

# **Managing the CCAFS Theme by Region matrix for international public goods and development outcomes**

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## Contents

Acknowledgements.....	4
Executive Summary and Recommendations .....	5
1. Introduction.....	9
1.1 Background .....	9
1.2 Review Objective .....	9
1.3 Review Terms of Reference .....	9
2. Approach and Methods .....	10
3. Findings and Recommendations .....	12
3.1 How successful is the matrix management in CCAFS?.....	12
3.1.1 Context and Opportunity.....	12
3.1.2 CCAFS alignment to CGIAR reform process and System Level Outcomes ....	12
3.1.3 Matrix effectiveness - Theme by Region.....	13
3.1.4 Matrix effectiveness - involvement of Centers.....	15
3.1.5 Matrix effectiveness - leadership.....	20
3.1.6 Matrix efficiency and management systems.....	20
3.1.7 Matrix effectiveness - external partnerships and demand for research.....	21
3.2 Is sufficient attention paid to ensuring synergies are achieved across themes, and is there sufficient evidence of synthesis in the IPGs? .....	23
3.2.1 Gender and Social Differentiation .....	24
3.3 Is there a sufficient level of comparability across regions, and is this reflected in the IPGs? .....	26
3.4 How well is the local-to-global set of activities managed, in terms of having an appropriate mix of activities at different scales and managing the cross-scale connections? .....	28
3.5 Are the initial outcomes or incipient outcomes being reported by CCAFS of sufficient scale for a program of this size, and do they reflect an integrated program? .....	30
3.5.1 Definition of outcomes .....	30
3.5.2 Approach and process for development of outcomes in CCAFS .....	30
3.5.3 Assessment of outcomes – milestones.....	34
3.5.4 Assessment of outcomes - Annual Outcomes/Incipient Outcomes .....	34
3.5.5 Assessment of outcomes – Theme level Outcomes.....	37
3.5.6 International Public Goods – scale, comprehensiveness and quality .....	40
3.5.7 International Public Goods - influence and lasting impact of IPGs.....	46
Annex 1. Evaluation matrix to be used in the CCAFS Theme by Region Review .....	48
Annex 2. List of documents accessed and examined for the review. ....	50
Annex 3. List of interviews undertaken for the review .....	55

Annex 4. Extract from CGIAR Financial Report 2012 showing the sources of funding for each of the CRPs.....	56
Annex 5. Governance structure of CCAFS.....	57
Annex 6. Budget allocation by Region and Theme in 2011 \$USD.....	58
Annex 7. Analysis of journal publications in CCAFS using 2011 and 2012 publication lists .....	59

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## Executive Summary and Recommendations

This review was commissioned to undertake an evaluation of how the Climate Change, Agriculture and Food Security (CCAFS) Theme by Region matrix is being managed to deliver on International Public Goods (IPGs) and development outcomes.

The CGIAR is going through a significant reform process with CGIAR Research Programs (CRPs) now the main organizational mechanism for research outputs and outcomes. This has involved establishment of a matrix management structure requiring close interaction between CRPs and CGIAR Centers.

It was evident from this review that CCAFS has embraced this reform process in structure, function and the necessary behaviours and leadership to make it effective. The overall CCAFS goal and the Themes and their outcomes are all well aligned to the CGIAR System Level Outcomes.

CCAFS has an added dimension to the matrix in the form of Regions, originally established to provide a facilitation role between Themes and delivery of activities by Centers in the focus regions for CCAFS. However, as CCAFS has evolved the role of this regional dimension of the matrix has strengthened. The regional function now plays an important role in on-ground delivery of activities, in implementing participatory action research and in setting priorities for research and outcome delivery. Within the regions, Climate Smart Villages have become an important mechanism for delivery and integration. This growing role of the regional function and Regional Program Leaders needs greater support to ensure its ongoing effectiveness.

Centers are pivotal to the delivery of activities, IPGs and outcomes. CCAFS has involvement from all 15 Centers further demonstrating the leading role CCAFS is playing in the reform process. However, the engagement by Centers in CCAFS has been slow to develop and needs to accelerate. There is good evidence that is occurring in South Asia, particularly through Climate Smart Villages and the central and influential role of the Regional Program Leader. While leadership is critical to effectiveness of the matrix, stronger processes of resourcing and accountability between Themes and Centers is required to achieve desired outputs and outcomes, including adequate investment in engagement processes and incentives to strengthen cross-Center collaboration.

Leadership is central to an effective matrix and it was evident from this review that CCAFS has a highly effective leadership team that makes decisions in a transparent way. This approach to leadership is supported by effective governance, management and reporting systems that make it possible to efficiently monitor the progress to achieving milestones and outcomes.

Theme Leaders work effectively and collaboratively, but there was, apart from gender research activities and some of the other Theme 4 cross-cutting activities, not strong evidence of cross-Theme synergies. The demands on Themes to deliver on their milestones, and work in different regions and with a large number of Centers leaves little time for effective strategic engagement. Mechanisms to foster more strategic cross-Theme engagement are required.

This review focused on the South Asia region so there was little opportunity for cross-region comparison. However, it is clear that the regions differ significantly in both the key drivers and the research approach required. There is a good appreciation that a top-down “one-size fits all” from Themes to regions is not appropriate though some concepts can be applied universally e.g. Climate Smart Villages.

There is a good balance of activities at local, national, regional and global scales. There are recognised challenges in working across these various scales e.g. how to scale out work at village scale to achieve wider impact yet maintain the rigour and long-term monitoring at a range of key sites; how to better integrate policy work at a national scale with lessons and insights from village scale on-ground activities; achieving better contextualization of global models at local scales to increase relevance to decision-makers. Amongst these challenges, successful initiatives are emerging such as climate analogues, which are assisting not just in providing a way of exploring new options, but also as a mechanism for cross-region integration.

The final area the review examined related to Outcomes and International Public Goods. An analysis of Annual Outcomes across CCAFS shows that 19% are relevant to the local scale, 22% at the national/regional scale, 44% are cross-regional, and 14% global. About two-thirds of the Annual Outcomes have good linkages to Theme level Outcomes and System Level Outcomes. An assessment of Theme Level Outcomes suggests about two-thirds are on track to achievement in 2015/16 but about one-third need more effort to bring them back on-track.

CCAFS invests considerable effort in a range of International Public Goods that fall into three broad groups of: Data and Tools; Reports, Working Papers and Policy Briefs; and scientific publications. A new website was launched in July 2013 and it provides a highly effective and open platform for accessing outputs from CCAFS.

Cross-cutting policy briefs and synthesis reports attract a lot of interest, as measured by downloads, and opportunities exist to build on this success through synthesis of a wider range of research activities. Journal publications produced by CCAFS are of a high quality and are collaborative, with on average 5.5 authors per paper. The papers are published in journals with a high impact factor for agriculture (average 3.0). However, the numbers of journal publications are quite low relative to other CRPs and to one international benchmark (CSIRO). This may be related to the relatively new area of research, particularly for Centers. Effort needs to be spent on lifting publications rates from Centers but in a way that doesn't compromise the efforts on achieving outcomes and impacts.

In conclusion, CCAFS has put together an impressive research program that effectively embraces the matrix organization, with the Theme x Region dimension of the broader matrix being critical to its success. An effective and functional leadership team underpins CCAFS. There are a number of areas that could be strengthened in relation to involvement of Centers, cross-Theme synergies, outcomes and outputs, and these are detailed in the following recommendations.

**Recommendation 1:**

*Recognise the growing importance and role of Regions in the Theme x Region x Center matrix by:*

- (a) *Elevating of the role of Regions and regional needs in the framing of both science and outcomes as CCAFS moves into Phase 2 and as the CGIAR moves to Intermediate Development Outcomes*
- (b) *Continue to strengthen and grow activities such as Climate Smart Villages as a means of achieving full integration of Themes and Centers at a regional scale*
- (c) *Develop ways of more explicitly communicating and reporting achievements and outcomes at a Regional scale, such as annual reports.*

**Recommendation 2:**

*Increased effort should be invested by the CCAFS management team in developing increased Window 3/Bilateral investment in CCAFS by working closely with Centers and donors. This will require developing a strong value proposition as to the long term benefits of investment in adaptation and mitigation.*

**Recommendation 3:**

- (a) *Develop a clear process for resourcing and accountability of activities between Centers (and other non-Center partners) and the CCAFS management team but in a way that fosters joint ownership and collaboration rather than it becoming a transactional purchaser/provider model.*
- (b) *Provide adequate resources to Themes and Regional Program Leaders to nurture the collaboration and engagement between Centers and the CCAFS management team.*

**Recommendation 4:**

*Put in place a set of targeted incentives and capacity building initiatives to achieve increased cross-Center involvement in CCAFS activities.*

**Recommendation 5:**

*Establish a monitoring and evaluation activity to capture longitudinally the depth and breadth of external partnerships, how they evolve through time, and the influence on decision-making in CCAFS and the external partners.*

**Recommendation 6:**

- (a) *Provide opportunities at PMC meetings, or if required dedicated meetings, to engage in more strategic discussions on cross-Theme synergies and for these to be reflected in cross-Theme activities.*
- (b) *Include overt reporting of cross-Theme synergies, outputs and incipient outcomes in Annual Reports and Milestones.*

**Recommendation 7:**

*Develop clear plans with associated implementation strategies for undertaking participatory research at local scales in the future that offer the rigour associated with focused effort at a manageable number of sites but builds in approaches for scale out to achieve wider impact.*

**Recommendation 8:**

*Clearly articulate the role, if any, for working with vulnerable commercial scale farmers and have this strategy visible in business plans.*

**Recommendation 9:**

*Develop approaches to more explicitly link outcomes from local scale research activities to national scale policies.*

**Recommendation 10:**

*For effective application of global models at local scales, increased effort should be placed on activities that connect the down-scaled climate models, crop models and their application to local scale farming systems and their social and economic dynamics.*

**Recommendation 11:**

*Increased effort should be invested in developing a coherent structure that links Milestones, Annual Outcomes and higher level, longer term outcomes (IDOs). A key aspect of this should be development of an approach to Impact Pathways that is consistent across Themes and Regions. This Impact Pathways approach should be developed in a way that facilitates close integration between Annual and Intermediate Development Outcomes.*

**Recommendation 12:**

*Increased effort should be directed to the Theme Outcome areas that are currently progressing slowly and at risk of not achieving their planned outcomes by 2015-16. In particular, areas relevant to the System Level Outcome on food security, with an emphasis on wider system aspects of food security, should receive some focus.*

**Recommendation 13:**

*Invest more effort in producing cross-cutting, synthesis reports and policy briefs given the strong external interest in these products. This will require identifying research activities that lend themselves to these synthesis publications and may provide additional benefit as a stimulant for cross-Theme interactions.*

**Recommendation 14:**

*CCAFS should develop a plan to lift publication rates in ISI journals. This will require a mix of measures ranging from performance indicators to short term incentives to longer term capacity building in Centers and done in a way that doesn't compromise a focus on achieving outcomes.*

**Recommendation 15:**

*CCAFS should maintain its investment in a diversity of IPGs as a means of influencing decision-making and achieving desired outcomes and impacts.*



## **1. Introduction**

### **1.1 Background**

In 2012 the first external evaluation of the Climate Change, Agriculture and Food Security (CCAFS) Research Program was conducted by the European Commission (EC) which focused on how CCAFS was performing in relation to the Consultative Group on International Agricultural Research (CGIAR) reform process. A review of the CCAFS governance and management functions commissioned by the CIAT Board of Trustees (BoT) was carried out in the first half of 2013 in line with the CCAFS Program Plan.

At its 3<sup>rd</sup> meeting in October 2012 the CCAFS Independent Science Panel (ISP) decided that CCAFS should undertake at least one programmatic external review per year commissioned by the ISP in addition to possible annual reviews on administrative, legal and/or financial issues commissioned by the CIAT BoT. These external reviews should be designed so that they can be inputs into the major evaluation that is expected to happen in Year 5, commissioned by the Internal Evaluation Arrangement (IEA).

The ISP decided that the first programmatic review would take place in late 2013, and would evaluate CCAFS' interim outcomes and science products, based on two years of implementation. The focus would be on how the CCAFS Theme by Region matrix is being managed to deliver outcomes and international public goods. The review would also examine efforts to ensure integration across themes, and how CCAFS achieves an appropriate mix of local, national, regional and global activities.

### **1.2 Review Objective**

To undertake an evaluation of how the CCAFS Theme by Region matrix is being managed to deliver on International Public Goods (IPGs: publications, databases and other knowledge products) and development outcomes.

### **1.3 Review Terms of Reference**

1. How successful is the matrix management in CCAFS?
2. Is sufficient attention paid to ensuring synergies are achieved across themes, and is their sufficient evidence of synthesis in the IPGs?
3. Is there a sufficient level of comparability across regions, and is this reflected in the IPGs?
4. How well is the local-to-global set of activities managed, in terms of having an appropriate mix of activities at different scales and managing the cross-scale connections?
5. Are the initial outcomes or incipient outcomes being reported by CCAFS of sufficient scale for a program of this size, and do they reflect an integrated program?

## 2. Approach and Methods

By design, this review was intended to be largely desk-top, supplemented by telephone/skype interviews and if practical, some face to face interviews in country. A wide range of materials was made available by CCAFS for the review, from various plans and reports to minutes of meetings of the Independent Science Panel and the Program Management Committee. While not stated in the Terms of Reference, there was a request to provide some focus of the review on the South Asia region, to limit the need for face-to-face interviews in multiple regions. This was achieved by concentrating the interview component of the Review in South Asia while the assessment of documents, plans and reports encompassed all of CCAFS.

The Review document has been structured around the Terms of Reference. However, detailed Evaluation Criteria were provided (Annex 1) and these have been addressed within the Terms of Reference as set out below.

1. How successful is the matrix management in CCAFS? *Evaluation Criteria: 1,2,3,4,5,9,10*
2. Is sufficient attention paid to ensuring synergies are achieved across themes, and is their sufficient evidence of synthesis in the IPGs? *Evaluation Criteria: 6*
3. Is there a sufficient level of comparability across regions, and is this reflected in the IPGs? *Evaluation Criteria: 7*
4. How well is the local-to-global set of activities managed, in terms of having an appropriate mix of activities at different scales and managing the cross-scale connections? *Evaluation Criteria: 8*
5. Are the initial outcomes or incipient outcomes being reported by CCAFS of sufficient scale for a program of this size, and do they reflect an integrated program? *Evaluation Criteria: 11,12,13,14,15,16*

The methodological approach to the Review was:

- (i) Review of material provided which includes: CCAFS strategic planning documents; CCAFS operational planning and management processes e.g. annual Business Plans, Minutes of PMC and ISP meetings; Outputs e.g. IPGs; and Performance and Outcomes e.g. Annual Reports, previous external assessments of outcomes (Annex 2). An evidence-based approach was taken to the review of this material and where possible quantitative analyses were undertaken. This assessment was made using the evaluation matrix as a guiding framework.
- (ii) Face to face interviews in Delhi. Two senior level CSIRO scientists familiar with CCAFS and South Asia agriculture (Dr Mark Howden and Dr Christian Roth) travelled to Delhi for a workshop in early November and while in Delhi they conducted interviews with the Regional Program Leader, a Center partner, and two external partners of CCAFS. A structured list of questions was used to guide the interviews.
- (iii) Telephone/Skype interviews with the CCAFS Director, three Theme Leaders, Regional Program Leaders in East and West Africa, two ISP members, two Center participants in South Asia, and the Communications function within the CCAFS Coordinating Unit (see Annex 3 for full list of interviewees) and other external partners of CCAFS.

(iv) The analysis of written materials and information and insights gained from the interviews were then synthesised in the review report to address the Terms of Reference taking into account the evaluation criteria. Where appropriate, specific recommendations were provided.

(v) Timeframes

<b>Milestone</b>	<b>Date</b>
Briefing from Evaluation Manager	October 18, 2013
Inception Report	October 29, 2013
Face to face interviews in Delhi	November 4-7, 2013
Telephone interviews	November 4-30, 2013
Review and analysis of written materials	November 4-December 14, 2013
Draft Evaluation Report submitted	December 21, 2013
Final Evaluation Report submitted (provided timely feedback on draft received)	March 12, 2014

## 3. Findings and Recommendations

### 3.1 How successful is the matrix management in CCAFS?

*(Evaluation Criteria 1,2,3,4,5,9,10)*

#### 3.1.1 Context and Opportunity

The CGIAR has in recent years embarked on a reform process to more effectively deal with the world's pressing issues relating to food security, climate, the environment and poverty. Its vision for addressing these challenges is embodied in its four System Level Outcomes: to reduce poverty and hunger, improve human health and nutrition, and enhance ecosystem resilience.

To achieve this vision, a fundamental change in strategy was adopted which sees CGIAR Research Programs (CRPs) as the main organizational mechanism of CGIAR research. This research is undertaken by the fifteen CGIAR Centers in what is a matrix management structure.

Climate Change, Agriculture and Food Security (CCAFS) is one of the CRPs. CCAFS is not only a new organizational structure - it is also a new area of research having first emerged as a CGIAR Challenge Program in 2009. This increased emphasis on climate change, agriculture and food security has been recognized by the CGIAR as a new area of competency that needs to be developed and strengthened:

*“understanding the impact of climate change on agriculture and devising strategies for adaptation and mitigation that will benefit the poor”* (CGIAR Strategy and Results Framework 2011).

Commencing a new program of research in a relatively new area of scientific endeavour coupled with a new organizational design process still in its formative stages provides some significant challenges. However, it also provides opportunities for innovation both in research and research management as this new area of research is not shackled by the history of past structures and embedded processes, culture and behaviours. With the right strategy and the right leadership (essential in every organization but especially so in matrix organizations) there is an opportunity for a new program like CCAFS to be leading the way for the organization.

#### 3.1.2 CCAFS alignment to CGIAR reform process and System Level Outcomes

It is evident from the CCAFS Research Program Plan (2011) that CCAFS has embraced the reform process both in alignment of objectives and outcomes to System Level Outcomes (SLOs), in drawing on relevant skills from across the Centers in the CGIAR, and in leadership.

The overall goal of CCAFS, which is to: *“promote a food secure world through the provision of science-based efforts that support sustainable agriculture and enhance livelihoods while adapting to climate change and conserving natural resources and environmental services”*, closely links to the SLOs.

At a lower scale, the twelve Theme Outcomes also align well with the SLOs. At finer scales of organization such as Annual Outcomes there is less obvious alignment with SLOs e.g. about two-thirds of Annual Outcomes have good alignment with SLOs. A detailed analysis of Outcomes can be found in 3.5.4 and their alignment to SLOs is covered more fully in that section.

### 3.1.3 Matrix effectiveness - Theme by Region

Implementing a matrix management system in a complex and geographically dispersed organization like the CGIAR is challenging. Based on experience in other organizations full and effective implementation of matrix organizational design can take up to a decade. CGIAR is a few years into this process so it would not be expected to yet have in place a matrix that is fully effective.

CGIAR have introduced the matrix with the CRPs as the main organizational mechanism for research with Centers providing the capability to undertake the research in a way that facilitates the CGIAR system to achieve its System Level Outcomes.

While the focus of the CGIAR reform process has been on getting effective CRP-Center and cross-Center interactions, CCAFS implementation of this two-dimensional matrix is interesting in that a third axis in the matrix in the form of Regions was introduced from the outset. There is a view amongst management consultants that building matrix organizations with three axes runs the risk of increasing management complexity, leading to poor decision-making and increasing overhead costs. In contrast there are real world examples of where multi-axis matrix organizations have been successful e.g. Proctor & Gamble.

Based on various interviews with CCAFS senior leaders and with Centers it has become clear that the Region dimension of the matrix provides a significant value add in effectiveness and clarity rather than contributing complexity and confusion. However, to reach this point has taken some learning and evolution.

At the outset of CCAFS, Themes were viewed as providing the science leadership and directions to CCAFS with the aim of drawing in Centers to deliver on the goals and outcomes of CCAFS. The regions were always designed to play an important role but in the early stages this was viewed as a facilitation role - effectively providing the glue between Themes, Centers, partners and stakeholders at national and regional scales.

CCAFS made the decision to initially focus in three regions (East Africa, West Africa and South Asia) though that has now expanded to five regions with South-East Asia and Latin America now actively engaged.

It became evident during this review process that the importance of the Regional function has grown since the inception of CCAFS. It plays an important role not just in facilitation but in ensuring on-ground delivery of activities is achieved and in implementing participatory action research. This is essential given the increasing emphasis being placed within CGIAR on outcomes and impact because it is likely that most of CCAFS outcomes will be expressed via the regionally based activities. More critically, it was made clear by a number of interviewees across Regional Program Leaders and Themes Leaders that the Regions are increasingly providing an important role in setting the priorities for science and outcome

delivery for Themes rather than a more top-down driven process that characterized earlier design and implementation.

This is leading to more overt expression of research needs from a regional perspective. For example, the East Africa Region has produced a needs document to contribute to ongoing discussions about research priorities (Developing a Climate Change, Agriculture and Food Security Research Agenda for East Africa: Identifying Research Needs and Priorities).

Another important dimension of the design of the Theme by Region matrix in CCAFS is the use of core sites and Climate Smart Villages across the various regions. The establishment of these sites and associated baseline surveys and technology interventions provide a consistent research approach that will permit integration and scaling up of outcomes from local to global scales. These sites are also designed to be a focal point for cross-Theme and cross-Center activities within regions.

While there are issues with achieving good cross-Center involvement in Climate Smart Villages (see Center discussion below in 3.1.4) and regional activities more generally it was clear from the discussions with Centers in South Asia that there is relatively good interaction across the three dimensions of Theme x Region x Center in NW and NE India. Much of the success in this implementation of the Theme by Region matrix and involvement of Centers in South Asia can be attributed to the leadership of the Regional Program Leader. Broader aspects and importance of leadership in effective implementation of the matrix are discussed in more detail in 3.1.5.

There was less of a sense of genuine cross-Theme interaction within these on-ground activities in Climate Smart Villages within South Asia. While the Themes are working co-operatively at these local scales there were not clear examples of cross-Theme synergies adding value over and above the individual Theme activities, which appeared to be proceeding very positively. Broader aspects of cross-Theme synergies are explicitly addressed in Section 3.2.

In establishing a Theme by Region matrix, it would be logical to try to develop research approaches at a Thematic level that can be applied consistently across different regions. It was suggested by Regional Program Leaders that care must be exercised in taking this approach that the individual context, issues and priorities of different regions are taken into account. An expression of this sentiment was “the five regions are not five replicates”.

Given the growing importance of regions it would be useful to see greater expression of the outcomes in a regional context in both the strategy and in reporting e.g. CCAFS Annual Report. It was difficult in this review process to more explicitly get an integrated view of the activities and milestones at a regional scale because the way they are reported is at the level of Center and Regional led activities. Some consideration should be given to ways of being able to demonstrate achievements and outcomes at this regional scale.

### **Recommendation 1:**

*Recognise the growing importance and role of Regions in the Theme x Region x Center matrix by:*

- (a) *Elevating of the role of Regions and regional needs in the framing of both science and outcomes as CCAFS moves into Phase 2 and as the CGIAR moves to Intermediate Development Outcomes*

- (b) *Continue to strengthen and grow activities such as Climate Smart Villages as a means of achieving full integration of Themes and Centers at a regional scale*
- (c) *Develop ways of more explicitly communicating and reporting achievements and outcomes at a Regional scale, such as annual reports.*

#### 3.1.4 Matrix effectiveness - involvement of Centers

A clear goal of the CGIAR reform process is to harness the skills, experience and geographic spread of activities from across the Centers to deliver the goals and outcomes of the CGIAR Research Programs.

It is clear from the spread of activities across Centers in CCAFS that CCAFS has embraced the reform process. All 15 Centers have activities in CCAFS and in addition to this reflecting CCAFS leadership in the reform process it also highlights that climate change will affect all aspects of agriculture and food security. Table 1 shows the distribution of research activities across Centers based on the 218 Activities in CCAFS in 2012.

This table highlights a good spread of activities across most Centers. With the exception of CIFOR (one Theme Objective), all other Centers are involved in at least three Theme Objectives with 13 of the 15 Centers being involved in at least four Theme Objectives.

However, allocation of resources to Centers and activities does not on its own necessarily represent effective buy-in and engagement by Centers into CCAFS. There was a general view expressed by the ISP, Director, Theme Leaders and Regional Program Leaders that the genuine engagement from Centers has been slow to develop, as reflected by involvement in activities, and needs to accelerate. In particular, the core sites were designed to draw in the Centers to be working together on common sites, thereby achieving not only effective CCAFS-Center engagement but also deeper cross-Center collaboration. This ambition has not yet been fully realized with Centers still focusing much of their efforts in long established sites and relationships which limits room for cross-Centre engagement. There is also a concern within CCAFS that the activities being undertaken by the Centers do not always have a strong alignment with the Theme and Region objectives and outcomes and within Regions the ability or willingness of Centers to fully embrace participatory action research approaches has been slow to develop.

