach

Intermediate Development Outcomes	Humidtropics strategic approach
SO 1. LIVELIHOODS IMPROVEMENT	
IDO on Income focuses on increased and more equitable income as a result of Humidtropics system interventions, earned by smallholders in the value chain.	The focus of IPs on key value chains such as vegetables, soybean, maize, beans, Irish potatoes, livestock, banana with vitamin A supplementation, in the different Action Sites are all expected to impact on incomes and nutrition for the farming households.
IDO on Nutrition monitors the increased consumption of diversified and quality foods by the poor, especially among nutritionally vulnerable women and children.	Enhanced consumption of diverse, nutritious, and safe products by the poor, year round, through diversification of high quality crops and livestock, availability and affordability in markets, positive attitude toward diversified diets, and empowerment of women to make food-related decisions, supportive household dynamics and self-sufficiency, and policy incentives.
SO 2. SUSTAINABLE INTENSIFICATION	
IDO on 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 farm-level biomass through scaling of best-bet interventions for sustainable intensification (use of appropriate inputs and crop and livestock management to improve yields) and diversification (best crop associations and rotations within systems), which are identified through participatory action research testing best-fit options aligned to conditions in Action Sites.
IDO on 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.	Increased agro-biodiversity, soil fertility, and water availability/ use-efficiency through scaling of best-bet interventions for natural resources management, which are identified through participatory action research testing best-fit options aligned to conditions in Action Sites.
SO 3. WOMEN AND YOUTH EMPOWERMENT	
IDO on 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.	<ul style="list-style-type: none"> • The active involvement of Youth Agripreneurs in the various Platforms, especially in the ECA Flagship is a key strategy aimed at enhancing youth empowerment by linking production to markets through processing of their cassava, cereals and legumes. • Involvement of women in leadership positions within the Platforms or groups was also a clear strategy to empower them. Across all the Action Sites visited, the women's participation was very evident in terms of their access to and control over the benefits from the integrated systems approach.

²⁸ <http://humidtropics.cgiar.org/at-a-glance/>

Intermediate Development Outcomes

Humidtropics strategic approach

SO 4. SYSTEMS INNOVATION

IDO on 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.

- Improved stakeholder capacity to innovate and support scaling of best-bet interventions at farm, national, and regional scales, based on co-evolution of institutions via social innovation, through structured R4D Platform and IP processes.
- The design reflected the understanding and firm belief that significant changes in complexities of integrated production systems, with associated synergies, could lead to realization of the IDOs. Equally fundamental to the design is the understanding that for complex, coherent and timely changes with ownership to occur, the key stakeholders had to be involved directly. The ToC argued that such involvement can and should lead to an innate “capacity to change” from the Community of Practice. To realize the needed functional partnerships, the model of R4D Platforms and IPs were fostered. This process would need equal if not greater emphasis than the production-oriented innovations that were identified.

The majority of survey respondents (77%) also agree or strongly agree with the Humidtropics conceptual approach that promotion of agricultural diversification and integration of high value crops helps increase incomes for smallholder farmers without taking on an excessive risk to their food security (**Figure 5**). The detailed responses to the entire online survey is in **Annex 7.2**.

Please select below what best reflects your level of agreement with the following statement: Humidtropics' efforts to promote agricultural diversification and integration of high value crops (fruit, vegetables, industrial crops) and/ or livestock into farming systems helps smallholder farmers to increase income without taking on excessive risks to their food security.

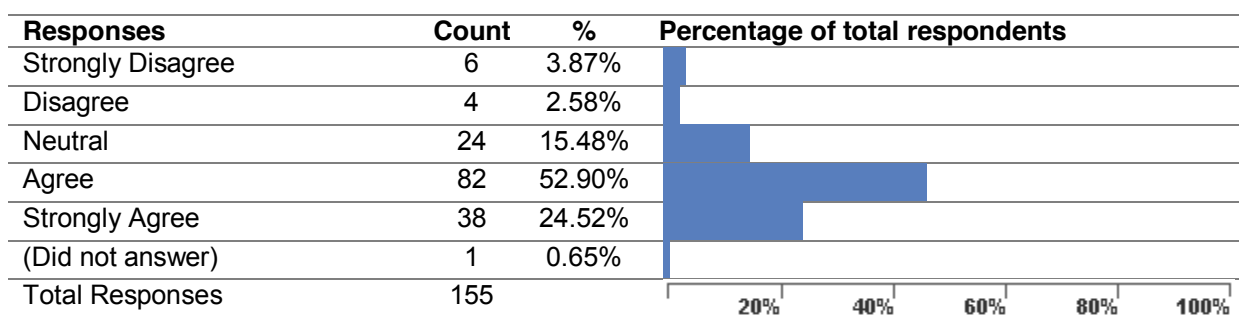


Figure 5: Survey - level of agreement that agricultural intensification increases income.

4.1.4 Alignment of Humidtropics with Societal Needs

The challenges addressed and the corresponding entry points in each Flagship include but are not limited to the following:

East and Central Africa (ECA):

ECA Challenges: High population density at an average of 263 persons/km² – this region has the highest population density in Africa – labor productivity has decreased, opportunities for expansion are limited, and extreme erosion is threatening the sustainability of the agricultural production systems. At the same time, strongly increasing food (or commodity) prices are severely affecting the poor.

ECA Entry Points: Market-oriented research, which entailed local value addition such as processing soybean into milk in Uganda and DRC; integration of cash crops including livestock products, facilitation of local market organization, and access to financial services. Productivity-oriented research, which aimed at increasing staple crop productivity, e.g. with the Irish Potatoes in Rwanda, 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. Natural resource-oriented research, which research outputs included 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 in Rwanda and DRC. Integrated watershed management in Ethiopia, which involved soil and water conservation and exploitation of shallow groundwater for improved crop and livestock management. This has proven successful in reversing land degradation and improving food security in Ethiopia.

West Africa (WA):

WA Challenges: Lack of supportive policies, weak institutional mechanisms, weak input delivery systems and poor linkages among farm households, extension agencies and development agencies further inhibit adoption of needed agricultural technologies.

WA Entry Points: For markets, studies of markets and institutions, intensification of production systems, improved agricultural resource management and their interactions were conducted. For systems intensification, options for diversifying production systems, adaptation to climate change, better pests and diseases management and improved soil management were implemented. For better agricultural and natural resource management, better management of soils, fostering biodiversity, protecting system carbon stocks were included.

Central America and the Caribbean (CAC):

CAC Challenges: Climatic conditions are highly diverse, which is further exacerbated by the area's vulnerability to natural disasters, such as hurricanes that annually devastate infrastructure and destroy crops. Poverty and food shortages are major problems in rural areas, with over 20% of the population malnourished while food insecurity, especially among pregnant women and children <5 years of age is also prevalent. Large areas are dominated by agriculture on steep slopes with moderate to severe degradation, which is driven by erosion or nutrient depletion of soils due to poorly adapted management practices resulting in low productivity, food insecurity, low farmer income, and overuse of agricultural and grazing lands. Expansion into fragile areas and deforestation further compound the issue.

CAC Entry Points: In order to enhance the CAC systems productivity, R4D efforts were geared towards agro-ecological intensification, integrating soil fertility management, water use

efficiency, and emphasizing multi-strata system components as entry points. They used improved germplasm and accompanying management technologies in the crop-livestock-tree production systems in order to create a natural resource base for sustainable agriculture, while addressing the dichotomy of the trade-offs with agricultural productivity. Improved soil quality, water conservation, and nutrient management, linked to income generation. For example, in Haiti, the focus was on closing yield gaps and then relating food surpluses to value addition and business development. While in Nicanorte, tools to support awareness of agri-ecological practices such as on-farm decision-making tools in a participatory manner were developed. In addition, Platforms were used as learning forums where rural communities learn to adopt Humidtropics initiatives, which are practiced on-farm, especially in cocoa and coffee production that helped to make them a catalyst for change at the farm level. To encourage the participation of women in decision-making at all levels, they also conducted an appraisal of 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.

Central Mekong (CM):

Challenges: There is transformation away from small-scale subsistence farming toward market-oriented agriculture, which to a large extent, is leading toward simplification of diverse landscapes, loss of agro-biodiversity, increased threats to food security, and loss of local ecological and agricultural knowledge. These changes also drive reduction in forest cover, biodiversity, and corresponding environmental services. There is also impacts of new market mechanisms on traditional livelihoods, produce and resource demands of cities, a transformation in diets to much higher protein consumption, climate change impacts on future regional water supplies, and the ultimate relationship between agricultural intensification and sustainability of ecosystem services. The challenges presented new opportunities to use them to advance Humidtropics research that links together new learning about agricultural production with market and trade pathways while strengthening natural resources management to maintain environmental services.

Entry Points: With diets in the Action Area changing, whereby people were eating fewer cereals and more animal products, particularly poultry and pork, one of the entry points supported the expansion of animal enterprise among small-scale farmers, which required expansion beyond local markets to generate reliable demand and higher prices for producers. The Action Area also promoted use of animal manure in high-value crops, especially niche-market vegetables as well as other horticultural crops, to mention a few. For example, in Central Mekong: sustainable diversification of production connected to market for food, nutrition and income; integrated livestock systems for animal food products; and sustainable intensification for productivity and NRM was encouraged. In Northwest Vietnam: due to the disparity between urban and rural populations, coupled with poor agricultural productivity (degrading soils, mono-cropping), high child malnutrition, low prices and constrained market access (poor infrastructure, difficult terrain), pollution of waterways, and poor implementation of policies, the entry point aimed at increasing provision and access to rural credit, introduction of innovative farming practices, better linking value chain actors, diversifying farming activities, and creation of off-farm jobs.

4.1.5 Partnership Design and Delivery of Results

To achieve results, the Humidtropics design promoted working in partnership with other Centers and partners. The partnership strategy of Humidtropics identifies three levels of partnership engagement:

- The first category of “**Core Partnerships**” involves the partnership among the founding members of Humidtropics. These consist of the 11 institutions that sign Program Participant Agreements with IITA (Humidtropics’ Lead Center) for undertaking and

facilitating core areas of work. Core Partners currently include seven CGIAR Centers (IITA, ILRI, ICRAF, CIP, IWMI, Bioversity International, and CIAT) and four non-CGIAR institutions (FARA, *icipe*, WUR, and AVRDC).

- The second category of partners consists of institutions that take some **active leadership roles** in Humidtropics research implementation or facilitation of research processes, in particular Action Sites or research domains.
- The third category of **partnerships involves the wider collaboration** of implementation partners who engage in the R4D Platforms and IPs, and participatory research at the various Action Sites. This third category has the largest number of institutions, participating to varying degrees in the implementation of Humidtropics. These include: NGOs, Universities, Women Groups, Farmer Groups, Youth Groups, Faith-Based Organizations, and Local Governments, etc. For example in the ECA Flagship, the core partners involved in the R4D Platform in the Uganda Action Site included (a) Bioversity International and ICRAF. The other partners were either in the second or third category and these included (b) local universities such as Makerere University and the Uganda Christian University (UCU); (c) the private sector such as Farm Gain and the Youth Forum; (d) producer organizations such as the Uganda Farmers Federation, and d) a very active public sector involvement and linkage.

The dynamics between the different types of partnerships differs according to their comparative advantage and roles. The core partners are place-based, provide technical guidance, and are the key implementers in the different sites where they are located. The second category partners provide leadership to the research process and may not necessarily be one of the core partners. For example, in the Uganda Action Site, Makerere University and UCU take an active leadership role in the research currently conducted on soil fertility and vegetable production respectively. In each case, they collaborate with the core partners, ICRAF for Makerere and AVRDC for UCU, and other local partners including the youth and private sector groups.

According to the online survey results, about 55% of respondents agree that the partnerships constitute a broad spectrum of stakeholders although there is room for broader representation. A few (25%) argue that although partnerships engage stakeholders, much more engagement is needed. Others (17%) responded that the partnerships formed have not resulted into tangible outcomes (**Figure 6** below). These findings are not surprising and are corroborated by site visits, which confirmed that across all the Action Sites visited, the partnership engagement varied depending on the evolution of the Platforms. In the ECA Flagship, there was a broad array of partners as mentioned above, including youth groups. While in Nicaragua, the youth were not as engaged. Humidtropics has established strong partnerships with a number of other CRPs. There is active engagement among the three systems CRPs (Humidtropics, Dryland Systems, and Aquatic Agricultural Systems), with regular consultations and several joint activities undertaken, especially related to issues of sustainable intensification and capacity to innovate.

Program Coherence: Over the short program history (2013-2015), Humidtropics researchers have sought an appropriate balance between encouraging local relevance and ownership and promoting a prescribed framework. Activities within Humidtropics fall on a spectrum from research driven largely by local stakeholders' concerns and capacities through the situation analyses in each Action Area, to research more strongly influenced by Humidtropics' ToC that focuses on the IDOs and preferred methods in alignment with CGIAR strategy. The former is less likely to enable convergence and cross-comparison, while the latter would be more likely to foster a coherent global Program. For example, the contribution to Nutrition or Income IDOs across all the Flagship Projects can be analyzed in the long term, while research outputs generated are specific to each site and may not lend themselves to cross-comparison. An additional important factor in Program coherence has been the degree to which bilateral projects were adapted and mapped to Humidtropics' conceptual approach.

Please select below what best reflects your level of agreement with the following statement:
Humidtropics has emphasized forming robust partnerships with a broad spectrum of stakeholders, including multiple levels of government; policy and technical institutions; NGOs; and private sector/ value chain actors.

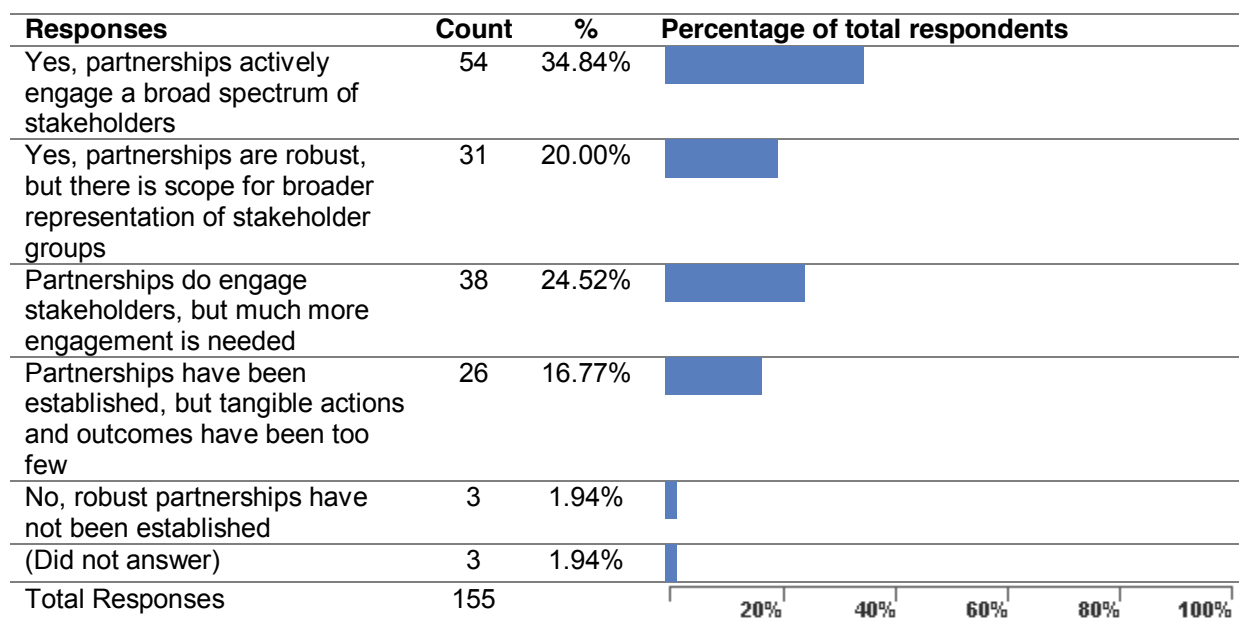


Figure 6: Survey - Level of Agreement on Partnership Engagement

4.2 Efficiency

This section focuses on Efficiency by evaluating institutional arrangements, governance and management, and Program implementation. The relevant evaluation sub question (**Table 1**) is stated as follows:

Question 3) To what extent is Humidtropics effectively managed with appropriate staff, governance and management, institutional arrangements, and internal processes and conditions, for assuring high quality research outputs, considering gender and generations, funding, documenting and disseminating both positive and negative findings, and monitoring and reporting progress?²⁹

The descriptive details of the management arrangements were elaborated in the Inception Report. In this section, they are used to organize our observations. We choose to state upfront that in support of the ToR, it would be beyond the scope of this evaluation to compare the efficiency of Humidtropics with that of any other CRP or program as this would be better placed in a meta-review of the CRP evaluations together, which we understand the IEA will conduct in 2016.

The CCEE Team chose to evaluate the Program's efficiency from an internal orientation by asking if there is progress that justifies the investment, if there is evidence that the management capacity results in change that address the IDOs, and to what extent the partnership design for delivery is cost-effective.

²⁹ Note that the concurrent CGIAR internal audit of Humidtropics addressed related issues in consultation with CCEE as appropriate.

SUMMARY FINDINGS ON EFFICIENCY:

Section 4.2.1: To the degree possible, Humidtropics management has tried to foster delegated decision-making at the lowest appropriate levels to accommodate for the significant political, cultural, social, geographical and agro-ecosystem differences between the Action Areas and Action Sites. It was observed that each managerial tier from Executive Office (four persons) to Action Area Coordination (two persons per Area) was kept at the absolute minimum and delegated to core partner organizations with comparative strength in the Action Areas (IITA, ICRAF, CIAT) keeping the management costs relatively low. However, this also increases the dependency on management capacities and investments of the partner organizations, including the non-core partners in the Action Sites, which may result in variable commitments, delivery, and quality of reporting, putting more pressure on the small management teams with a risk of reducing efficiency.

Sections 4.2.2 – 4.2.5: Overall, the management maintained focus on Program objectives and delivery while responding adaptively to emerging realities such as budget changes and CGIAR reforms. Several mechanisms were instituted to increase coordination among core partners, although budget gaps reduced their effectiveness. For example, prioritization of Cluster 4 funding for Platform-generated research projects was a response to the need for better fund allocations to the array of partners engaged in Platform research initiatives beyond the core partners.

Overall: The Program is in its formative stage, and while the institutional and management arrangements and related processes are still developing, it is plausible at this stage to find that progress made has justified the investment to date.

4.2.1 Humidtropics Management

Work plans have generally been built “bottom-up”, considering financial guidelines and principles of the Humidtropics process. When financial cutbacks were required due to externalities (shortfalls in CGIAR funding), the decision taken by Humidtropics management to give priority to Cluster 4 projects, which had been selected and designed with major inputs from the Field Site communities, was a good one. This was to ensure that “ground-level” partners would feel respected and engaged. Examples of “bottom-up” planning and implementation are found in all the country case studies (see **Annexes 8.1 – 8.4**). Some of the positive and negative management practices include but are not limited to the following:

Positive:

On Decision-Making: the small management structure and active engagement of the focal points, and Management Committee of the CRP, leads to responsive and timely decision-making. For example, when budget cuts are announced, these are communicated with options provided for changing direction, which are subsequently decided and acted upon. There is full delegation of decision-making related to Flagship affairs relegated to Flagship Managers. For example, Flagship Managers organize the POWB and manage their own budgets guided by but without seeking further approval from the Executive Office. Decision-making related to Cluster 4 project proposals and their implementation as an internal process was found to be mostly efficient – for example, as soon as proposals are submitted to the Flagship Manager, they are forwarded to the Executive Office, which distributes it to reviewers within other Flagship Projects with a turnaround of one week before the proposals are approved.

Resource Mobilization for Local Partners: Funding was made available to local partners in the R4D. However, this approach may come with some trade-off costs of using a local partner compared to a CGIAR Center to deliver results in terms of the quality of research or its products.

Negative:

Through the KIs, the findings revealed that on occasion, core partners had a problem with prioritizing engagement in Cluster 4 projects because it would take away funds from their own research priorities. However, the CCEE Team supports the management explanation that eventually, Cluster 4 projects are Platform research initiatives better suited the Program's approach. When the decision to allow core partners to use a part of Cluster 4 funds was made for 2015, there was a noticeable shift in engagement observed and validated by the CCEE Team.

4.2.2 Institutional & Governance Arrangements

The Humidtropics governance and management arrangements were established based on the August 2012 approved proposal and found by the CCEE Team to constitute the following:

A. Oversight Institutional Arrangements

The oversight institutions consist of: i) The Consortium Board; ii) Lead Center Management Board (IITA Board of Trustees); iii) Independent Advisory Committee (IAC); and iv) Core Partners. The roles and responsibilities of each of these organizations are detailed in the Agreements and ToRs where applicable.

B. Management Team

- Executive Office (Management Team) consists of the following: Executive Director, Dr. Kwesi Atta-Krah; Chief Officer Management, Dr. Eric Koper; Communication Officer, Ms. Valerie Poiré; and Administration Officer, Mr. Oyewale Abioye. This small team of three international and one national staff also draws services where needed, related to Project Administration Office, Projects, Communication and Finance from IITA's established offices on full cost-recovery basis.
- The Management Committee comprises five SRT Leaders who provide scientific leadership, oversight, and guidance for the SRTs and four fulltime Action Area Coordinators (Area-Based Flagship Managers).
- Action Areas and Site Teams: The Action Area Coordinators oversee the entire research process and teams in their respective Flagship Projects, including developing work plans, delivering outputs, and responsibly manage allocated budgets. At the time of evaluation these were Dr. Chris Okafor (ECA-IITA), Dr. Latifou Idrissou (WA-IITA), Dr. Lisa Hiwasaki (CM-ICRAF) and Dr. Rein van der Hoek (CAC-CIAT).
- SRT Leaders provide scientific leadership, oversight, and guidance for the SRTs. These work with the Action Area Coordinators to support technical quality and rigor in research for the region. For example, Dr. Tim Robinson (SRT 1); Dr. Mark Lundy (SRT 2.1); Dr. Bernard Vanlauwe (SRT 2.2); Dr. Edmundo Barrios (SRT 2.3); Prof. Cees Leeuwis and Dr. Ann Degrande (SRT 3). They organize workshops within their disciplines and provide guidance on the global methodology used across the different Action Areas.
- Partner Focal Points: each partner organization assigned a focal point who is the main interface with the Executive Office related to collaborate Agreements and implementation of their part of the research portfolio as outlined in their POWBs and Progress Reports. At the time of the CCEE, the following focal points with their affiliation were assigned: Dr. Richard Asare (IITA), Dr. Tim Robinson (ILRI), Dr.

Michael Peters (CIAT), Dr. Timothy Williams (IWMI), Dr. Dieudonne Harahagazwe (CIP), Dr. Laurens Klerkx (WUR), Dr. Victor Afari-Sefa (AVRDC), Dr. Jessica Raneri (Bioversity International), Dr. Oluwole Fatunbi (FARA), Dr. Charles Midega (*icipe*) and Prof. Ingrid Oborn (ICRAF).

- A new category of Cluster Leaders: In some Action Sites, there is an emerging awareness of the need for Action Site Facilitators. For example, in the Uganda Action Site, Mr. Moses Tenywa from Makerere University is the Action Site Facilitator, who helps coordinate the affairs of the R4D Platform and operations at the various Field Sites.

The CCEE Team observed that the components of the institutional and governance arrangements described above are, in fact, in place and the managers/facilitators at the various levels engaged efficiently and enthusiastically in their responsibilities. All the Management Committee members and Focal Points have high academic backgrounds and qualifications ranging across social and biological sciences found to be relevant by the CCEE Team in relation to the complexity of integrated systems research. The Executive Office team is very small but it delegates well to the Flagship Managers, SRT Leaders and Focal points, which is preferable for the type of formalized knowledge network it represents and allows for efficient operations and decision-making as observed by the CCEE Team. Nonetheless, the findings of the 2015 Internal Audit Report by the Consortium Office indicate a lack of formal document trail for key decisions taken in regard to the CRP, even though inclusive and due processes were undertaken but merely supported through series of emails. However, it was observed that more recently (from mid-2014), a more formal set of minutes was maintained for the Management Committee meetings. Since the IAC and Management Committee constitute some of the advisory institutional arrangements for the CRP, the CCEE Team agrees with the recommendation made by the Audit Team that key CRP-related decisions should be captured in a structured manner that will ensure that information is easily accessible and identifiable by interested parties as and when it may be required, and outlive present office bearers in order to minimize risk.

With regard to Project Management, the 2015 Internal Audit Report findings also indicate that there is no involvement of the CRP Director in the approval of bilateral projects mapped to the CRP by Participating Centers. The CCEE Team agrees with the recommendation made by the Audit team that criteria for mapping bilateral projects to the CRP should be developed and applied across the CRP, which should include clear criteria for mapping and a clear description of responsibilities for review and approval of the mapping.

At the field level, the CCEE Team positively noted that the management arrangements are distributed amongst partner organizations and treat the Lead Center equal to other partners by having a clear separation between the Executive Office, which represents IITA as Lead Center, with the Executive Director in charge and IITA as Partner, under a different Directorate, and with the Focal Point in charge. Also Area-Based Flagship management for areas outside Africa are assigned to CIAT and ICRAF to benefit from their comparable strengths and infrastructures in these Action Areas, while local partners often take leadership roles at Action Site and Field Site levels. This distribution of responsibilities improves engagement but may not necessarily be efficient in some cases as it may add unproductive decision layers and other demands. However, the CCEE Team did not find evidence of such inefficiencies though it does not mean they do not exist in some places. Some examples observed by the CCEE Team related to the aforementioned statements are: (i) strong ownership/ leadership and support from CIAT was seen in Nicanorte along with meaningful inputs from Bioversity International, and intellectual inputs on community methods and scaling came from WUR; (2) in ECA (Uganda, Rwanda and DRC), work by ICRAF in leading tree-based interventions was also evident, for example, in the Uganda Action Site, ICRAF has provided the farmers with over 1,500 seedlings and is working in partnership with Makerere University on greenhouse gas emissions and how it can be mitigated by replacing part of the N fertilizer in maize production by N-fixation from beans and leguminous trees, other

experiments engaged in by ICRAF entailed the biomass production, which can be used as livestock feed during the dry season. Other than the few weaknesses noted above by both the CCEE Team and in the Internal Audit Report, the institutional and governance arrangements were functioning well at all levels.

4.2.3 Budget Analysis & Coping with Budget Cuts

Humidtropics allocates approximately one third of its W1 and W2 budget to the four core non-CGIAR partner organizations. All core partner organizations further allocate funds to local partners in the Action Areas, Action Sites and Field Sites where appropriate. As such, Humidtropics distributes its funding over many partners sometimes at risk of spreading its investments too thin. However, it was explained that in cases where there is presence of Bilateral and W3 funded projects in the same area, that they complement each other, especially when mapped onto Humidtropics, such as CIALCA, or working within the same system in a location such as RTB. The CCEE Team also found that facilities and staff of local partners are used but not charged to Program thus delivered in kind. Similarly, evidence was found where local governments would contribute to aspects of Program delivery in a particular site directly to local participants as was witnessed by the CCEE Team in the Uganda Action Site. This does not necessarily add up to significant amounts but is a clear expression of enthusiasm and valuing the Program's work. Nevertheless, especially in view of decreasing budgets, it would have been advised to focus efforts on fewer platforms and interventions, thereby accelerating research in these sites. It is worth noting that the next generation of CRPs should consider working in many of the Humidtropics sites not only because investments in systems analysis, priority setting, capacity development, etc., has taken place but also because many of the partnerships are well developed and ready to continue improving the systems.

The distribution of W1, W2, W3 and Bilateral by "natural classification" as per annual financial reports (**Figure 7**) shows an increase from 2013 to 2014 mostly explained by increased W3 and Bilateral expenses (see Annual Reports earlier referred to). Personnel, as expected is the largest expense but the CCEE Team found the distribution to collaborator costs and supplies and services representative of a Program of this type with travel expenses relatively low given the geography of the Program. The Detailed Budget and Expenditure by Center Activities, Personnel, and Source of Funding for 2014 is included in **Annex 7.3**

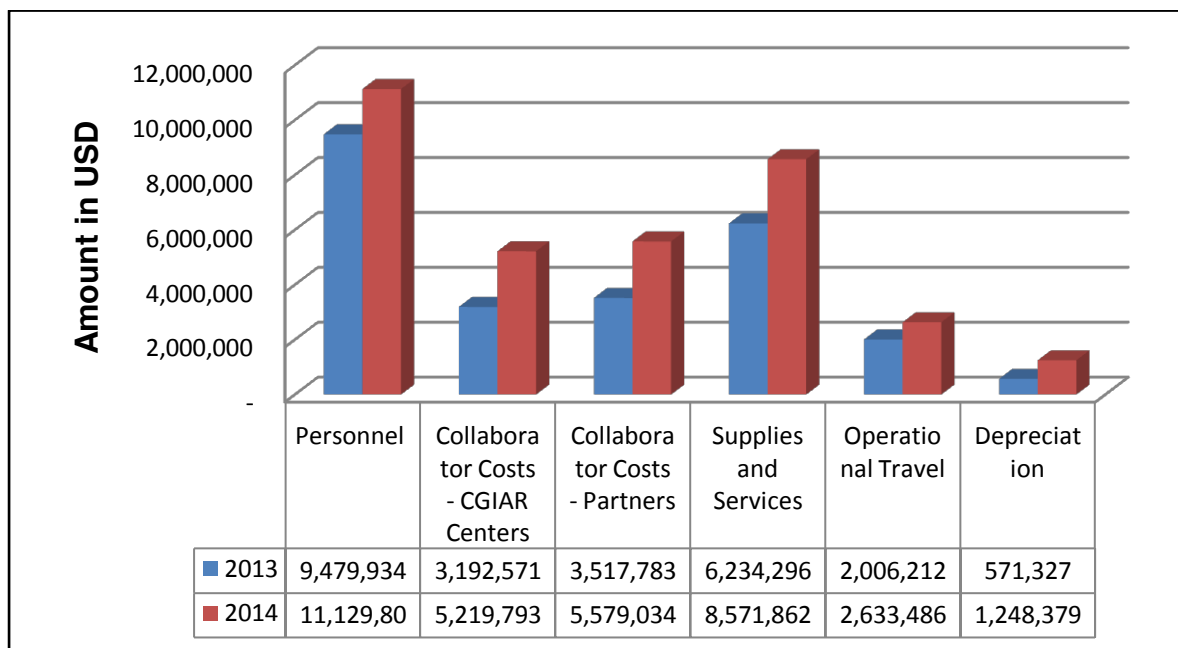


Figure 7: Humidtropics reported expenditures by natural classification (2013 - 2014)

A summary of total budget and expenditure by Flagship and Activities for 2014 outlined in **Table 6** below indicates that the Area-Based Flagships receive 87% of the budget and the Crosscutting Flagship gets 13%. Out of the four Area-Based Flagship Projects, the highest proportion of USD 6,535,279 goes to the ECA Flagship (65%), followed by the WA Flagship (25%). Right from the design phase of Humidtropics, this was a conscious decision to allocate over 70% the budget to the Africa region because of its geographic relevance for Humidtropics. It is important to note that all Flagship Projects allocate some of their budget to gender within each cluster of activities to varying degrees from 15 to 100%, with the latter being the Cluster on Gender Research and Integration under the Crosscutting Flagship. This meets the criteria of allocating an estimated 30% that was envisaged during the design.

Within each Area-Based Flagship, at least a minimum of 7% has been allocated to the R4D Partnership Development Activities (Cluster 4). The Flagship that has allocated the highest proportion of its funds to the R4D activity is CAC at 28%, followed by CM (18%), and ECA at 14%, and WA with the lowest at 7%. However, it is also important to note that having high proportions of funding to the Cluster 4 activities in some Flagship Projects maybe a factor of when the Cluster 4 projects started and/or the number of Centers operating within the area. For example, in CAC, there are several centers involved such as CIAT, ICRAF, Bioversity International and WUR, which already had a presence on the ground and therefore were able to jump-start the process quickly and use these funds.

Table 6: Summary of total budget and expenditure by Flagship and Activities (2014).

ANNUAL PROGRAM PARTICIPANT FINANCIAL REPORT GENDER EXPENDITURE BY FLAGSHIP AND CLUSTER OF ACTIVITIES (CURRENCY – USD) CRP 1.2 - Humidtropics REPORT PERIOD (FROM 01/01/2014 TO 31/12/2014)											
		BUDGET				EXPENSES					
Flagship Project	Cluster of Activities	W1+W2 total	W3	Bilateral	Total 2014	% of Program Total to Flagship-Type	W1+W2 total	W3	Bilateral	Total 2014	% to Gender
1 Crosscutting Flagship Project	1.1 Global Synthesis	158,001	0	0	158,001		180,124	0	0	180,124	20%
	1.2 Strategic Nutrition Research	324,834	0	0	324,834		290,333	0	0	290,333	63%
	1.3 Scaling and Institutional Innovation	73,745	0	0	73,745		61,670	0	0	61,670	20%
	1.4 Gender Research and Integration	688,229	0	0	688,229		619,770	0	0	619,770	100%
	1.5 Capacity Development	328,850	0	0	328,850		259,593	0	0	259,593	50%
	1.6 Results Based Management	0	0	0	0		0	0	0	0	63%
	1.7 Communication	0	0	0	0		0	0	0	0	
Total for Crosscutting Flagship		1,573,659	0	0	1,573,659	13%	1,411,490	0	0	1,411,490	
						% of Flagship Total to Action Area					
2 East and Central Africa Flagship Project	2.1 Systems Analysis and Synthesis	168,858	182,397	22,000	373,255		143,083	156,990	4,765	304,838	22%
	2.2 Integrated Systems Improvement	705,680	2,604,787	1,610,477	4,920,943		565,987	2,627,600	1,463,574	4,657,161	25%
	2.3 Scaling and Institutional Innovation	200,715	20,504	108,800	330,019		122,711	11,634	23,563	157,909	32%
	2.4 R4D Partnership Development	289,080	65,650	556,331	911,061	14%	272,092	55,160	555,997	883,248	33%
Subtotal		1,364,332	2,873,339	2,297,608	6,535,279	65%	1,103,873	2,851,384	2,047,898	6,003,155	
3 West Africa Flagship Project	3.1 Systems Analysis and Synthesis	353,664	331,363	0	685,028		337,942	321,359	0	659,300	27%
	3.2 Integrated Systems Improvement	598,719	857,338	132,896	1,588,952		513,868	820,762	118,433	1,453,063	25%
	3.3 Scaling and Institutional Innovation	61,077	0	0	61,077		35,080	0	0	35,080	15%
	3.4 R4D Partnership Development	171,271	0	0	171,271	7%	151,318	0	0	151,318	17%
Subtotal		1,184,731	1,188,701	132,896	2,506,327	25%	1,038,207	1,142,121	118,433	2,298,761	
4 Central Mekong Flagship Project	4.1 Systems Analysis and Synthesis	184,355	0	0	184,355		189,228	0	0	189,228	22%
	4.2 Integrated Systems Improvement	192,390	0	20,000	212,390		179,930	0	0	179,930	25%
	4.3 Scaling and Institutional Innovation	7,552	0	0	7,552		6,988	0	0	6,988	13%
	4.4 R4D Partnership Development	81,181	0	0	81,181	17%	80,545	0	0	80,545	17%
Subtotal		465,477	0	20,000	485,477	5%	456,691	0	0	456,691	
5 Central America and Caribbean Flagship Project	5.1 Systems Analysis and Synthesis	191,508	0	0	191,508		205,605	0	0	205,605	45%
	5.2 Integrated Systems Improvement	176,768	38,973	0	215,740		165,523	38,969	0	204,492	34%
	5.3 Scaling and Institutional Innovation	10,576	0	0	10,576		10,074	0	0	10,074	32%
	5.4 R4D Partnership Development	163,464	0	0	163,464	28%	158,509	0	0	158,509	33%
Totals for Area Based Flagships		3,556,856	4,101,012	2,450,503	10,108,372	87%	3,138,482	4,032,474	2,166,331	9,337,287	
ITA TOTAL		5,130,515	4,101,012	2,450,503	11,682,031		4,540,972	4,032,474	2,166,331	10,748,777	

For 2013, funding for activities was by SRTs³⁰.

Humidtropics' approved 2013 Windows 1 and 2 budget allocation was USD 13.748 million, of which USD 12.117 million (or 88.1%) were expended in the year – see details of expenditures by SRT in **Table 7** below. Thus, a total of USD 1.632 million unspent funds in 2013 have been carried over to be utilized in 2014. In addition, to the Windows 1 and 2 expenditures, Window 3 and Bilateral expenditures totaling USD 8.995 million and USD 7.551 million respectively, were mapped or aligned to Humidtropics in 2013. **Table 7** below reflects total expenditures of USD 28.663 million (from all funding sources) in 2013 by SRT and funding sources. The Lead Center Executive Office recorded total expenditures of USD 689,000, which formed about 5.7% of the actual Windows 1 and 2 Humidtropics expenditures.

³⁰ According to Humidtropics Annual Report, 2013.

Table 7: Humidtropics Financial Summary 2013 by SRT and Funding Source (in USD million).