There is, however, evidence of where that engagement is starting to work effectively. In South Asia, there are close interactions between the key Centers and the Regional Program Leader and the development of Climate Smart Villages has seen good engagement from Centers with Centers like CIMMYT and Bioversity taking the lead on various activities across Climate Smart Villages, e.g. CIMMYT in NW India. In the policy domain IFPRI has been closely engaged with CCAFS in South Asia. Centers were very clear in stating their intent to further develop the working relationship with CCAFS in South Asia. Indeed all the Centers interviewed in South Asia were very positive about their engagement with CCAFS. While this in part can be attributed to the intent of CCAFS to embrace the reform process, the role of key individuals and relationships can't be under-estimated. In this regard there was a clear message from all Centers about the important and influential role the Regional Program Leader is playing in South Asia. This reinforces earlier comments about the importance of Regions in the effective operation of the matrix between Themes and Centers.

The current organizational design model that empowers and encourages Centers to attain Window 3/Bilateral funding that may or may not have strong alignment to the strategies of



Table 1. Analysis of activities by Theme objective and Region/Center. The blue dots within each cell of the matrix illustrate the intensity of effort (numbers of activities) undertaken across CCAFS in 2012. Blank cells = no activities, smallest dot = 1 to 2 activities, medium dot = 3 to 5 activities, large dot = 6 to 9 activities, very large dot = >9 activities.

Region	Theme Objective											
	1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
East Africa	●		●	●		●	●		●	●	●	
West Africa	●					●			●	●	●	
South Asia	●		●	●	●	●			●	●	●	
Africa Rice	●	●	●								●	
Bioversity	●	●	●	●								
CIAT	●	●	●				●		●		●	●
CIFOR									●			
CIMMYT	●			●	●	●		●	●	●	●	●
CIP		●		●		●					●	●
ICARDA	●	●		●								
ICRAF	●			●			●	●	●	●	●	●
ICRISAT	●	●		●		●			●		●	
IFPRI				●		●	●		●	●		●
IITA	●	●					●		●	●		
ILRI	●	●	●	●			●	●	●	●	●	●
IRRI	●			●					●	●		
IWMI	●			●		●					●	
WorldFish	●			●			●			●		●

CRPs may act as a disincentive to much closer alignment of Center activities and CRPs. This would appear to be a particular issue for CCAFS given its relatively small amount of Window 3/Bilateral funding compared with most other CRPs i.e. 24% Window3/Bilateral funding compared with a CGIAR average of 63% in 2012 (Annex 4). It is also clear that many donors prefer the bilateral funding approach as it better aligns to their own strategies and objectives so any incentives need to be designed with this reality in mind.

Given the reform process underway in the CGIAR system and the evolution of CRPs, it would in fact be more desirable in the medium to long term to have a greater proportion of funding available to CRPs via Window 1 and Window 2 funding. However, given the current realities of the high level of Window 3/Bilateral funding flowing directly to Centers it is essential for CCAFS to work closely with Centers and donors to achieve a greater investment in CCAFS. While it was not possible to explore it as part of this review it would be useful to understand the reasons for relatively low levels of Window 3/Bilateral investment in CCAFS. It is likely that there is in fact a greater level of activity underway that is closely connected to the goals of CCAFS but it is climate related work that is being mainstreamed into the work of other CRPs, particularly via Window 3/Bilateral funding. While ultimately, climate adaptation and mitigation does need to be mainstreamed into broader development objectives, there is a risk that premature or ill-informed mainstreaming may lead to ineffective adaptation and mitigation or even mal-adaptation. Close engagement with Centers and other CRPs is needed to avoid this risk.

**Recommendation 2:**

*Increased effort should be invested by the CCAFS management team in developing increased Window 3/Bilateral investment in CCAFS by working closely with Centers and donors. This will require developing a strong value proposition as to the long term benefits of investment in adaptation and mitigation.*

Achieving more effective engagement from Centers requires building relationships, confidence and trust, and ensuring expectations are and deliverables are clear. On this second point, the CCAFS Program Management Committee has instituted a system of appraisal of performance of Centers with the level of performance and alignment to CCAFS objectives influencing the level of funding in the following year. As CCAFS moves into Phase 2, the model of funding to Centers will move from one of allocation or grant to one based on bidding for activities based on the ability to deliver on what is needed by CCAFS.

It is also important that measures are put in place to continue to build the relationships between Regional Program Leaders and Centers and between Themes and Centers. CRPs have been established with relatively little supporting soft infrastructure to develop and nurture internal engagement and collaboration. Given the geographic spread of the activities of all Themes in CCAFS it has been difficult for Theme Leaders to reach out to Centers as effectively as they might given the significant nature of the reform process in CGIAR. There is clearly an important role for Regional Program Leaders in this area but given their growing roles, the issue of resources to support engagement and collaboration with participating Centers is of concern.

**Recommendation 3:**

(a) *Develop a clear process for resourcing and accountability of activities between Centers (and other non-Center partners) and the CCAFS management team but in a*

*way that fosters joint ownership and collaboration rather than it becoming a transactional purchaser/provider model.*

- (b) *Provide adequate resources to Themes and Regional Program Leaders to nurture the collaboration and engagement between Centers and the CCAFS management team.*

Another key ambition of the reform process is through the establishment of CRPs to achieve much greater levels of cross-Center collaboration. As indicated above, the establishment of core sites within CCAFS provides a mechanism for fostering cross-Center collaboration.

The ISP Minutes from the meeting held in May 2013 indicate that cross-Center collaboration has reached an “optimum level” and that all Centers have acceptable cross-Center collaboration. However, Program Management Committee minutes and the 2012 Annual Report indicate the need to further strengthen cross-Center involvement in CCAFS. The 2013 Business Plan contains specific sections within each Theme to strengthen cross-Center activities so the issue is recognized and actions are being put in place to address this concern.

One measure of cross-Center collaboration is through publications. Table 2 summarises all the journal publications attributed to CCAFS in 2011 and 2012. It should be noted that papers published in 2011 and 2012 would for the most part be a result of work that was undertaken for some years prior. Given that Challenge program only commenced in 2009 and CCAFS as a CRP in 2011 as part of the CGIAR reform process, then it would not necessarily be expected that publications in 2011 and 2012 to yet reflect full cross-Center collaboration. However, the analysis provides a reasonable benchmark by which publications in the future can be judged.

The vast majority of journal papers (125) published in 2011 and 2012 were from a single Center (86%), with just 23 papers (14%) having authors from more than one Center. In contrast, there was quite a reasonable number and diversity of institutions involved in papers with a mean of 3.4 institutions per paper. Likewise there were 5.5 different authors per paper. So there is good evidence of external to CGIAR collaboration in papers produced by CCAFS but there is relatively little cross-Center collaboration.

Table 2. Analysis of journal publications in 2011 and 2012 in the context of cross-Center and cross-institutional involvement.

Centers involved	0	1	2	3	4	5
# of papers	14	125	17	2	2	2
	Mean		Median		Range	
No. Institutions	3.4		2		1-15	
No. Authors	5.5		4		1-21	

**Recommendation 4:**

*Put in place a set of targeted incentives and capacity building initiatives to achieve increased cross-Center involvement in CCAFS activities.*

Consideration should be given to incentives to encourage cross-Center authorship of papers. The foundation to achieving this is of course research activities involving multiple Centers. Clearly incentives for cross-Center collaboration can be provided through funding mechanisms but there should also be put in place some capacity building initiatives to stimulate this collaborative approach.

### 3.1.5 Matrix effectiveness - leadership

A critical factor in the success of a matrix organisation reform process is that of leadership. It is clear from various interviews with ISP members and senior leaders within CCAFS that CCAFS has embraced this reform process with a strategic and operational approach that is closely aligned to the reform agenda. This quality of leadership is not just evident from the structural aspects such as a wide level of Center engagement by CCAFS in the portfolio of activities but also in the culture, systems and processes put in place by CCAFS. In addition to the various interviews, a review of the Program Management Committee and ISP Minutes over the last year reveals a leadership team committed to both the reform process and the goals of CCAFS and the delivery of its outcomes.

A key element to emerge in the various interviews and the wide range of material that is publicly available is that of transparency. For matrix organizations to work effectively there needs to be a high level of trust and communication across the various axes. An essential element of building effective relationships, collaborations and trust is through processes, systems and decisions being transparent.

From interviews with a wide range of people across CCAFS and with partners it is apparent that CCAFS has built transparency across many elements of its operations. This ranges from research operations e.g. all data collected at core sites being publicly available, to the management systems that are in place to report on achievement of Activities and Milestones, to the way funding is allocated to centers based on well defined and communicated performance indicators. This “open access” approach being implemented by CCAFS has benefits that reach far beyond internal dimensions of a more effective matrix e.g. evidence of third parties using and analyzing the data available from baseline surveys of core sites. There are some valuable lessons that can be shared more widely across the CGIAR System based on the systems and processes in place in CCAFS. Reaching this conclusion is somewhat at odds with the CCAFS 2012 Annual Report to the Consortium, where a partnership survey suggested that transparency was an indicator in which CCAF performed least strongly. I have trouble reconciling these conclusions based on the interviews conducted with the ISP, Centers and external partners.

A critical factor in the success of the Regional dimension of the matrix is the leadership provided by the Regional Program Leaders and the Theme Leaders. The leadership required is not just across the Theme x Region dimensions of CCAFS but also across into Centers and with other research partners and key stakeholders. Through this review process it has become clear that there is generally a close working relationship between Theme Leaders and Regional Program Leaders across the three established regions in East Africa, West Africa and South Asia. Within South Asia, where this review had more focus, it was clear this effective leadership extended beyond CCAFS Theme Leader – Regional Program Leader relationships into interactions with Centers and external partners. In particular, the Regional Program Leader, and his leadership and engagement skills were seen as being particularly important to the growing success of CCAFS in South Asia.

### 3.1.6 Matrix efficiency and management systems

The governance structure of CCAFS is shown in Annex 5. Core elements of this governance structure for the effective and efficient operation of CCAFS are the Independent Science

Panel (strategy), the Program Director (strategy and operations), the Program Management Committee (strategy and operations), and the Coordinating Unit (operations).

The Program Management Committee (PMC) is the key entity for the successful implementation of CCAFS strategy and the successful operation of the matrix, not just between Themes and Regions and across-Themes but also in setting the culture and approaches to engaging with Centers. While the PMC's formal membership (with voting rights) is the Director, four Theme Leaders and one Regional Program Leader (currently South Asia), in practice its participants include all Regional Theme Leaders and key staff from the Coordinating Unit. This more inclusive mode of the PMC is desirable for achieving effective within-CCAFS matrix and management operations.

Based on an investigation of the Minutes of the PMC meetings there would appear to be frank and constructive discussions at the PMC meetings which suggests a healthy culture which is essential for effective matrix operations in any organization. This view is reinforced by the external review of governance in CCAFS, conducted earlier in 2013. However, the minutes do reveal a strong focus on operational matters with little space for more strategic discussions on matrix effectiveness and efficiency and the processes, systems, and collaborative and cultural mechanisms needed to improve matrix effectiveness (see Recommendation 7).

One area of matrix efficiency that CCAFS would appear to be taking a lead on is in the area of formal systems for reporting of activities and milestones. It was quite easy as a reviewer to get a sense of accomplishment within Themes, Regions and Centers from the consistent and systemic approach to Technical Reports on Activities, Summary of outputs, Case studies and Publications. While there was some unevenness in the quality of the reporting across Themes, Regions and Centers, this reporting provides a high level of accountability. I have no doubt that the nature of the reporting structure would cause frustration for some individual scientists who would view it as an unnecessary administrative task but it does add value. Moving to a web-based system (in train) with some degree of pre-fill or rollover functionality would alleviate some of these concerns.

### 3.1.7 Matrix effectiveness - external partnerships and demand for research

A critical success factor in the Theme by Region matrix structure, and CCAFS more generally, is strong engagement with key partners and stakeholders who are intended beneficiaries of the research. Through the evidence provided in the 2012 Annual Reports (Report to the CGIAR and the external Annual Report – Unfolding results) it is clear that effective external partnerships are in place to deliver outcomes, particularly in the area of policy at regional and national levels. Some evidence of effective external engagement is provided at more local scales such as NGOs and agricultural advisory services though it was not as strong as the examples given for policy interactions.

To assess the effectiveness of external partnerships at the scale of the Theme x Region matrix, specific questions were asked of Theme Leaders and Regional Program Leaders. In addition, in South Asia two face to face interviews were conducted with external partners.

Based on the discussions with Theme Leaders and Regional Program Leaders, it was clear that the Regional Program Leaders take on a critical role of establishing relationships with key external partners within Regions and individual countries for Regional and Theme led

activities. Theme Leaders engage more with external partners and donors operating at the regional to global scale and with research institutions external to the CG system, principally the five CCAFS partner universities, who have key roles in delivery of specific research outputs or in housing data platforms. This arrangement appears to be working reasonably effectively and it reinforces the importance of Regional Program Leaders in the matrix structure in terms of engaging key partners within regions.

Another area of significant external engagement with external partners within Regions is through the Centers via Window 3/Bilateral funding. This is likely to lead at times to multiple engagement of stakeholders via Regional Program Leaders and Centers leading to some potential for confusion. However, within South Asia this was not seen as a major concern but rather a reality of the CGIAR organizational design. At the very least there should be a good understanding and level of communication between Centers and Regional Program Leaders to ensure there is consistency in engagement with external stakeholders. There was a view expressed that a focus by CCAFS on external engagement was occurring at the expense of interactions with Centers. Coordinating with Centers in external engagement might overcome this concern and achieve the appropriate balance of attention to external engagement and Centers within regions.

The two external partners in South Asia who were interviewed were both very positive about their dealings with CCAFS and that the research engagements are highly relevant to their needs. Both commented that the engagement occurred early on in the research design process, allowing for good ownership of the research activities. They both indicated that a strong relationship with the Regional Program Leader was critical to successful engagement and one indicated that good interactions with key Centers was also important.

The research projects are still in their early stages so neither stakeholder could identify evidence as yet that the projects were influencing decision-making. Both believed that CCAFS could have a significant impact though one of the stakeholders indicated that the magnitude of the challenge was such that a program the size of CCAFS in South Asia could not hope to have country level impacts but rather the scale of impact is likely to be at local to sub-national scales within jurisdictions.

It would be valuable to capture in a comprehensive way through a formal monitoring and evaluation process the nature of these external engagements, how they evolve with time and the impact on decision-making.

**Recommendation 5:**

*Establish a monitoring and evaluation activity to capture longitudinally the depth and breadth of external partnerships, how they evolve through time, and the influence on decision-making in CCAFS and the external partners.*

**3.2 Is sufficient attention paid to ensuring synergies are achieved across themes, and is there sufficient evidence of synthesis in the IPGs?**  
*(Evaluation Criteria 6)*

In the design of CCAFS, it was the intention from the outset to have close linkages and synergies across the Themes, as depicted in Figure 1, reproduced from the CCAFS Program Plan 2011. In particular, Theme 4, is set up to play an integrating cross-cutting role with other Themes in delivery of climate scenarios, data, tools, policy analyses, and research in gender and social differentiation. While Theme 1 is focused on long term adaptation and Theme 3 on mitigation, the trade-offs and synergies between adaptation and mitigation are clearly an avenue for a coherent cross-Theme suite of activities. Similarly, Themes 1 and 2 should link closely at the intersection of climate variability and climate change, particularly at multi-year to decadal timescales.

A number of mechanisms have been put in place to facilitate these cross-Theme synergies such as: joint planning sessions based on a team approach to Theme planning; role of Regional program Leaders in bringing different Theme activities together in a regional, national, and local context; establishment of core sites and Climate Smart Villages to bring different Theme activities together; and ultimately integration of outputs and outcomes to achieve System Level Outcomes.

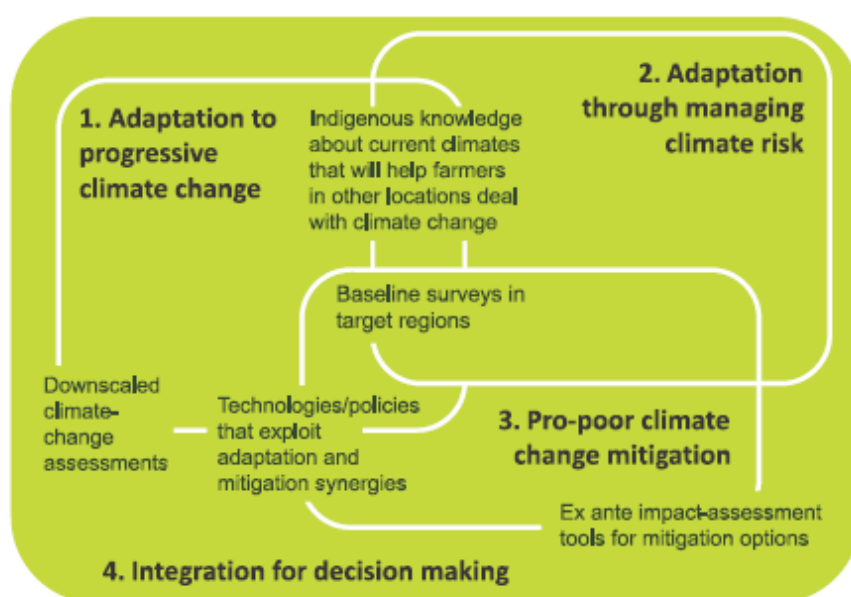


Figure 1. Anticipated interactions between CCAFS Themes as originally envisaged in the CCAFS Program Plan 2011.

It was clear from both the interviews and the Minutes of Program Committee meetings that there is a high level of trust and cooperation between Theme Leaders and a willingness to share. There is little or no evidence of “turf protection” or “empire building” amongst the Theme Leaders.

There is evidence of some cross-Theme activities e.g. Theme 1 hosting down-scaled climate data originating from Theme 4, household modeling work in Theme 2 working closely with Theme 4 in dynamic treatment of climate risk. There is also good evidence of cross-cutting gender activities in the Themes (see more detailed discussion below on gender integration).

However, with the exception of the gender activities, highly visible evidence of strong cross-Theme synergies in the conceptual thinking, design and implementation of research and in outputs is, on the whole, lacking. The 2012 Annual Report reports on individual Research Themes and it is not obvious in the synthesis reporting of Products/Tools, Significant Achievements and Outcomes the degree to which these were a result of cross-Theme work.

The specific issue of evidence of cross-Theme synergies in International Public Goods is addressed in Section 3.5.6.

A number of factors may be at play in this lack of visibility of cross-Theme activities and synergies:

- the hierarchical structure of the research in CCAFS i.e. Activities, Milestones, Theme Objectives, Theme Outcomes and the nature of the reporting structures for these entities tends to compartmentalize research into individual Themes and works against more overt expression of cross-Theme synergies
- the demands on Themes to work across a number of Regions and interact closely with a number of Centers to deliver on Activities are very significant, which leaves relatively little time to strategically and operationally invest in cross-Theme activities
- a view from a couple of CCAFS leaders was that the necessary operational aspects of PMC meeting agendas left little bandwidth for more strategic discussions on issues such as cross-Theme synergies.

If these factors are combined it is not surprising that cross-Theme synergies and outputs are not as evident as anticipated. The challenge is how to achieve greater cross-Theme engagement at the project activity level and reporting of those synergies without adding additional complexity and process to existing organizational design and management systems. It is clear that the Theme leaders engage and communicate well with each other so a hard system response to achieve greater synergies in activities across Themes is not preferred.

#### **Recommendation 6:**

- Provide opportunities at PMC meetings, or if required dedicated meetings, to engage in more strategic discussions on cross-Theme synergies and for these to be reflected in cross-Theme activities. For example, it would appear that increased activity in Themes 1 and 2 in integrating the adaptation responses to climate variability and climate change (especially where timescales merge) would be beneficial. Likewise more emphasis on adaptation-mitigation co-benefits and trade-offs (Themes 1 and 3) would be useful.*
- Include overt reporting of cross-Theme synergies, outputs and incipient outcomes in Annual Reports and Milestones.*

#### **3.2.1 Gender and Social Differentiation**

An important cross-Theme synergy for CCAFS is the work in gender and social differentiation. This work aims to integrate gender analysis in climate change, agriculture and food security research across the Themes and Regions. It is anticipated that this research will lead to more equitable inclusion of women in decision-making at levels of the household, village, and institutions through capacity development and organizational gender mainstreaming. This work is well coordinated at the whole of CCAFS level but the budgets are mainstreamed across, Themes, Regions and Center activities with targets of 15-20% of budgets allocated to gender work being realized. To further achieve institutional



mainstreaming of the gender research within CCAFS, staff have been recruited into the CCAFS core team who have gender research experience, Theme and Regional research leaders have gender-related objectives and Centers have been recruiting gender specialists. A community of practice is evolving within CCAFS and tools and approaches are being shared on the CCAFS website.

In the area of research activities, the baseline surveys have been designed to allow data on gender to be collected, analysed and disaggregated, which has included working closely with key Centers to develop shared standards and tools. A range of gender indicators and approaches to monitoring them have been developed in a bottom-up way with research partners and these indicators are being used to assess gender equity against targets.

Based on the available evidence it would appear CCAFS has fully embraced the CGIAR goal for gender equity to be embedded in CRPs as a cross-cutting priority and there is good evidence of synergies across Themes and Regions in the way the program is being implemented in CCAFS.

**3.3 Is there a sufficient level of comparability across regions, and is this reflected in the IPGs?**  
*(Evaluation Criteria 7)*

This review had a focus in South Asia and apart from talking with the East and West Africa Program Leaders there was little direct engagement with other Regions making it somewhat difficult to undertake cross-Region comparisons. However, information that could be disaggregated according to region has been assessed.

Budget breakdown by Region was not available for 2012 but the 2011 numbers (Annex 6) show that the budget was relatively even across the Regional Themes with West Africa receiving about \$1.8M less in funding than the other two Regions (c. \$10.5M each).

The three Regional Program Leaders interviewed stressed that the issues, research needs and external engagement differed significantly amongst Regions and a top-down, “one size fits all” research approach is not appropriate. Likewise, the individuality of regions means that comparisons must be made in the context of place-based drivers, technologies and tools differentially suited to different regions, diversity of institutions, capacity and partners. For example, better managing existing climate variability through better weather and climate information (climate services) is a high priority in East and West Africa while the rapid scale-out in South Asia of Climate Smart Villages that target specific farming system interventions is starting to have significant outcomes. The comments below therefore need to be interpreted within that context of considerable regional diversity.

The activities in Regions are made up of the Region’s own budget and initiatives, that of the Centers which makes up the majority of research undertaken, and to a lesser extent Theme Leader led activities. It is difficult to compare regions based on annual Activity Reports because it is not possible to disaggregate the Center Reports into regions. However, the Region led Activities can be assessed based on Technical Reports per Activity.

In West Africa and South Asia, completion of Activities was 75% and 64%, respectively, while in East Africa, only 30% of Activities were assessed to be fully completed (Table 3). All three Regions demonstrated significant integration of gender activities. East and West Africa each had three journal publications while South Asia had ten listed. The Regional Program Leader synthesis summaries all suggested good levels of engagement and pathways to impact, which is a little at odds with the assessment of Activity completion. It would be worth exploring this relatively low level of Activity completion in East Africa as it may reflect some inconsistency in achievement rankings based on the synthesis summaries which suggested similar levels of achievement across Regions.

Table 3. Analysis of Region led Activity Reports

	East Africa	West Africa	South Asia
Activities			
- Completed	7	6	9
- Partially completed	11	2	5
- Uncompleted	5	0	0
Publications	3	3	10
Gender activities and integration	✓	✓	✓
Synthesis - path to impact, incipient outcomes	✓	✓	✓

IPGs are dealt with in more detail in Section 3.5.6 but in terms of the different Regions there appears to be a good level of comparability in data and tools, such as baseline surveys (data, reports and atlas) in their consistency and quality. For tools such as future scenarios or climate services these will necessarily be different amongst and within regions but they are being used appropriately in different regions. Most other data and tools are global and more generic in nature e.g. downscaled climate projections, climate analogues, food security maps though they need to be applied with the appropriate context in different regions.

**3.4 How well is the local-to-global set of activities managed, in terms of having an appropriate mix of activities at different scales and managing the cross-scale connections?**  
*(Evaluation Criteria 8)*

At the establishment of CCAFS there was a clear strategy to undertake research activities that ranged from global to local in scale and to establish a network of stakeholders and partners also from the global to local scale. While it is not possible to determine the relative split across different scales of activities there is significant investment in modeling, policy relevant activities, technologies e.g. pre-breeding and testing of varieties more pre-disposed to a future climate, and participatory action research at household/village scale to test climate smart interventions.