By Strategic Research Theme (SRT)	W1/W2 Budget	W1/W2 Expenditure	W3 Expenditure	Bilateral Expenditure	2013 TOTAL Expenditure
SRT1 Systems Analysis and Synthesis	3.062	2.660	2.343	2.999	8.002
SRT2 Integrated Systems Improvement*	1.261	0.886	0	0.172	1.058
SRT2.1 Value Chains, Institutions and Markets	1.699	1.426	0.509	1.122	3.057
SRT2.2 Increasing System Productivity	3.239	3.262	3.649	2.116	9.027
SRT2.3 Natural Resource Improvement	1.611	1.470	1.787	0.721	3.977
SRT3 Scaling and Institutional Innovation	2.185	1.724	0.708	0.421	2.853
SRTs Total	13.057	11.428	8.995	7.551	27.974
Lead Center Management	0.690	0.689	0	0	0.689
TOTAL	13.748	12.117	8.995	7.551	28.663
Carry forward to 2014		1.632			
TOTAL		13.748			

* Includes Bioversity International Center Funds (budget of USD 0.650 million and actual expenses of USD 0.298 million).

Impact of Reduced Funding Levels: Very large budget cuts applied in 2014 and 2015 had corresponding impacts on R4D activities. Ambitious targets for IDOs that were set under a much more promising budget scenario became less realistic. Core Humidtropics funds (W1 and W2) became an equal component of the CRP budget, with W3 and Bilateral budgets (**Table 8**) toward the IDOs. Accordingly, the priorities associated with W3 and bilateral funds had disproportionate weight in Program implementation. Importantly, this was not part of the CRP design, rather an outcome of CGIAR system budget dynamics.

KII findings with CIAT, which is taking the lead role in Nicaragua, revealed that with the budget cuts, implementation of their activities was interrupted because they have a few bilateral projects, which were used to cover the shortfall. However, they noted that they would have shortfalls for the 2016 budget. At CIAT, they managed because of the gains made through the exchange rate. For other Centers, KIIs revealed that they used different strategies in order to cope with budget cuts. For ICRAF, they made a strategic decision to let their country offices keep the money allocated, and in addition had N2Africa project funding, which helped them to continue implementing their activities. In Ethiopia, Africa RISING funded by USAID employed the staff in the field. While they did not cut down staff, international staff were asked to diversify what they were they are doing. For Bioversity International, they decided not to hire additional staff. To stretch their funds, they have cut back on some programs because of the requirement to pre-financing their activities. Instead, they also engaged fewer students, cut back on travel and cannot pick up staff time, which would have been available.

Table 8: Cumulative Funding to Centers by Source & Expenditure (2012-2014)

CRP 1.2: Humidtropics 1 July 2012 - 31 December 2014												
(a) Cumulative CRP2014 Fin plan approved budget							(b) Actual Expenses - Cumulative					
	Period Windows 1 & 2	Window 3	Bilateral funding	Center funds	Total Funding	% Share of Total	Windows 1 & 2	Window 3	Bilateral funding	Center funds	Total Funding	
IITA	13,434,861	24,930,789	21,139,520	-	59,505,170	57%	12,413,514	22,402,929	16,639,893	-	51,456,336	
BIOVERSITY	978,281	781,231	1,593,760	1,093,751	4,447,023	4%	978,824	431,491	818,417	739,365	2,968,097	
CIAT	2,992,990	322,871	5,922,217	-	9,238,078	9%	3,013,166	208,238	4,919,916	9,648	8,150,968	
CIP	1,598,292	203,618	1,648,601	-	3,450,511	3%	1,580,733	453,415	1,126,732	-	3,160,880	
ILRI	5,649,633	7,337,647	2,455,509	-	15,442,789	15%	5,589,393	5,480,132	1,850,880	-	12,920,405	
IWMI	1,136,932	-	-	-	1,136,932	1%	1,136,932	-	426,256	-	1,563,188	
ICRAF	1,638,752	-	445,003	240,221	2,323,976	2%	1,638,753	-	513,399	240,221	2,392,373	
AVRDC	1,797,601	-	-	-	1,797,601	2%	1,652,407	-	-	-	1,652,407	
FARA	4,501,397	-	-	-	4,501,397	4%	3,361,780	-	-	-	3,361,780	
icipe	1,776,908	-	-	-	1,776,908	2%	1,679,845	-	-	-	1,679,845	
WUR	981,516	-	-	-	981,516	1%	868,396	-	-	-	868,396	
	36,487,163	33,576,156	33,204,610	1,333,972	104,601,901		33,913,743	28,976,205	26,295,493	989,234	90,174,675	
% Contribution	35%	32%	32%	1%	100%		38%	32%	29%	1%	100%	

Table 9 below highlights the proportion of W1, W2, W3 and Bilateral funding in 2014 to IITA as the Lead Center and the other partners. The highest funding goes to IITA (57%) as the lead implementing Center to cover collaborator costs, personnel, operational travel, etc. This is followed by ILRI (15%) and CIAT at 9%. The funding of the other eight Centers (IWMI, CIP, ICRAF, AVRDC, FARA, *icipe*, WUR and Bioversity International) ranges from about 1% - 4%.

For some Centers like FARA, the burn rates appear low at about 56% out of the total Center allocation unspent (**Table 9**). This is because of the requirement to pre-finance, which the Fund Council mandates for all CRPs when there is delay in the release of funds. According to KII findings, FARA is not able to pre-finance their activities in the face of these delays coupled with the uncertainty created by budget cuts. This affects implementation of their planned activities because they fear making long-term commitments, in case the funds do not materialize. The CCEE team notes that the delay in the release of funds is a structural problem within the CGIAR system as a whole, which affects organizations such as FARA. The latter happens to be the only core partner with Humidtropics that is based in Africa.

Table 9: CRP Annual Finance Plan Summary (by Center, Windows 1/2) & Burn Rates

	Initial Financial Plan (if applicable)		Final Financial Plan		Actual Expenditure		Variance	
	USD	Percent	USD	Percent	USD	Percent	USD	Percent
Sources								
Windows 1&2	3,074,000	100.0%	2,544,750	100.0%				
Totals	3,074,000	100.0%	2,544,750	100.0%				
Center Allocations								
IITA	6,517,441	35.4%	6,517,441	38.7%	6,017,032	40.3%	500,409	26.0%
Bioversity	720,599	3.9%	617,420	3.7%	617,420	4.1%	-	0.0%
CIAT	1,494,436	8.1%	1,312,378	7.8%	1,312,378	8.8%	-	0.0%
CIP	853,329	4.6%	747,729	4.4%	747,729	5.0%	-	0.0%
ILRI	2,669,934	14.5%	2,290,814	13.6%	2,290,814	15.3%	-	0.0%
IWMI	524,107	2.8%	450,287	2.7%	450,287	3.0%	-	0.0%
ICRAF	944,310	5.1%	871,438	5.2%	871,439	5.8%	(1)	0.0%
AVRDC	1,019,952	5.5%	877,553	5.2%	732,359	4.9%	145,194	7.5%
FARA	2,132,094	11.6%	1,892,094	11.2%	822,799	5.5%	1,069,295	55.5%
icipe	771,000	4.2%	623,228	3.7%	526,163	3.5%	97,065	5.0%
WUR	753,335	4.1%	649,808	3.9%	536,688	3.6%	113,120	5.9%
Totals	18,400,537	100.0%	16,850,190	100.0%	14,925,108	100.0%	1,925,082	100.0%

4.2.4 *Process for Integrated Systems Improvement*

Humidtropics implementation for integrated systems improvement entailed the following:

Guidance for Program implementation was helpful to guide Program leaders at inception in order to enhance the efficiency of the process of integration across various Action Sites. A significant focus was given to defining the approach and methods for integrated systems research to be implemented in Humidtropics, including differentiating the approach from that of non-systems CRPs and pre-existing bodies of work (i.e. clarifying the novel elements of the systems approach). However, there was urgency to begin engaging local partners, which was commonly turned toward baseline data gathering, which may have interfered with the required steps to be followed as provided for in the guidelines. Core partners including Bioversity International, CIAT, ICRAF, ILRI, AVRDC, FARA, and WUR provided substantive inputs to early characterization activities. In some Action Sites, available secondary data gathered for situation analysis was not sufficient for research design (e.g. not gender-disaggregated), but in other sites, such as in the ECA Flagship where legacy projects such as CIALCA and N2Africa were in place, recently gathered data was instrumental in informing the activities that were implemented within the Action Sites. The CCEE Team observed that although there was a guidance on Program implementation, it did not necessarily result in efficient approaches at start-up in some cases. This varied depending on the availability of data needed to get the Program running as quickly as possible.

Humidtropics' guidance indicated that SRT 2 activities should wait for completion of site characterization (SRT 1), so that integrated systems research design would benefit from stakeholder priority-setting and testing of assumptions based on comprehensive information. The pace of site characterization varied across Action Sites (e.g. staff transitions slowed progress on a survey in Cameroon and Nigeria). In some cases, participatory priority-setting went ahead (e.g. RAAIS process was implemented within numerous R4D Platforms) before situational analysis reports were completed. In response to budget cuts (see **Section 3.5**), the IAC encouraged delaying work in new Action and Field Sites, and the process then focused on situation analyses and baseline data compilation, and collection in existing sites, especially related to larger-scale drivers such as government policies and markets³¹.

Mechanisms to promote research collaboration: Core partners have significant autonomy in how they deliver on contracted Humidtropics obligations including selection of research priorities, methods, and staff. SRT Leaders and subsequently Flagship Managers were mandated to provide guidance and establish expectations for research cooperation among core partners. The shift from the initial SRT-based Program and budget structure to the Flagship-based structure reduced the capacity of SRT Leaders to effectively promote scientific agreement and consistent application of agreed approaches, tools, and methods across Area-Based Flagship Projects. Humidtropics management sought to address this gap by strengthening the Crosscutting Flagship, however this was inhibited by major budget cuts. The IAC has recommended that bilateral and "core-funded" (Windows 1 and 2) projects mapped to Humidtropics should be more explicitly linked to crosscutting research questions and hypotheses to increase the likelihood that these questions and hypotheses will be adequately investigated.

Given the significant challenge of blending the capacities and institutional priorities of the eleven core partners and a large set of Action Site partners, Humidtropics management actively promoted collaborative planning³² and co-location of bilateral projects, although some partners indicated low clarity on roles and commitments to deliver research. Individual

³¹ Report on the Inaugural Meeting of the Independent Advisory Committee, June 2014.

³² For example, WUR staff provided workshops on partnership and institutional innovation at all Area-Based Flagship Projects.

researchers assigned to Humidtropics demonstrated varying levels of adoption of “systemness” concepts and capacity to integrate these concepts into research design (institutional incentives or professional imperatives for peer-reviewed quality publications may play a role here). Proposal writing has been an important mechanism for collaboration and convergence among partners on research design including the Humidtropics 2015-2016 Extension Proposal (core partners) and Cluster 4 proposals (local, national, and global partners working in Action Sites).

Budget support for participatory research: As budget cuts reduced researchers’ time allocation to Humidtropics, robust participation in stakeholder platform meetings and leadership on tangible actionable research became more difficult. Research partners not based in Action Areas faced travel constraints to effective participation in platform planning processes³³. Participatory farmer-driven research in Field Sites requires adequate time commitment and consistent, ongoing presence by lead researchers to build trust and to engage effectively in design and implementation of on-farm trials. In CAC, this need was partly met by hiring and training local consultants to assist with situational analysis, research implementation, and data management³⁴. The single-year budget planning was not conducive for recruiting and retaining researchers (e.g. WUR rules expect a 4-year financial commitment prior to hiring Ph.D. students and researchers). As such, contracts between the Humidtropics Lead Center IITA and core partners required financial outlays that were difficult for some partner institutions to manage. In the face of budget cuts, the requirement to pre-finance activities meant that for some non-CGIAR partners such as FARA could not make long-term commitments, which in turn affected implementation.

The CCEE Team therefore observes that although collaboration and funding mechanisms were put in place, the reality of implementing Humidtropics on the ground according to these mechanisms and making the research participatory could not be fully realized.

4.3 Quality of Research

This section focuses on research design, leadership, quality of research outputs, tools, and approaches, research priorities and relevance, and building on legacy projects. The evaluation sub questions (**Table 1**) are stated as follows:

Question 4) To what extent does Humidtropics’ research approach, design and outputs reflect high quality, up-to-date scientific thinking, knowledge, and innovation, relevant to integrated systems problems and opportunities, including these for women and youth?

Question 5) To what extent have Humidtropics research for development activities been appropriately prioritized, effectively coordinated, and implemented, given key contextual factors, legacy projects, and financing needs for long-term research programs and key partnerships?

³³ In the CAC Flagship, five of the six international scientists with 10-50% time commitments are posted outside of Nicaragua (home to CAC’s single operational Action Site) and have limited ability to invest significant time in Field Site level participatory research.

³⁴ CAC Flagship leaders noted the importance of timely shared access to data and other resources for effective engagement with Field Site partners.

SUMMARY FINDINGS ON QUALITY OF RESEARCH:

Section 4.3.1, 4.3.3 & 4.3.6: Evaluation perspective on Quality of Research

The CCEE Team's perspective on the overall quality of research for Humidtropics is that its design and approaches have been grounded in theory of integrated systems research for development, with a focus on developing the necessary capacities at both farmer and institutional levels through the IPs that constitute partnerships and broad stakeholder participation that will make it sustainable.

Section 4.3.1: Overall, the Humidtropics integrated systems research design is:

- Guided by hypotheses that are clearly linked to major global challenges including improving livelihood opportunities for women and youth;
- Deliberately directed toward important and difficult knowledge frontiers such as trade-off analysis and farmer-focused farm system research;
- Gaining valuable experience with balancing the concerns of global donors, international researchers, national leaders, and local stakeholders in research priority-setting;
- Effectively engaging multi-disciplinary knowledge sets and resources.

Section 4.3.2: There is high quality scientific leadership, oversight, and guidance for the research provided by the Centers concerned such as ICRAF, AVRDC, ILRI, IITA, Bioversity International, and CIAT with the involvement of international (WUR) and/or local universities.

Section 4.3.3: Quality of research outputs – Humidtropics has produced a comprehensive mix of research outputs as shown in its Annual Reports. The CCEE Team was provided access to the Humidtropics Repository, which includes process documents that lead to final publications. From the Bibliographic analysis, there were 104 publications presented of which 20 were book chapters and 73 were spread over 55 Journals with the remaining publications in other outlets. The maximum number of publications in a particular Journal was four (2x), followed by three (2x), two (8x) and one (43x).

Section 4.3.4: Given a very complex and dynamic context, Humidtropics' R4D activities have been appropriately prioritized and effectively coordinated with the following caveats:

- Mismatches between initial Program ambitions and actual available resources created tremendous pressure for real-time adaptation, which inevitably created confusion and frustration among the large number of geographically separated Program partners;
- Adaptation of initial Program design concepts to on-the-ground realities required a transition period;
- Complex funding mechanisms within the CGIAR system contributed to unequal resources for Program implementation across the four Area-Based Flagship Projects.

Section 4.3.5: All Flagship Projects build on one or more legacy projects (generally part of one or more Centers' work) that are endorsed by the R4D Platforms as worthy of entry-point activity.

Section 4.3.6 & 4.3.7: Quality of research in terms of integrated systems improvement and the likelihood of its scaling up is evolving. There is a dynamic process of local appraisal of the community by existing and potential partners, followed by alliances to enable identification of entry points. The approach enables stakeholders to share ownership of the process and community empowerment which includes, inter alia, trained facilitators (at least one per Action Site), organizers to facilitate a wide range of needs (especially communications), and recorders to ensure that all activities are documented. This documentation process enables

the conduct of research on processes themselves and will inform on scaling-up and eventually on the broader lessons.

4.3.1 Research Design, Systems Trade-offs and Synergies

(i) Systems Analysis and Synthesis (SRT 1)

SRT 1 within Humidtropics was designed to address a plethora of issues in any given context in order to understand the external environment within which the research design is expected to succeed. In addition, the analysis entails identifying the necessary trade-offs that have to be made for any given choice. Figure 8 summarizes these processes:

- The Situation Analysis;
- Baselines and Typologies;
- Identification of Entry Points.

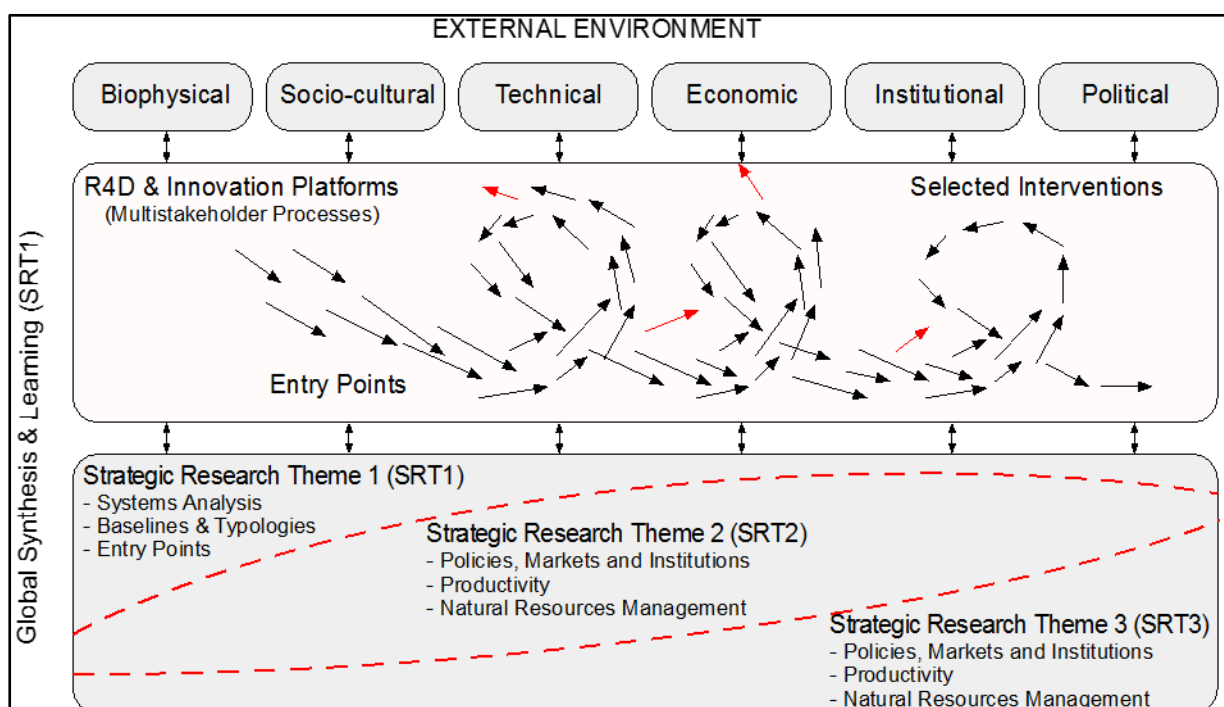


Figure 8: Systems Analysis and Global Synthesis in Context

The research design and system trade-offs and synergies in Humidtropics were addressed through site characterization. The process entailed bringing together a number of international and local partners, including the private sector at both R4D Platform and IP levels to identify key constraints and determine priority entry points. This process employed several methods, key among which was use of the Rapid Appraisal of Agricultural Innovation Systems (RAAIS) tool for identifying constraints in a participatory manner in the different phases. The RAAIS tool was used as part of the diagnostic process to guide the ex-ante analysis of complex agricultural problems, and the identification of entry points that would enhance the innovation capacity in each Action Site. This tool entailed the prioritization of research needs in line with resource availability in a participatory manner by conducting RAAIS workshops with all the different stakeholder groups. As part of the implementation of Humidtropics, it was agreed that during the launch of an Action Area and Action Site meeting, the very first step to be taken had to be prioritization of entry themes. During the launch and subsequent meetings, at least four entry themes that had been identified through the RAAIS would be prioritized, and only a maximum of two selected for implementation depending on the availability of funds. The

specific criteria used for the prioritization included: (i) relevance across the Action Site, (ii) relevance for the Humidtropics IDOs, (iii) specific interest of the R4D Platform partners, (iv) a description of entry themes, entry points, best-bet interventions, and best-fit interventions in terms of identification logic, potential content, and relation to the various geographical dimensions of Humidtropics, and (v) the anticipated scope for scaling through development partners and/or government support.