The research at local scales has had three strong foci: the establishment of core sites and Climate Smart Villages, agricultural climate services, and gender related research activities. This scale of research work has also included activities relevant to but not necessarily restricted to CSVs e.g. index based insurance, use of ICT in disseminating weather and other value-adding market information, crop diversification.

The original plans in CCAFS were to place most emphasis at local scales within the cores sites/Climate Smart Villages, working with smallholders. A rich information base will be built up at these sites and through strong protocols on consistent data collection and reporting, an ability to synthesise and value add at national and regional and cross-regional scales is being created. Central to this local to regional model is the anticipated role of Centers in investing their allocated resources into these sites. While this is increasingly happening, there is still significant investment by Centers in a wider range of local sites due to history of activity and strength of local relationships. In addition, other research partners often have established local sites and to achieve both effective collaboration and impact it is proving desirable to work at these other local scale sites.

This throws up a number of challenges and questions of balance, including: how to achieve increasing investment in climate smart villages from Centers; how to scale out CSVs to achieve wider impact that is measurable at sub-national and national scales yet maintain the rigour and effort in existing CSVs; how to exploit new opportunities at local scale that don't lend themselves to operating within the concept of CSVs.

**Recommendation 7:**

*Develop clear plans with associated implementation strategies for undertaking participatory research at local scales in the future that offer the rigour associated with focused effort at a manageable number of sites but builds in approaches for scale out to achieve wider impact.*

The discussion above is very much in the context of smallholder farmers. Not all vulnerable farmers are smallholders yet from the materials available for this review it was not evident that there is a substantive effort into more market-oriented farmers wishing to operate at commercial scales. This maybe a conscious decision by CCAFS to not invest too much effort at this more commercial scale or it is happening but the work is not as visible as the work with smallholders.

**Recommendation 8:**

*Clearly articulate the role, if any, for working with vulnerable commercial scale farmers and have this strategy visible in business plans.*

At national scales, much of the work occurs in a policy context, informing national policy in a diverse range of areas but with some emphasis in National Adaptation Plans (NAPs) and Nationally Appropriate Mitigation Actions (NAMAs) and in building capacity at the national scale to more effectively participate in global discussions such as the UNFCCC. It is not clear that there is much linkage between the national scale policy work and local scale participatory action research but there would appear to be good opportunities to be working with policy makers to have national scale policies that are informed by the local scale in the types of incentives and facilitation needed to support adaptation and mitigation.

**Recommendation 9:**

*Develop approaches to more explicitly link outcomes from local scale research activities to national scale policies.*

The climate analogues work provides a good example of work that is relevant to national, regional and cross-regional scales in that climate analogues of future climates in one region may only be found in the present in other regions. The nature of this approach is likely to encourage co-operation across regions (particularly South-South) as people within one region start to explore the farming systems of other climate analogue regions. The most visible component of the climate analogue work is the modeling work, which requires a reasonably strong understanding of the different Global Climate Models (GCMs) and associated emissions scenarios, dissimilarity analysis and weighting loadings, for the tool to be used effectively. A challenge remains in being able to then take the analogue climate and apply it locally and with the right socio-economic to explore different cropping and farming system options.

Likewise, a significant activity in CCAFS has been the tool development in down-scaled climate projections. This draws on efforts undertaken at global scales, through the IPCC process and the development and public access to a range of GCMs to build a portal that allows production of down-scale climate projections. This provides a basis for linking work undertaken at the global scale and producing relevant information for local scale analysis, scenario development, and testing of different intervention options and policies.

However, as with the climate analogue tool the down-scaled climate modeling approaches require a reasonably strong understanding of the different GCMs and the different emission scenarios for it to be used appropriately. It is not clear of the process for the intermediate step of taking these down-scaled climate projections and applying them to more local scale applications that are contextualized to not just the physical climate analogue but also the appropriate social and economic drivers.

**Recommendation 10:**

*For effective application of global models at local scales, increased effort should be placed on activities that connect the down-scaled climate models, crop models and their application to local scale farming systems and their social and economic dynamics.*

The other aspect of global scale activities is the work of CCAFS at the policy level via the IPCC, UNFCCC and WMO's global framework for climate services. These activities are

important for CCAFS, not just in their own right, but for connection to more regionally based activities e.g. climate services in AGRHYMET.

**3.5 Are the initial outcomes or incipient outcomes being reported by CCAFS of sufficient scale for a program of this size, and do they reflect an integrated program?**  
*(Evaluation Criteria 11,12,13,14,15,16)*

3.5.1 Definition of outcomes

There can be quite a bit of confusion about what constitutes outputs, outcomes and impacts. For the purposes of this review, the following simple definitions have been adopted:

- Output:* products, tools or services produced by the research
- Outcomes:* use of the research to change policy or practice, usually in the short to medium timeframe and at a reasonable scale
- Impact:* longer term, deeper changes in people’s lives and livelihoods that have occurred as a result of the research.

The outcome definition is consistent with that adopted by CCAFS, namely: ‘An outcome is the use of the research by non-research partners to change policies and practices. In many cases the users of the research will be policy makers (or those influencing the policy process), national development agencies, service providers to farmers including non-governmental agencies, and sometimes farmers themselves.’

3.5.2 Approach and process for development of outcomes in CCAFS

In the strategic planning for CCAFS covering the period 2012-2015, a Log Frame approach was adopted. The Log Frame is quite standard in its implementation, consisting of a nested set of Milestones, Outputs, Outcomes and Objectives with each of the Milestones having a date for completion, narrative/description, performance indicator, means of verification, assumptions and partners.

For each of the CCAFS Themes there are three Objectives each with an Outcome, giving a total of 12 Outcomes across CCAFS (Table 4). Although not explicitly stated in each of the 12 Outcome statements it is assumed these Outcomes are to be delivered by 2015.

Table 4. List of CCAFS Outcome statements as presented in Log Frame 2012-2015.

<b>Theme 1. Adaptation to Progressive Climate Change</b>
Outcome 1.1: Agricultural and food security strategies that are adapted towards predicted conditions of climate change promoted and communicated by the key development and funding agencies (national and international), civil society organizations and private sector in at least 20 countries
Outcome 1.2: Strategies for addressing abiotic and biotic stresses induced by future climate change, variability and extremes, including novel climates mainstreamed among the majority of the international research agencies who engage with CCAFS, and by national agencies in at least 12 countries
Outcome 1.3: Improved adaptation policies from local to international level supporting farming communities, rural institutions and food system actors adapted to future climate conditions in at least

20 countries.
<b>Theme 2. Adaptation through Managing Climate Risk</b>
Outcome 2.1: Systematic technical and policy support by development agencies for farm- to community-level agricultural risk management strategies and actions that buffer against climate shocks and enhance livelihood resilience in at least 20 countries
Outcome 2.2: Better climate-informed management by key international, regional and national agencies of food crisis response, post-crisis recovery, and food trade and delivery in at least 12 countries
Outcome 2.3 Enhanced uptake and use of improved climate information products and services, and of information about agricultural production and biological threats, by resource-poor farmers, particularly vulnerable groups and women, in at least 12 countries
<b>Theme 3. Pro-Poor Climate Change Mitigation</b>
Outcome 3.1: Enhanced knowledge and tools about agricultural development pathways that lead to better decisions for climate mitigation, poverty alleviation, food security and environmental health, used by national agencies in at least 20 countries
Outcome 3.2: Improved knowledge about incentives and institutional arrangements for mitigation practices by resource-poor smallholders (including farmers' organizations), project developers and policy makers in at least 10 countries
Outcome 3.3: Key agencies dealing with climate mitigation in at least 10 countries promoting technically and economically feasible agricultural mitigation practices that have co-benefits for resource-poor farmers, particularly vulnerable groups and women
<b>Theme 4. Integration for Decision Making</b>
Outcome 4.1: Appropriate adaptation and mitigation strategies mainstreamed into national policies in at least 20 countries, in the development plans of at least five economic areas (e.g. ECOWAS, EAC, South Asia) covering each of the target regions, and in the key global processes related to food security and climate change
Outcome 4.2 Improved frameworks, databases and methods for planning responses to climate change used by national agencies in at least 20 countries and by at least 10 key international and regional agencies
Outcome 4.3 New knowledge on how alternate policy and program options impact agriculture and food security under climate change incorporated into strategy development by national agencies in at least 20 countries and by at least 10 key international and regional agencies.

The Outcome statements are fairly high level in their description and the key metric used in nearly all the Outcome statements is the number of countries in which the outcome will be achieved. This rather generic approach to the development of Outcomes creates some challenges for assessing whether they are of sufficient scale or in getting a feel for different emphases in the various regions in which CCAFS operates. Indeed the “Regions” dimension of the CCAFS matrix is almost lost within the whole Log Frame approach, which is strongly centered around Themes.

The inherent design of the Log Frame doesn't allow for expression of more intermediate or incipient outcomes to judge whether the various activities are on track to achieving the overall 2015 Outcomes. It has to be assumed that the achievement of Milestones will ultimately lead to the achievement of the Theme Outcomes.

This structural/design shortcoming in being able to demonstrate incipient or intermediate outcomes appears to have been addressed to some degree by the inclusion of Outcome reports in the Annual Technical Reports for Themes, Regions and Centers. For 2012, there were 36 Outcomes reported.

Annual Outcomes are decided at the commencement of each year with an expectation that each of the Annual Outcomes will have a linkage through to one of the 12 Theme Outcomes. However, it doesn't appear that there has been in place a formal process for linking these Annual Outcomes to the higher level Theme Outcomes.

This is dealt with to some extent through increased emphasis and effort on the development of Impact Pathways. Impact Pathway roadmaps are provided in the 2013 CCAFS Business Plan for two of the four Themes (Themes 1 and 4) and for the three established Regional Programs (East Africa, West Africa, South Asia). This is a positive and constructive initiative. However, it is clear that this process is still in its early stages of development as each Theme and Regional Program has adopted a different approach for developing Impact Pathways and the use of some terminology is a little confusing. For example, outcomes are listed in most Impact Pathways and while these are consistent with Theme Level Outcomes there is not a direct alignment and so a new set of outcome statements are introduced.

In addition, to these two approaches to Outcome reporting, the CGIAR has introduced a process of Intermediate Development Outcomes (IDOs). CCAFS has proposed five Intermediate Development Outcomes, focusing on behavioural changes at farmer, local, institutional, national and international levels, as well as one directed towards gender equity. IDOs will become the main mechanism for CCAFS to demonstrate its contribution towards the CGIAR System Level Outcomes.

This linkage between Activities, Milestones and Outcomes is illustrated in Figure 2.



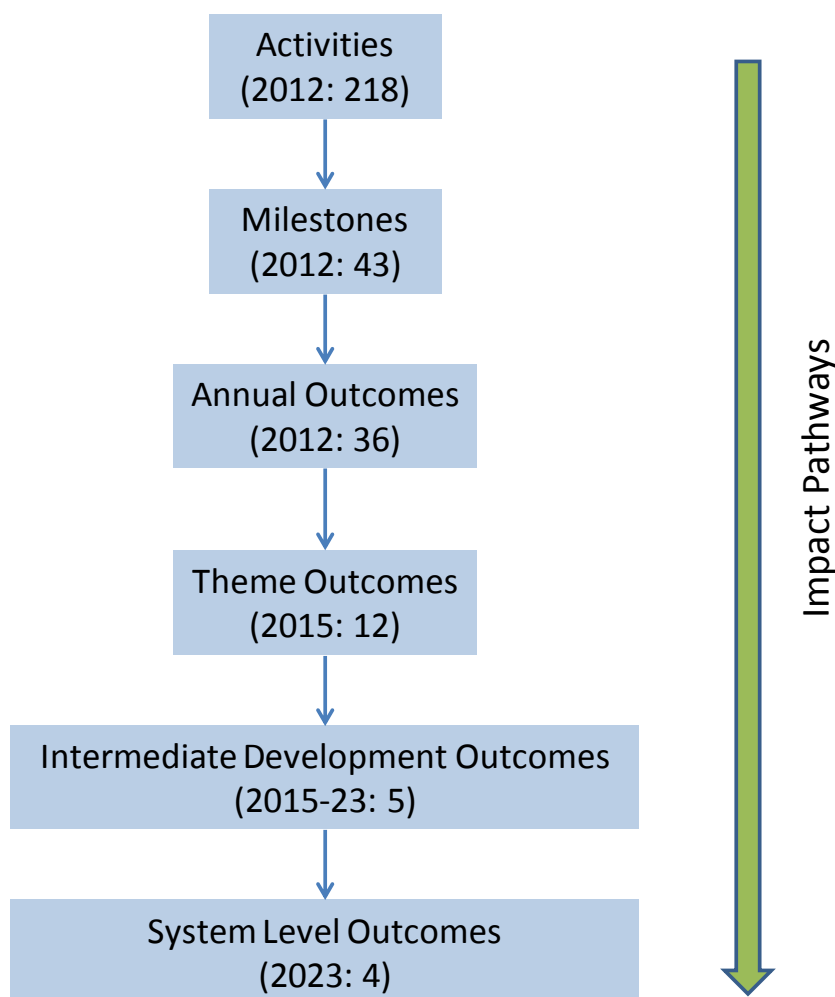


Figure 2. Connectivity between Activities, Milestones, Outcomes and Impact Pathways

It is clear from the interviews with various senior leaders in CCAFS that the process of developing outcomes and pathways to impact is a relatively new one, not just for CCAFS, but for the CGIAR more broadly. It is also evident from the interviews that CCAFS is embracing the need to move to a more outcomes and impacts focus and is leading the way within the CGIAR and this is to be commended.

As the whole process of outcomes and impacts develops consideration should be given to a more coherent and systematic linkage between milestones, annual outcomes and higher level outcomes (Theme Level Outcomes and IDOs as they in time replace Theme Level Outcomes) and the integration of impact pathways. The Annual Outcomes are a key building block to achieving longer term outcomes and impact. They also provide an opportunity to more overtly demonstrate outcomes at regional and local scales to demonstrate the linkages and achievements at global to local scales. At the moment they are largely determined in a bottom-up process. In contrast the Intermediate Development Outcomes are established in a broader top-down process. There is a risk of these two scales of outcomes not connecting effectively unless a more planned approach to their integration is taken.

**Recommendation 11:**

*Increased effort should be invested in developing a coherent structure that links Milestones, Annual Outcomes and higher level, longer term outcomes (IDOs). A key aspect of this should be development of an approach to Impact Pathways that is consistent across Themes and*

*Regions. This Impact Pathways approach should be developed in a way that facilitates close integration between Annual and Intermediate Development Outcomes.*

### 3.5.3 Assessment of outcomes – milestones

A precursor to achieving nearer term incipient outcomes and medium term Theme Outcomes is achievement of Milestones. Table 5 shows the degree to which 2012 milestones were accomplished. Across all Theme outputs, 67% of Milestones were accomplished with 33% partially accomplished and no milestones that were not accomplished. These assessments of Milestone accomplishment represent the views of Theme Leaders and Regional Program Leaders and would appear to be thoroughly assessed based on the explanations and evidence.

Table 5. Accomplishment of Milestones in CCAFS in 2012.

Milestone Output	Milestones in 2012	Accomplished	Partially Accomplished	Not Accomplished
1.1	7	5	2	0
1.2	1	0	1	0
1.3	3	2	1	0
2.1	5	4	1	0
2.2	1	1	0	0
2.3	2	2	0	0
3.1	2	1	1	0
3.2	3	2	1	0
3.3	4	1	3	0
4.1	5	5	0	0
4.2	6	5	1	0
4.3	4	1	3	0
Total	43	29	14	0

### 3.5.4 Assessment of outcomes - Annual Outcomes/Incipient Outcomes

In 2012 and 2013 there were two separate assessments of the Annual Outcomes in CCAFS. The first was an assessment from the Director of CCAFS of the Annual Outcomes for 2011 and 2012 and the second was an examination of the 2012 Annual Outcomes by an external consultant. Both of these assessments focused on whether the stated outcomes really fitted the definition of an outcome and whether there was sufficient evidence to support their achievement.

Both the Director and the external consultant found that over half of the reported outcomes were unacceptable. The vast majority of unacceptable outcomes related to them not being outcomes at all but rather outputs or achievements of activities. Some were rated as unacceptable because of the lack of evidence to support them.

This assessment reflects a learning process for CCAFS and CGIAR more broadly as the introduction of outcomes is relatively new to the CGIAR.

Rather than revisit these earlier assessments of 2012 Annual Outcomes, for this Review the focus has been on the key evaluation criteria relating to impact i.e. are the outcomes of sufficient scale for a program of CCAF's scale, are the outcomes having much influence or

likely to have much influence, are the outcomes building blocks for the achievement of the Theme Outcomes and IDOs, and are the outcomes aligned well to the System Level Outcomes of CGIAR.

Rather than dismiss the greater than 50% of 2012 Outcomes which are deemed not to be acceptable because of poor fit with the acceptable definition of an outcome, a likely outcome was inferred based on the nature of the described outcome. Each of the 36 outcomes for 2012 were rated using the following criteria:

1. Level of influence: 1 = Low; 2 = Moderate; 3 = High, noting that influence is separate to scale or extent e.g. a high level of influence can be achieved at local scales
2. Extent of influence: 1 = Local; 2 = National/Regional; 3 = Across regions; 4 = Global
3. Building block for Theme Outcome: 1 = Little evidence of linkage; 2 = Good linkage
4. Relevance to System Level Outcome: 1 = Little/moderate relevance; 2 = Strong relevance

The results of this assessment are shown in Table 6. The intention is not to focus on individual assessments or comparisons as the relatively subjective nature of the assessment process means that there is only a medium level of confidence around any individual assessment. However, there is a greater level of confidence in the overall assessment.

The analysis suggests that:

- the current level of influence of the annual outcomes is moderate (mean = 2.1)
- the outcomes are occurring at a range of scales (19% local, 22% national/regional, 44% across regions, and 14% global)
- 69% of the Annual Outcomes have good linkages to Theme Level Outcomes
- 67% of Annual Outcomes appear to be relevant to the CGIAR System Level Outcomes.

Table 6. Assessment of the 2012 Annual Outcomes in terms of likely influence, spatial scale, and alignment to Theme and System Level Outcomes.

Center Region Theme	Outcome	Influence	Extent	Link to Theme Outcome	SLO relevance
Bioversity	Farmers' field experimentation	1	1	1	1
CIAT	Coffee systems	2	3	2	2
CIAT	Crop wild relatives and pre-breeding	3	4	2	2
CIFOR	GHG inventories	2	4	2	1
CIMMYT	Institutions and adaptive farming IGP	2	2	2	2
CIMMYT	ICT and managing farmers' risks	3	3	2	2
CIP	Greenhouses in the Andes	3	1	2	2
ICARDA	Breeding and CC related traits	1	3	1	1
ICRAF	Forests and local adaptation	1	3	2	2
ICRAF	Forests and sequestration in China	2	2	1	2
ICRAF	Vegetation and CC, Tibetan Plateau	1	1	1	1
ICRAF	Philippines and Vietnam activities	1	1	1	1
ICRAF	Capacity building nationally REDD	2	3	2	1
ICRAF	Soil carbon stocks	1	3	1	1
ICRISAT	Seasonal climate forecasts in Kenya	2	2	2	2
ICRISAT	Seasonal climate forecasts in Zimbabwe	2	2	2	2
IFPRI	Mitigation and market access	2	3	1	1
IITA	Climate-smart banana-coffee systems	3	2	2	2
ILRI	Mitigation protocols for IPCC	2	4	1	1
ILRI	East Africa Scenarios	2	2	2	2
IRRI	Rice water saving and GHG	3	3	2	2
IRRI	Improved rice varieties - Mekong	3	3	2	2
IWMI	Vulnerability mapping Sri Lanka	3	2	2	2
IWMI	Use of vulnerability assessment	2	3	2	2
WorldFish	Iligan Bay project buy-in	2	1	1	2
Theme 1 led	Use of downscaled climate products	2	4	2	2
Theme 1 led	Capacity building in Nepal	2	1	2	2
Theme 2 led	Influence on investment priorities	2	3	2	2
Theme 3 led	Linking agriculture and REDD+	2	3	2	1
Theme 3 led	Govts and NGOs using CCAFS results	2	3	2	2
Theme 4 led	CC impact on agricultural commodities	1	4	1	1
Theme 4 led	Gender research at CCAFS sites	2	3	2	2
East Africa Region led	Agriculture included in UNFCC	3	4	1	1
East Africa Region led	Strengthened research agenda	1	2	2	1
West Africa Region led	Uptake of climate products	3	2	2	2
South Asia Region led	Participatory CSVs at benchmark sites	3	2	2	2

### 3.5.5 Assessment of outcomes – Theme level Outcomes

#### 3.5.5.1 Likely Achievement of Outcomes

Given the relatively early stage development of the CCAFS program and the implementation of the 2012-2015 Log Frame it would be unlikely that any of the planned Outcomes for 2015 would be close to being achieved. However, based on the Technical Reports for 2012, including the progress on Milestones and the 36 Outcome reports, as well as the synthesized 2012 annual report to the CGIAR, it is possible to at least determine whether progress is on track, slow, or whether there is inadequate evidence to make an assessment (Table 7).

Table 7. Assessment of progress of Theme level Outcomes.

Theme Outcome	Progress
<b>Theme 1: Adaptation to Progressive Climate Change</b>	
Outcome 1.1: Agricultural and food security strategies that are adapted towards predicted conditions of climate change promoted and communicated by the key development and funding agencies (national and international), civil society organizations and private sector in at least 20 countries	<i>On-track.</i> Nine annual outcomes (25%) for 2012 relate to this Theme outcome. National programs and strategies now being influenced by this research.
Outcome 1.2: Strategies for addressing abiotic and biotic stresses induced by future climate change, variability and extremes, including novel climates mainstreamed among the majority of the international research agencies who engage with CCAFS, and by national agencies in at least 12 countries	<i>On-track.</i> Good outcome to date on \$US50m wild relatives and pre-breeding program. Other evidence a little more patchy.
Outcome 1.3: Improved adaptation policies from local to international level supporting farming communities, rural institutions and food system actors adapted to future climate conditions in at least 20 countries.	<i>On-track.</i> Good progress demonstrated through banana-coffee systems, capacity building in Nepal, scale out of Climate Smart Villages
<b>Theme 2. Adaptation through Managing Climate Risk</b>	
Outcome 2.1: Systematic technical and policy support by development agencies for farm- to community-level agricultural risk management strategies and actions that buffer against climate shocks and enhance livelihood resilience in at least 20 countries	<i>On-track.</i> Evidence for impact through Outcome with CIMMYT and 6000 farmers and from insurance work in India
Outcome 2.2: Better climate-informed management by key international, regional and national agencies of food crisis response, post-crisis recovery, and food trade and delivery in at least 12 countries	<i>Slow.</i> There are no annual outcomes relevant to this Theme outcome and little other evidence to suggest much progress.
Outcome 2.3 Enhanced uptake and use of improved climate information products and services, and of information about agricultural production and biological threats, by resource-poor farmers, particularly vulnerable groups and women, in at least 12 countries	<i>On-track.</i> Good evidence of products relating to climate information being used and influencing other programs. Potentially significant outcome.
<b>Theme 3. Pro-Poor Climate Change Mitigation</b>	
Outcome 3.1: Enhanced knowledge and tools about agricultural development pathways that lead to better decisions for climate mitigation, poverty alleviation, food security and environmental health, used by national agencies in at least 20 countries	<i>Slow.</i> Good evidence of research outputs and links to national agencies but evidence of uptake is not clear.
Outcome 3.2: Improved knowledge about incentives and institutional arrangements for mitigation practices by resource-poor smallholders (including farmers' organizations), project developers and policy makers in at least 10 countries	<i>Slow.</i> No annual outcomes relevant to this Theme outcome evident and little other material to suggest much progress.

Outcome 3.3: Key agencies dealing with climate mitigation in at least 10 countries promoting technically and economically feasible agricultural mitigation practices that have co-benefits for resource-poor farmers, particularly vulnerable groups and women	<i>On-track.</i> Good evidence that this outcome is progressing well, especially from IRRI rice work.
<b>Theme 4. Integration for Decision Making</b>	
Outcome 4.1: Appropriate adaptation and mitigation strategies mainstreamed into national policies in at least 20 countries, in the development plans of at least five economic areas (e.g. ECOWAS, EAC, South Asia) covering each of the target regions, and in the key global processes related to food security and climate change	<i>On-track.</i> Good evidence from east Africa scenarios work and vulnerability mapping in Sri Lanka that the research is being mainstreamed into national policies/strategies.
Outcome 4.2 Improved frameworks, databases and methods for planning responses to climate change used by national agencies in at least 20 countries and by at least 10 key international and regional agencies	<i>On-track</i> Evidence that outputs (GHG inventories, mitigation protocols, REDD) are influential but it is not clear whether the scale of outcomes (20 countries, 10 agencies) is achievable though there are a large number of activities underway.
Outcome 4.3 New knowledge on how alternate policy and program options impact agriculture and food security under climate change incorporated into strategy development by national agencies in at least 20 countries and by at least 10 key international and regional agencies.	<i>Slow.</i> Available evidence points to the IFPRI work as the only significant activity that relates to this outcome in terms of alternative policies.