The advantage of addressing the integrated analysis from different dimensions (biophysical, socio-cultural, economic, institutional and political), bringing in interactions across different levels (national, regional, local), and coupled with the needs and interests of different stakeholder groups (farmers, government, researchers, etc.) was useful for facilitating buy-in into the research projects that were implemented in the respective Action Sites. The other benefit from using such a process to identify entry themes at the Action Site level, was its ability to directly link R4D themes to the system present in the Action Sites, and thus to have relevance for contributing to the broader Humidtropics IDOs. The entry themes were then translated into entry points at the Field Site level, depending on the social and technical conditions that had been addressed as the main constraints, such as productivity, NRM, markets, institutions, and nutrition level, etc. For market and institutions-related interventions, many of these were implemented at the Action Site rather than the Field Site level.

Sequencing of activities: The primacy of baseline characterization and situational analysis for Humidtropics implementation in Action Sites had mixed utility given that these processes were generally time-consuming and delayed identification of Field Sites and entry points, important precursors to research design. To shorten these delays, as pressures to demonstrate impact accelerated, Program guidance became more flexible regarding fast-track testing of high-potential innovations (e.g. existing bilateral projects). Ongoing situational analysis concurrent with research implementation did increase complexity in Action Sites. Across partners and Action Sites, perceptions varied regarding the value of having a situational analysis report as a collaborative planning tool (e.g. key issues seen as already well-understood), the relative value of compiling secondary datasets versus consulting local experts, and whether reports were sufficiently analytical rather than descriptive.

4.3.2 Research Leadership and Staffing

For specific “Research Themes”, scientific leadership, oversight, and guidance for the research is provided by the Centers concerned such as ICRAF, AVRDC, ILRI, IITA, Bioversity International, CIAT and/or local universities. These researchers are supported and employed by their host organization but funded by Humidtropics. 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. Obviously, such buy-in and the harnessing of expertise across relevant institutions adds to the efficiency of the Program.

In terms of Humidtropics staffing, there is a good involvement of the different scientific disciplines including biological sciences, social sciences and management. There is a big proportion (over 60 Full Time Equivalent (FTE) of staff with PhDs in the biological sciences consistently since 2013 to 2015 (**Figure 9**). Those from the social sciences follow at an average of about 50 FTE. There is also a higher number of staff with PhDs within management (over 18 FTE) compared to those with Master’s or Bachelor’s levels, but this is partly explained by the Executive Office, SRT Leadership and Flagship Management investments and the need for staff with both research and managerial skills to carry out such responsibilities.

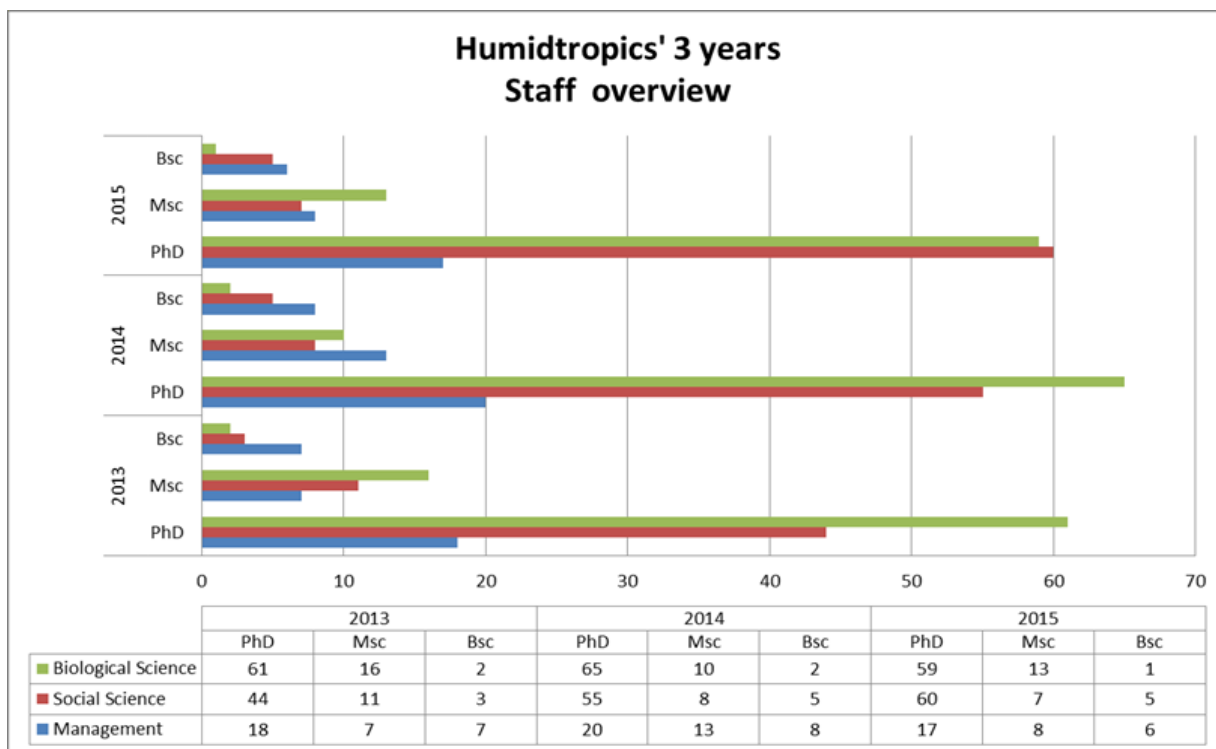


Figure 9: Humidtropics Staffing (Full Time Equivalent) and Qualification (2013 – 2015)

The detailed staffing list (FTE) by Flagship and qualification is summarized in **Table 10** below. The ECA Flagship, because of its size, has the highest number of staff at an average of 115 allocating their time to the Program across the three years of implementation (2013-2015). It also reflects the presence of the main bilateral and W3 projects mapped on to Humidtropics.

The number of staff in the other Flagships allocating their time to Humidtropics is below 50 people in each. In all cases, the number of people with PhDs especially in biological sciences outnumber the other qualifications and disciplines of social science and management. The exception to this rule is the staffing for the Crosscutting Flagship, which by its nature consists mostly of social scientists.

Table 10: Number of Humidtropics Staff by Flagship and Qualification (2013 – 2015)

Number of staff by discipline and qualifications				Number of staff allocating time to different flagships															
Education Level	Discipline	ALL			ECA			WA			CAC			CM			CC		
		2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015
Ph.D		123	140	136	78	77	76	27	28	26	7	18	14	24	28	31	18	27	32
	Biological Science	61	65	59	39	35	31	11	12	9	6	12	10	15	20	19	6	9	13
	Social Science	44	55	60	30	29	35	7	9	12	1	4	3	7	7	12	12	18	18
	Management	18	20	17	9	13	10	9	7	5		2	1	2	1				
Masters (MSc/MA/Mphil and Masters)		34	31	28	17	18	15	4	1	5	4	1	1	7	4	3	3	6	8
	Biological Science	16	10	13	7	6	6	1		4	3			5		1		3	2
	Social Science	11	8	7	6	4	2				1	1	1	1		1	3	2	4
Bachelors (BSc/BA)		12	15	12	4	4	8	1	1	1	4	3	1	4	5	4	0	3	2
	Biological Science	2	2	1		1	1				2	1							
	Social Science	3	5	5	2	1	2	1	1	1	1	1	1			3		3	
Other (Higher Education Diploma, Secondary School, Other and Blanks)		24	14	27	19	8	21	2	1	1	0	0	0	3	2	4	3	4	5
	Biological Science	3	3	1	2		1							1	1			2	
	Social Science	2	3	3	1	2	2	1	1	1				1	1	1	1	1	1
	Management	19	8	23	16	6	18	1						2		3	2	1	4
Total Staffing Level		193	200	203	118	107	120	34	31	33	15	22	16	38	39	42	24	40	47

More details are found in the Detailed Staff Qualification, Experience & Involvement in Humidtropics in **Annex 11**. Of note is that the sub-disciplinary spread is wide ranging and would be expected for an integrated systems program. Widening partnerships at core and local levels as originally including the four non-CGIAR partners to address systems needs but where CGIAR itself has no comparative advantage is considered by the CCEE Team as good practice, even though the many perspectives and approaches inherent to the multi-disciplines may initially be confusing and add to the complexity, the potential richness of a solutions portfolio may eventually result in real systems changes. The CCEE Team therefore finds the staffing of Humidtropics to be of suitable for its design, complexity and budget with a good blend of experienced scientists (see **Annex 11**) and upcoming scientists providing high quality in terms of the pool of expertise in not only the biological and social sciences but also those engaged in research and program management.

Coordination: While they are not given decision-making power, SRT Leaders were charged with advising, guiding, training, and backstopping core partners for fostering coherence (i.e. common framework, consistent use of tools) within and across Action Areas. With the major structural shifts in Humidtropics in 2014, the new Flagship Managers are expected to promote convergence among partners in their Area-Based Flagship (also without official decision-making power) and the cross-Flagship convergence role of the SRT Leaders was reduced (driven by CO strategic redirection). The importance of dedicated leadership by Flagship Managers was highlighted by the confusion and delay that followed when this role was suddenly vacant in the CM Flagship. The number and composition of core partners active in the Humidtropics Action Sites varied. Where there was a greater number of core partners, the need for coordination became apparent to increase clarity regarding expectations and roles. For example, in the CM Flagship, a semi-annual core partners meeting was instituted in 2014 and this has helped to increase communication and collaborative activities. Appropriate funding must be in place to support this coordination function. In other Flagship Projects, such as ECA, there was a high level of coordination among the core partners both at the R4D Platform and IP levels. There were clear communication channels facilitated by the Flagship Manager.

4.3.3 Quality of Research Outputs

Humidtropics has produced a comprehensive mix of research outputs as shown in its Annual Reports, where Annex 1 provides a summary of outputs produced following the CO criteria and where evidence is referenced and available online. The CCEE Team valued the easy access to process and final documents in the Humidtropics Repository, where it could easily sample reports, publications, spreadsheets, images and videos for review and evidence. It is evident to the CCEE Team that the outputs are of varying quality and level of completeness covering a broad range of approaches and disciplines. The Program has experimented as planned with many different tools, methods and approaches to enhance systems stakeholders (farmers and institutions) capacities to analyze their situation and system and set priorities. At this stage it is trying to synthesize these experiences into products that can be used by other projects to support their systems analysis and priority-setting. As for the systems interventions research, this only started to take shape beyond the legacy work after systems analysis was concluded and covers priorities mainly through platform research initiatives funded in Cluster 4 of the Area-Based Flagship Projects. These projects only started late 2014 and where planting was concerned during the rainy seasons in 2015.

The CCEE Team visited a number of research plots in the Action Sites during their field visits ranging from research-led, student-executed, farmer-led/executed to community led/executed trials tapping into solutions developed by others such as legume intercropping as researched by N2Africa. It thus uses researcher-led and participatory approaches. The CCEE Team found this use of many different methods and approaches refreshing and consistent with the multi-level approach explained in **Section 3.1**.

Research outputs on multi-stakeholder processes that are essential to eventual scaling of promising technologies and innovation processes are materializing in 2015 and expected to accelerate in the next few years, including as part of systems-related Flagship Projects in 2nd generation CRPs. The CCEE Team extensively looked into what the Program means by scaling, and although Humidtropics initially needs to scale its approach to ensure that research contributes to more location specific development needs, the intent is to mainly use the higher level R4D Platforms and similar multi-stakeholder processes to generate development partner interest to scale promising social and technical solutions to the extrapolation domains. The CCEE Team can only speculate on the likelihood of this scaling process to materialize rather than having evidence of such at this early stage of implementation. Nevertheless, based on the current processes and early research it seems a plausible approach to pursue. It would also be early to gauge if the cost-benefit ratios are competitive compared to other approaches to scaling but it would be credible to assume that given its focus on relevance and co-evolution of changes for all systems stakeholders, the approach would improve the chances for real change. It would be very important to research if some of the early best-fit options indeed can be scaled through the higher-level stakeholder processes and at what costs, even beyond the termination of Humidtropics if the CGIAR is to demonstrate a cost-effective pathway to impact.

PUBLICATIONS

At the start of the inception phase the CCEE Team was provided access to the Humidtropics Repository mentioned before. The repository includes process documents that lead to final publications and eventually can not only be used to audit the steps from idea to publication but used for synthesis products for learning purposes. The term documents as mentioned should be interpreted in the wider sense and also includes pictures and videos. Each team member browsed through this repository and was supported by the Humidtropics team to find additional documents or documents relevant to their domain. The latter was needed as there were literally hundreds of documents available and team members downloaded many to get an idea of what the Program was doing. As found earlier this was very helpful but better use of tags and distinction between types of documents and stages of their development would have made it easier to get a sense of “quality” in terms of underlying research, methods, approaches, etc. The wide range of disciplines is evident in these publications and is consistent with the distribution of social and biological researchers (**Section 4.3.2**).

Following from the assumptions and propositions made in **Section 2.3** and the team’s awareness that traditionally, the success of academic research has been judged in quite narrow ways, usually by an assessment of peer-reviewed published outputs supported by bibliometric analyses that quantify published outputs and quality in measurements such as impact factors, and the extent to which the outputs have influenced others in the same field by citation tracking, it became apparent that this was a complex undertaking if to do justice to the Program.

With support of Ms. Sophie Zimm, Evaluation Analyst of the IEA, a bibliometric analysis was conducted of selection of publications that mostly were indexed by Thomson Reuters with related impact factors where applicable. The team also looked at the bibliometric analysis commissioned by the CGIAR (2014) to Elsevier, which uses SCOPUS and alternative citation index. Both on first sight seem objective and unbiased using straightforward methods based on simple counting. However, the CCEE Team is aware that objectivity has been generally challenged as for example number of citations depend on number of researchers in the same domain which is not necessarily conducive to reflect originality and intrinsic quality of the research, especially in view of multi- and interdisciplinary research typical for systems. The large number of social science related publications also poses challenges as they often feature in niche publications and non-indexed open access Journals. In general, the CCEE Team is also aware for the pitfall of bias toward Anglo-Saxon publishers which disadvantages

other publishers. As can be seen this is true to some extent for Humidtropics, where there is a wide range of publishers also in the humid tropics countries. Despite these cautionary notes it helps to gauge where the Program stands and as such we found the following:

From the Elsevier analysis in 2014:

131 Humidtropics researchers were matched to the SCOPUS author profiles representing the largest number. Looking at the Humidtropics staffing (**Section 4.3.2**) which represents FTEs this seems realistic, as there may be a large engagement of part-time researchers. This may also explain why the H index at 6.0 was the lowest among CRPs, indicating low level of publications per researcher as some may have published their research under another CRP where their proportion of time was higher. The team found for example in Nigeria that researchers were both in RTB and Humidtropics with a larger proportion in RTB. The research was related to cassava productivity increase by intercropping with legumes, and even though the researcher may be listed in SCOPUS under Humidtropics the same person also can be listed under RTB with the publication being recorded only in RTB. The CCEE Team thus found that interpretation of the metrics need to be considered in the context of a systems Program, where researcher from multiple disciplines work together but may prefer to publish in journals renowned in their domain and as part of their engagement in other CRPs. Meeting and interviewing a cross-section of Humidtropics associated researchers, however does in the field see the presence of many new researchers, especially in the social sciences such as post docs from WUR.

From the Bibliographic analysis with support from IEA:

There were 104 publications presented of which 20 were book chapters and 73 were spread over 55 Journals with the remaining publications in other outlets. The maximum number of publications in a particular Journal was four (2x), followed by three (2x), two (8x) and one (43x). This wide spread is consistent with the large number of different disciplines and geographies involved, but it also is a potential weakness in lacking critical mass and specific peer-reviewed outlets for integrated systems research of which no Journal was established or published in. The absence of such research community with recognized Journals makes it vulnerable against well-established knowledge domains traditionally used by CGIAR researchers. At the same time, given the large numbers of interested researchers and also the relatively large number of book chapters, there seems to be value in collaboration with other disciplines but this cannot be discerned from the metrics and thus is more related to the other findings in this report. Of the journal articles 102 were cited in Google Scholar, and the top 10 by Thomson Reuters were cited from 15 to 46 times related to publications in 2013 (3) and 2014 (7) mainly related to livestock and soil fertility publications. It would be too early to signal if this is of worry or not as the number of publications is within expectations, but it may also signal that the Program has more emphasis on non-scientific outlets, which seems more plausible given the large number of guidelines, reports, blog posts, etc., in the early stages of the Program, and the gradual development of an integrated systems research community. As with any discipline this will take time and it would be important for CGIAR to find ways to keep including systems research in its portfolio for the reasons mentioned throughout this report, and more importantly to develop a unique new body of knowledge that links research with development results.

The knowledge production as measured in peer-reviewed papers as illustrated by the bibliometric analysis would not suffice to gauge the quality of research. As such other findings in the evaluation report on capacity development (in wider sense including capacity to innovate), product and or policy development, credibility of impact pathways and potential for wider societal benefits would in the view of the CCEE Team be necessary to give better insight in the need for and quality of integrated systems research.