Overall, the CCAFS program appears to be on-track to achieving most of the Theme Outcomes in 2015-16. However, based on the evidence available for this review, it would appear that about one-third of the Theme Outcomes are progressing too slowly at their current pace to be achieved by 2015-16. It may be possible that the Outcomes that appear to be struggling are actually on-track but the evidence to support that is not readily apparent. Some intervention may be necessary to get these outcomes on-track or alternatively if they are actually progressing reasonably well then much better evidence in the form of tangible annual outcomes (as opposed to outputs) needs to be developed.

Many of the Theme Outcomes have a prescribed number of countries in which the outcome will be achieved. A number of the Annual Outcomes give an indication of how many countries in which they are working and having an impact but it is not clear from the information provided or available whether the target number of countries will be achieved.

#### 3.5.5.2 Scale and Relevance of Outcomes

Based on the assessed relevance of the Annual Outcomes and the description of the Theme Outcomes there would appear to be an appropriate level of alignment and consistency with the four CGIAR System Level Outcomes (SLOs): less rural poverty, better food security, better nutrition and health, sustainably managed resources.

It is difficult to determine objectively whether the scale of the outcomes, both incipient and expected by 2015-16, is in proportion to the level of investment and expenditure in CCAFS. However, my assessment is that if the 12 Theme Level Outcomes can be substantively achieved then the CCAFS program would have done well given both the level of resourcing and the fact CCAFS is a relatively new research program, initiated from effectively a zero base in 2009.

The main risks in being able to achieve this scale of outcome relate to (a) the outcome areas that are currently progressing slowly not receiving the required effort to accelerate their progress and (b) not achieving the outcomes in the prescribed numbers of countries, which ranges from 10 to 20 countries.

An area of outcome performance that is not captured by the Theme Outcomes in listing numbers of countries in which activity is occurring, is the intensity of that activity. For example, in South Asia the Climate Smart Village concept, where a range of intervention strategies are introduced, is being taken up quite rapidly. For example, the State of Maharashtra is planning to implement >1000 CSVs and the World Bank is also looking to scale out the CSV concept to Nepal with proposed implementation in 1000 CSVs. At a sub-national scale, the outcomes from this level of scale-out are likely to be very significant.

Notwithstanding CCAFS involvement in the Commission on Sustainable Agriculture and Climate Change, the Theme Outcome areas that appear to be making slower progress have a stronger alignment with the System Level Outcome relating to broader aspects of food security, as opposed to local scale production elements of food security. Some additional effort may need to be directed to ensure that CCAFS is able to contribute well to this SLO. There is some evidence that this gap is recognized with the 2013 Business Plan indicating that a food security information expert has been acquired and a new scientist hired to work at the interface of climate services and food security.

**Recommendation 12:**

*Increased effort should be directed to the Theme Outcome areas that are currently progressing slowly and at risk of not achieving their planned outcomes by 2015-16. In particular, areas relevant to the System Level Outcome on food security, with an emphasis on wider system aspects of food security, should receive some focus.*

3.5.5.3 Do the outcomes reflect an integrated program of research?

It is difficult to assess whether the outcomes reflect an integrated program based simply on the Annual Outcomes and the Annual Report to CGIAR. To get a better understanding of how well integrated the program is in terms of likely outcomes the matrix analysis of Activities (Theme x Centre and Regional Program) was used (Table 1). This analysis indicates a program of activity that is quite well integrated. East Africa, West Africa and South Asia all have some activities that they lead across all four Themes. Focusing in on the South Asia region, it has a fairly even spread across Themes of activities it leads, participating in 8 of the 12 Theme objectives.

The analysis also reveals that the Theme objectives with the greatest amount of activity (1.1, 2.1, 3.3 and 4.2) also tend to have the greatest breadth across Regions and Centers.

While the two assessments were conducted independent of each other, there would appear to be a fairly close correlation between the assessment of progress in the 12 Theme Outcomes (Table 7) and the level of effort directed towards activities in each of the corresponding Theme objectives. Indeed the four Theme objectives with the lowest numbers of activities in 2012 were also the four Theme outcomes where progress was assessed to be slowest.

### 3.5.6 International Public Goods – scale, comprehensiveness and quality

Within CCAFS, International Public Goods take a number of forms including data, tools, policy briefs, working papers, technical reports, journal papers, conference proceedings and book chapters.

A new website was launched in July 2013 and it provides an easy to use interface to navigate all forms of IPGs. Published articles, policy briefs and reports are easily searchable and accessible and while accessing journal articles requires visiting the publishers' websites, links are provided and it would appear open access has been arranged for all journal articles.

A particularly useful aspect of the accessibility of the IPGs on the website in the context of this Theme by Region review is the ability to easily get to Regional and Theme relevant information. The communication team is to be commended for the functionality and ease of use of the new website interface.

To understand the quality and impact of the IPGs it is useful to break them into three groups; Reports, Working Papers, Policy Briefs; Journal papers, Conference proceedings; and Data and Tools.

#### 3.5.6.1 Reports, Working Papers, Policy Briefs

Download statistics provide some useful information on the value of this category of IPGs. The data for the top 20 downloaded publications in 2012 and the top 10 downloaded publications in 2013 (until October) are shown in Table 8.

The data reveals that the most downloaded publications are strongly dominated by those that synthesise CCAFS work across Themes and across Regions. These publications tend to be written for a general audience and with a focus on policy makers and key decision-makers. This assessment was supported by comments made by the Communication and Knowledge Manager, and is reflected in recent efforts at synthesis e.g. climate smart agriculture success stories, which was released in November 2013 and there were over 2000 downloads in a week. This suggests that in this class of publications most effort should be directed towards more cross-cutting, integrated reports, papers and policy briefs.

There were relatively few publications in the top 20/10 that clearly stood out as a combined effort of two or three Themes explicitly working together to develop the report or paper. They tended to be either single Theme or whole of CCAFS synthesis outputs.

In terms of individual Themes where the work was not cross-cutting, there was a much larger number of top 20/10 publications from Theme 3 than other Themes. It is not known whether this reflects higher output from this Theme or a high level of interest in specific mitigation opportunities. Given, a number of these Theme 3 publications were also in more specific regions it may suggest a more context specific and targeted interest in mitigation issues.

#### **Recommendation 13:**

*Invest more effort in producing cross-cutting, synthesis reports and policy briefs given the strong external interest in these products. This will require identifying research activities that lend themselves to these synthesis publications and may provide additional benefit as a stimulant for cross-Theme interactions.*



Table 8. Download statistics for top 20 publications in 2012 and top 10 in 2013 until October. “Synthesis” denotes across all Themes and “CCAFS” denotes where the publication is led by CCAFS as a whole rather than from a particular Theme. Asterisk numbers in 2013 reflect publications that were also in the top 20 in 2012.

Publication title	# downloads	Themes	Regions
<b>2012</b>			
1. Final Report from the Commission on Sustainable Agriculture and Climate Change	30,021	CCAFS - synthesis	All
2. Summary for policy makers from the Commission on Sustainable Agriculture and Climate Change	14,752	CCAFS - synthesis	All
3. Climate Change and Crop Production. Chapter 1: Adapting Crops to Climate Change: A Summary (Matthew P. Reynolds and Rodomiro Ortiz)	4,149	T1	All
4. Recalibrating Food Production in the Developing World: Global Warming Will Change More Than Just the Climate	3,500	T4 lead - synthesis	All
5. Farming's climate smart future	2,769	CCAFS - synthesis	All
6. Impacts of climate change on the agricultural and aquatic systems and natural resources within the CGIAR's mandate #	2,601	T4 lead - synthesis	All
7. Actions needed to halt deforestation and promote climate-smart agriculture	2,431	CCAFS - synthesis	All
8. Climate Analogues	1,931	T1, T3	All
9. Mapping hotspots of climate change and food insecurity in the global tropics	1,895	T4 lead - synthesis	All
10. Testing Climate Models for Agricultural Impacts	1,763	T4 lead - synthesis	All
11. Mechanisms for agricultural climate change mitigation incentives for smallholders	1,717	T3	All
12. Institutional innovations in African smallholder carbon projects	1,641	T3	Africa
13. The State of Climate Information Services for Agriculture and Food Security in East African Countries	1,436	T2	East Africa
14. Towards policies for climate change mitigation: Incentives and benefits for smallholder farmers	1,317	T3	All
15. Baseline GHG emissions from the agricultural sector and mitigation potential in countries of East and West Africa	1,234	T3	Africa

16. Helping smallholder farmers mitigate climate change	1,191	T3	All
17. Changing climate adaptation strategies of Boran pastoralists in southern Ethiopia	1,151	T1, T2	East Africa
18. Corporate social responsibility and supply agreements in the private sector: Decreasing land and climate pressures	1,090	T3	All
19. Agro-climate tools for a new climate-smart agriculture	1,073	T2	All
20. Annual Report 2011	911	CCAFS	All
<b>2013</b>			
1. Achieving food security in the face of climate change: Summary for policy makers from the Commission on Sustainable Agriculture and Climate Change	3200*	CCAFS - synthesis	All
2. Impacts of climate change on the agricultural and aquatic systems and natural resources within the CGIAR's mandate	2500*	T4 lead - synthesis	All
3. Helping smallholder farmers mitigate climate change	2100*	T3	All
4. Institutional innovations in African smallholder carbon projects	1500	T3	Africa
5. Climate change communication and social learning - Review and strategy development for CCAFS	810	CCAFS - synthesis	All
6. Recalibrating Food Production in the Developing World: Global Warming Will Change More Than Just the Climate	800*	T4 lead - synthesis	All
7. Mapping hotspots of climate change and food insecurity in the global tropics	800*	T4 lead - synthesis	All
8. Methods for the quantification of emissions at the landscape level for developing countries in smallholder contexts	700	T3	All
9. Setting the agenda: Climate change adaptation and mitigation for food systems in the developing world	530	CCAFS - synthesis	All
10. How can small-scale farmers benefit from carbon markets?	520	T3	All

### 3.5.6.2 Journal papers

Some of the analysis relating to journal publications has already been discussed in Section 3.1.4 in the context of cross-Center collaboration. It was not possible to assign individual journal publications to Themes to determine the level of synergy across Themes. However, it is worth assessing whether the quantum and quality of the journal papers from CCAFS is sufficient for a program of its size.

Table 9 shows the numbers of ISI journal papers for each CRP in 2012, where data was available from individual CRP Annual Reports. It was not possible to access the numbers of

scientists in each CRP to make the ideal comparison of journal papers per scientist FTE. Instead the total number of \$ expended by each CRP in 2012 was used as the normalizing factor, recognizing that this is not ideal. The expenditure numbers were sourced from the CGIAR 2012 Annual Report. This table that reveals in terms of journal papers per \$M of budget that CCAFS performed below average in comparison with other CRPs producing 1.2 papers per \$M compared with an overall average of 2.0 papers per \$M.

Table 9. Analysis of ISI publications in different CRPs relative to Program expenditure.

<b>CRP</b>	<b># ISI journal papers in 2012</b>	<b>Expenditure in 2012 (\$M)</b>	<b>Papers per \$M expended</b>
Livestock and Fish	78	16	4.9
Dryland Cereals	24	7	3.4
A4NH	115	37	3.1
Wheat	121	41	3.0
Water, Land and Ecosystems	158	56	2.8
Rice	215	99	2.2
Forests, Trees and Agroforestry	151	71	2.1
Maize	112	74	1.5
Aquatic Agricultural Systems	30	20	1.5
Roots, Tubers and Bananas	75	51	1.5
Policies, Institutions and Markets	105	75	1.4
CCAFS	77	63	1.2
Grain Legumes	15	22	0.7
<b>Average</b>	<b>1276</b>	<b>632</b>	<b>2.0</b>

To make an international comparison, Table 10 shows the number of journal publications in CCAFS in 2012 compared with CSIRO's Sustainable Agriculture Flagship Program. Flagship Programs in CSIRO are not dissimilar to CRPs in many respects. They are cross-cutting research programs drawing on staff from Divisions (akin to Centers) in a matrix management organizational structure. Also like the CGIAR system, CSIRO is a mission-oriented research organization that aims to achieve significant impact in policy, industry and communities and at the same time maintain a high standard of research outputs.

Table 10. Comparison of CSIRO Sustainable Agriculture Flagship and CCAFS in journal paper metrics. CSIRO data extracted from internally available statistics.

<b>Organization</b>	<b>Scientists (FTE)</b>	<b># journal papers in 2012</b>	<b>Papers/FTE</b>	<b>Ave ISI Impact factor</b>
CCAFS	132	77	0.58	3.0
CSIRO Sustainable Agriculture Flagship	104	212	2.04	3.2

The journal paper productivity per scientist FTE in the Sustainable Agriculture Flagship is considerably higher than in CCAFS. However, there is little difference in the journal quality where papers are published, using ISI Impact factor as the quality metric. It is also apparent from the analysis of journal papers in Section 3.1.4 that journal papers in CCAFS are highly collaborative, generally involving multiple authors and institutions (Annex 7).

In terms of citation numbers, the average citations per journal paper over 2011 and 2012 5.6 and 1.7, respectively. Table 11 shows the top ten citation papers for the 2011 and 2012 years. All except one of these top ten papers were published in 2011. There is no particular pattern in the type of article that has been well cited as they range from specific aspects of climate change on plant physiology or plant disease to land use and management to broader issues of food security.

Table 11. Citation metrics for the ten most highly cited papers published in 2011 and 2012.

<b>Paper title</b>	<b>Journal and IF (brackets)</b>	<b>Citation # ISI</b>
Agriculture and food systems in sub-Saharan Africa in a 4 degrees C+ world	Philosophical Transactions of the Royal Society Series A (2.9)	30
Agricultural biotechnology for crop improvement in a variable climate: hope or hype?	Trends in Plant Science (11.8)	23
Complexity in climate-change impacts: an analytical framework for effects mediated by plant disease	Plant pathology (2.7)	19
Potential impacts of climate change on the environmental services of humid tropical alpine regions	Global Ecology and Biogeography (7.2)	18
Climate Change Affects Winter Chill for Temperate Fruit and Nut Trees	Plos One (3.7)	18
Monitoring and assessment of land degradation and desertification: towards new conceptual and integrated approaches	Land Degradation and Development (2.0)	17
What Next for Agriculture After Durban?*	Science (31.0)	17
Application of indicator systems for monitoring and assessment of desertification from national to global scales	Land Degradation and Development (2.0)	14
Assessing the vulnerability of traditional maize seed systems in Mexico to climate change	PNAS (9.7)	13
Management and land use change effects on soil carbon in northern China's grasslands: a synthesis	Agriculture, Ecosystems and Environment (2.9)	12

\* Published in 2012

There are likely to be multiple factors contributing to the relatively low number of journal publications in CCAFS. First, the whole area of climate change, agriculture and food security is relatively new and this domain of research was first established in the CGIAR system in 2009. It takes quite a few years for work to be undertaken and to appear in journal papers so the low number of journal publications in CCAFS may in part be explained by the relatively recent emergence of climate change. Certainly, the quality of journals in which the papers are being published cannot be questioned as an Impact Factor of 3.0 is high in the field of agriculture, which on average across a range of journals has an Impact Factor of around 1. As indicated earlier in the Section 3.1.4 the engagement from Centers in CCAFS has taken some time and so the early drive in journal paper publication has come from the Theme Leaders. As the Centers become more deeply engaged in CCAFS it would be expected that publication rates would increase but this may need some performance management to ensure this occurs given that between two-thirds and three-quarters of the CCAFS budget flows through Centers.

Another contributing factor may relate to the effort CCAFS has put into producing a diversity of IPGs ranging from data and tools to working papers and policy briefs to journal papers. This goal to create a range of products to address the needs of end users has most likely diluted the effort and resources available to devote to journal publications. Nevertheless, the publication rate in journals could and should be increased.

There is a note of caution in suggesting journal publication rates be increased and that is the need to maintain balance between high quality publications in numbers in keeping with a research program the size of CCAFS and the need to have impact in policy and on the ground. This is a challenging balance for a research organization that has dual goals of outcomes and high quality research outputs. Increasing publication output should not be at the expense of delivering outcomes critical to the success of CCAFS.

**Recommendation 14:**

*CCAFS should develop a plan to lift publication rates in ISI journals. This will require a mix of measures ranging from performance indicators to short term incentives to longer term capacity building in Centers and done in a way that doesn't compromise a focus on achieving outcomes.*

3.5.6.3 Data and tools

CCAFS has put considerable effort into making available data, e.g. baseline surveys from core sites, and tools such as downscaled climate projections, climate analogues, climate services for managing today's variability, and food security maps. Usage statistics are available for these outputs.

In terms of data, CCAFS-Climate is heavily used with 27,000 visitors to the site in 2012, with more than 39,000 individual downloads of data totaling more than 28 terabytes. This data was cited 37 times in peer reviewed journals in 2012. Other key databases (Agtrials, Dataverse- baseline surveys) were used less frequently but the information and data contained in them is much more targeted and location specific. There was considerable interest in the methods and approaches used in the baseline surveys, indeed receiving more visitors than the baseline data itself.

Of the tools, Climate Analogues was the most heavily used, with 3287 visits in 2012. A feature of this tool was the wide diversity of users, suggesting the analogue approach is an innovative way of communicating and engaging about climate change. The MarkDim stand-alone tool was also popular, receiving over 2500 visits.

It is almost impossible to benchmark these usage statistics given the individual nature of all web-based tools and databases. The most "like for like" comparison is the CCAFS-Climate database which can be compared with other sites that offer climate projections for a range of climatic variables for different emission scenarios and from different climate models. For example, the Climate Change in Australia website ([www.climatechangeinaustralia.com.au/](http://www.climatechangeinaustralia.com.au/)), was established in 2007 to provide climate projections for different regions in Australia based on the 2007 IPCC CMIP3 model runs. It received between 350,000 and 500,000 unique visitors per year between 2007 and 2010. It of course had a national coverage and was relevant to all sectors of the economy, not just agriculture.

### 3.5.7 International Public Goods - influence and lasting impact of IPGs

There is strong evidence to suggest that the IPGs are influential and contributing to decisions being made from scales of national policy to farm-scale management. The CCAFS Annual Report – “Unfolding results: CCAFS research into action” provides details of how a range of IPGs are influencing decision-makers. These include:

- The recommendations of the Commission on Sustainable Agriculture and Climate Change have been readily accepted and embraced by a large number of national governments and international agencies even though the goal of the Commission to have agriculture incorporated into the UNFCCC has not yet been successful
- Influencing the development and implementation of Nationally appropriate mitigation actions (NAMAs) (Policy Brief)
- Scaling up climate services to reach a much wider group of farmers and government agencies e.g. national frameworks in West Africa, application of seasonal forecasts (Workshops, Tools, Reports)
- Research outputs demonstrating innovations in coffee-banana systems influencing policy decisions in Rwanda (Papers, Workshops, Reports)
- Influencing youth through modern ICT methods (Tools)
- Building capacity in measurement and mitigation of greenhouse gases (Reports, Workshops)
- Disaggregating gender data from household surveys to target different actions based on gender in areas such as adaptation and innovation in carbon financing for smallholders (Data, Reports, Training Guides)
- Development of future scenarios and back-casting to influence policy decisions (Tools, Data, Workshops)

This list, which isn't comprehensive and provides a series of examples, highlights the value in having a wide range of IPGs in the “toolkit” to influence decision-making. It is apparent from these examples that the investment in a diversity of approaches is paying off and having them available in a well produced web site is essential.

#### **Recommendation 15:**

*CCAFS should maintain its investment in a diversity of IPGs as a means of influencing decision-making and achieving desired outcomes and impacts.*

Based on this diverse approach to IPGs, it is likely that they will continue to have important influence into the future. While some IPGs have immediacy in influencing decisions (e.g. Policy Briefs) and won't have a long life-span, others will play an important long-term role in influencing decision-making. For example, baseline data from core sites and climate smart villages will be valuable when the impact of interventions need to be assessed in future years. Similarly, having data on various agricultural trials will be a valuable resource into the future.

The significant up-front investment in tools such as climate scenarios, seasonal climate forecasts, climate analogues should have a long-term benefit, particularly where those tools provide information that can be contextualized for decision-making at local scales. There is no doubt that these various tools will need to be refined or even replaced as needs change and technology improves but they provide an important long-term mechanism for engaging with and influencing decision-makers across a range of scales. Likewise, research papers in journals provide the scientifically robust platform on which to develop policy and

management recommendations. There is often a significant lag between publication of research papers and their impact so the research publications currently being produced by CCAFS should provide benefits into the foreseeable future.

**Annex 1. Evaluation matrix to be used in the CCAFS Theme by Region Review.**

<b>Evaluation criteria</b>	<b>Evaluation questions to be addressed</b>	<b>Expected evaluation product</b>	<b>Expected approach and sources of information</b>
Relevance	<ol style="list-style-type: none"> <li>1. Is the matrix being managed in line with the main goals and System Level Outcomes (SLOs) of the CGIAR?</li> <li>2. Is this matrix management in line with the reform process in the CGIAR?</li> <li>3. Is there evidence of demand for the program from intended beneficiaries and how is the matrix managed in relation to assessing demand for thematic and regional topics?</li> <li>4. Are appropriate stakeholders consulted at appropriate moments in the research?</li> </ol>	<p>Analysis of whether the CCAFS outcomes, Intermediate Development Outcomes, and IPGs are in line with the SLOs</p> <p>Analysis of the Centers involved in the management of the matrix and how this fits with the reform process (e.g. are there cross-centre relationships)</p> <p>Assessment of the degree to which partner and stakeholder concerns shape strategic directions and research products; and how the matrix is managed to get partner and stakeholder input.</p>	<p>For SLOs see “Strategic Results Framework”; see Annex 3 documents under “outcomes” and “IPGs”.</p> <p>See the “Strategic Results Framework” for information on the reform; Interviews of program participants and partners</p> <p>Interviews of program participants and partners; example of workshop reports where stakeholders are engaged (see Annex 3 under “Basic information about CCAFS in South Asia”</p>
Effectiveness	<ol style="list-style-type: none"> <li>5. How successful is the matrix management in CCAFS in terms of progress made?</li> <li>6. Is sufficient attention paid to ensuring synergies are achieved across themes, and is their sufficient evidence of synthesis in the IPGs?</li> <li>7. Is there a sufficient level of comparability across regions, and is this reflected in the IPGs?</li> <li>8. How well is the local-to-global set of activities managed, in terms of having an appropriate mix of activities at different scales and managing the cross-scale connections?</li> </ol>	<p>Analysis of the most recent annual report of CCAFS, augmented by views from Theme Leaders and Centre participants</p> <p>Analysis of cross-theme interactions and the evidence of synthesis in the IPGs</p> <p>Analysis of how South Asia’s structures and partnerships compare with those of West Africa</p> <p>Analysis of activities across scales and evidence of cross-scale products</p>	<p>“CCAFS Annual Report CGIAR Consortium 2012” – see Annex 3 under “Outcomes”; Interviews of program participants and partners</p> <p>IPGs (see lists in Annex 3 under “IPGs”); Interviews of program participants and partners</p> <p>IPGs (see lists in Annex 3 under “IPGs”); Interviews of program participants and partners</p> <p>See lists in Annex 3 of IPGs under “IPGs”; Interviews of program participants and partners</p>



	9. Are management systems tracking progress and proposing adjustments to research as necessary? Is this system working well?	Analysis of management procedures, PMC and ISP Minutes to assess how effective the systems are performing and evolving	See documents in Annex 3 under “CCAFS planning processes”; Interviews of program participants and partners
Efficiency	10. How successful is the matrix management in CCAFS with respect to efficiency?	Analysis of program participant perceptions of transaction costs	Interviews of program participants and partners
Impact	11. Are the initial outcomes or incipient outcomes being reported by CCAFS of sufficient scale for a program of this size?	Analysis of the number and significance of outcomes reported for 2012, augmented by views of partners	See lists and analysis in Annex 3 under “Outcomes”; Interviews of program participants and partners
	12. Do the initial outcomes or incipient outcomes reflect an integrated program?	Analysis of degree to which the emerging outcomes can be the building blocks for outcomes at a larger scale; and whether outcomes represent integrated efforts?	See lists and analysis in Annex 3 under “Outcomes”; Interviews of program participants and partners
	13. Are the IPGs and initial outcomes influential?	Analysis of outcomes and IPGs reported for 2012 in relation to the degree to which they are or could be influential	See lists and analysis in Annex 3 under “Outcomes” and “IPGs”; Interviews of program participants
	14. Is it likely that the IPGs produced and outcomes will lead to impacts in regard to the CGIAR System Level Outcomes (SLOs): Less rural poverty; better food security; better nutrition and health; sustainably managed resources?	Analysis of outcomes and IPGs reported for 2012 in relation to their relevance to the SLOs	See lists and analysis in Annex 3 under “Outcomes” and “IPGs”; Interviews of program participants and partners
Sustainability	15. To what extent are the benefits of the program expected to continue based on the international public goods and initial outcomes produced? Why or why not?	Analysis of outcomes and IPGs reported for 2012 in relation to (a) the likelihood of outcomes leading to long-lasting impacts and (b) IPGs having long-term value.	See lists and analysis in Annex 3 under “Outcomes” and “IPGs”; Interviews of program participants and partners
Quality of science	16. Are the IPGs of sufficient number and quality for a program of this size?	Analysis of the numbers of IPGs and the degree to which they are in “high impact” journals. Assess the quality of a sample of the IPGs.	See lists in Annex 3 under “IPGs”; Interviews of program participants and partners

## Annex 2. List of documents accessed and examined for the review.

Document type/information source	Key documents and key content	Link/availability
Basic information about CGIAR	<p><b>A STRATEGY AND RESULTS FRAMEWORK FOR THE CGIAR</b></p> <p><b>CGIAR Financial Report 2012</b></p>	<p><a href="http://consortium.cgiar.org/wp-content/uploads/2011/08/CGIAR-SRF-Feb_20_2011.pdf">http://consortium.cgiar.org/wp-content/uploads/2011/08/CGIAR-SRF-Feb_20_2011.pdf</a></p> <p><a href="http://library.cgiar.org/bitstream/handle/10947/2869/2012_CGIAR_Financial_Report.pdf?sequence=1">http://library.cgiar.org/bitstream/handle/10947/2869/2012_CGIAR_Financial_Report.pdf?sequence=1</a></p>
Basic information about CCAFS	<p><b>CCAFS website</b> The primary repository for information about CCAFS governance, management, research and international public goods</p> <p><b>Two-page overview of CCAFS</b> Provides a brief overview of CCAFS activities and where CCAFS works</p> <p><b>CCAFS Program Plan summary</b> The Program Plan is the basic document of CCAFS about goals, objectives, research areas and governance. This is a summary, below is the full document.</p> <p><b>CCAFS Program Plan</b> See above</p>	<p><a href="http://www.ccafs.cgiar.org">www.ccafs.cgiar.org</a></p> <p><a href="http://ccafs.cgiar.org/publications/climate-change-agriculture-and-food-security#.Uk77-tLdfsc">http://ccafs.cgiar.org/publications/climate-change-agriculture-and-food-security#.Uk77-tLdfsc</a></p> <p><a href="http://ccafs.cgiar.org/publications/ccaafs-program-plan-summary">http://ccafs.cgiar.org/publications/ccaafs-program-plan-summary</a></p> <p><a href="http://ccafs.cgiar.org/publications/ccaafs-program-plan#.Uk785dLdfsc">http://ccafs.cgiar.org/publications/ccaafs-program-plan#.Uk785dLdfsc</a></p>
CCAFS planning processes	<p><b>Terms of Reference for Theme Leaders, Regional Program Leaders and Contact Points</b> Outlines the basic tasks of CCAFS research leaders who implement the theme by region matrix</p> <p><b>CCAFS Strategy for Priority Setting, Monitoring and Evaluation</b> The document shows how CCAFS is dealing with monitoring and evaluation (M&amp;E), and to demonstrate the cascade from the overarching logframe down to project activities in specific sites</p>	<p><a href="http://ccafs.cgiar.org/about/governance/theme-leaders#.Uk79WdLdfsc">http://ccafs.cgiar.org/about/governance/theme-leaders#.Uk79WdLdfsc</a></p> <p><a href="http://ccafs.cgiar.org/about/governance/regional-program-leaders#.Uk79dtLdfsc">http://ccafs.cgiar.org/about/governance/regional-program-leaders#.Uk79dtLdfsc</a></p> <p><a href="http://ccafs.cgiar.org/about/governance/cgiar-contact-points#.Uk79t9Ldfsc">http://ccafs.cgiar.org/about/governance/cgiar-contact-points#.Uk79t9Ldfsc</a></p> <p><a href="http://cgspace.cgiar.org/handle/10568/25108">http://cgspace.cgiar.org/handle/10568/25108</a></p>

	<p><b>Consolidated Logframe of Activities, 2012-2015</b> A rolling three-year document. Identifies Objectives, Outcomes, Outputs and Milestones with associated performance indicators and means of verification (i.e. outputs), assumptions, and partners involved.</p> <p><b>Business Plan 2013</b> Outlines the annual CCAFS planning on research, synthesis, capacity enhancement, engagement, communication and budgets (format for 2012 onwards)</p> <p><b>Theme and Regional Program Leader Workplans 2013 - consolidated</b> Provides an in depth outline of the consolidated activities in the theme by region matrix for those activities directly implemented by these Leaders (i.e. excludes the Centre activities)</p> <p><b>Management and management discussions about annual planning (reference to minutes)</b> An overview of the discussions about annual planning. Example of the management and governance discussions about annual CCAFS planning for 2013.</p> <p><b>Governance and management discussions about the theme by region matrix (reference to minutes)</b></p> <p><b>2013 external governance and management review of CCAFS by Maureen Robinson</b> reflecting on the relationship between themes and regions (excerpts from review report)</p>	<p><a href="http://ccafs.cgiar.org/sites/default/files/assets/docs/ccafs_consolidated_logframe-2012-2015.pdf">http://ccafs.cgiar.org/sites/default/files/assets/docs/ccafs_consolidated_logframe-2012-2015.pdf</a></p> <p><a href="http://ccafs.cgiar.org/publications/2013-business-plan#_Uk8BFTLdfsc">http://ccafs.cgiar.org/publications/2013-business-plan#_Uk8BFTLdfsc</a></p> <p><a href="https://www.dropbox.com/s/dw6fz8ptheo8efmc/TL%20%20RPL%20Consolidated%202013%20Activities.xlsx">https://www.dropbox.com/s/dw6fz8ptheo8efmc/TL%20%20RPL%20Consolidated%202013%20Activities.xlsx</a></p> <p><a href="https://www.dropbox.com/s/3fejcbounpnms1/Management%20and%20governance%20discussions%20about%20annual%20planning.docx">https://www.dropbox.com/s/3fejcbounpnms1/Management%20and%20governance%20discussions%20about%20annual%20planning.docx</a></p> <p><a href="https://www.dropbox.com/s/b5ogzmyffo55lwa/Governance%20and%20management%20discussions%20about%20the%20by%20region%20matrix.docx">https://www.dropbox.com/s/b5ogzmyffo55lwa/Governance%20and%20management%20discussions%20about%20the%20by%20region%20matrix.docx</a></p> <p><a href="https://www.dropbox.com/s/jl2z5gnl5z92l4s/2013%20external%20governance%20and%20management%20review%20of%20CCAFS%20by%20Maureen%20Robinson.docx">https://www.dropbox.com/s/jl2z5gnl5z92l4s/2013%20external%20governance%20and%20management%20review%20of%20CCAFS%20by%20Maureen%20Robinson.docx</a></p> <p>Link to the full report: <a href="http://ccafs.cgiar.org/governance-and-management-review#_UIMkWDLdfsc">http://ccafs.cgiar.org/governance-and-management-review#_UIMkWDLdfsc</a></p>
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	<p><b>2012 external review of CCAFS by EC/IFAD (excerpts from review report)</b></p> <p><b>Satisfaction survey</b> Satisfaction survey based on feedback from Contact Points and CCAFS Management</p>	<p><a href="https://www.dropbox.com/s/jt0phzc1mup04xe/EC%20IFAD%20review%20of%20CCAFS%20excerpt.docx">https://www.dropbox.com/s/jt0phzc1mup04xe/EC%20IFAD%20review%20of%20CCAFS%20excerpt.docx</a></p> <p>Link to the full report: <a href="https://www.dropbox.com/s/3itngig62lcwnk4/EC%20IFAD%20review%20CCAFS.docx">https://www.dropbox.com/s/3itngig62lcwnk4/EC%20IFAD%20review%20CCAFS.docx</a></p> <p><a href="https://www.dropbox.com/s/hx4wwt3fgd4aoh8/MiniSurvey%20compilation%20Contact%20Point%20and%20Management.docx">https://www.dropbox.com/s/hx4wwt3fgd4aoh8/MiniSurvey%20compilation%20Contact%20Point%20and%20Management.docx</a></p>
<p><b>Outcomes</b></p>	<p>All CGIAR Centers, Regional Program Leaders and Theme Leaders have to report outcome stories annually.</p> <p><b>CCAFS Annual Report 2012 pp. 3-8</b></p> <p><b>CCAFS Annual Report CGIAR Consortium 2012 p. 1, 2-6 (for outcomes)</b></p> <p><b>External assessment of 2012 outcomes (by Peter Cooper)</b></p> <p><b>External assessment of 2012 outcomes (summary by Bruce Campbell of the Peter Cooper assessment)</b></p> <p><b>The three below a), b) and c) are examples of planning for outcomes:</b></p> <p><b>a) Draft Knowledge to Action Strategy</b></p>	<p><a href="http://ccafs.cgiar.org/publications/unfolding-results-ccafs-research-action-annual-report-2012#.Uk8CmdLdfsc">http://ccafs.cgiar.org/publications/unfolding-results-ccafs-research-action-annual-report-2012#.Uk8CmdLdfsc</a></p> <p><a href="http://ccafs.cgiar.org/publications/2012-annual-report-cgiar-consortium-cgiar-research-program-climate-change-agriculture#.Uk8Cx9Ldfsc">http://ccafs.cgiar.org/publications/2012-annual-report-cgiar-consortium-cgiar-research-program-climate-change-agriculture#.Uk8Cx9Ldfsc</a></p> <p><a href="https://www.dropbox.com/s/4ewems54es4wa72/CCAFS%20Outcome%20Review..docx">https://www.dropbox.com/s/4ewems54es4wa72/CCAFS%20Outcome%20Review..docx</a></p> <p><a href="https://www.dropbox.com/s/elcede0pzhbghlu/Summary%20analysis%20of%20Outcomes.pdf">https://www.dropbox.com/s/elcede0pzhbghlu/Summary%20analysis%20of%20Outcomes.pdf</a></p> <p><a href="https://www.dropbox.com/s/cnepgq8ggefrral/Theme%204%20M%20BE%20strategy%20draft%20Sept6.docx">https://www.dropbox.com/s/cnepgq8ggefrral/Theme%204%20M%20BE%20strategy%20draft%20Sept6.docx</a></p> <p><a href="https://www.dropbox.com/s/47aukg1uup2funv/Linking%20Knowledge%20with%20Action%20Research%20Summary.docx">https://www.dropbox.com/s/47aukg1uup2funv/Linking%20Knowledge%20with%20Action%20Research%20Summary.docx</a></p>

	<p><b>b) CCAFS Engagement and Communications Strategy</b></p> <p><b>c) Collaboration with IFAD</b></p>	<p><a href="https://www.dropbox.com/s/035c4msiuw55wie/CCAFS%20T4%201%20Impact%20Pathway.pdf">https://www.dropbox.com/s/035c4msiuw55wie/CCAFS%20T4%201%20Impact%20Pathway.pdf</a></p> <p><a href="http://ccafs.cgiar.org/publications/ccafs-engagement-and-communications-strategy#.Uk8DvdLdfsc">http://ccafs.cgiar.org/publications/ccafs-engagement-and-communications-strategy#.Uk8DvdLdfsc</a></p> <p><a href="https://www.dropbox.com/s/ig1k4z46mkrkdet/IFAD%20partnership.docx">https://www.dropbox.com/s/ig1k4z46mkrkdet/IFAD%20partnership.docx</a></p>
<p><b>International Public Goods (IPGs)</b></p>	<p><b>CCAFS list of publications 2011-2012</b> Contains list of all CCAFS funded outputs in the period 2011 to 2012.</p> <p><b>CCAFS publications (usage statistics)</b> Gives an overview of: top 25 publications downloads from CCAFS databases for 2012 and top 10 publications downloaded so far in 2013</p> <p><b>CCAFS databases</b> Contains an overview of CCAFS databases on our website</p> <p><b>CCAFS databases</b> A summary overview and usage statistics. The data if for 2012 and is updated once a year.</p> <p><b>Other CCAFS knowledge products overview and usage statistics</b> In addition to being made freely available online, CCAFS knowledge products are promoted online via a number of channels including the</p>	<p><b>2011</b> <a href="http://cgspace.cgiar.org/bitstream/handle/10568/32802/Annex%25203%2520-%2520Full%2520list%2520of%25202011%2520publications.pdf?sequence=4">http://cgspace.cgiar.org/bitstream/handle/10568/32802/Annex%25203%2520-%2520Full%2520list%2520of%25202011%2520publications.pdf?sequence=4</a></p> <p><b>2012</b> <a href="http://cgspace.cgiar.org/bitstream/handle/10568/32803/2012publicationslist.pdf?sequence=21">http://cgspace.cgiar.org/bitstream/handle/10568/32803/2012publicationslist.pdf?sequence=21</a></p> <p>All 2011-2012 Publications are being made available via the CCAFS website and will be complete by 2013 <a href="http://ccafs.cgiar.org/publications">http://ccafs.cgiar.org/publications</a></p> <p><a href="https://www.dropbox.com/s/dkka1qoem9l0i7k/CCAFS%20Publications%20-%20overview%20and%20usage.docx">https://www.dropbox.com/s/dkka1qoem9l0i7k/CCAFS%20Publications%20-%20overview%20and%20usage.docx</a></p> <p><a href="http://ccafs.cgiar.org/resources/tools-maps-models-and-data">http://ccafs.cgiar.org/resources/tools-maps-models-and-data</a></p> <p><a href="https://www.dropbox.com/s/f2fufsypwrbtla/CCAFS%20portal%20data%20Access%20usage%202012.pdf">https://www.dropbox.com/s/f2fufsypwrbtla/CCAFS%20portal%20data%20Access%20usage%202012.pdf</a></p> <p><a href="https://www.dropbox.com/s/yuvv88jqef6x7x/Other%20CCAFS%20knowledge%20products.docx">https://www.dropbox.com/s/yuvv88jqef6x7x/Other%20CCAFS%20knowledge%20products.docx</a></p>

	<p>CCAFS Website (<a href="http://ccafs.cgiar.org">http://ccafs.cgiar.org</a>) and Blog (<a href="http://ccafs.cgiar.org/blog">http://ccafs.cgiar.org/blog</a>), e-bulletins (including regionally targeted bulletins), Facebook and Twitter channels.</p> <p><b>Gender</b>  <b>CCAFS Gender Theory of Change and Outcome Strategies</b></p> <p><b>CCAFS gender material</b></p> <p><b>Journal publications from other CRPs</b></p>	<p><a href="https://www.dropbox.com/s/h3rjvz3er1olnhy/CCAFS%20Gender%20Theory%20of%20Change%20and%20Outcome%20Strategies.pptx">https://www.dropbox.com/s/h3rjvz3er1olnhy/CCAFS%20Gender%20Theory%20of%20Change%20and%20Outcome%20Strategies.pptx</a></p> <p><a href="http://www.ccafs.cgiar.org/gender">http://www.ccafs.cgiar.org/gender</a></p> <p><a href="http://www.cgiar.org/resources/crp-documents/">http://www.cgiar.org/resources/crp-documents/</a></p>
<b>CCAFS partnerships</b>	<p>Stock-take and recommendations on mobilizing effective partnerships in CCAFS – discussed at CCAFS ISP meeting October 2013</p>	<p><a href="https://www.dropbox.com/s/gevguasjwn4vyp3/Mobilizing%20effective%20partnerships.docx">https://www.dropbox.com/s/gevguasjwn4vyp3/Mobilizing%20effective%20partnerships.docx</a></p> <p><a href="https://www.dropbox.com/s/nqv8d5h5gy0v4yn/Mobilizing%20effective%20partnerships.pptx">https://www.dropbox.com/s/nqv8d5h5gy0v4yn/Mobilizing%20effective%20partnerships.pptx</a></p>
<b>Basic information about CCAFS in South Asia</b>	<p><b>CCAFS South Asia website</b>  The primary repository for information about CCAFS South Asia publications, activities, stories, events, partners, etc.</p> <p><b>Two-page overview of CCAFS South Asia</b>  Provides a brief overview of CCAFS South Asia activities and where we work</p> <p><b>South Asia Regional Program Leader workplan 2013</b>  This is an excerpt of the above mentioned consolidated workplan for 2013 to provide a specific overview of the South Asia Regional Leader workplan for 2013</p> <p>Workshop report: APAARI meeting  One example of a stakeholder meeting to help define the research agenda</p>	<p><a href="http://ccafs.cgiar.org/regions/south-asia">http://ccafs.cgiar.org/regions/south-asia</a></p> <p><a href="https://www.dropbox.com/s/pu3ojf64nkph8i3/CCAFS%20South%20Asia%20in%20brief.pdf">https://www.dropbox.com/s/pu3ojf64nkph8i3/CCAFS%20South%20Asia%20in%20brief.pdf</a></p> <p><a href="https://www.dropbox.com/s/dfraqjlprkgu41q/South%20Asia%202013%20Workplan.xlsx">https://www.dropbox.com/s/dfraqjlprkgu41q/South%20Asia%202013%20Workplan.xlsx</a></p> <p><a href="https://www.dropbox.com/s/0k25eilrz7y306y/APAARI%20conference%20report.pdf">https://www.dropbox.com/s/0k25eilrz7y306y/APAARI%20conference%20report.pdf</a></p>

### Annex 3. List of interviews undertaken for the review.

<b>Person</b>	<b>Role</b>	<b>Date</b>	<b>Interview type</b>
P.J. Joseph	External partner, Chairman and MD, Agricultural Insurance Company of India	04/11/2013	In person, Delhi
P.K. Joshi	Center partner, Director, IFPRI, South Asia	04/11/2013	In person, Delhi
Thomas Rosswall	Chair, ISP	05/11/2013	Skype
Philip Thornton	Theme Leader (Theme 4)	06/11/2013	Skype
Pramod Aggarwal	Regional Program Leader, South Asia	07/11/2013	In person, Delhi
Alok Sikka	External partner, Deputy Director-General, ICAR	07/11/2013	In person, Delhi
Andy Jarvis	Theme Leader (Theme 1)	08/11/2013	Skype
Robert Zougmore	Regional Program Leader, West Africa	08/11/2013	Skype
Bruce Campbell	Program Director, CCAFS	11/11/2013	Skype
Ram Badan Singh	Member ISP, President National Academy of Agricultural Sciences, India	18/11/2013	Skype
M. Lal Jat	Center partner, CIMMYT, Delhi	18/11/2013	Skype
James Kinyangi	Regional Program Leader, East Africa	18/11/2013	Skype
James Hansen	Theme Leader (Theme 2)	19/11/2013	Skype
Prem Mathur	Center partner, Bioversity, Delhi	19/11/2013	Skype
Torben Timmerman Vanessa Meadu	Head of Coordination & Communications Communication and Knowledge Manager	22/11/2013	Skype

**Annex 4. Extract from CGIAR Financial Report 2012 showing the sources of funding for each of the CRPs.**

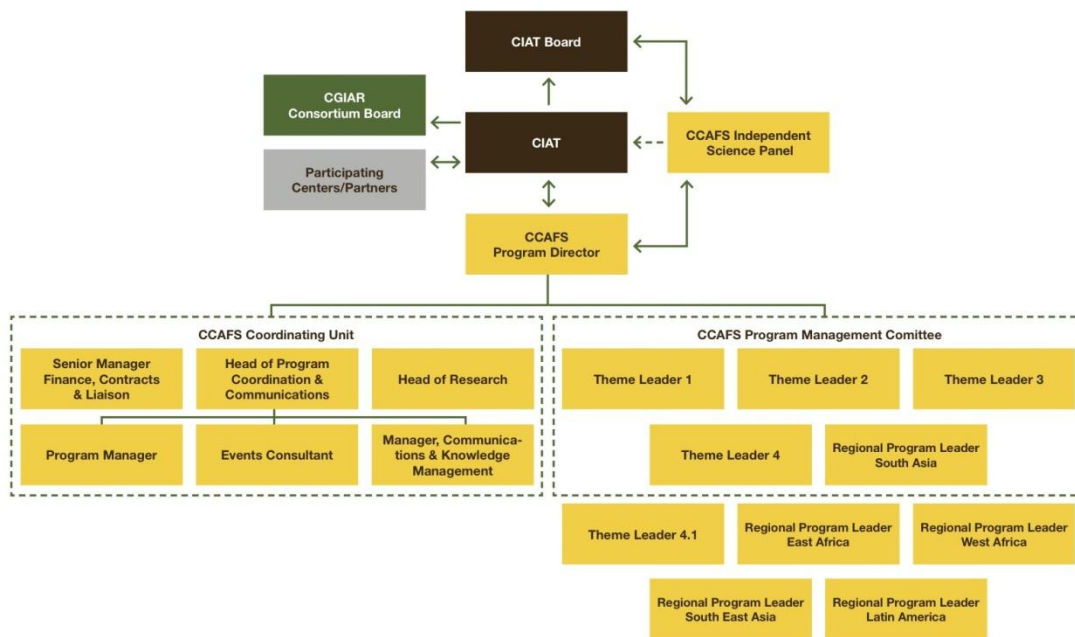
	From financial statements of individual Centers				% of individual CRP funding			Total (% of Total)
	W1/2	W3	Bilateral	Total	W1/2	W3	Bilateral	
Dryland Systems	9.1	2.8	18.6	30.5	30%	9%	61%	4%
Humidtropics	7.2	2.9	9.9	20.0	36%	11%	53%	3%
AAS	7.5	1.0	11.6	20.1	36%	5%	59%	3%
PIM	15.2	9.5	50.4	75.1	21%	13%	66%	11%
WHEAT	11.4	2.3	27.0	40.7	28%	5%	67%	6%
MAIZE	13.5	9.2	51.5	74.2	18%	12%	69%	11%
GRiSP	35.4	12.7	50.9	99.0	35%	13%	52%	14%
RTB	22.3	2.6	26.3	51.2	44%	7%	49%	7%
Grain Legumes	7.5	3.8	11.1	22.4	33%	19%	47%	3%
Dryland Cereals	3.2	0.1	4.1	7.4	43%	2%	55%	1%
Livestock and Fish	7.7	0.3	7.9	15.9	47%	2%	51%	2%
A4NH	9.1	1.2	27.1	37.4	24%	3%	73%	5%
WLE	22.4	5.1	28.4	55.9	38%	10%	51%	8%
Forests, Trees and Agroforestry	29.4	1.3	40.5	71.2	41%	1%	58%	10%
CCAFS	46.4	0.5	16.0	62.9	73%	1%	26%	9%
Genebanks	12.6	-	3.3	15.9	79%	0%	21%	2%
<b>Total</b>	<b>260</b>	<b>56</b>	<b>384</b>	<b>700</b>	<b>37%</b>	<b>8%</b>	<b>55%</b>	<b>100%</b>



## Annex 5. Governance structure of CCAFS.

### CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

#### Organizational structure



**Annex 6. Budget allocation by Region and Theme in 2011 \$USD. 2011 numbers as data could not be disaggregated to region for 2012.**

Theme	West Africa (WA)	East Africa (EA)	Indo-Gangetic Plains (IGP)	Global	Other Regions	Sub-total	CCAFS, Theme and Regional Coordination	CGIAR System Costs (2%)	Total
Theme 1 Adaptation to Progressive Climate Change	3.1	4.5	4.4	3.8	5.4	21.2			21.2
Theme 2 Adaptation through Managing Climate Risk	1.5	2.2	1.9	1.3	1.4	8.3			8.3
Theme 3 Pro-poor climate change mitigation	1.7	1.8	2.5	2.4	2.4	10.9			10.9
Theme 4 Integration for decision making	2.3	1.9	1.8	8.1	1.5	15.6			15.6
CCAFS, Theme and Regional Coordination	-	-	-	-	-	-	1.8		1.8
<b>Subtotal</b>	<b>8.6</b>	<b>10.4</b>	<b>10.5</b>	<b>15.7</b>	<b>10.8</b>	<b>56.0</b>	<b>1.8</b>	<b>-</b>	<b>57.8</b>
CGIAR System Costs (2%)								0.8	0.8
<b>TOTAL</b>	<b>8.6</b>	<b>10.4</b>	<b>10.5</b>	<b>15.7</b>	<b>10.8</b>	<b>56.0</b>	<b>1.8</b>	<b>0.8</b>	<b>58.6</b>
<b>Percentage</b>	<b>15%</b>	<b>18%</b>	<b>18%</b>	<b>27%</b>	<b>18%</b>	<b>96%</b>	<b>3%</b>	<b>1%</b>	<b>100%</b>