The most cited journals include:

- A fourth principle is required to define Conservation Agriculture in sub-Saharan Africa: the appropriate use of fertilizer to enhance crop productivity;
- Medium-term impact of tillage and residue management on soil aggregate stability, soil carbon and crop productivity;
- Mapping the global distribution of livestock;
- A paradigm shift towards low-nitrifying production systems: the role of biological nitrification inhibition (BNI);
- Soil heterogeneity and soil fertility gradients in smallholder agricultural systems of the East African highlands;
- Systems approaches to innovation in crop protection. A systematic literature review;
- Predicting the risk of avian influenza A H7N9 infection in live-poultry markets across Asia;
- Sustainable intensification and the smallholder African farmer;
- Mapping the economic benefits to livestock keepers from intervening against bovine trypanosomosis in Eastern Africa;
- Towards dynamic research configurations.

4.3.4 Research Priorities & Relevance for Women and Youth

Influences on research priority-setting: Stakeholder-driven research priority-setting processes are influenced by the representativeness of those convened for R4D Platforms and IPs. Many different priorities can make their way into entry point identification and research design. Legacy research projects contribute valuable, locally-relevant knowledge and capacity, but can also inject assumptions about the most relevant problems and solutions. Core partners' bilateral projects that are mapped to Humidtropics set the frame for tangible action in terms of available funding and associated research objectives. Humidtropics' program-level priorities (i.e. IDOs) infuse objectives that would not necessarily arise from R4D Platform discussions (e.g. gender equity, agro-biodiversity). The array of local and national stakeholders brings their own set of core concerns and vested interests.

The Humidtropics Platform concept explicitly recognizes these diverse influences and seeks (and succeeds, to varying degrees) to create a framework for collective assessment and decision-making that better aligns with actual system complexity and builds shared ownership of outcome-oriented research. R4D Platforms and IPs are the central mechanism for achieving Humidtropics' IDOs. Core research partners' primary strengths, as well as more immediate problem-solving orientation of local stakeholders, contributed to widespread emphasis on productivity and NRM. Humidtropics Program-level emphasis on livelihood, nutrition, gender, youth, and innovation capacity brought these issues to the fore in many Action Sites.

The evidence gathered from KIs, FGDs and the survey findings all confirm that women and youth have been emphasized in planning and implementation of Humidtropics activities. Over 64% of the survey respondents agreed that efforts had been made towards empowerment of women and youth, with a few (32%) arguing that much more was still needed (**Figure 10**).

Q19. Please select below what best reflects your level of agreement with the following statement: Empowerment of women and youth has been emphasized in planning and implementation of Humidtropics initiatives.

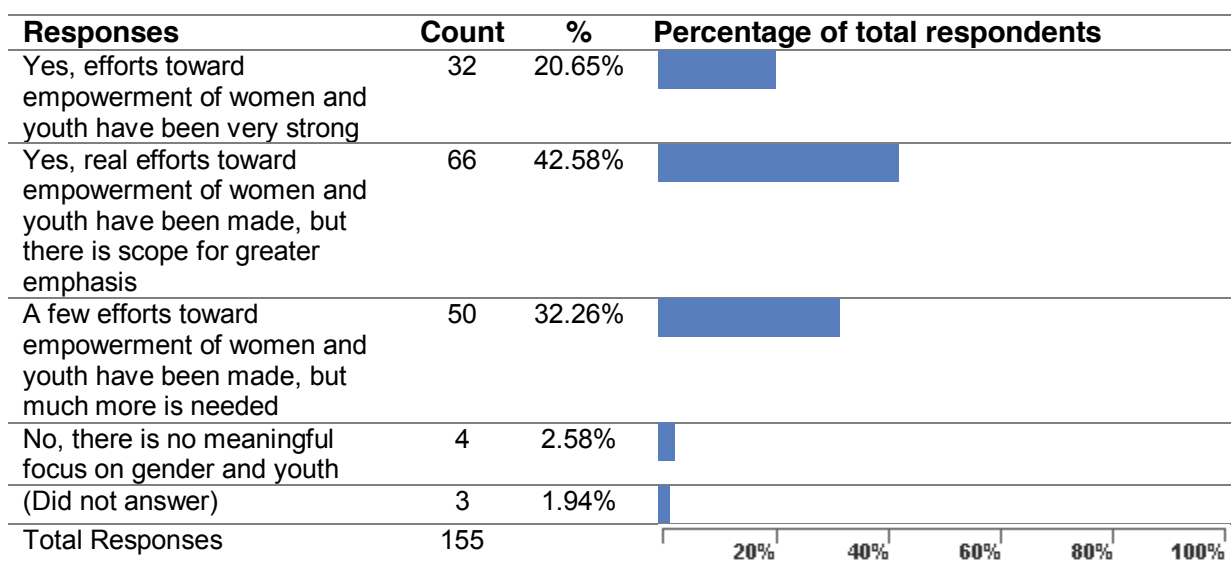


Figure 10: Survey Results on Empowerment of Women and Youth

While it is an explicit component of the Environment IDO and an essential feature of sustainable intensification, ecosystem services were less apparently a priority in the entry themes emerging from R4D Platforms and IPs, although soil fertility, agro-biodiversity, and water availability were featured in some Action Sites. From inception, Humidtropics has emphasized farm- and community-scale interventions while maintenance of some ecosystem services can require larger scale emphasis (e.g. biodiversity, climate regulation, water quality)³⁵.

As Humidtropics was rolled out in Action Sites, local and national partners were informed that it would be a 15-year Program focused on building local knowledge and innovation capacity in order to increase the effectiveness of existing or new development initiatives. It was made clear that Humidtropics funds would be used to support stakeholder platforms and R4D research (designed to produce best-bet innovations to be disseminated by scaling partners). Many Humidtropics project budgets are small and rely on contributing partnerships. In the Nicanorte Action Site, local partner organizations and farm households contribute 27% of the total direct implementation costs and this is complemented by a range of in-kind activities including data gathering on farms and in communities in support of Platform processes.

4.3.5 Building on Legacy Projects

Humidtropics is build on legacy projects. With for example, for increasing system productivity, whereby systems' productivity is viewed in the most holistic sense to include annual and perennial crops, remnant forests, and other non-crop areas, livestock and their interrelationships at the farm and community levels, specific entry points towards improving system productivity were identified based on a combination of improved lines of crops and livestock; external inputs including organic inputs, fertilizer, and other soil amendments; better agronomic and pest and disease management; better feeds and health services for livestock; and targeted use of agro-biodiversity for income and ecosystem services.

³⁵ Landscape-scale processes, including ecosystem services are the mandate of the Water, Land and Ecosystems CRP, which engages similar partners as Humidtropics.

THE CASE OF CIALCA

Some of this work was undertaken by building on legacy work already achieved by the Consortium for Improving Agriculture-based Livelihoods in Central Africa (CIALCA), coordinated by IITA, Bioversity International, and CIAT-TSBF, and active in the Great Lakes Region since 2006 with activities in DRC (see **Box 1**), Rwanda, and Burundi and related activities in Uganda and Kenya (www.cialca.org). CIALCA focused its R4D activities around banana- and legume- based systems that cover a major proportion of agricultural land in that region.

For example, the productivity of beans, one of the major sources of protein, was low as a result of widespread attack of pests and diseases, poor nutrient management, and sub-optimal agronomic management. Taking these factors into consideration, together with farmer associations, CIALCA installed on-farm field trials and demonstrations that improved productivity of cassava-based systems through 1) combining improved cassava and bean varieties previously identified through participatory selection; 2) adapted agronomic practices through row planting that adjusted the spacing between cassava plants and legume intercrops; and 3) targeted small doses of fertilizer in combination with organic inputs. This combined management strategy resulted in 30-50% higher cassava yields and a doubling of legume yields. Such improved performance is sufficient to overcome food insecurity and malnutrition except that poorest households have less ability to access mineral fertilizer and mobilize organic resources, stressing the importance of farm typologies in targeting technologies.

Note: This intensification is central to Hypothesis 1 and reinforced by Hypotheses 4-7, with a core research question directing SRT 2.2 concerns on ‘How can farm households mobilize farm technologies and ecosystem services into more productive, profitable, and efficient small enterprises to meet their livelihood aspirations?’.

In addition to the legacy work in DRC, the Sustainable Tree Crops Program in West Africa (STCP) in Central Africa is linked with CIALCA and the Lake Kivu sub-Saharan Africa Challenge Program (SSA-CP), both operating through a set of integrated research activities that come closest to the vision of Humidtropics’ research in the other Action Areas. Humidtropics is in its most basic sense a test of the CGIAR reform process, whose core areas of research innovation consist of four principal areas:

- Development of a conceptual structure and methods for research on production systems, market links, and natural resource and biodiversity integrity within a framework of system intensification;
- Research on scaling up integrated market, productivity, and natural resource management interventions, and how this is translated into impacts on development outcomes;

Box 1: CIALCA Legacy Work in DRC

The Mushinga Innovation Platform in DRC has built on legacy projects such as the adoption of CIALCA technologies. The integrated systems improvement is being achieved through the projects such as the 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 practice) 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 Research University.

Other trials included:

- The 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 (including 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).

- Developing sampling and data structures at different scales that allow for analysis within and across Action Areas leading to global synthesis and production of IPGs;
- Design and testing of institutional innovations that facilitate lower transaction costs in the delivery of integrated approaches and particularly target poverty and gender equity outcomes.

All of these tasks must be performed within an evolving and testable conceptual framework across a set of Action Sites systematically selected within that overall conceptual framework. Success also relies upon the development and refinement of research methods at each scale with the potential for integration across scales.

THE CASE OF SSA-CP

The attributes of the IAR4D concept (as outlined in **Box 2**) were seen as equally relevant to the design of Humidtropics. As such, a conscious effort was made to partly overlap in the East and Central Africa Action Area with the SSA-CP.

Three tasks were undertaken for integrating the SSA-CP into the Humidtropics which included the following:

- Integration of the SSA-CP pilot learning sites through selected IPs in DRC, Rwanda and Uganda as learning sites for partners in Humidtropics;
- Use of SSA-CP learning sites to improve collaboration among researchers in the CGIAR Centers to address specific research issues raised on the IPs;
- Definition of scaling-up processes in new sites based on the experiences under the SSA-CP.

The field visits to DRC, Rwanda and Uganda confirm the use of the R4D concept and the IP model in the Action Areas and Action Sites respectively. All IPs established in the three countries have been used as learning sites by bringing together different stakeholders from diverse CGIAR and other core partners, down to district-level government agents, NARES, local universities, farmers organizations, youth groups, etc. This has resulted in better collaboration between the key stakeholders, all of whom were engaged in the initial process of collecting baseline information, entry point identification, partnership building, facilitation of IPs and R4D Platforms, etc.

For example, the Uganda Platform in Mukono included the following key partners:

- a) Core partners: Bioversity International and 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 Farmers Federation;
- e) Active public sector involvement and linkages.

Box 2: Lessons learned from the SSA-CP

The SSA-CP aimed at generating impact through the Integrated Agricultural Research for Development (IAR4D) process, which has its roots in the innovation system approach for development. The IAR4D approach was implemented through IPs, which have the following characteristics:

- A functional linkage point for all the stakeholders along the value chain of the specific agricultural commodity and system of production. The linkages bring together farmers, researchers, extension agents, private sector (input dealers, financial institutions, transporters, etc.), policymakers and commodity end users (supermarkets, bulk buyers, institutional buyers, companies);
- Integration of productivity, NRM, markets, policy, product development and nutrition, and gender into the research agenda;
- An efficient modality for organizing stakeholders for interaction and output delivery;
- An effective mechanism for knowledge generation and transfer to farmers and other stakeholders for successive generations of innovations;
- Action research oriented toward problem solving and impact;
- Bottom-up organizational development and scaling up of innovations.

With regard to the latter, there has been very good collaboration between the Local Governments (LGs) of Mukono-Wakiso (urban) and Kiboga-Wakiso (rural), which is a good example of market linkages that are likely to lead to the achievement of results, whereby the Mukono LG has many processors who have been linked to the Kiboga LG, 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, which scaling through soybean processing for both food and feed.

THE CASE OF N2AFRICA (N2A)

The Program in Uganda was built on legacy work by N2A, but also focused on priorities that emerged 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 Dairy Development Project (EADD) – also supported by the Bill and Melinda Gates Foundation, and implemented by five other partners who include: Heifer International, Technoserve, ILRI, African Breeders Association, and ICRAF. This project is targeting 45,000 farmers in 20 districts in Uganda. It uses “volunteer farmers” in order to provide extension services, which project is now mapped to Humidtropics in Mukono-Wakiso IP.

THE CASE OF LEGACY PROJECTS ACROSS ALL THE FLAGSHIP PROJECTS

The design of Humidtropics is also underpinned by the STCP in West Africa (**Box 3**) and CIALCA work in Central Africa linked to the Lake Kivu SSA-CP, both operating through a set of integrated research activities that come closest to the vision of Humidtropics.

In other cases throughout all the Flagship Projects, it appears that capitalizing on existing legacy work helps rapidly put interesting relevant studies into the farmer research sites. As Platforms moved into their second season planning, new ideas of emphasis came from the community-level discussions to inform the IPs. To capitalize on this community buy-in and expression of “innovation capacity”, Humidtropics correctly chose to encourage formulations of the emerging concepts as priorities for work. Some older legacy projects (e.g. Quesungual in Nicanorte) have great merit for scaling-up by the community learning process. However, the “bottom-up” derived R4D innovation areas are equally extremely important to foster ownership by the community. Participating Centers need to be ready to engage and support both pathways.

Therefore, given the importance of legacy and bilateral projects mapped to Humidtropics to the design of the Program, the magnitude of budgets and associated activities varied significantly across the four Area-Based Flagship

Box 3: The STCP

The STCP was a collaborative public-private partnership between the global chocolate industry, national and international research institutes, national extension services, and various donor agencies for the development, testing, and scaling out of innovations targeting smallholder cocoa production systems and marketing services. The program is active in Cote D'Ivoire, Ghana, Nigeria, and Cameroon, which together account for 70% of global cocoa production. The conceptual framework and some priorities of the program that benefited the design of Humidtropics included:

- A comprehensive producer baseline survey at the start of the program in 2001-2002;
- Development and testing of a Farmer Field School extension approach for the integrated management of cocoa pest and disease;
- Development and testing of institutional innovations with producer organizations that included collective marketing and the provision of improved planting materials;
- The program also benefited conceptually from the participation of key research personnel in the Alternatives to Slash and Burn program of the CGIAR, which has developed innovative approaches for the evaluation of environmental and economic trade-offs for a range of production systems across the global pan tropics. These approaches have been used to evaluate land-use change scenarios and productivity.

Projects. The ECA and WA Flagship Projects benefitted from the mapping, while the CAC and CM Flagship Projects were more dependent on the limited funding available through Windows 1 and 2. The differences in Program size across Area-Based Flagship Projects affected the rate at which Action Sites and Field Sites became operational.

4.3.6 *Integrated Systems Improvement*³⁶

Research approach: The Humidtropics approach to integrated agricultural systems research attends to both agricultural innovations and enabling conditions for adoption of these innovations by farmers. Key considerations in development of agricultural innovations include: (1) explicit recognition of farmers as system managers operating within multi-scale biophysical and socio-cultural heterogeneity; and (2) minimizing trade-offs between short-term yield gains and long-term provision of ecosystem services. These considerations drive the following features of Humidtropics' research: (1) farmers as active research participants at all stages; (2) shared ownership of research and scaling through multi-stakeholder partnerships; (3) spatially-explicit and socially-differentiated assessment of biophysical, socio-economic, and institutional contexts; (4) focus on entry points for enhancing total factor productivity, smallholder livelihoods, and natural resource integrity; and (5) processes for identifying locally-relevant best-bet and best-fit technologies³⁷.

Integration of place-based knowledge: Partnership development and cooperative implementation of the Humidtropics research agenda is founded on the 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.

An important subset of core partnerships involve the seven CGIAR Centers, which are lead partners in Humidtropics since its inception: IITA, ILRI, ICRAF, CIP, IWMI, Bioversity International, and CIAT. Humidtropics' design integrates bilateral projects housed at these partner Centers into implementation of the Program in relevant Action Areas. Humidtropics' design also relies on engagement with other CRPs as sources of knowledge, tools, and technology resources to support its place-based "farm system research"³⁸ in Action Sites (see **Figure 11**).

Research model: In essence, Humidtropics undertakes place-based research in which appropriate knowledge and technology, from local to global sources, is identified and mobilized toward systems change through entry points, which are agreed upon in multi-stakeholder platforms. When done well – and there are numerous examples in the Humidtropics portfolio – integrated system research has high relevance for and adoption by beneficiaries. This model has potential for informing "discovery"³⁹ research leaders about knowledge needs on the ground, and providing feedback on the utility of new technologies and methods (e.g. whether research innovations have practical application in the field and if there are unanticipated system-level effects of their use). Increasing demands on CGIAR to generate livelihoods impacts at scale, understanding effective modes of farm system research, with clear linkages to farmer-oriented research, is a critical area of investigation.

³⁶ Integrated Systems Improvement involves researching and mainstreaming promising systems interventions related to productivity, natural resource management, and markets and institutions. This theme also includes use of modeling tools and analysis, gender considerations, research-development interactions, and scaling-out dimensions. Sustainable intensification and diversification are key drivers in this respect.

³⁷ Idea Note on Sustainable intensification of smallholder systems in the humid and sub-humid tropics.

³⁸ See Quality of Research section for richer discussion of the "farm system research" model.

³⁹ In this report, farm-level research refers to scientific efforts, commonly undertaken in laboratories and research-scale trials, to create new technologies and methods intended to achieve targeted objectives (e.g., increased crop yield, drought-resistance) through application in multiple contexts.