**Annex 7. Analysis of journal publications in CCAFS using 2011 and 2012 publication lists**

Journal title	Impact factor	Article title, authors, affiliations	Citation rate	No of Centers	No of Institutions	No Authors
Acta horticulturae	N/A					
		Climate Change in the Subtropics: the Impacts of Projected Averages and Variability on Banana Productivity / Van den Bergh, I ; Ramirez, J ; Staver, C ; Turner, DW ; Jarvis, A ; Brown, D. 2012. 1. Biovers Int, Montpellier, France	0	2	6	6
Advances in agronomy	5.06					
		Maize production in a changing climate: impacts, adaptation, and mitigation strategies / Cairns, JE ; Sonder, K ; Zaidi, PH ; Verhulst, N ; Mahuku, G ; Babu, R ; Nair, SK ; Das, B ; Govaerts, B ; Vinayan, MT ; Rashid, Z ; Noor, JJ ; Devi, P ; Vicente, FS ; Prasanna, BM. 2012. 1. Int Maize & Wheat Improvement Ctr CIMMYT, Mexico City, DF, Mexico 2. Int Maize & Wheat Improvement Ctr CIMMYT, Hyderabad, Andhra Pradesh, India 3. Katholieke Univ Leuven, Dept Earth & Environm Sci, Louvain, Belgium 4. Int Maize & Wheat Improvement Ctr CIMMYT, Nairobi, Kenya	4	1	2	4
African crop science journal	N/A					
		Assessing climate change impacts and adaptation strategies for smallholder agricultural systems in Uganda / Bagamba, F. ; Bashaasha, B. ; Claessens, I. ; Antle, J. 2012. 1. College of Agricultural and Environmental Sciences, Makerere University, P. O. Box 7062, Kampala, Uganda 2. International Potato Center (CIP), P. O. Box 25171, 00603 Nairobi, Kenya 3. Department of Agricultural and Resource Economics, Oregon State University, Corvallis OR 97331, USA	0	1	3	3

		Farmer perceptions on climate change and variability in semi-arid Zimbabwe in relation to climatology evidence / Moyo, M. ; Mvumi, B. M. ; Kunzekweguta, M. ; Mazvimavi, K. ; Craufurd, P. ; Dorward, P. 2012. [NOTE: <i>this article title is different to that given in list. The listed article features in Asian Jnl of Agric Research</i> ] 1. International Crop Research Institute for the Semi-Arid Tropics (ICRISAT), P. O. Box 776, Bulawayo, Zimbabwe 2. Department of Soil Science and Agricultural Engineering, Faculty of Agriculture, University of Zimbabwe, P. O. Box MP 167, Mt Pleasant, Harare, Zimbabwe 3. International Crop Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru 502-324, India 4. School of Agriculture Policy and Development, University of Reading, Box 236, Reading, RG6 6AT, UK	0	1	4	6
African journal of ecology	0.631					
		Ecological adaptation of the shea butter tree ( <i>Vitellaria paradoxa</i> CF Gaertn.) along climatic gradient in Benin, West Africa / Kakai, Romain Glele; Akpona, T. Jean Didier; Assogbadjo, Achille E.; Gaoue, Orou Gande; Chakeredza, Sebastian; Gnangle, P. Cesaire; Mensah, Guy Apollinaire; Sinsin, Brice. DEC 2011. 1. Univ Abomey Calavi, Fac Agron Sci, Cotonou, Benin 2. Univ Tennessee, Natl Inst Math & Biol Synth, Knoxville, TN 37996 USA 3. ANAFE, Nairobi, Kenya 4. Natl Inst Agr Res Benin INRAB, Cotonou, Benin	2	0	4	8
Agricultural and forest meteorology	3.421					
		Assessing relevant climate data for agricultural applications / Ramirez-Villegas, Julian; Challinor, Andy. AUG 2012. 1. Int Ctr Trop Agr CIAT, Cali, Valle Del Cauca, Colombia 2. CGIAR Res Program Climate Change Agr & Food Secur, Cali, Colombia 3. Univ Leeds, Inst Climate & Atmospher Sci ICAS, Sch Earth & Environm, Leeds, W Yorkshire, England	4	1	2	2
Agricultural systems	2.504					

		A method for evaluating climate change adaptation strategies for small-scale farmers using survey, experimental and modeled data / Claessens, L ; Antle, JM ; Stoorvogel, JJ ; Valdivia, RO ; Thornton, PK ; Herrero, M. SEP 2012. 1. Int Potato Ctr CIP, Nairobi, Kenya 2. Wageningen Univ, NL-6700 AA Wageningen, Netherlands 3. Oregon State Univ, Corvallis, OR 97331 USA 4. Int Livestock Res Inst, Nairobi, Kenya 5. ILRI, CCAFS, Nairobi, Kenya	1	2	4	5
		Interpretation of commercial production information: A case study of lulo (Solanum quitoense), an under-researched Andean fruit / Jimenez, Daniel; Cock, James; Jarvis, Andy; Garcia, James; Satizabal, Hector F.; Van Damme, Patrick; Perez-Urbe, Andres; Barreto-Sanz, Miguel A. MAR 2011. 1. Int Ctr Trop Agr CIAT, Decis & Policy Anal DAPA, Cali 6713, Colombia 2. Univ Ghent, Fac BioSci Engrn Agr Sci, Lab Trop & Subtrop Agron & Ethnobot, B-9000 Ghent, Belgium 3. Univ Lausanne, Hautes Etud Commerciales HEC, Inst Syst Informat ISI, CH-1015 Lausanne, Switzerland 4. Univ Appl Sci Western Switzerland HEIG VD, REDS Inst, CH-1401 Yverdon, Switzerland 5. BIOTEC, Precis Agr & Construct Field Crop Models Trop Fru, Cali, Colombia	1	1	5	8
Agricultural water management	2.203					
		Water and land productivities of wheat and food legumes with deficit supplemental irrigation in a Mediterranean environment / Karrou, M.; Oweis, T. 2012. 1. Int Ctr Agr Res Dry Areas ICARDA, Aleppo, Syria	2	1	1	1
		Role of groundwater in buffering irrigation production against climate variability at the basin scale in South-West India / Pavelic, P ; Patankar, U ; Acharya, S ; Jella, K ; Gumma, MK. JAN 2012. 1. Int Crops Res Inst Semi Arid Trop, Int Water Management Inst, Patancheru 502324, Andhra Pradesh, India 2. Groundwater Surveys & Dev Agcy, Pune, Maharashtra, India 3. Int Rice Res Inst, Manila 1099, Philippines	3	2	3	3

		Comparisons of energy balance and evapotranspiration between flooded and aerobic rice fields in the Philippines / Alberto, Ma Carmelita R.; Wassmann, Reiner; Hirano, Takashi; et al. JUL 2011 1. Int Rice Res Inst, Los Banos 4031, Laguna, Philippines 2. Hokkaido Univ, Res Fac Agr, Sapporo, Hokkaido 060, Japan 3. Natl Inst Agroenvironm Sci, Tsukuba, Ibaraki 305, Japan	4	1	3	3
		Drought is a major yield loss factor for rainfed East African highland banana / van Asten, P. J. A.; Fermont, A. M.; Taulya, G. FEB 2011. 1. Int Inst Trop Agr, Kampala, Uganda	7	1	1	1
Agriculture and food security	N/A					
		The role for scientists in tackling food insecurity and climate change / Beddington, J. R. ; Asaduzzaman, M. ; Clark, M. E. ; Bremauntz, A. F. ; Guillou, M. D. ; Jahn, M. M. ; Lin ErDa ; Tekalign Mamo ; Negra, C. ; Nobre, C. A. ; Scholes, R. J. ; Rita Sharma ; Nguyen Van Bo ; Wakhungu, J. JUL 2012. 1. Government Office of Science, London, UK 2. Bangladesh Institute of Development Studies, Dhaka, Bangladesh 3. CSIRO, Campbell, Australia 4. Universidad Autónoma Metropolitana, Mexico City, Mexico 5. INRA, French National Institute for Agricultural Research, Paris, France 6. University of Wisconsin, Madison, WI, USA 7. Chinese Academy of Agricultural Sciences, Beijing, China 8. Ministry of Agriculture, Addis Ababa, Ethiopia 9. Commission on Sustainable Agriculture and Climate Change, New York, NY, USA 10. Ministry of Science, Technology and Innovation, Brasília, DF, Brazil 11. Council for Scientific and Industrial Research, Pretoria, South Africa 12. National Advisory Council, Prime Minister's Office, New Delhi, India 13. Vietnam Academy of Agricultural Science, Thanh Tri, Ha Noi, Viet Nam 14. African Center for Technology Studies, Nairobi, Kenya	0	0	14	14
		Reducing subsistence farmers' vulnerability to climate change: evaluating the potential contributions of agroforestry in western Kenya / Thorlakson, T.; Neufeldt, H. 2012. 1. Sustainability Science Program, Harvard University, Cambridge, MA, USA. 2. World Agroforestry Centre (ICRAF), Nairobi, Kenya. 3. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)	0	1	2	2

		Eating patterns and food systems: critical knowledge requirements for policy design and implementation / Guyomard, H. ; Darcy-Vrillon, B. ; Esnouf, C. ; Marin, M. ; Russel, M. ; Guillou, M. 2012. 1. INRA Paris, 147 rue de l'universite, 75 338 Paris, Cedex 07, France	0	0	1	6
		Re-orienting crop improvement for the changing climatic conditions of the 21st century / Mba, C.; Guimaraes, E. P.; Ghosh, K. 2012. 1. Plant Genetic Resources and Seeds Team, Plant Production and Protection Division, Food and Agriculture Organization of the United Nations (FAO), Rome, Italy 2. International Centre for Tropical Agriculture (CIAT), Cali, Colombia	0	1	2	3
		Food price volatility and hunger alleviation - can Cannes work? / Hajkowicz, S. ; Negra, C. ; Barnett, P. ; Clark, M. ; Harch, B. ; Keating, B. 2012. 1. CSIRO, Ecosciences Precinct, PO Box 2583, Brisbane 2. Secretariat, Commission on Sustainable Agriculture and Climate Change, Copenhagen, Denmark. 3. CSIRO, 343 Royal Parade, Parkville, Victoria	0	1	2	6
Agriculture and human values	1.355					
		Strengthening understanding and perceptions of mineral fertilizer use among smallholder farmers: evidence from collective trials in western Kenya / Misiko, Michael; Tiftonell, Pablo; Giller, Ken E.; Richards, Paul. FEB 2011. 1. Africa Rice Ctr AfricaRice, Cotonou, Benin 2. CIRAD Persyst, Unite Rech Syst Culture Annuels, F-34398 Montpellier 5, France 3. Wageningen Univ, NL-6700 AK Wageningen, Netherlands 4. Wageningen Univ, NL-6700 EW Wageningen, Netherlands	1	1	3	4
Agriculture, ecosystems and environment	2.859					

		Soil carbon sequestration and associated economic costs for farming systems of the Indo-Gangetic Plain: A meta-analysis / Grace, PR ; Antle, J ; Aggarwal, PK ; Ogle, S ; Paustian, K ; Basso, B. 2012. 1. QUT, Inst Sustainable Resources, Brisbane 2. Michigan State Univ, WK Kellogg Biol Stn, Hickory Corners, MI 49060 USA 3. Oregon State Univ, Dept Agr & Resource Econ, Corvallis, OR 97331 USA 4. Int Water Management Inst, CGIAR Res Program Climate Change Agr & Food Secur, New Delhi 110012, India 5. Colorado State Univ, Nat Resource Ecol Lab, Ft Collins, CO 80521 USA 6. Colorado State Univ, Dept Soil & Crop Sci, Ft Collins, CO 80521 USA 7. Univ Basilicata, I-85100 Potenza, Italy	1	1	6	6
		Methane production and emission in surface and subsurface rice soils and their blends / Mitra, Sudip; Majumdar, Deepanjan; Wassmann, Reiner. SEP 2012. 1. Jawaharlal Nehru Univ, Sch Environm Sci, New Delhi 110067, India 2. Natl Environm Engr Res Inst, CSIR, Air Pollut Control Div, Nagpur 440020, Maharashtra, India 3. IRRI, Los Banos, Philippines	0	1	3	3
		Carbon sequestration and land rehabilitation through <i>Jatropha curcas</i> (L.) plantation in degraded lands / Wani, SP ; Chander, G ; Sahrawat, KL ; Rao, CS ; Raghvendra, G ; Susanna, P ; Pavani, M. OCT 2012. 1. Int Crops Res Inst Semi Arid Trop, Patancheru 502324, Andhra Pradesh, India	1	1	1	7
		Long-term soil quality degradation along a cultivation chronosequence in western Kenya / Moebius-Clune, B. N.; van Es, H. M.; Idowu, O. J.; Schindelbeck, R. R.; Kimetu, J. M.; Ngoze, S.; Lehmann, J.; Kinyangi, J. M. APR 2011. 1. Cornell Univ, Dept Crop & Soil Sci, Ithaca, NY 14853 USA 2. New Mexico State Univ, Dept Extens Plant Sci, Las Cruces, NM 88003 USA 3. Int Livestock Res Inst, CGIAR ESSP Program Climate Change Agr & Food Secu, Nairobi, Kenya	11	1	3	8



		Management and land use change effects on soil carbon in northern China's grasslands: a synthesis / Wang, Shiping; Wilkes, Andreas; Zhang, Zhicai; Chang, Xiaofeng; Lang, Rong; Wang, Yanfen; Niu, Haishan. AUG 2011. <i>Title differs from that in pubs list.</i> 1. World Agroforestry Ctr ICRAF China Programme, Beijing 10049, Peoples R China 2. Chinese Acad Sci, Inst Tibetan Plateau Res, Beijing 100085, Peoples R China 3. Chinese Acad Sci, Kunming Inst Bot, Ctr Mt Ecosyst Studies, Kunming 650204, Peoples R China 4. World Agroforestry Ctr ICRAF China Programme, Beijing 100081, Peoples R China 5. Chinese Acad Sci, NW Inst Plateau Biol, Key Lab Adapt & Evolut Plateau Biota, Xining 810008, Peoples R China	12	1	2	5
Agroforestry systems	1.373					
		Climate change and tree genetic resource management: maintaining and enhancing the productivity and value of smallholder tropical agroforestry landscapes. A review / Dawson, Ian K.; Vinceti, Barbara; Weber, John C.; Neufeldt, H ; Russell, J ; Lengkeek, AG; Kalinganire, A ; Kindt, R ; Lilleso, JPB ; Roshetko, J ; Jamnadass, R. JAN 2011. 1. World Agroforestry Ctr, Nairobi, Kenya 2. Biovers Int, I-00057 Rome, Italy 3. World Agroforestry Ctr, W & Cent Africa Sahel Reg Off, Bamako, Mali 4. Scottish Crop Res Inst, Dundee DD2 5DA, Scotland 5. Tree Domesticat Team, NL-6708 PW Wageningen, Netherlands 6. Univ Copenhagen, DK-2970 Horsholm, Denmark 7. Winrock Int Livestock Res & Training Ctr, Morrilton, AR USA 8. World Agroforestry Ctr, SE Asia Reg Off, Bogor, Indonesia	8	1	6	11
Agronomy journal	1.518					
		Can Integration of Legume Trees Increase Yield Stability in Rainfed Maize Cropping Systems in Southern Africa? / Sileshi, Gudeta W.; Debusho, Legesse Kassa; Akinnifesi, Festus K. 2012. 1. World Agroforestry Ctr ICRAF, So Africa Reg Programme, Chitedze Agr Res Stn, Lilongwe, Malawi 2. Univ Pretoria, Dep Stat, ZA-0028 Hatfield, South Africa 3. CFNI, Dallas, TX 75224 USA	0	1	3	3
American journal of botany	2.586					

		ISOLATION AND CHARACTERIZATION OF NOVEL MICROSATELLITE MARKERS FOR AVENA SATIVA (POACEAE) (OAT) / Wu, Bin; Zhang, Zongwen; Chen, Lingyun; He, Minggao. FEB 2012. 1. Chinese Acad Agr Sci, Inst Crop Sci, Beijing 100081, Peoples R China 2. Chinese Acad Agr Sci, Off E Asia, Beijing 100081, Peoples R China	1	0	1	4
Animal feed science and technology	1.608					
		Livestock and greenhouse gas emissions: The importance of getting the numbers right / Herrero, M ; Gerber, P ; Vellinga, T ; Garnett, T ; Leip, A ; Opio, C ; Westhoek, HJ ; Thornton, PK ; Olesen, J ; Hutchings, N ; Montgomery, H ; Soussana, JF ; Steinfeld, H ; McAllister, TA. JUN 2011. 1. Int Livestock Res Inst, Nairobi, Kenya 2. Food & Agr Org United Nations, Anim Prod & Hlth Div, Rome, Italy 3. Univ Wageningen & Res Ctr, Anim Sci Grp, Wageningen, Netherlands 4. Univ Surrey, Ctr Environm Strategy, Surrey, England 5. Commiss European Communities, Joint Res Ctr, Inst Environm & Sustainabil, I-21020 Ispra, VA, Italy 6. Netherlands Environm Assessment Agcy PBL, Bilthoven, Netherlands 7. Aarhus Univ, Dept Agroecol & Environm, Tjele, Denmark 8. Minist Agr Forestry, Wellington, New Zealand 9. Inst Natl Rech Agronom, Clermont Ferrand, France 10. Agr & Agri Food Canada, Lethbridge Res Ctr, Calgary, AB, Canada	3	1	10	14
Annual review of environment and resources	4.968					
		Climate Change and Food Systems / Vermeulen, Sonja J.; Campbell, Bruce M.; Ingram, John S. I. 2012. 1. Univ Copenhagen, Dept Plant & Environm Sci, DK-1958 Frederiksberg C, Denmark 2. Consortium Int Agr Res Ctr Res Program Climate Ch, DK-1958 Frederiksberg C, Denmark 3. Ctr Int Agr Trop, Cali, Colombia 4. Univ Oxford, Environm Change Inst, Oxford OX1 3QY, England 5. NERC, Swindon SN2 1EU, Wilts, England	3	1	3	3
Asian journal of	N/A					

agricultural research						
		Effect of drought on <i>Oryza glaberrima</i> rice accessions and <i>Oryza glaberrima</i> derived-lines / Ndjioudjop, M. N. ; Seck, P. A. ; Lorieux, M. ; Futakuchi, K. ; Yao, K. N. ; Djedatin, G. ; Sow, M. E. ; Bocco, R. ; Cisse, F. ; Fatondji, B. 2012. 1. Africa Rice Center, Cotonou, Benin 2. Institut d'Economie Rurale, Sikasso, Mali 3. IRD/CIAT, Agrobiodiversity and Biotechnology Unit, Int Center for Tropical Agriculture, Cali, Colombia	0	2	3	10
Bioscience	4.739					
		Crop Wild Relatives-Undervalued, Underutilized and under Threat? / Ford-Lloyd, Brian V.; Schmidt, Markus; Armstrong, Susan J.; Barazani, O ; Engels, J ; Hadas, R ; Hammer, K ; Kell, SP ; Kang, DM ; Khoshbakht, K ; Li, YH ; Long, CL ; Lu, BR ; Ma, KP ; Nguyen, VT ; Qiu, LJ ; Ge, S ; Wei, W ; Zhang, ZW ; Maxted, N. JUL 2011. 1. Univ Birmingham, Sch Biosci, Birmingham B15 2TT, W Midlands, England 2. Org Int Dialogue & Conflict Management, Vienna, Austria 3. Inst Plant Sci, Israel Plant Gene Bank, Bet Dagan, Israel 4. Biovers Int, Rome, Italy 5. Univ Kassel, Witzenhausen, Germany 6. China Agr Univ, Coll Agron & Biotechnol, Plant Genet Breeding Dept, Beijing 100094, Peoples R China 7. Chinese Acad Agr Sci, Inst Crop Sci, Beijing 100193, Peoples R China 8. Chinese Acad Sci, Kunming Inst Bot, Yunnan, Peoples R China 9. Fudan Univ, Shanghai 200433, Peoples R China 10. Chinese Acad Sci, Inst Bot, Beijing, Peoples R China 11. Hanoi Univ Agr, Hanoi, Vietnam 12. Biovers Int, Beijing, Peoples R China	10	1	11	20
British journal of environment and climate change	N/A					

		Potential impact of climate change on termite distribution in Africa / Ahmed, B. M. ; Nkunika, P. O. Y. ; Sileshi, G. W. ; French, J. R. J. ; Nyeko, P. ; Jain, S. 2011. 1. Dept of Forest and Ecosystem Science, University of Melbourne 2. Dept of Biological Sciences, University of Zambia, P.O. Box 32379, Lusaka, Zambia 3. World Agroforestry Centre (ICRAF), P.O. Box 30798, Lilongwe, Malawi 4. Faculty of Science, Health and Education, University of the Sunshine Coast, Maroochydore, Australia 5. Dept of Forestry, Biodiversity and Tourism, Makerere University, P.O. Box 7062, Kampala, Uganda 6. Dept of Mathematics and statistics, University of Zambia, P.O. Box 32379, Lusaka, Zambia	1	1	6	6
Canadian journal of plant science	0.716					
		Identification of early-maturing maize inbred lines based on multiple traits under drought and low N environments for hybrid development and population improvement / Badu-Apraku, B.; Akinwale, R. O. 2011. 1. IITA UK Ltd, IITA, Croydon CR9 3EE, England	2	1	1	2
Carbon management	2.068					
		Lessons from Reducing Emissions from Deforestation and Degradation: advancing agriculture in the UN Framework Convention on Climate Change / Negra, Christine; Wollenberg, Eva. APR 2011. 1. H John Heinz III Ctr Sci Econ & Environm, Washington, DC 20006 USA 2. Univ Vermont, Propoor Climate Change Mitigat Program Climate Ch, Burlington, VT 05405 USA	0	0	2	2
Climatic change	3.634					
		Multi-year variability or unidirectional trends? Mapping long-term precipitation and temperature changes in continental Southeast Asia using PRECIS regional climate model / Lacombe, Guillaume; Chu Thai Hoanh; Smakhtin, Vladimir. 2012. 1. Int Water Management Inst, Headquarters 127, Sunil Mawatha, Pelawatte, Battaramulla, Sri Lanka 2. SE Asia Off, Int Water Management Inst, Viangchan, Laos 3. Int Water Management Inst, Pelawatte, Battaramulla, Sri Lanka	3	1	1	3
		Carbon sequestration potential of parkland agroforestry in the Sahel / Luedeling, Eike; Neufeldt, Henry. DEC 2012. 1. World Agroforestry Ctr ICRAF, Nairobi, Kenya	1	1	1	2

		Can agriculture support climate change adaptation, greenhouse gas mitigation and rural livelihoods? insights from Kenya / Bryan, E ; Ringler, C ; Okoba, B ; Koo, J ; Herrero, M ; Silvestri, S. MAY 2013. 1. Int Food Policy Res Inst, Washington, DC 20006 USA 2. Kenya Agr Res Inst Kabete, Nairobi, Kenya 3. Int Livestock Res Inst, Nairobi 00100, Kenya	0	2	3	6
		A way forward on adaptation to climate change in Colombian agriculture: perspectives towards 2050 / Ramirez-Villegas, J ; Salazar, M ; Jarvis, A ; Navarro-Racines, CE. DEC 2012. 1. CGIAR Res Program Climate Change Agr & Food Secur, Cali, Colombia 2. Ctr Int Agr Trop, Cali 6713, Colombia 3. Univ Leeds, Sch Earth & Environm, Leeds, W Yorkshire, England 4. Reg Off Amer, Biovers Int, Cali 6713, Colombia	2	2	3	4
		East African food security as influenced by future climate change and land use change at local to regional scales / Moore, N ; Alagarswamy, G ; Pijanowski, B ; Thornton, P ; Lofgren, B ; Olson, J ; Andresen, J ; Yanda, P ; Qi, JG. FEB 2012. 1. Michigan State Univ, Dept Geog, E Lansing, MI 48823 USA 2. Zhejiang Univ, Coll Environm & Resource Sci, Hangzhou 310003, Zhejiang, Peoples R China 3. Michigan State Univ, CGCEO, E Lansing, MI 48823 USA 4. Purdue Univ, Dept Forestry & Nat Resources, W Lafayette, IN 47906 USA 5. Int Livestock Res Inst, Nairobi 00100, Kenya 6. Great Lakes Env Res Lab, Ann Arbor, MI 48108 USA 7. Univ Dar Es Salaam, Inst Resources Assessment, Dar Es Salaam, Tanzania	3	1	7	8
Crop science	1.513					
		Drought Adaptive Traits and Wide Adaptation in Elite Lines Derived from Resynthesized Hexaploid Wheat / Lopes, Marta S.; Reynolds, Matthew P. JUL 2011. 1. CIMMYT, Mexico City 06600, DF, Mexico	4	1	1	2
Current opinion in environmental sustainability	3.168					

		<p>A vision for attaining food security / Misselhorn, A ; Aggarwal, P ; Ericksen, P ; Gregory, P ; Horn-Phathanothai, L ; Ingram, J ; Wiebe, K. MAR 2012.</p> <ol style="list-style-type: none"> <li>1. Univ KwaZulu Natal, Hlth Econ &amp; HIV &amp; Aids Res Div, ZA-4000 Durban, South Africa</li> <li>2. Int Water Management Inst, CGIAR Res Program Climate Change Agr &amp; Food Secur, New Delhi 110012, India</li> <li>3. Int Livestock Res Inst, Nairobi 00100, Kenya</li> <li>4. E Malling Res, E Malling ME19 6BJ, England</li> <li>5. Univ Reading, Ctr Food Secur, Sch Agr Policy &amp; Dev, Reading RG6 6AR, Berks, England</li> <li>6. World Resources Inst, Washington, DC 20002 USA</li> <li>7. Univ Oxford, Environm Change Inst, Ctr Environm, Oxford OX1 3QY, England</li> <li>8. Food &amp; Agr Org United Nations FAO, Agr Dev Econ Div ESA, I-00153 Rome, Italy</li> </ol>	3	2	7	7
		<p>Climate change, agriculture and food security: a global partnership to link research and action for low-income agricultural producers and consumers / Vermeulen, S ; Zougmore, R ; Wollenberg, E ; Thornton, P ; Nelson, G ; Kristjanson, P ; Kinyangi, J ; Jarvis, A ; Hansen, J ; Challinor, A ; Campbell, B ; Aggarwal, P. MAR 2012.</p> <ol style="list-style-type: none"> <li>1. Univ Copenhagen, CCAFS Coordinating Unit, Dept Agr &amp; Ecol, Fac Life Sci, DK-1958 Frederiksberg C, Denmark</li> <li>2. Int Crops Res Inst Semi Arid Trop, Bamako, Mali</li> <li>3. Univ Vermont, Burlington, VT 05405 USA</li> <li>4. Int Livestock Res Inst, Nairobi 00100, Kenya</li> <li>5. Int Food Policy Res Inst, Washington, DC 20006 USA</li> <li>6. World Agroforestry Ctr, Nairobi 00100, Kenya</li> <li>7. Ctr Int Agr Trop, Cali, Colombia</li> <li>8. Columbia Univ, Int Res Ctr Climate &amp; Soc, Palisades, NY 10964 USA</li> <li>9. Univ Leeds, Inst Climate &amp; Atmospher Sci, Sch Earth &amp; Environm, Leeds 1SZ 9JT, W Yorkshire, England</li> <li>10. Int Water Management Inst, New Delhi 110012, India</li> </ol>	3	5	10	12
Current science	0.905					
		<p>Low-cost facility for assessing impact of carbon dioxide on crops / Chakrabarti, B ; Singh, SD ; Kumar, SN ; Aggarwal, PK ; Pathak, H ; Nagarajan, S. APR 2012.</p> <ol style="list-style-type: none"> <li>1. Indian Agr Res Inst, New Delhi 110012, India</li> <li>2. CGIAR Res Programme Climate Change Agr &amp; Food Sec, Int Water Management Inst, New Delhi 110012, India</li> </ol>	0	1	2	6

		Impact of climate change on crop productivity in Western Ghats, coastal and northeastern regions of India / Kumar, S. Naresh; Aggarwal, P. K.; Rani, Swaroopa; Jain, Surabhi; Saxena, Rani; Chauhan, Nitin. AUG 2011. 1. Indian Agr Res Inst, Div Environm Sci, New Delhi 110012, India	2	1	2	6
Ecology and Society	2.831					
		Using Coupled Simulation Models to Link Pastoral Decision Making and Ecosystem Services / Boone, Randall B.; Galvin, Kathleen A.; BurnSilver, Shauna B.; et al. 2011. 1. Colorado State Univ, Nat Resource Ecol Lab, Ft Collins, CO 80523 USA. 2. Colorado State Univ, Dept Forestry Rangeland & Watershed Stewardship, Ft Collins, CO 80523 USA. 3. Colorado State Univ, Dept Anthropol, Ft Collins, CO 80523 USA. 4. Univ Alaska, Agr & Forestry Expt Stn, Fairbanks, AK 99701 USA. 5. Univ Edinburgh, Edinburgh EH8 9YL, Midlothian, Scotland	2	1	5	5
Economia Agraria y Recursos Naturales	N/A					
		The economics of agrobiodiversity conservation for food security under climate change / Pascual, U.; Narloch, U.; Nordhagen, S.; Drucker, A. G. 2011. 1. Department of Land Economy, University of Cambridge, 19 Silver Street, CB39EP, Cambridge, UK. 2. Basque Centre for Climate Change (BC3) and IKERBASQUE, Basque Foundation for Science. Alameda Urquijo, 48011 Bilbao, Basque Country. 3. Bioversity International, Rome, Via dei Tre Denari 472/a,00057 Maccarese Fiumicino, Rome, Italy.	0	1	3	3
Ecosphere	N/A					
		A metamodeling framework for extending the application domain of process-based ecological models / Sparks, A. H.; Forbes, G. A.; Hijmans, R. J.; Garrett, K. A. 2011. 1. Department of Plant Pathology, Kansas State University, Manhattan, Kansas 66506-5502 USA 2. International Potato Center, Apartado 1558, Lima 12, Peru 3. Department of Environmental Science and Policy, University of California, Davis, California 95616 USA	2	1	3	3
Environmental modelling & software	3.476					

		Improving daily rainfall estimation from NDVI using a wavelet transform / Quiroz, Roberto; Yarleque, Christian; Posadas, Adolfo; Mares, Victor; Immerzeel, Walter W. FEB 2011. 1. Int Potato Ctr, Lima, Peru 2. FutureWater, Wageningen, Netherlands	5	1	2	5
Environmental science and policy	2.978					
		Challenges and opportunities in linking carbon sequestration, livelihoods and ecosystem service provision in drylands / Stringer, LC ; Dougill, AJ ; Thomas, AD ; Spracklen, DV ; Chesterman, S ; Speranza, CI ; Rueff, H ; Riddell, M ; Williams, M ; Beedy, T ; Abson, DJ ; Klintonberg, P ; Syampungani, S ; Powell, P ; Palmer, AR ; Seely, MK ; Mkwambisi, DD ; Falcao, M ; Siteo, A ; Ross, S ; Kopolo, G. MAY-JUN 2012. 1. Univ Leeds, Sch Earth & Environm, Leeds LS2 9JT, W Yorkshire, England 2. Manchester Metropolitan Univ, Sch Sci & Environm, Manchester M1 5GD, Lancs, England 3. Univ Bern, CDE, CH-3012 Bern, Switzerland 4. BioClimate, Res & Dev, Edinburgh EH16 6AE, Midlothian, Scotland 5. Univ Edinburgh, Sch Geosci, Edinburgh EH9 3JN, Midlothian, Scotland 6. World Agroforestry Ctr So Africa, Lilongwe, Malawi 7. Desert Res Fdn Namibia, Board Trustees, Windhoek, Namibia 8. Copperbelt Univ, Sch Nat Resources, Dept Plant & Environm Sci, Kitwe, Zambia 9. Ecolivelihoods Ltd, Apricot Cottage, Collingham LS22 5AR, W Yorks, England 10. Agr Res Council Anim Prod Inst, Grahamstown, South Africa 11. Univ Malawi, Bunda Coll Agr, Lilongwe, Malawi 12. Eduardo Mondlane Univ, Dept Forestry, Maputo, Mozambique 13. D1 Oils Plc, London EC4A 2AB, England 14. Zambia Biochar Trust, Lusaka, Zambia 15. Eduardo Mondlane Univ, Fac Agron & Forestry Engn, Forestry Engn Dept, Maputo, Mozambique	9	1	15	21



		Modified taungya system in Ghana: a win-win practice for forestry and adaptation to climate change? / Kalame, Fobissie B.; Aicloo, Robert; Nkem, Johnson; Ajayie, Oluyede C.; Kanninen, Markku; Luukkanen, Olavi; Idinoba, Monica. AUG 2011. 1. Univ Helsinki, Viikki Trop Resources Inst VTTRI, Dept Forest Sci, FIN-00014 Helsinki, Finland 2. Kwame Nkrumah Univ Sci & Technol KNUST, Kumasi, Ghana 3. United Nations Off Nairobi Gigiri, United Nations Dev Programme, Nairobi, Kenya 4. World Agroforestry Ctr ICRAF, Lilongwe, Malawi 5. African Union Commiss, Addis Ababa, Ethiopia	0			
		Options for support to agriculture and food security under climate change / Vermeulen, SJ ; Aggarwal, PK ; Ainslie, A ; Angelone, C ; Campbell, BM ; Challinor, AJ ; Hansen, JW ; Ingram, JSI ; Jarvis, A ; Kristjanson, P ; Lau, C ; Nelson, GC ; Thornton, PK ; Wollenberg, E. JAN 2012. 1. Univ Copenhagen, Dept Agr & Ecol, Fac Life Sci, CGIAR ESSP, Program Climate Change Agr & Food Secu, DK-1958 Frederiksberg C, Denmark 2. Univ Copenhagen, Fac LIFE, DK-1870 Frederiksberg C, Denmark 3. Int Water Management Inst, Pelawatte, Battaramulla, Sri Lanka 4. Oxford Brookes Univ, Dept Geog & Anthropol, Oxford OX3 0BP, England 5. Univ Vermont, Burlington, VT 05401 USA 6. Int Livestock Res Inst, Nairobi 00100, Kenya 7. Univ Leeds, Inst Climate & Atmospher Sci, Sch Earth & Environm, Leeds 1SZ 9JT, W Yorkshire, England 8. Columbia Univ, Earth Inst, Int Res Inst Climate & Soc, Palisades, NY 10964 USA 9. Univ Oxford, Environm Change Unit, Oxford OX1 3QY, England 10. Ctr Int Agr Trop, Cali, Colombia 11. World Agroforestry Ctr, Nairobi 00100, Kenya 12. Int Food Policy Res Inst, Washington, DC USA	8	5	12	14
Euphytica	1.643					
		New genetic sources of resistance in the genus Phaseolus to individual and combined aluminium toxicity and progressive soil drying stresses / : Butare, Louis; Rao, Idupulapati; Lepoivre, Philippe; Polania, J ; Cajiao, C ; Cuasquer, J ; Beebe, S. OCT 2011. 1. Ctr Int Agr Trop CIAT, Cali, Colombia 2. Univ Liege ULg, Gembloux Agrobio Tech, Unite Phytopathol, B-5030 Gembloux, Belgium 3. Inst Sci Agron Rwanda ISAR, Kigali, Rwanda	2	1	3	7

European journal of agronomy	2.8					
		Variation in time of day of anthesis in rice in different climatic environments / Julia, Cecile; Dingkuhn, Michael. 2012. 1. CIRAD, BIOS Dept, UMR AGAP, F-34398 Montpellier, France 2. Int Rice Res Inst, CESD, Manila, Philippines	1	1	2	2
Experimental agriculture	1.062					
		ASSESSING AND ADDRESSING CLIMATE-INDUCED RISK IN SUB-SAHARAN RAINFED AGRICULTURE FOREWORD TO A SPECIAL ISSUE OF EXPERIMENTAL AGRICULTURE / Cooper, P. J. M.; Coe, R. APR 2011. <b>[See also article below; not in pubs list, but similar title and authors]</b> 1. Univ Reading, Reading RG6 2AH, Berks, England 2. World Agroforestry Ctr, Nairobi, Kenya	3	1	2	2
		ASSESSING AND ADDRESSING CLIMATE-INDUCED RISK IN SUB-SAHARAN RAINFED AGRICULTURE: LESSONS LEARNED / Coe, R ; Stern, RD. APR 2011. 1. Univ Reading, Reading RG6 2AH, Berks, England 2. World Agroforestry Ctr, Nairobi 00100, Kenya	1	1	2	2
		ADDING VALUE TO FIELD-BASED AGRONOMIC RESEARCH THROUGH CLIMATE RISK ASSESSMENT: A CASE STUDY OF MAIZE PRODUCTION IN KITALE, KENYA / Dixit, P. N.; Cooper, P. J. M.; Dimes, J.; Rao, K. P. APR 2011. 1. Int Crops Res Inst Semi Arid Trop, Nairobi 00623, Kenya 2. Int Crops Res Inst Semi Arid Trop, Bulawayo, Zimbabwe	5	1	1	4
		CLIMATE-AND LAND USE-INDUCED RISKS TO WATERSHED SERVICES IN THE NYANDO RIVER BASIN, KENYA / Gathenya, Mwangi; Mwangi, Hosea; Coe, Richard; Sang, Joseph. APR 2011. 1. Jomo Kenyatta Univ Agr & Technol, Nairobi, Kenya 2. World Agroforestry Ctr, Nairobi, Kenya	3	1	2	4
		REVIEW OF SEASONAL CLIMATE FORECASTING FOR AGRICULTURE IN SUB-SAHARAN AFRICA / Hansen, James W.; Mason, Simon J.; Sun, Liqiang; Tall, Arame. APR 2011. 1. Columbia Univ, Challenge Program Climate Change Agr & Food Secur, Palisades, NY USA 2. Columbia Univ, Int Res Inst fir Climate & Soc, Earth Inst, Palisades, NY USA 3. Johns Hopkins Univ, African Studies SAIS, Baltimore, MD USA	11	1	2	3

		AN INTEGRATED ADAPTATION AND MITIGATION FRAMEWORK FOR DEVELOPING AGRICULTURAL RESEARCH: SYNERGIES AND TRADE-OFFS / Jarvis, Andy; Lau, Charlotte; Cook, Simon; Wollenberg, Eva; Hansen, James; Bonilla, Osana; Challinor, Andy. APR 2011. 1. Int Ctr Trop Agr CIAT, Cali, Colombia 2. Univ Vermont, Burlington, VT 05405 USA 3. Columbia Univ & Palisades, Earth Inst, Int Res Inst Climate & Soc, New York, NY USA 4. Univ Leeds, Leeds LS2 9JT, W Yorkshire, England	9	1	4	7
		CLIMATE VARIABILITY AND CHANGE: FARMER PERCEPTIONS AND UNDERSTANDING OF INTRA-SEASONAL VARIABILITY IN RAINFALL AND ASSOCIATED RISK IN SEMI-ARID KENYA / Rao, K. P. C.; Ndegwa, W. G.; Kizito, K.; Oyoo, A. APR 2011. 1. Int Crops Res Inst Semi Arid Trop, Nairobi, Kenya	6	1	1	4
Field Actions Science Reports	N/A					
		Scaling up Agroforestry to Achieve Food Security and Environmental Protection among Smallholder Farmers in Malawi / T.L. Beedy, O.C. Ajayi, G.W. Sileshi, G. Kundhlande, G. Chiundu, A.J. Simons. 2012. 1. World Agroforestry Centre (ICRAF)-Southern Africa, Lilongwe, Malawi 2. World Agroforestry Centre (ICRAF), Nairobi, Kenya 3. World Agroforestry Centre (ICRAF)-Southern Africa, Lilongwe, Malawi	N/A	1	1	6
Field crops research	2.474					
		Climate effects on yield components as affected by genotypic responses to variable environmental conditions in upland rice systems at different altitudes / Shrestha, S ; Asch, F ; Dusserre, J ; Ramanantsoanirina, A ; Brueck, H. AUG 2012. 1. Univ Hohenheim, Inst Plant Prod & Agroecol Trop & Subtrop, Dept Plant Prod & Agroecol Trop & Subtrop, Sect Crop Water Stress Management, D-70599 Stuttgart, Germany 2. Agr Res Developing Countries CIRAD, Res Unit Partnership Sustainable Farming & Rice C, Antsirabe, Madagascar 3. Natl Ctr Appl Res & Rural Dev FOFIFA, Res Unit Partnership Sustainable Farming & Rice C, Antsirabe, Madagascar	1	0	3	5

		Influence of climate variability on seasonal and interannual variations of ecosystem CO <sub>2</sub> exchange in flooded and non-flooded rice fields in the Philippines / Alberto, Ma Carmelita R.; Hirano, Takashi; Miyata, Akira; et al. AUG 2012. 1. Int Rice Res Inst, Los Banos 4031, Laguna, Philippines 2. Hokkaido Univ, Res Fac Agr, Sapporo, Hokkaido, Japan 3. Natl Inst Agroenvironm Sci, Tsukuba, Ibaraki 305, Japan 4. Karlsruhe Inst Technol, Karlsruhe, Germany	1	1	4	3
		Do barley and wheat (bread and durum) differ in grain weight stability through seasons and water-nitrogen treatments in a Mediterranean location? / Cossani, C. Mariano; Slafer, Gustavo A.; Savin, Roxana. MAR 2011. 1. Univ Lleida, Dept Crop & Forest Sci, Ctr UdL IRTA, Lleida 25198, Spain	3	0	1	3
		Wheat yield and tillage-straw management system x year interaction explained by climatic co-variables for an irrigated bed planting system in northwestern Mexico / Verhulst, Nele; Sayre, Ken D.; Vargas, Mateo; Crossa, Jose; Deckers, Jozef; Raes, Dirk; Goyaerts, Bram. DEC 2011. 1. CIMMYT, Int Maize & Wheat Improvement Ctr, Mexico City 06600, DF, Mexico 2. Katholieke Univ Leuven, Dept Earth & Environm Sci, B-3001 Heverlee, Belgium 3. Univ Autonoma Chapingo, Mexico City 56230, DF, Mexico	2	1	3	7
Food security	2.072					
		Are food insecure smallholder households making changes in their farming practices? Evidence from East Africa / Kristjanson, P ; Neufeldt, H ; Gassner, A ; Mango, J ; Kyazze, FB ; Desta, S ; Sayula, G ; Thiede, B ; Forch, W ; Thornton, PK ; Coe, R. 2012. 1. World Agroforestry Ctr, Climate Change Agr & Food Secur Program CCAFS, Nairobi 00100, Kenya 2. Makerere Univ, Dept Extens & Innovat Studies, Kampala, Uganda 3. Managing Risk Improved Livelihood MARIL, Addis Ababa, Ethiopia 4. Selian Agr Res Inst, Arusha, Tanzania 5. Cornell Univ, Ithaca, NY USA 6. Int Livestock Res Inst, CCAFS Program, Nairobi, Kenya 7. Int Livestock Res Inst, CGIAR Res Programme Climate Change Agr & Food Sec, Nairobi, Kenya	3	2	6	10

		Adaptation to climate change for food security in the lower Mekong Basin / Mainuddin, Mohammed; Kirby, Mac; Hoanh, Chu Thai. DEC 2011. 1. CSIRO Land & Water, Canberra 2. SE Asia Reg Off, Int Water Management Inst, Viangchan, Laos	1	1	2	2
		The socioeconomics of food crop production and climate change vulnerability: a global scale quantitative analysis of how grain crops are sensitive to drought / Simelton, E ; Fraser, EDG ; Termansen, M ; Benton, TG ; Gosling, SN ; South, A ; Arnell, NW ; Challinor, AJ ; Dougill, AJ ; Forster, PM. JUN 2012. 1. Univ Leeds, Sch Earth & Environm, Leeds LS2 9JT, W Yorkshire, England 2. World Agroforestry Ctr ICRAF, Hanoi, Vietnam 3. Univ Guelph, Dept Geog, Coll Human & Appl Social Sci, Guelph, ON N1G 2W1, Canada 4. Univ Aarhus, Dept Environm Sci, Roskilde, Denmark 5. Univ Leeds, Fac Biol Sci, Leeds LS2 9JT, W Yorkshire, England 6. Univ Nottingham, Sch Geog, Nottingham NG7 2RD, England 7. Univ Reading, Dept Meteorol, Walker Inst, Reading, Berks, England 8. Univ Leeds, Sch Earth & Environm, Inst Climate & Atmospher Sci, Leeds LS2 9JT, W Yorkshire, England	3	1	8	10
		Cassava and overcoming the challenges of global climatic change: report of the second scientific conference of the Global Cassava Partnership for the 21st century / Glenn Hyman, Anthony Bellotti, Luis Augusto Becerra Lopez-Lavalle, Neil Palmer, Bernado Creamer. 2012. 1. International Center for Tropical Agriculture (CIAT), Cali, Valle del Cauca, Colombia	N/A	1	1	5
		Threats to cassava production: known and potential geographic distribution of four key biotic constraints / Herrera Campo, Beatriz Vanessa; Hyman, Glenn; Bellotti, Anthony. SEP 2011. 1. Ctr Int Agr Trop, Cali 6713, Colombia	1	1	1	3
Food technology	0.363					
		Perspective (: adapt now to climate change) / Luedeling, Eike. SEP 2011. <i>[article title differs in Web of Science]</i> 1. World Agroforestry Ctr ICRAF, Nairobi, Kenya	0	1	1	1
Forests	1.094					

		<p>Do Anthropogenic Dark Earths Occur in the Interior of Borneo? Some Initial Observations from East Kalimantan / Sheil, D ; Basuki, I ; German, L ; Kuyper, TW ; Limberg, G ; Puri, RK ; Sellato, B ; van Noordwijk, M ; Wollenberg, E. JUN 2012.</p> <ol style="list-style-type: none"> <li>1. Inst Trop Forest Conservat, Kabale, Uganda</li> <li>2. So Cross Univ, Sch Environm Sci &amp; Management, Lismore, NSW</li> <li>3. Ctr Int Forestry Res CIFOR, Bogor 16000, Indonesia</li> <li>4. Univ Georgia, Dept Anthropol, Athens, GA 30602 USA</li> <li>5. Wageningen Univ, Dept Soil Qual, NL-6700 AA Wageningen, Netherlands</li> <li>6. Komplek Lab Pusat UNAS, Fauna &amp; Flora Int Indonesia Program, Jakarta 12550, Indonesia</li> <li>7. Univ Kent, Sch Anthropol &amp; Conservat, Ctr BioCultural Divers, Canterbury CT2 7NR, Kent, England</li> <li>8. CNRS, Ctr Asie Sud Est, F-75016 Paris, France</li> <li>9. Ecole Hautes Etud Sci Sociales, F-75016 Paris, France</li> <li>10. Jalan CIFOR, ICRAF Southeast Asia, World Agroforestry Ctr, Bogor 16115, Indonesia</li> <li>11. Univ Vermont, Gund Inst Ecol Econ, Burlington, VT 05405 USA</li> <li>12. Univ Vermont, Rubenstein Sch Environm &amp; Nat Resources, Burlington, VT 05405 USA</li> </ol>	1	2	10	9
Frontiers in physiology	N/A					
		<p>Bridging the phenotypic and genetic data useful for integrated breeding through a data annotation using the Crop Ontology developed by the crop communities of practice / Shrestha, Rosemary; Matteis, Luca; Skofic, Milko; Portugal, Arlet; McLaren, Graham; Hyman, Glenn; Arnaud, Elizabeth. 2012.</p> <ol style="list-style-type: none"> <li>1. Genetic Resources Program, Centro Internacional de Mejoramiento de Maiz y Trigo, Texcoco, Edo. de México, Mexico</li> <li>2. Bioersity International, Maccaresse, Rome, Italy</li> <li>3. Generation Challenge Programme, Centro Internacional de Mejoramiento de Maiz y Trigo, Texcoco, Edo. de México, Mexico</li> <li>4. Centro Internacional de Agricultura Tropical, Cali, Colombia</li> </ol>	0	2	4	7
Functional and integrative genomics	3.292					