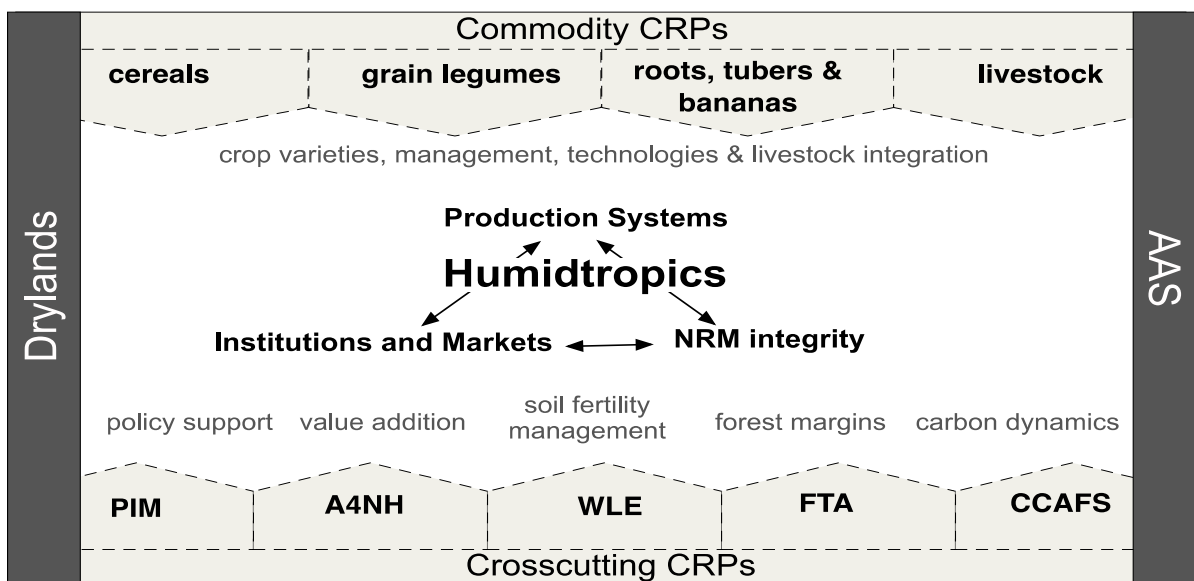


Figure 11: Conceptual place-based integration of solutions emerging from other CRPs

Novelty and impact: The place-based, people-centered approach to integrated systems research that has been tested by Humidtropics represents a novel and challenging scientific endeavor. To appropriately investigate agricultural, natural resources, socio-economic, and institutional dimensions, high quality integrated systems research relies on multi-disciplinary research teams willing to deal with complexity and capable of analyzing trade-offs and synergies within socio-ecological systems. Given the intricacy of integrating multiple disciplines and research domains, significant involvement by senior scientists is essential. For example in all sites visited, the CCEE Team witnessed the involvement of senior scientists working in tandem with other disciplines in order to steer their research agenda forward. A case in point were the senior scientists in from ICRAF in the Uganda Action Site who were conducting studies on incorporation of multipurpose trees and shrubs for fruits, fodder, poles, shade and timber to enhance system integration, and evaluating local/indigenous fodder shrubs for improved livestock productivity.

The potential to combine biophysical and social sciences effectively to derive a more accurate understanding of the complex decision-making processes in rural agricultural contexts⁴⁰ represents a critical area of scientific inquiry with central relevance for global efforts toward sustainable agricultural intensification, poverty reduction, improved nutrition, and gender equity. For example, in the Nicarnote Action Site, there is an emphasis on tweaking integrated systems such that innovations on components drive the added value (synergies) that enhance the overall system and farm family livelihoods, including gender and youth empowerment. The buy-in ownership process directs applied research to tune the production system identified by the community of practice. Most of the biophysical research evolving is not cutting-edge science, but is appropriate to the needs of the farmers such as the soil sampling in cocoa fields to assess the soil nutrient status and eventually guide farmer ability to enhance productivity of coca more effectively and efficiently.

Working with non-traditional research partners such as local institutions, who often lack research expertise, requires research leaders to hone facilitation skills and re-calibrate the balance between scientific rigor and practical on-farm implementation. For example, the key SRT 2 themes of Sustainable Intensification and Diversification are appropriate for both addressing local stakeholders' needs for improved productivity, income security, and market access, while also creating space for innovative research.

⁴⁰ For example, innovative non-parametric analysis of data collected on farm fields with uneven replication is under study in several Action Sites (e.g., Nicanorte and Uganda).

Systems research tools: The Tools for Systems Analysis (TOSA) toolbox was created as a Program-wide resource by identifying twenty-five existing tools that could be usefully applied in Action Sites for site characterization, entry point identification, research design, Platform development, and scaling. These tools use spatial, survey, M&E, and other types of data to: (a) document ecological knowledge, local landscape structure, use of plant and animal species, women’s agricultural activities, dietary diversity, and livestock distribution and feed availability; (b) assess complex agricultural systems, household typologies, development domains, future scenarios, and policy measures; and (c) guide participatory processes, agro-entrepreneurial development, smallholder market access, technology targeting and scaling, and climate adaptation (see **Table 11**). Performance assessment tools for stakeholder platforms are under development and will be added as they are completed. The intention of the TOSA toolbox is to direct appropriate tools to diverse contexts, and to compare their use and utility, however, in the absence of robust mechanisms for promoting consistent application, it may be too early to assess the extent to which this intention is manifested across Action Sites.

Table 11: Selection of tools for Systems Analysis used/developed by Humidtropics⁴¹

Tool	Purpose
Humidtropics Similarity Analysis	Find areas with similar characteristics to a study site.
Local Knowledge Toolkit (AKT5)	Gather local ecological knowledge.
Situational Analysis Checklist	Ensure attention to three primary objectives of Humidtropics.
Tool for Monitoring and Evaluation of IPs	Provide a conceptual framework for monitoring and evaluation of IPs.
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 Agro-enterprise Development	Entry point for addressing entrepreneurial development needs of institutions that support rural communities.
Identifying Market Opportunities for Rural Smallholder Producers	Support agencies implementing a participatory 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	Ecosystem service mapping using 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.
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	Questionnaire results on women and children's dietary diversity.
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

⁴¹ Humidtropics' Tools for System Analysis (TOSA): <http://data.ilri.org/tools/group/humidtropics2>

Tool	Purpose
	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 Interventions)	Facilitate targeting and scaling-out of three different Agricultural Water Management (AWM) technologies in the Limpopo and the Volta River Basins.
CCAFS Climate Analogues tool	Support adaptation in integrated 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.

4.3.7 *Scaling and Institutional Innovation*

Scaling and Institutional Innovation (SRT 3)⁴²: Central to the Humidtropics approach is the premise that institutional innovation is necessary for the scaling of sustainable intensification technologies and processes⁴³.

It attempts to address the challenge of building more effective strategies to enable a wider diversity of stakeholders to implement system improvements in ways that are equitable and sustainable (see Hypotheses 7-9). Research on scaling and institutional innovation is globally guided by SRT 3 and focuses on the co-development of social and technical institutional innovations with the technologies and processes emanating from integrated systems improvement guided by SRT 2. Together with the SRT 1, it researches tools, methods and approaches that enhance systems stakeholders' capacities, including women and youth, to identify challenges and opportunities, invest, test and experiment with systems intervention options, and share their experiences and promote the best-fits for scaling at farm, national and global levels. The original Humidtropics proposal explains that over the planned period of 15 years, research would:

1. Improve the understanding on how to create appropriate technologies that integrate productivity with sustainable resource management and foster the necessary institutional conditions (policies, markets, community norms and values) to enable these technologies to become effective;
2. Develop methodologies, approaches and frameworks for multi-stakeholder processes engaged in research for development such as R4D Platforms and IPs;
3. Test how scaling up can be enhanced through a combination of communication approaches and technologies – in essence stimulating alternative impact pathways.

These dynamic processes are illustrated in Sections 3.1 and 4.3.1 where scaling can be seen as a measure of a particular intervention to have made it from a niche/incubator in a Field Site to the mainstream regimes of an Action Area and beyond. The CCEE Team looked for

⁴² Scaling and Institutional Innovation focuses on co-evolving institutions via social innovation with the technologies emanating from the integrated systems improvement theme. As such it improves stakeholders' capacity to innovate and supports the scaling of interventions at farm, national and global levels.

⁴³ Idea Note on Sustainable intensification of smallholder systems in the humid and sub-humid tropics.

evidence how this translated into plausible processes of research, capacity and partnership development. In practical formative evaluation terms, this means that at this stage of Humidtropics implementation that the team looked for credible evidence that research and multi-stakeholder processes at farm and institutional levels were initiated, that they identified and prioritized entry points and started research at farm and institutional levels.

Humidtropics has emphasized capacity building in relation to institutional innovations. A non-CGIAR partner, WUR, provides leadership in this area. Progress has been made in the use of multi-stakeholder platforms as a key vehicle for catalyzing institutional change. It was explained to the CCEE Team that in the early stages of proposal development, the CGIAR did not have enough critical research capacity to develop a framework to systematically conceptualize and assess farmer and institutional decision-making at a production system level, make choices among technology options, and promote adoption under alternative development and dissemination strategies. The proposal development team engaged WUR to lead this research with their established social science competences ranging from improving agricultural knowledge and information systems (Communication, Sociology, Anthropology) to influencing behavior (Social Psychology), in addition to their agricultural production research competences.

The CCEE Team observed significant engagement of WUR researchers in the research sites, engaged in practical studies related to the functioning of R4D Platforms and IPs, such as the case studies on building multi-stakeholder processes in Rwanda, Burundi and DRC. These studies supported the development of a framework that systematically conceptualizes and assesses farmer decision-making related to the agricultural production system, choices between technology options, and their adoption under alternative development and dissemination strategies. Research also spawned series of case studies, practice briefs, guidelines, publications on capacity to innovate, etc.

Group interviews and individual in-depth interviews with Humidtropics researchers and Platform members not only gave confidence that a significant research effort was undertaken, but more importantly demonstrated the enthusiasm to collaborate to address challenges and opportunities that would eventually result in real changes in people's lives and institutional performance, despite the many disciplinary differences and variable research competences. The CCEE Team found this to be one of the core achievements in the early stages of Program development that enhances the plausibility of what the Program set out to accomplish. Despite the Program discontinuing in 2017, efforts should be made to capitalize on the investments made by Humidtropics and ensure that this energy, drive and collaboration continues in 2nd generation CRPs and Site Integration activities.

It was found that Humidtropics learned from traditional farming research efforts (FSR, see Section 3.1) and enhances methods and approaches to establish the operational linkages that are needed between FSR activities and the entire range of agricultural research, development planning, and Program implementation that eventually contribute to development changes. It also enhances early IP approaches such as by SSA-CP and CIALCA by not using researcher-led entry points, but a collaborative process with multiple stakeholders at different levels that determine the entry points and impact pathways. It was found that communities in the Field Sites, along with members of the more generic and representative for an extrapolation domain R4D Platform, negotiate what will be done and by whom often resulting in the establishment of an IP that tackles such. Here we would like to refer to the significant number of Platform research initiatives in Cluster 4 funded projects and the Case Studies where evidence of such research was clearly found. Obviously, there are inputs from the pool of CGIAR Centers, and in a number of cases in this early work, entry point activities are founded on legacy projects that already have some momentum and are often supported by Window 3 and Bilateral funds, such as N2A, CIALCA, and established Learning Alliances.

Humidtropics has fostered a dynamic community facilitation approach that follows a light-weight community and rural appraisal (RAAIS tool). Platforms are fostered to optimize engagement by diverse local institutions from universities to farmer organizations to private sector partners (see the Area-Based Flagships Case Studies in the “standalone” Annexes 10.1 – 10.4 for examples). Humidtropics management’s decision to emphasize funding of community-led initiatives under the umbrella of Cluster 4 projects was found to have helped encourage Centers to work together in the same spaces. The partnerships therefore become more real and the opportunities for synergies greater. Humidtropics is evolving an approach to understand and tune integrated production systems, which are by their very nature, complex. This complexity demands a process of local appraisal of the community coupled with technical underpinning of partner institutions followed by alliances to enable identification and prioritization of entry points.

In 2014, a number of studies were initiated on the conceptual and methodological framework to assess the contribution of multi-stakeholder platforms in enhancing “capacity to innovate” among communities in targeted locations. Tools for situation analysis on community engagement have been pilot tested and staff are being trained. For example, six RAAIS workshops were held in Burundi, DRC, Rwanda, Cameroon, Nigeria and China. The workshops functioned as mentoring to identify constraints and opportunities for technological and institutional innovation towards sustainable intensification of agricultural systems. See also the country case studies for other examples of capacity building on diverse components of the Humidtropics approach to community participatory research and development on integrated productions systems. The CCEE Team observed that entry point identification for innovations in the early stages were often based on legacy projects, and that these in Cluster 4 projects that are currently being emphasized have more of a local design and implementation pathway.

There was clear evidence during the field visits that local participating communities are beginning to have confidence and develop the skills to engage on decisions and actions with minimal, if any, external inputs by for example the core partners. However, there is the inherent risk that the program at high investments mainly focusses on short-term and local needs of not bringing higher level systems actors and policy-makers through R4D Platform meetings in the fold.

The Field Site visits showed an emphasis on improving crop-based systems in most sites. However, there was apparent interest among farmers to increase livestock production and to see this dimension of Humidtropics enhanced. Opportunities and needs for livestock R4D were observed in Nicaragua, Uganda, Rwanda, and DRC. There are good examples of supportive Humidtropics projects in the livestock area (e.g. assessment of livestock feed value chains in Oyo state, Nigeria; tree-forage-livestock assessment in the Green Triangle of Central Mekong) and reportedly robust livestock research activities in Ethiopia.

The process for scaling up the application of the toolkits for broad adoption needs further thinking and will likely need the development of investment grade projects. For example, in Nicaragua the coffee and cocoa industries are beginning to engage in training on quality control, and in Uganda the oilseed processor and feed-mill industries are engaging in provision of markets for the newly emerging smallholder soybean production as part of banana diversification research which could spawn further investments.

It was also found that partnerships with government at different levels is diverse; generally strongest at the community/ district levels, but in Uganda the Ministry of Local Government is engaged and supportive, and has provided an avenue for future funding of Humidtropics activities which the CCEE Team found encouraging as early evidence of a butting scaling and adoption process.

The CCEE Team found some initial evidence (e.g. Uganda Case) that Humidtropics innovations will spread beyond the research sites through R4D Platform participants, such as district policymakers and public investments and through farmer-to-farmer incremental learning, but it would be too early to gauge if this will do so for the extrapolation domains as a whole without needing to replicate the intensive work with Platforms and related costs of delivery in the small Field Sites, which if not careful would be more akin of innovation work by local NGOs solving community problems than international research programs that aim to find solutions for the larger societal needs. However, it was found that the research leaders are aware of this potential delivery trap and the Program design therefore synthesizes these solutions at local, extrapolation domain and global levels through SRT 1 and crosscutting Global Synthesis, and includes research on using new information and communication technologies to scale best fit options. The Cluster 4 projects also are designed to mitigate this risk and are mostly derived from prioritization through multi-level stakeholder processes widening participation beyond the local sites with Impact Pathways clearly defined and stemming from the overarching Impact Pathway (**Figure 2**) and ToC (**Figure 3**).

4.4 Effectiveness

This section focuses on the plausibility of the Humidtropics integrated systems approach to deliver results. As explained from the onset, this CCEE is taking place at the early formative stages of this complex Program and it would as per the ToR be premature to present summative findings on measurement of the real impact or benefits. Results in terms of outcomes are expected to unfold in a more logical timeframe of ten years or more, when summative finding on effectiveness would be more likely. Therefore, the CCEE presents findings at this formative stage on the extent to which multi-stakeholder processes such as R4D Platforms and IPs have evolved and engage in prioritization of development opportunities and needs, and in research for development systems interventions that plausibly deliver results in time. The evaluation sub questions (**Table 1**) are stated as follows:

Question 6) To what extent does Humidtropics effectively collaborate with its partners to achieve planned outputs and outcomes, maximize synergies, and enhance partner capacity?

Question 7) To what extent does the overarching ToC and Impact Pathway translate into site-relevant processes and research for development?

Question 8) To what extent does Humidtropics' integrated systems approach plausibly lead to better and more holistic results, and provide additional value to the CGIAR capacity to deliver relevant international public goods that lead to impact at scale?

SUMMARY FINDINGS ON EFFECTIVENESS:

Section 4.4.1: Overall, the application of the Humidtropics ToC and Impact Pathway has yielded many proofs of concept, e.g. conducting the situational analysis prior to implementation of any research activity, was both a product and a process, which was instrumental in informing comprehensive site characterization and entry point identification. The careful development of stakeholder platforms has generated synergistic, collaborative R4D research. These examples provide important lessons for future implementation related to effective convening, trust-building, and ongoing Platform support.

Section 4.4.2: There is anecdotal evidence presented throughout this report and in the accompanying case studies, which demonstrate that the activities being implemented will contribute to all six IDOs, with some being more pronounced in some Flagship Projects than others. It is important to note that the current results framework based off the IDOs only

started in 2014 and Humidtropics is one of the few CRPs implementing a pilot project on RBM. The CCEE Team verified progress in development of RBM processes especially for Cluster 4 projects. These processes were supported by the introduction of DevResults (<http://www.devresults.com>).

Section 4.4.3: Overall, Humidtropics' integrated systems approach demonstrates substantial plausibility for achieving holistic livelihood improvement at scale in rural agricultural contexts and represents an important element of CGIAR's pursuit of outcome-oriented R4D.

Section 4.4.4: Platform evolution is evident through the partnership model, which brings together multi-sector actors (government agencies, national institutions, private sector entities, and international development organizations and the private sector) within R4D Platforms and IPs. The wide stakeholder involvement is central for sustainable intensification research and enhances shared leadership for setting and achieving objectives (Platform outputs and outcomes). As a result, the Platforms have achieved synergies such as serving as a useful link among local Action Site partners and other core partners. This has also contributed to improved partner capacity in terms of serving as a venue for increasing mutual awareness and useful exposure to integrated systems approaches, farmer-driven research, and various expertise.

Section 4.4.5: Capacity to deliver IPGs: Humidtropics, through its generation of tools, processes and new research outputs on integrated systems, which are applicable to various contexts, has delivered on IPGs. Specific examples include:

- **New knowledge:** Humidtropics has generated numerous tools and publications that are currently being used in different contexts and are accessible worldwide. Tools include twenty-five Tools for Systems Analysis (TOSA) currently catalogued under <http://data.ilri.org/tools/group/humidtropics2>. Humidtropics has also generated over 100 publications in international journals or as book chapters that will benefit everybody throughout the world.
- **Technology in terms of new knowledge on increasing total farm productivity:** For example, in the West Africa Flagship, by using optimal enterprise combinations in the cocoa-based systems in Southwestern Nigeria.
- Through **DevResults** (<http://www.devresults.com>), which is a specialist RBM online application designed to capture these trajectories which could lead to an IPG.

4.4.1 *Translation of ToC and Impact Pathway into site-relevant processes and R4D*

Under SRT 1, situation analyses were conducted in each of the Flagship Projects to establish the benchmark conditions based upon which progress could later be determined along the Impact Pathway.

Impact Pathway and local contexts: Nearly three billion people live in poverty in the humid and sub-humid tropics. Low agricultural productivity is common, although drivers vary among different regions. For example, high population density combined with low soil fertility hamper East Africa farmers whereas policy-driven inefficiencies and market constraints afflict Latin American producers. Agricultural intensification initiatives have been few in sub-Saharan Africa and have often utilized unsustainable practices in Central America and Southeast Asia⁴⁴. The Humidtropics Impact Pathway relies on three linked streams of innovation: technical innovation in (1) production systems; (2) natural resource management; and (3) social innovation in institutions and markets⁴⁵.

⁴⁴ Idea Note on Sustainable intensification of smallholder systems in the humid and sub-humid tropics.

⁴⁵ Idea Note on Sustainable intensification of smallholder systems in the humid and sub-humid tropics.

Action Areas and Sites: Selection of the Humidtropics Action Areas was guided by three criteria: (1) representative and capture the diversity of the humid tropics; (2) in urgent need of large-scale investment; and (3) advance earlier investments and existing and potential partnerships⁴⁶. Each of the four selected Action Areas encompass high population densities, widespread rural poverty, degraded natural resources, low productivity, weak access to agricultural inputs and markets, and nutritional insecurity. Existing programs and institutional partners⁴⁷ were present, enabling Humidtropics to jump-start collaborative interventions toward agricultural intensification, diversification, and value addition (the IAC of Humidtropics has recommended that selection of research areas and sites should be linked to their potential for testing crosscutting research questions and hypotheses⁴⁸). There are commonalities across many Humidtropics Action Sites including the prevalence of certain crops (i.e. bananas, cassava, cocoa, maize) and production challenges (i.e. erosion and land degradation, low access to information, services and finance). Yet, differences in natural resource condition, socio-economic and institutional contexts, and other key factors necessitate diverse entry points and social and technological interventions across sites⁴⁹.

Leadership, representation and investment: As implemented so far, effective stakeholder platforms are central to Humidtropics success and a key variable is the leadership quality and commitment of the selected R4D Platform Facilitator (commonly a representative of a high-credibility national partner)⁵⁰. Government participation can be instrumental as in Nigeria where active participation by state-level political leaders infused high energy into the R4D Platform, but can also inhibit participatory engagement such as in the CM Flagship where centralized governments are the norm and Platform participants were observed to be more reticent about free exchange of ideas. Also important is ensuring that the set of Platform participants extend beyond the existing networks of core partners and are representative of key sectors. In the CAC Flagship, Platform conveners have to work hard to engage national government representatives, while in the CM Flagship, the challenge has been to identify independent civil society actors. Special efforts, tailored to local cultural norms, have been needed to boost active participation by women, youth, and minority ethnic and other marginalized groups (e.g. appropriate translation services or meeting formats).

Given the importance of trust-building within Action Sites, local presence of core partners is a determinant of effectiveness. For example, relationship building languished in Nan, Thailand when core partners engaged remotely from Bangkok, while in Nicanorte, locally-based consultants were hired to ensure active engagement among IP partners. To different degrees, lead partners in Action Sites combined one-on-one meetings with individual partners and more formal multilateral meetings with diverse stakeholders (i.e. workshops) as a deliberate trust-building strategy. Platforms that lacked explicit budget and staff support (e.g. lead partners did not allocate funds for Platform coordination) were less effective.

Platform engagement: The situational analysis process is important as both a product – comprehensive site characterization to inform entry point identification – and a process – a transparent, consultative, partnership-building exercise. Accordingly, completion of the situational analysis has been a watershed moment when stakeholders are convened for collaborative planning. Where a foundation had been built to carry meeting outcomes forward in a collaborative mode, impressive shared leadership was often mobilized toward tangible R4D projects. In cases where there was low clarity on roles or inadequate budget and staff capacity to support meeting outcomes, momentum was lost. In order to yield hoped-for

⁴⁶ POWB 2014.

⁴⁷ Such as SSA-CP, STCP, CIALCA, N2A, Africa RISING, Eco-efficient Crop-Livestock Systems, and CPWF-Mekong.

⁴⁸ Report on the Inaugural Meeting of the Independent Advisory Committee, June 2014.

⁴⁹ POWB 2014.

⁵⁰ In Northwest Vietnam, the R4D Platform had to be re-convened as the recruiting process for participants and Platform Facilitator was determined to be ineffective.

returns from the effort expended to convene R4D Platforms, core partners should be prepared to translate Platform dialogues into relevant, tangible activities including convening of IPs in Field Sites.

Action/ Field Site activities: In Action Sites, given that the Program brings a conceptual framework rather than a pre-defined set of activities and targets, core partners were commonly asked to explain what Humidtropics was prepared to deliver beyond multi-stakeholder dialogues. The resonance of the answers provided appears to have varied across Sites and Platforms. In general, abstract concepts like climate-smart agriculture were much less compelling to local partners than were outcome-oriented projects such seed potato multiplication in Kadahenda, Rwanda, and livestock exchange fairs in the Development Triangle in the CM Flagship.

Overall, there is substantial evidence that collaboration among the multiple types of Humidtropics partners has resulted in important program outputs, but not yet on outcomes, has generated synergies, and has enhanced partners' capacities, with the following caveats:

- The capacity of government or other essential institutional partners to engage in multi-stakeholder decision-making is a critical factor of success;
- Platform processes require dedicated budgets and staffing to function effectively as a crucible of partnership-based R4D research;
- Cross-Flagship analysis is needed to understand key factors in order to systematically achieve synergies.

4.4.2 Progress towards planned outputs and outcomes

In terms of progress of Humidtropics towards its planned outputs and outcomes as stipulated in its Results Framework, it is too early to quantify the achievement of results to date. This is because the evolution of the process from conducting of the RAAIS methodology, to establishing the IPs and making them functional, in and of itself required a timeframe of no less than 2-3 years.

For ECA, the focus on women and youth activities, coupled with the focus on productivity of key value chains (soybean, maize, beans, cassava) and environment within its Action Sites is likely to yield livelihoods improvement in the long run. In CAC, the focus on productivity and environment linkages coupled with high value crops such as cocoa and coffee, and their linkage to international markets, is also likely to lead to not only sustainable intensification but also better livelihoods. Across all the Flagship Projects, the capacity to innovate is evident from the nature of partnerships already created and the type of scaling up mechanisms being established.

The RBM pilot allocated special resources to support research generation from R4D Platforms. As a result, Cluster 4 proposals were developed by Platforms and research grants awarded on both competitive and commissioned basis. These projects were expected to be managed along the principles of RBM, which included mainstreaming M&E procedures, and incorporating key data management processes such as (i) formulating sub-objectives (results); (ii) selecting indicators to measure progress towards each objective; (iii) setting explicit targets for the selected indicators; (iv) regularly collecting data on results to monitor performance; (v) integrating evaluations to provide complementary performance information; and (vi) using performance information for purposes of accountability, learning and decision-making. In addition, these processes were supported by the introduction of DevResults. The CCEE Team was able to verify progress on the ground with regard to development of processes especially for Cluster 4 projects for mainly three out of the six processes outlined above. These included formulating sub-objectives (results), selecting indicators to measure

progress towards each objective, and regularly collecting data on results to monitor performance, which is entered in the DevResults system (**Figure 12** below).

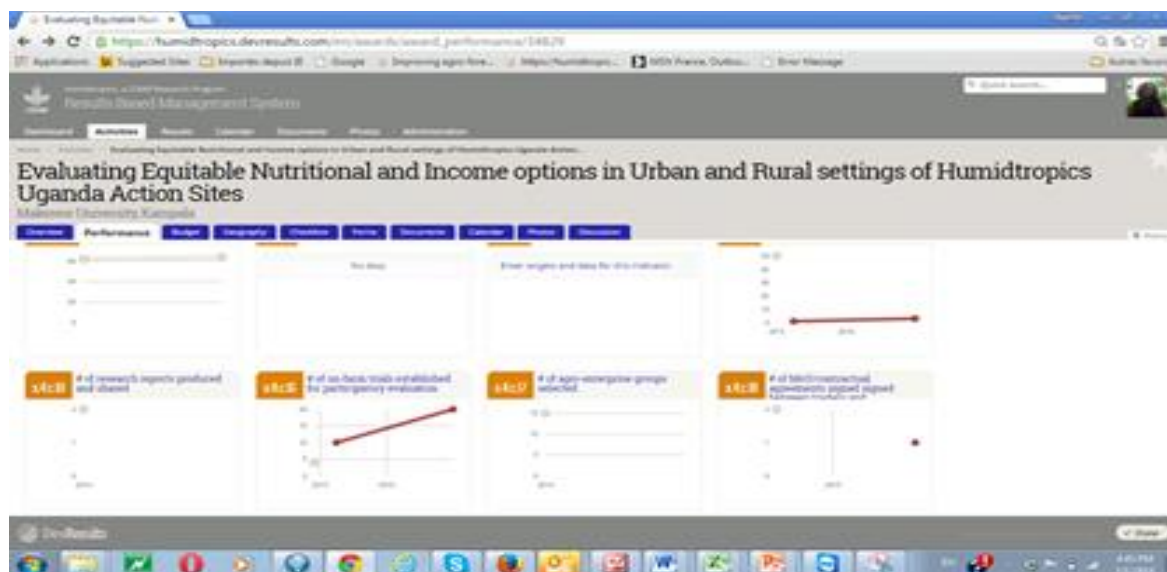


Figure 12: Screenshot of Data in the DevResults System

However, the setting of explicit targets was not as adequately addressed since the current targets reflect much higher-level context indicators rather than their own project level selected indicators. Also, some of the indicators selected are geared towards tracking processes rather than actual results. M&E staff were recruited for each Flagship and trained in RBM. The capacity to manage the RBM process varied across the Flagship Projects, with ECA doing much better than CAC and WA among the places visited.

4.4.3 Integrated systems approach and achievement of impact at scale

Evaluation findings through KIIs, FGDs and the survey, all corroborate the importance of using the integrated systems approach (**Figure 13** below). Over 63% of the survey respondents ranked the integrated systems approach as the most important. KIIs with nine core partner Centers (AVRDC, IITA, ILRI, FARA, CIP, Bioversity International, IWMI, ICRAF, CIAT) also unanimously identified the integrated systems approach as most important to go forward, in whatever shape or form.

Current limitations: Given that agricultural research globally continues to have a strong orientation toward “farm-level research” focused on major commodities, the Humidtropics approach of “farm system research” focused on integrated systems improvement faces ongoing skepticism. Given the short duration and highly dynamic context of this Program’s operation, Humidtropics is not yet in a position to definitively assert that its ambitious targets are in reach. However, at this stage, the potential for high impact through the Humidtropics Impact Pathway remains a viable proposition, especially where adequate resources for Platform development (e.g. facilitator training, seed funding) and engagement with scaling partners (e.g. technical assistance to governments) is available. The IAC of Humidtropics has articulated concern that, without an explicit plan for synthesizing results from across Field and Action Sites (e.g. a discrete set of well-defined, crosscutting research questions and associated hypotheses), the Program’s emphasis on location-specific research questions may limit impact at scale. The IAC encouraged establishing mechanisms for ongoing research synthesis⁵¹.

⁵¹ Report on the Inaugural Meeting of the Independent Advisory Committee, June 2014.

Design, implementation, and scaling of research to transform agri-food systems through sustainable intensification and diversification are knowledge and time intensive (e.g. site characterization, multi-level stakeholder platforms, testing best-fit interventions, engaging scaling partners). Integrated systems research will be best positioned to achieve its full potential when global donors and other international research stakeholders recognize and commit to providing the necessary financial and human resources.

Q29. Please choose one of the options below: The most important aspect of Humidtropics is:

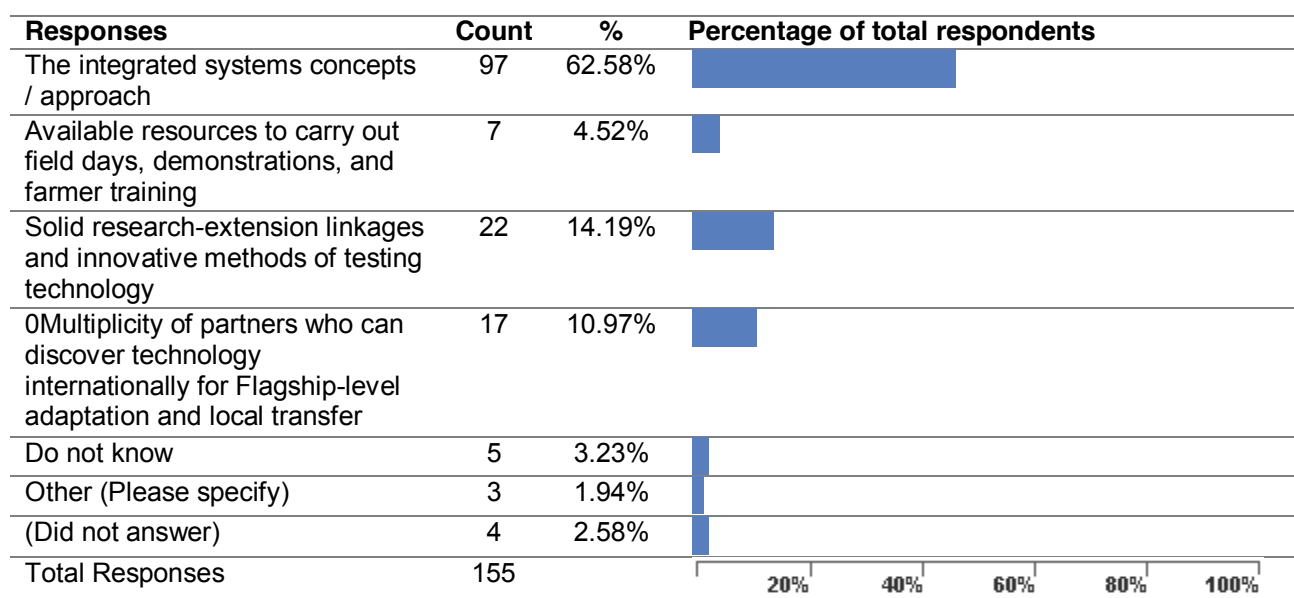


Figure 13: Survey Response on Most Important aspect of Humidtropics

4.4.4 Evidence of Platform evolution

Partnership model: When Humidtropics R4D Platforms and IPs function as intended, partners assume shared leadership for setting and achieving objectives overall and individual partner organizations commit to delivering specific elements of agreed research endeavors (including embedding research within development initiatives). Platforms are explicitly multi-sector with participation by government agencies, national institutions, private sector entities, and international development organizations. The role of private sector partners (e.g. farmer organizations, agri-dealers, traders, agri-food companies, financial institutions) is central for sustainable intensification research given the importance of investment in integrated systems (e.g. agri-chemical inputs)⁵². Given the explicit recognition of heterogeneity among Field Sites, engagement of national research centers is important for appropriate place-based research design and implementation⁵³.

In a recent assessment on Platform sustainability, the authors note that “platforms that lacked explicit budget and staff support (e.g. core partners did not allocate funds for Platform coordination) were less effective”. There is no further assessment of what that means regarding the sustainability of the Platform approach, considering that the Platforms are apparently not institutionalized within existing local organizations, who could take over responsibility once the program ends.

⁵² Idea Note on Sustainable intensification of smallholder systems in the humid and sub-humid tropics.

⁵³ Idea Note on Sustainable intensification of smallholder systems in the humid and sub-humid tropics.

Delivery of Platform outputs and outcomes: The numerous operational R4D Platforms and IPs are centrally important outputs of Humidtropics, although in-area staffing (essential to build trust-based partnerships) allocated to these Platforms has been variable. By linking in-region activities of multiple international research institutions, Humidtropics Platforms helped to give stakeholders, including farmers and other private sector actors, more of a “one stop shop” experience (although, in some Sites, core partners established separate local groups). Another set of essential Humidtropics outputs includes the array of R4D projects implemented either through bilateral or Cluster 4 funding. These projects are diverse in terms of the level of co-location of research activities, collaboration among research partners, and the inclusiveness of research design processes (see examples in Case Studies on Area-Based Flagship Projects).

Achieve synergies: Where there is a conducive enabling environment, Humidtropics has served a useful linking role among local Action Site partners that has led to synergistic research implementation (e.g. significant co-investment by partners in CAC). In other settings, Action Site partners struggled to achieve alignment (e.g. agreeing on baseline measurement methods and roles in Northwest Vietnam). Where synergies emerged among core partners, these were commonly driven by shared interests among individual researchers. As a discrete, modestly-sized funding opportunity, Cluster 4 calls were widely noted as effective for encouraging collaboration⁵⁴. Going forward, there is significant room under the Crosscutting Flagship to distill lessons from across Area-Based Flagship Projects and to evaluate application of a common set of tools.

Improved Partner capacity: Humidtropics has been a venue for increasing mutual awareness and broadening capacity of core partners. For example, Bioversity International has had preliminary success in injecting the principles and practices associated with agro-biodiversity and dietary diversity into program components (e.g. work plans, toolbox). Participation in Humidtropics gave AVRDC (a non-CGIAR research institute) useful exposure to integrated systems approaches, farmer-driven research, and new regions of operation and brought in helpful vegetable expertise related to diversification objectives. Humidtropics helped ILRI to reawaken its historical interest in crop-livestock systems and increase system science staff capacity.

Survey findings (**Figure 14**) corroborate the findings from KIIs and FGDs that participating in a Platform increased different stakeholders’ knowledge in various dimensions, and more importantly brought research closer to farmers.

Q27. Please select below what best reflects your level of agreement with the following statement: Participation in Humidtropics Flagship Projects has enhanced learning and knowledge sharing between organizations.

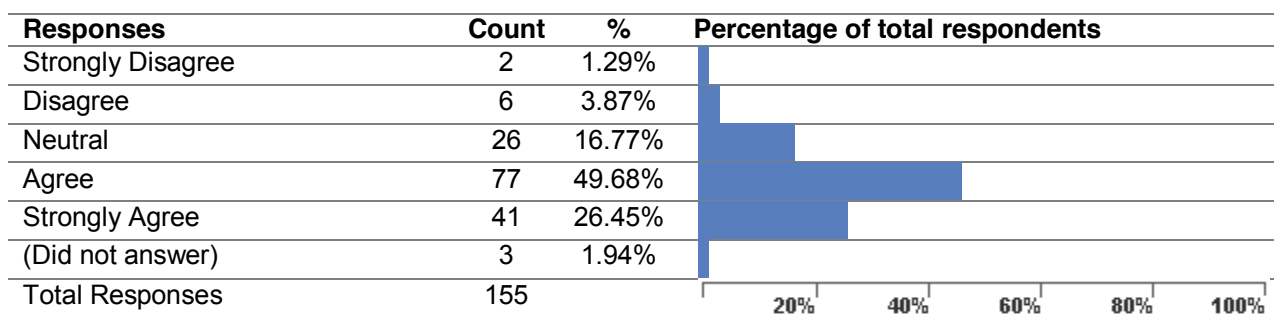


Figure 14: Survey – Level of Agreement on Learning and Knowledge

⁵⁴ Although, in CM, national research partners had out-size influence in determining Cluster 4 research priorities, alienating farmers and development-oriented organizations.

An outline of some of the progress achieved through the partnerships across the various Flagship Projects is presented below.

EAST & CENTRAL AFRICA

Entry points: 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 development of improved value chains for priority commodities.

Tools used: RAAIS and EXTRAPOLATE used by R4D Platforms and IPs in Uganda, Burundi, Kenya, DRC and Rwanda to identify priorities for participatory action research to generate best fit options.

Ongoing Cluster 4 projects:

- Uganda (Wakiso/Mukono & Kiboga/Kyankwanzi): Evaluating equitable nutritional and income options in urban and rural settings (Partners: IITA, AVRDC, NAROMUZARDI, UCU, Del-Agro, Farm Gain, VEDCO).
- DRC (Mushinga): Livestock integration in cassava-grain legumes production systems (Partners: FH, IITA, FAO, UEA, Diobass, Bioversity International, Mushinga Cooperative Union).
- Rwanda (Kadahenda): Improving agro-forestry and Irish potato based cropping system (Partners: University of Rwanda, IMBARAGA farmer federation, Gardens for Health, IITA, ICRAF, CIP, Bioversity International, EPR, CIAT).
- Burundi (Gitega): Livestock integration in improved cassava-legumes based system to improve livelihoods (Partners: ISABU, Burundi University (FABI), Reseau Burundi 2000 plus).
- Kenya (Siaya, Busia, Vihiga): Integrated soil fertility and *Striga* management in Western Kenya (Partners: Maseno University, Ministry of Agriculture, WeRATE, Kenya Agricultural, Livestock Research Organization, *icipe*).

WEST AFRICA

Entry points: *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.

Tools used: RAAIS used by R4D Platforms in Nigeria, Cameroon and Ghana to identify priorities for participatory action research to generate best fit options.

Ongoing Cluster 4 projects:

- Nigeria (Oyo, Osun): Increasing total farm productivity by optimal enterprise combinations in the cocoa-based systems in Southwestern Nigeria.
- Cameroon (Littoral/South-West, Central, Western): Improvement of integrated tree crop systems in Cameroon, through production, post-harvest, and marketing interventions.
- Cote D'Ivoire (Nawa): Sustainable intensification of food crops production for nutrition and food security in tree crop-based systems in Soubré region.

CENTRAL AMERICA AND THE CARIBBEAN

Entry points: *Nicarante:* Cocoa rejuvenation and value chain, coffee rejuvenation and value chain, integrated crop, pasture, livestock systems on degraded hillsides.

Tools used: The R4D Platform helped to identify the entry points.

Ongoing Cluster 4 projects:

- Improved decision making on diversified smallholder farms in the Humidtropics Nicanorte Action Site:
 - Cocoa Territory: Rancho Grande/Wasala;
 - Mixed system basic grains and livestock: Esteli/Condega;
 - Coffee territory: Jinotega/El Cuá.
- Monitoring changes in soil fertility in diversified agricultural systems to identify successful soil restoration measures.
- Participatory development of common certification codes and practices for small coffee growing households facing the challenge of multiple certifications.

CENTRAL MEKONG

Entry points: Integrated crop-livestock systems, improved tree-crop systems, sustainable intensified rice rotations with vegetables and potatoes, gender-enabling sustainable agroforestry development, enhancing value-chains, cross-border trade, boosting market access for commodities targeted to marginalized groups, and agroforestry policy analysis/ dialogues.

Tools used: RAAIS and InPaC-S used in China, and IMPACT Lite and EXTRAPOLATE used in Northwest Vietnam by R4D Platforms to identify priorities for participatory action research to generate best fit options.

Ongoing Cluster 4 projects:

- Vietnam (Central Highlands): Enhanced livelihoods and better natural resource management through appropriate integration and diversification on smallholder farms.
- Thailand (Nan): Assessment of different opportunities for agricultural diversification.
- Vietnam (Northwest): Development of appropriate technical innovations in integrated systems for scaling up.

4.4.5 Capacity to deliver relevant IPGs that lead to impact

In the context of the CGIAR, provision of IPGs is through “research outputs of knowledge and technology generated through strategic and applied research that are applicable internationally to address generic issues and challenges consistent with CGIAR goals”. Humidtropics, through its generation of tools, processes and new research outputs on integrated systems, which can be applied to various contexts, has delivered on IPGs. Specific examples on new knowledge, technical, institutional or methodological innovations that have been demonstrated to contribute to reaching CGIAR goals include but are not limited to the following:

- **Knowledge:** Humidtropics has generated numerous tools and publications that are currently being used in different contexts and are accessible worldwide.
 - a) **Tools for system analysis**, which include twenty-five Tools for Systems Analysis (TOSA) currently catalogued under <http://data.ilri.org/tools/group/humidtropics2>. The tools are under review for their gender-relevance but are accessible and being used by in R4D Platforms and IPs across all the regions. Some of the most popular ones include RAAIS and EXTRAPOLATE. The other one is the FEAST tool, 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, 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 through e-learning training materials for use in classrooms 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>.

- b) **Publications:** Humidtropics has generated over 100 publications in international journals or as book chapters that will benefit everybody throughout the world.
- **Technology in terms of new knowledge on farm productivity**
- a) For example, in the West Africa Flagship, increasing total farm productivity by optimal enterprise combinations in the cocoa-based systems in southwestern Nigeria. (IITA, FARA, ILRI, WUR). This research focused on six states in southwestern Nigeria 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).
 - b) Through DevResults, 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 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.

There is ample evidence that has been presented throughout this CCEE report, coupled with the research outputs generated from activities conducted through SRT 1, SRT 2 and SRT 3, all of which contribute to the body of knowledge needed to create not only IPGs but also provide a platform for understanding trajectories of changes. 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 managers' response to production and natural resource management challenges to complex survey and analysis intended to partition and redirect drivers of change.

Unique strengths: Many Humidtropics partners articulate affinity for the Program's conceptual framework and primary emphasis on multi-stakeholder convening for R4D research. The multi-level platforms (i.e. R4D Platforms and IPs) are recognized as valuable for bringing a broad set of considerations into research planning, while also facilitating tangible farmer-driven research activities. In general, the Humidtropics model has showed promise for bridging divides among scientific disciplines, CGIAR Centers, and local and national stakeholders through place-based site characterization and research design. There is evidence of uptake of "systemness" concepts by researchers and local partners as well as increased innovation capacity in Action Sites.

5 Conclusions

This section presents eleven major synthetic observations based on the Key Findings from this evaluation based on the four criteria:

1 Relevance of Humidtropics

- 1. Alignment of Humidtropics' Program design with CGIAR and national strategies.** Program guidance emphasizes alignment and collaborative decision-making across diverse institutions, including government, through stakeholder platforms, although sites vary in the nature and extent of conceptual and operational alignment around integrated systems approach. Partners' commitment of financial and staff resources and capacity to shift institutional priorities to implement collaborative R4D endeavors ranged widely in the face of Humidtropics budget cuts.
- 2. Use of Theory of Change and Impact Pathway to define Action Site priorities.** The CCEE Team particularly liked the simplicity of an overarching ToC and related generic Impact Pathway, which were made specific, based on Action Site level priorities and entry points. The generic Impact Pathway shows the interdependence and relatedness of the IDOs and the possible synergies and trade-offs that interventions may result in when site- or system-specific priorities and entry points are established. Notwithstanding the foregoing, the development and quality of more site-specific Impact Pathways could improve, especially when more evidence of progress can be found.
- 3. Partnership design** used by Humidtropics was instrumental in forging Program coherence and providing a sense of ownership between its multiple stakeholders. The researchers sought an appropriate balance between encouraging local relevance and ownership, and promoting a prescribed framework influenced by Humidtropics' ToC that focuses on the IDOs and preferred methods in alignment with CGIAR strategy. There were strong partnerships with other CRPs, especially the two systems CRPs (Dryland Systems, and Aquatic Agricultural Systems), which helped the Program to share experiences and sharpen the perspectives on systems and stakeholders' capacity to innovate and ability to address issues of sustainable intensification. There was also diverse institutional partnerships, within and beyond the CGIAR, to design and deliver R4D research which brought together representatives from the public sector (government, policy, NARES), civil sector (CSOs, CBOs, NGOs), and private sector (farmer organizations, agri-dealers, traders, agro-food companies, financial institutions) across Action Sites, which was instrumental in linking R4D Platforms and IPs actors, and helped generate interest and enhanced ownership.

2 Efficiency

- 4. Decision-making:** Humidtropics management was efficient in terms of decision-making and provision of proper guidelines when the Program faced with multiple financial cutbacks. The decision to prioritize Cluster 4 projects, designed with inputs from the Field Site communities, ensured that the Program was still able to deliver societal needs while still in line with the CGIAR strategy. The small management structure also enhanced timely decision-making, especially when budget cuts were announced and change of direction was needed, it made it possible for the new guidelines to be communicated and quickly acted upon.
- 5. Use of Research for Development and Innovation Platforms:** Humidtropics' approach to integrated systems research does not necessarily reduces costs of research and development activities. It could be argued that scaling the IPs within

extrapolation domains would significantly increase development delivery costs. However, it is clear that Humidtropics' use of IPs was restricted to few within large extrapolation domains serving as social and technical innovation incubators whereby the role of R4D Platforms will help to scale the resulting innovations. The latter is yet to be tested but is an important element of the design that should be further explored. More importantly, the approach helps to improve the relevance of the social and technical interventions to particular scenarios, for example helping to transform best bet solutions developed by other projects such as RTB to become best fit options.

3 Quality of research

6. **Employment of place-based research:** Humidtropics employs a place-based “integrated system research” model that is attempting to conduct research within a whole-farm integrated perspective and to shift institutional emphasis from research outputs to research outcomes. The model seeks to mobilize knowledge and technology resources from partners in commodity and other non-systems CRPs in response to stakeholder-identified research needs. The Program has generated multiple proofs of concept demonstrating traditional and participatory research in Action and Field Sites. CGIAR research partners exhibit willingness to collaborate when this is facilitated by individual Center priorities and co-location of bilateral projects. However, full commitment by CGIAR partners in this integrated systems model of collaboration and research has been uneven.

4 Quality of research outputs

7. **Implementation of multi-stakeholder processes:** Humidtropics has learned from traditional farming systems research as carried out in the seventies and eighties and through more recent projects such as CIALCA, STCP, Learning Alliances and other initiatives, especially in relation to the need for multi-stakeholder processes at different levels. However, the Program should probably have experimented with more approaches and moved quickly from systems analysis and priority setting to systems interventions, especially as the Program design (Geels' model on multilevel processes) allows for successes and failures in experimenting with different solutions.
8. **Research beyond publications:** Following the assumptions and propositions made in Section 2.3, the CCEE Team is aware that traditionally, the success of academic research is judged usually by an assessment of peer-reviewed published outputs. This is normally supported by bibliometric analyses that quantify published outputs and quality in measurements such as impact factors, and the extent to which the outputs have influenced others in the same field by citation tracking. Although this analysis has been provided in this report⁵⁵, it became apparent that this in and of itself would not do justice to the Program. The CCEE Team argues that a systems Program deserves to be assessed from both the science and development lenses. As such, the quality of its outputs goes beyond the publications mentioned herein but includes all the processes, tools, social and technical innovations that have been documented throughout the report.

5 Effectiveness

9. **Implementing Results Based Management (RBM):** implementing a Results Based Management System requires significant changes in managing, thinking and working for core and other implementing partners. The CCEE Team concludes that Humidtropics made significant progress and shows promise to manage multiple

⁵⁵ From the bibliographic analysis, there were 104 publications presented of which 20 were book chapters and 73 were spread over 55 Journals with the remaining publications in other outlets.

partners and processes across a large geographical spread at the various levels of Program implementation.

10. **Developing the TOSA toolbox:** Humidtropics collaborated with Livestock and Fish CRP to develop the well-curated TOSA toolbox, which combines an array of tools in novel ways to support systems research. Toolbox development reflects creativity and clarity of purpose in reviewing the universe of existing resources to select appropriate tools for application in Action Sites. More consistent testing and cross-comparison of tools across diverse local contexts could have resulted with stronger Humidtropics guidance. Tools for testing the performance of IPs are still under development.

11. **Exploring Systemness:** in its early stage of development, international partners not directly involved in Action Sites have perceived the Humidtropics “systemness” trajectory as slow to mature toward tangible interventions. Progress can be difficult to detect during the “incubation period” needed to build effective stakeholder platforms and to identify systems entry points before initiating tangible activities and outputs. The Humidtropics model anticipates that early stage investments in system characterization and partnership development will lead to impact at scale, but the level of scaling will depend on both strategy (generally governmental) and human and financial resources for replication of the process.

6 Key Recommendations

6.1 Recommendations to Manage Risks

The evaluation was designed to inform future Humidtropics implementation. However, now that Humidtropics will no longer continue as a standalone Program, the CCEE highlights the following risks that need to be managed:

- The loss of trust built with national and local partners and forfeiture of investments in specific sites are a risk if the CGIAR system fails to plan comprehensively and in a timely manner for staff, projects, and partnerships that are advancing innovation capacity, empowerment of women and youth, and other central Humidtropics objectives;
- Humidtropics has served as an incubator for innovative thinking about integrated systems approaches (e.g. mobilization of place-based knowledge and stakeholder platforms to identify multiple intervention pathways) and this incubator function will disappear unless appropriately embedded within other CRPs;
- A topic that needs additional attention is understanding the essential elements for scaling the wide adoption of the process/ approach by development partners; there is a risk in the premature closure of the CRP that these important lessons will not be “harvested”;
- The CCEE Team is concerned that in addition to significant loss of investment there is a significant risk to the credibility and reputation of CGIAR and core partners if activities such as Cluster 4 projects by R4D and Innovation Platforms are terminated by the end of 2016. Especially, when they show good promise to deliver outcomes and constitute strong and enthusiastic partnerships that could be used by the Agri-food CRPs, Site Integration initiatives and/or other projects in 2017 and beyond. Humidtropics with other CRPs, Centers and Consortium Office therefore need to explore option show best to transit these elements of integrated systems research for development.

6.2 Specific Recommendations

The specific recommendations presented in the table below presume ongoing implementation, in some form, of all major Humidtropics components and elements.

Recommendations	Action Required	Responsible Entity (ies)
RELEVANCE OF HUMIDTROPICS		
1. The CGIAR Strategy and Results Framework could be modified to show for its IDOs and sub-IDOs a similar generic interdependencies and relatedness diagram that could be used to develop more specific CRP related ones.	Produce a generic diagram that reflects interdependences between CRPs and their contribution to sub-IDOs and IDOs.	CGIAR and Humidtropics managers
2. Inform future research design by robustly assessing mechanisms for effectively linking research for development models to achieve SLOs using a set of biophysical and socio-economic metrics that comprehensively characterize system change.	Conduct assessment on the biophysical and socio-economic metrics that characterize system change.	Humidtropics managers

Recommendations	Action Required	Responsible Entity (ies)
EFFICIENCY		
3. Due to lack of capacity at the local level, there is need to establish more cost-effective approaches for replicating the Humidtropics Platform-based process. This can be done by marshalling the current multi-disciplinary expertise of Humidtropics-affiliated researchers and practitioners to analyse the cost-effectiveness of diverse methods used in Action and Field Sites across Area-Based Flagship Projects.	Produce a report that presents analysis and proposes most cost-effective methods for convening stakeholder Platforms.	Humidtropics managers and core partners
4. The CCEE Team recommends that Humidtropics translates its experiences with developing, funding and managing Platform research initiatives through widening participation of local partners into guidelines that can be used by other projects and 2 nd generation CRPs.	Produce guidelines on developing, funding and managing research initiatives.	Humidtropics managers and core partners
QUALITY OF RESEARCH		
5. The underlying approach encourages experimentation with various social and technical systems interventions at farm and institutional levels. As such, it is recommended to reduce the investments in systems analysis and baselines in favour of experimentation.	Encourage experimentation with various social and technical interventions.	Humidtropics managers and core partners
6. Humidtropics' approach to integrated systems research should be considered by other projects and 2 nd generation CRPs to help improving the relevance of social and technical interventions for specific agro-ecological systems through multi-stakeholder processes such as IPs and enhance the potential for their scaling to large extrapolation domains through multi-stakeholder processes at country and regional levels such as R4D Platforms.	Document lessons learned and evidence-based analysis to demonstrate the benefits of using integrated systems research for specific agro-ecological systems through multi-stakeholder processes.	Humidtropics managers and core partners
7. There remains a systematic challenge to have genuine onsite collaboration between CGIAR partners. The trial with Cluster 4 projects shows promise but it should be modified to ensure further collaboration and sharing, especially with local and non-CGIAR Partners.	Encourage or require clear collaboration between CGIAR, non-CGIAR and local partners in site integration countries.	Humidtropics Managers, Agrifood System CRPs & Site Integration Countries
EFFECTIVENESS		
8. Continue to document effective elements of the systems research process tested by Humidtropics (e.g. co-location, cooperation, and collaboration among CGIAR and non-CGIAR partners through farmer-driven R4D projects). Emphasis should be on the multiple benefits such as improvements in productivity, better nutrition, scaling of IP concept, the benefits of using an integrated approach.	Produce evidence-based analysis documents. Then revise them based on independent review.	Humidtropics managers and core partners

Recommendations	Action Required	Responsible Entity (ies)
<p>9. Humidtropics, has generated a lot of tools, processes, technical, institutional innovations as new research outputs on integrated systems, which should be recognized as a body of knowledge that contributes to IPGs, demonstrating their potential for reaching the CGIAR goals.</p>	<p>Some if not all the Humidtropics processes such as situation analysis, the tools in TOSA and listed publications, should be tabled for recognition as IPGs.</p>	<p>Humidtropics managers</p>
<p>10. Experiences and current implementation of RBM in Humidtropics should not only be shared but where possible transition it to site integration efforts because the Program already is doing a similar thing in five of the six site integration ++ countries and in the vast majority of the 20 site integration countries.</p>	<p>Document lessons learned from using RBM to implement and manage programs.</p>	<p>Humidtropics managers and core partners</p>
<p>11. In Platform-based entry point identification, research planning and M&E, there is need to increase attention to widely accepted features for a sustainable intensified agricultural system (e.g. livestock, ecosystem services).</p>	<p>During 2015-16, develop and test mechanisms to increase scientist participation in Action Sites by the relevant systems scientists in Platform meetings in order to integrate explicit knowledge and tools from counterpart CRPs (e.g. Livestock and Fish; Water, Land, and Ecosystems). Integrate tested mechanisms in future systems R4D programs.</p>	<p>Humidtropics Action Area Coordinators; Lead Centers of post-2016 Systems Flagship Projects</p>