		Carbohydrate metabolism and cell protection mechanisms differentiate drought tolerance and sensitivity in advanced potato clones ( <i>Solanum tuberosum</i> L.) / Legay, Sylvain; Lefevre, Isabelle; Lamoureux, Didier; Barreda, Carolina; Luz, Rosalina Tincopa; Gutierrez, Raymundo; Quiroz, Roberto; Hoffmann, Lucien; Hausman, Jean-Francois; Bonierbale, Merideth; Evers, Daniele; Schafleitner, Rolan. JUN 2011. 1. Ctr Rech Publ Gabriel Lippmann, Dept Environm & Agrobiotechnol EVA, L-4422 Belvaux, Luxembourg 2. Int Potato Ctr, Germplasm Enhancement & Crop Improvement Div, Lima 12, Peru	7	1	2	12
Functional plant biology	2.471					
		Does susceptibility to heat stress confound screening for drought tolerance in rice? / Jagadish, Krishna S. V.; Cairns, Jill E.; Kumar, Arvind; Somayanda, Impa; Craufurd, Peter Q. 2011. 1. Univ Reading, Plant Environm Lab, Reading RG2 9AF, Berks, England 2. IRRI, Plant Breeding Genet & Biotechnol Div, Manila, Philippines 3. IRRI, Crop & Environm Sci Div, Manila, Philippines 4. Int Crops Res Inst Semi Arid Trop, Patancheru 502324, AP, India	4	2	3	5
		Crop improvement in the era of climate change: an integrated, multi-disciplinary approach for common bean ( <i>Phaseolus vulgaris</i> ) / McClean, Phillip E.; Burr ridge, Jimmy; Beebe, Stephen; Rao, Idupulapati M.; Porch, Timothy G. 2011. 1. N Dakota State Univ, Genom & Bioinformat Program, Fargo, ND 58102 USA 2. N Dakota State Univ, Dept Plant Sci, Fargo, ND 58102 USA 3. Penn State Univ, Dept Hort, University Pk, PA 16802 USA 4. Ctr Int Agr Trop, Bean Program, Cali 6713, Colombia 5. ARS, USDA, Trop Agr Res Stn, Mayaguez, PR 00680 USA	4	1	4	5
Genetic resources and crop evolution	1.593					
		Digitization and online availability of original collecting mission data to improve data quality and enhance the conservation and use of plant genetic resources / Thormann, I ; Gaisberger, H ; Mattei, F ; Snook, L ; Arnaud, E. JUN 2012. 1. Biovers Int, Rome, Italy	1	1	1	5
Geoderma	2.345					

		Carbon replacement and stability changes in short-term silvo-pastoral experiments in Colombian Amazonia / Mosquera, O ; Buurman, P ; Ramirez, BL ; Amezquita, MC. JAN 2012. 1. CIAT, Lab Analyt Serv, Cali, Colombia 2. Wageningen Univ, Earth Syst Sci Grp, NL-6700 AA Wageningen, Netherlands 3. Univ Amazonia, Caqueta, Colombia 4. Fdn Univ Catolica Lumen Gentium, Cali, Colombia	1	1	4	4
		Carbon stocks and dynamics under improved tropical pasture and silvopastoral systems in Colombian Amazonia / Mosquera, O ; Buurman, P ; Ramirez, BL ; Amezquita, MC. NOV 2012. 1. CIAT, Lab Analyt Serv, Cali, Colombia 2. Wageningen Univ, Earth Syst Sci Grp, NL-6700 AA Wageningen, Netherlands 3. Univ Amazonia, Caqueta, Colombia 4. Fdn Univ Catolica Lumen Gentium, Cali, Colombia	1	1	4	4
Global change biology	6.91					



		<p>Towards an integrated global framework to assess the impacts of land use and management change on soil carbon: current capability and future vision / Smith, P ; Davies, CA ; Ogle, S ; Zanchi, G ; Bellarby, J ; Bird, N ; Boddey, RM ; McNamara, NP ; Powlson, D ; Cowie, A ; van Noordwijk, M ; Davis, SC ; Richter, DD ; Kryzanowski, L ; van Wijk, MT ; Stuart, J ; Kirton, A ; Eggar, D ; Newton-Cross, G ; Adhya, TK ; Braimoh, AK. JUL 2012.</p> <ol style="list-style-type: none"> <li>1. Univ Aberdeen, Inst Biol &amp; Environm Sci, Sch Biol Sci, Aberdeen AB24 3UU, Scotland</li> <li>2. Shell Global Solut UK, Shell Technol Ctr Thornton, Chester CH1 3SH, Cheshire, England</li> <li>3. Colorado State Univ, Nat Resource Ecol Lab, Ft Collins, CO 80523 USA</li> <li>4. Colorado State Univ, Dept Ecosyst Sci &amp; Sustainabil, Ft Collins, CO 80523 USA</li> <li>5. Joanneum Res, Resources Inst Water Energy &amp; Sustainabil, A-8010 Graz, Austria</li> <li>6. Embrapa Agrobiol, BR-23890000 Rio De Janeiro, Brazil</li> <li>7. Lancaster Environm Ctr, Ctr Ecol &amp; Hydrol, Lancaster LA1 4AP, England</li> <li>8. Rothamsted Res, Dept Sustainable Soils &amp; Grassland Syst, Harpenden AL5 2JQ, Herts, England</li> <li>9. Univ New England, Natl Ctr Rural Greenhouse Gas Res, Armidale</li> <li>10. World Agroforestry Ctr ICRAF Situ Gede, Bogor 16115, Indonesia</li> <li>11. Univ Illinois, Dept Plant Biol, Urbana, IL 61801 USA</li> <li>12. Duke Univ, Nicholas Sch Environm, Durham, NC 27708 USA</li> <li>13. Govt Alberta Agr &amp; Rural Dev, Land Use Sect, Edmonton, AB T6H 5T6, Canada</li> <li>14. Wageningen Univ, Plant Prod Syst Grp, NL-6708 PB Wageningen, NL, Netherlands</li> <li>15. ILRI, Nairobi, Kenya</li> <li>16. Soils Policy Team, London SW1P 3JR, England</li> <li>17. Inst Energy Technol, Loughborough LE11 3UZ, Leics, England</li> <li>18. BBSRC, Swindon SN2 1UH, Wilts, England</li> <li>19. Cent Rice Res Inst, Cuttack 753006, Orissa, India</li> <li>20. World Bank, Washington, DC 20433 USA</li> </ol>	9	2	19	21
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		Climate change effects on walnut pests in California / Luedeling, Eike; Steinmann, Kimberly P.; Zhang, Minghua; Brown, Patrick H.; Grant, Joseph; Girvetz, Evan H. JAN 2011. 1. World Agroforestry Ctr ICRAF, Nairobi, Kenya 2. Univ Calif Davis, Dept Plant Sci, Davis, CA 95616 USA 3. Univ Calif Davis, Dept Land Air & Water Resources, Davis, CA 95616 USA 4. Univ Calif Cooperat Extens, Stockton, CA 95206 USA 5. Nat Conservancy Global Climate Change Program, Seattle, WA 98101 USA 6. Univ Washington, Sch Forest Resources, Seattle, WA 98195 USA	9	1	4	6
Global ecology and biogeography	7.223					
		Potential impacts of climate change on the environmental services of humid tropical alpine regions / Buytaert, Wouter; Cuesta-Camacho, Francisco; Tobon, Conrado. JAN 2011. 1. Univ London Imperial Coll Sci Technol & Med, London SW7 2AZ, England 2. Consortium Sustainable Dev Andean Ecoreg CONDESAN, Quito, Ecuador 3. Univ Nacl Colombia Con Sede Medellin, Medellin, Colombia	18	0	3	3
Global environmental change	5.236					
		Can marine fisheries and aquaculture meet fish demand from a growing human population in a changing climate? / Merino, G ; Barange, M ; Blanchard, JL ; Harle, J ; Holmes, R ; Allen, I ; Allison, EH ; Badjeck, MC ; Dulvy, NK ; Holt, J ; Jennings, S ; Mullon, C ; Rodwell, LD. OCT 2012. 1. Plymouth Marine Lab, Plymouth PL1 3DH, Devon, England 2. Univ Sheffield, Sheffield S10 2TN, S Yorkshire, England 3. Proudman Oceanog Lab, Liverpool L3 5DA, Merseyside, England 4. WorldFish Ctr, George Town, Malaysia 5. Simon Fraser Univ, Burnaby, BC V5A 1S6, Canada 6. Univ E Anglia, Sch Environm Sci, Norwich NR7 4TJ, Norfolk, England 7. Ctr Environm Fisheries & Aquaculture Sci, Lowestoft NR33 0HT, Suffolk, England 8. Unite Rech Ecosyst Marins Exploites, F-34200 Sete, France 9. Univ Plymouth, Sch Marine Sci & Engn, Plymouth PL4 8AA, Devon, England	7	1	9	13
Greenhouse gas measurement and management	N/A					

		Appropriate frequency and time of day to measure methane emissions from an irrigated rice paddy in Japan using the manual closed chamber method / Minamikawa, K. ; Yagi, K. ; Tokida, T. ; Sander, B. O. ; Wassmann, R. 2012. 1. Carbon and Nutrient Cycles Division, National Institute for Agro-Environmental Sciences, 3-1-3 Kannondai, Tsukuba 305-8604, Japan 2. Crop and Environmental Science Division, International Rice Research Institute, DAPO Box 7777, Metro Manila, Philippines	0	1	2	5
Greenhouse Gases: Science and Technology ( <i>title differs in pubs list</i> )	2.679					
		Greenhouse gas emission from rice- and wheat-growing areas in India: spatial analysis and upscaling / Bhatia, A (Bhatia, Arti) ; Aggarwal, PK (Aggarwal, P. K.) ; Jain, N (Jain, Niveta) ; Pathak, H (Pathak, H.). APR 2012. 1. Indian Agr Res Inst, Div Environm Sci, New Delhi 110012, India 2. Int Water Management Inst, CGIAR Res Program Climate Change, India Off, New Delhi, India	1	1	2	4
Hydro Nepal: journal of water, energy and environment	N/A					
		Hydrologic characterization of the Koshi Basin and the impact of climate change / Luna Bharati ; Pabitra Gurung ; Priyantha Jayakody. 2012. 1. International Water Management Institute, IWMI, Lalitpur, Nepal.	0	1	1	3
		Downstream impacts of the Melamchi inter-basin water transfer plan (MIWTP) under current and future climate change projections / Pabitra Gurung ; Luna Bharati. 2012. 1. International Water Management Institute, IWMI, Lalitpur, Nepal.	0	1	1	2
Hydrogeology journal	1.675					
		Confronting scale in watershed development in India / Syme, GJ ; Reddy, VR ; Pavelic, P ; Croke, B ; Ranjan, R. AUG 2012. 1. Edith Cowan Univ, Joondalup, WA 2. Livelihoods & Nat Resources Management Inst, Hyderabad 500067, Andhra Pradesh, India 3. Int Water Management Inst, Patancheru 502324, Andhra Pradesh, India 4. Australian Natl Univ, Fenner Sch Environm & Soc, ICAM, Canberra 5. Macquarie Univ, Grad Sch Environm, Sydney	1	1	5	5

Hydrological processes	2.497					
		The climate of cloud forests / Jarvis, Andy; Mulligan, Mark. JAN 2011. 1. Int Ctr Trop Agr CIAT, Cali 6713, Colombia 2. Kings Coll London, Dept Geog, Strand, London WC2R 2LS, England	7	1	2	2
Hydrological sciences journal	1.114					
		Drying climate in Ghana over the period 1960-2005: evidence from the resampling-based Mann-Kendall test at local and regional levels / Lacombe, G.; McCartney, M.; Forkuor, G. 2012. 1. Int Water Management Inst, SE Asia Reg Off, Viangchan, Laos 2. Int Water Management Inst, E Africa & Nile Basin Off, Addis Ababa, Ethiopia 3. Int Water Management Inst, Cantonments, Accra, Ghana	2	1	1	3
Hydrology and earth system sciences discussions	3.587					
		Patterns of water infiltration and soil degradation over a 120-yr chronosequence from forest to agriculture in western Kenya / G. Nyberg, A. Bargues Tobella, J. Kinyangi, and U. Ilstedt. 2011. 1. Department of Forest Ecology and Management, Swedish University of Agricultural Sciences, 901 83 Umea, Sweden 2. Climate Change, Agriculture and Food Security, c/o ILRI, P.O. Box 30709, Nairobi 00100, Kenya	N/A	1	2	4
		Soil property changes over a 120-yr chronosequence from forest to agriculture in western Kenya / Nyberg, G.; Tobella, A. Bargues; Kinyangi, J.; Ilstedt, U. 2012. 1. Swedish Univ Agr Sci, Dept Forest Ecol & Management, S-90183 Umea, Sweden 2. ILRI, Nairobi 00100, Kenya	0	1	2	4
ICES journal of marine science	2.277					
		Beam trawlermen take feet off gas in response to oil price hikes / Beare, Doug; Machiels, Marcel. JUL 2012. 1. WorldFish Ctr, Bayan Lepas 11960, Penang, Malaysia 2. IMARES, Dept Fisheries, NL-1970 AB Ijmuiden, Netherlands	3	1	2	2
Indian journal of agricultural sciences	0.177					

		Performance of potato ( <i>Solanum tuberosum</i> ) clones under water stress / Sharma, N ; Kumar, P ; Kadian, MS ; Pandey, SK ; Singh, SV ; Luthra, SK. SEP 2011. 1. Int Potato Ctr, New Delhi 110012, India	1	1	1	6
International journal for bio-resource and stress management	N/A					
		Food security and climate change in the Asia-Pacific Region: evaluating mismatch between crop development and water availability / Huda, S. ; Sadras, V. ; Suhas Wani ; Mei XuRong. 2011. 1. University of Western Sydney, Locked Bag 1797, Penrith South	0	0	1	4
International journal of agricultural sustainability	1.493					
		The role of agricultural biodiversity in strengthening resilience to climate change: towards an analytical framework / Mijatovic, D ; Van Oudenhoven, F ; Eyzaguirre, P ; Hodgkin, T. MAY 2013. 1. Biovers Int, Platform Agrobiodivers Res, I-00057 Rome, Italy 2. Biovers Int, I-00057 Rome, Italy	1	1	1	4
		Perceptions and outlook on intercropping coffee with banana as an opportunity for smallholder coffee farmers in Uganda / Jassogne, L ; van Asten, PJA ; Wanyama, I ; Baret, PV. MAY 2013. 1. Catholic Univ Louvain, Earth & Life Inst, B-1348 Louvain, Belgium 2. IITA, Kampala, Uganda	0	1	2	4
International journal of remote sensing	1.138					
		TRMM rainfall correction over the Andean Plateau using wavelet multi-resolution analysis / Heidinger, H ; Yarleque, C ; Posadas, A ; Quiroz, R. 2012. 1. Int Potato Ctr, Prod Syst & Environm Div, Lima 12, Peru	2	1	1	4
Journal for nature conservation	1.535					

		Analysis of threats to South American flora and its implications for conservation / Ramirez-Villegas, Julian; Jarvis, Andy; Touval, Jerry. DEC 2012. 1. CIAT, Ctr Int Agr Trop, Cali, Colombia 2. Univ Leeds, Sch Earth & Environm, Inst Climat & Atmospher Sci, Leeds LS2 9JT, W Yorkshire, England 3. CGIAR Res Program Climate Change Agr & Food Secur, Cali, Colombia 4. Nature Conservancy, Arlington, VA 22203 USA	0	1	3	3
Journal of agriculture and rural development in the tropics and subtropics	0.107					
		Yield gap analysis and assessment of climate-induced yield trends of irrigated rice in selected provinces of the Philippines / Angulo, Carlos; Becker, Mathias; Wassmann, Reiner. 2012. 1. Univ Bonn, Inst Crop Sci & Resource Conservat, D-53115 Bonn, Germany. 2. Int Rice Res Inst, Manila 1099, Philippines	0	1	2	3
Journal of agrometeorology	0.146					
		Evapotranspiration paradox at a semi-arid location in India / Rao, A. V. R. Kesava; Wani, Suhas P. JUN 2011. 1. Int Crops Res Inst Semi Arid Trop, Patancheru 502324, Andhra Pradesh, India	1	1	1	3
Journal of agronomy and crop science	2.151					
		Crop Improvement, Ideotyping and Modelling for African Cropping Systems Under Climate Change / (conf papers; Introduction by Asch, F.; Giese, M.) OCT 2012. 1. Univ Hohenheim, Inst Plant Prod & Agroecol Trop & Subtrop 380, D-70599 Stuttgart, Germany	0	0	1	2
		Genetic Advances in Adapting Rice to a Rapidly Changing Climate / Jagadish, SVK ; Septiningsih, EM ; Kohli, A ; Thomson, MJ ; Ye, C ; Redona, E ; Kumar, A ; Gregorio, GB ; Wassmann, R ; Ismail, AM ; Singh, RK. OCT 2012. 1. Int Rice Res Inst, Crop & Environm Sci Div, Manila, Philippines 2. Int Rice Res Inst, Plant Breeding Genet & Biotechnol Div, Manila, Philippines 3. ESA Reg Off, IRRI, Dar Es Salaam, Tanzania	2	1	1	10
Journal of climate	4.362					

		Precipitation Characteristics of the South American Monsoon System Derived from Multiple Datasets / Carvalho, LMV ; Jones, C ; Posadas, AND ; Quiroz, R ; Bookhagen, B ; Liebmann, B. JUL 2012. 1. Univ Calif Santa Barbara, Dept Geog, Santa Barbara, CA 93106 USA 2. Univ Calif Santa Barbara, Earth Res Inst, Santa Barbara, CA 93106 USA 3. Int Potato Ctr CIP, Lima, Peru 4. CIRES Climate Diagnost Ctr, Boulder, CO USA	2	1	3	6
Journal of crop improvement	N/A					
		Climate change and the conservation of plant genetic resources / Hodgkin, T. ; Bordoni, P. 2012. 1. Platform for Agrobiodiversity Research and Bioersivity International, Via dei Tre Denari 472/a, 00057 Maccarese, Rome, Italy 2. Bioersivity International, Rome, Italy	0	1	1	2
		Genetic analysis of performance of maize inbred lines under drought stress / Meseka, S. K.; Menkir, A.; Atala, S. 2011. 1. International Institute of Tropical Agriculture, Maize Improvement Unit, International Institute of Tropical Agriculture, PMB 5320 Oyo Road, Ibadan, Nigeria.	0	1	1	2
Journal of environmental protection	N/A					
		Use of the environmental impact quotient to estimate health and environmental impacts of pesticide usage in Peruvian and Ecuadorian potato production / Kromann, P.; Pradel, W.; Cole, D.; Taipe, A.; Forbes, G.A. 2011. 1. International Potato Center (CIP), Quito, Ecuador 2. International Potato Center, Lima, Peru 3. Dalla Lana School of Public Health, University of Toronto, Toronto, Canada	3	1	2	5
Journal of environmental quality	2.353					
		Speciation and Long- and Short-term Molecular-level Dynamics of Soil Organic Sulfur Studied by X-ray Absorption Near-Edge Structure Spectroscopy / Solomon, Dawit; Lehmann, Johannes; de Zarruk, Katrin Knoth; Dathe, Julia; Kinyangi, James; Liang, Biqing; Machado, Stephen. MAY 2011. 1. Cornell Univ, Dep Crop & Soil Sci, Ithaca, NY 14853 USA 2. Bioforsk Norwegian Inst Agr & Environm Res, N-1432 As, Norway 3. Oregon State Univ, Columbia Basin Agr Res Ctr, Pendleton, OR 97801 USA	3	1	3	7

Journal of food, agriculture and environment	0.435					
		Stability of Striga gesnerioides resistance mechanism in cowpea under high-infestation level, low soil fertility and drought stresses / Muranaka, Satoru; Fatokun, Christian; Boukar, Ousmane. APR 2011. 1. Int Inst Trop Agr IITA Nigeria, Ibadan, Oyo State, Nigeria	1	1	1	3
Journal of hydrology	2.964					
		Balancing-out floods and droughts: Opportunities to utilize floodwater harvesting and groundwater storage for agricultural development in Thailand / Pavelic, P ; Srisuk, K ; Saraphirom, P ; Nadee, S ; Pholkern, K ; Chusanathas, S ; Munyou, S ; Tangsutthinon, T ; Intarasut, T ; Smakhtin, V. NOV 2012. 1. Natl Agr & Forestry Res Inst, Int Water Management Inst, Ban Nongviengkham Xaytha, Vientiane, Laos 2. Khon Kaen Univ, Fac Technol, Groundwater Res Ctr, Khon Kaen, Thailand 3. Minist Nat Resources & Environm, Dept Groundwater Resources, Bangkok, Thailand 4. HYDROGEOSCI Co Ltd, Nonthaburi, Thailand 5. Int Water Management Inst, Colombo, Sri Lanka	0	1	4	10
Journal of integrative environmental sciences	0.724					
		Changes in soil CH4 fluxes from the conversion of tropical peat swamp forests: a meta-analysis / Hergoualc'h, KA ; Verchot, LV. 2012. 1. Ctr Int Forestry Res CIFOR, Forests & Environm Programme, Bogor, Indonesia	0	1	1	2
Journal of irrigation and drainage engineering	1.126					



		Urban Weather Data to Estimate Reference Evapotranspiration for Rural Irrigation Management / Luo, YF ; Jiang, YL ; Peng, SZ ; Khan, S ; Cai, XL ; Wang, WG ; Jiao, XY. SEP 2012. 1. Hohai Univ, State Key Lab Hydrol Water Resources & Hydraul En, Nanjing 210098, Jiangsu, Peoples R China 2. UNESCO Div Water Sci, F-75732 Paris 15, France 3. Int Water Management Inst So Africa, Johannesburg Area, South Africa	0	1	3	7
Journal of photochemistry and photobiology, B. Biology	3.11					
		Chlorophyll index, photochemical reflectance index and chlorophyll fluorescence measurements of rice leaves supplied with different N levels / Shrestha, Suchit; Brueck, Holger; Asch, Folkard. AUG 2012. 1. Univ Hohenheim, Dept Plant Prod & Agroecol Trop & Subtrop, Crop Water Stress Management Sect, D-70599 Stuttgart, Germany	1	0	1	3
Journal of public interest intellectual property	N/A					
		Keeping germplasm flowing / Gea Galluzzi, Michael Halewood, Isabel López-Noriega and Ronnie Vernoooy. 2012. 1. Biodiversity International, Cali, Colombia 2. Biodiversity International, Rome	N/A	1	1	4
Journal of soil and water conservation	1.722					
		Soil carbon stocks and stability across an altitudinal gradient in southern Peru / Segnini, A.; Posadas, A.; Quiroz, R.; Milori, D.; Vaz, C.; Martin-Neto, L. JUL-AUG 2011. 1. CIP, Environm Div, Lima, Peru 2. Embrapa Agr Instrumentat Ctr, Sao Carlos, SP, Brazil 3. EMBRAPA, Beltsville, MD USA 4. Embrapa Labex USA, Beltsville, MD USA	3	1	2	6
Land degradation and development	1.991					

		APPLICATION OF INDICATOR SYSTEMS FOR MONITORING AND ASSESSMENT OF DESERTIFICATION FROM NATIONAL TO GLOBAL SCALES / Sommer, S.; Zucca, C.; Grainger, A.; Cherlet, M.; Zougmore, R.; Sokona, Y.; Hill, J.; Della Peruta, R.; Roehrig, J.; Wang, G. MAR-APR 2011. 1. Commiss European Communities, Joint Res Ctr, IES, I-21027 Ispra, VA, Italy 2. Univ Sassari, I-07100 Sassari, Italy 3. Univ Leeds, Sch Geog, Leeds LS2 9JT, W Yorkshire, England 4. Observ Sahara & Sahel, Tunis 1080, Tunisia 5. Univ Trier, Fac Geog, Remote Sensing Dept, D-54286 Trier, Germany 6. Inst Social Ecol Res ISOE, D-60486 Frankfurt, Germany 7. State Forestry Adm, China Natl Inst Forest Inventory & Planning, Beijing 100714, Peoples R China	14	1	7	10
		MONITORING AND ASSESSMENT OF LAND DEGRADATION AND DESERTIFICATION: TOWARDS NEW CONCEPTUAL AND INTEGRATED APPROACHES / Vogt, J. V.; Safriel, U.; Von Maltitz, G.; Sokona, Y.; Zougmore, R.; Bastin, G.; Hill, J. MAR-APR 2011. 1. Commiss European Communities, Joint Res Ctr, IES, I-21027 Ispra, VA, Italy 2. Hebrew Univ Jerusalem, Dept Ecol Evolut & Behav, IL-91904 Jerusalem, Israel 3. Jacob Blaustein Inst Desert Res, Ctr Environm Convent, IL-84990 Sede Boqer, Israel 4. CSIR, ZA-0001 Pretoria, South Africa 5. Observ Sahara & Sahel, Tunis 1080, Tunisia 6. CSIRO Ctr Arid Zone Res, Alice Springs, NT 0871 7. Univ Trier, Fac Geosci, D-54296 Trier, Germany	17	1	7	7
Maydica	0.368					
		Selection of extra-early maize inbreds under low N and drought at flowering and grain-filling for hybrid production / Badu-Apraku, Baffour; Fakorede, Morakinyo A. B.; Oyekunle, Muhyideen; et al. 2011. 1. Int Inst Trop Agr UK Ltd, Croydon CR9 3EE, England. 2. Obafemi Awolowo Univ, Dept Crop Prod & Protect, Ife 220005, Osun State, Nigeria	0	1	2	3
Mitigation and adaptation strategies for global change	1.856					
		Land use and climate change adaptation strategies in Kenya / Adimo, Aggrey Ochieng; Njoroge, John Bosco; Claessens, Leaven; et al. FEB 2012. 1. Jomo Kenyatta Univ Agr & Technol, Dept Hort, Nairobi 00200, Kenya 2. Int Potato Ctr, Nairobi, Kenya	0	1	2	3

		Climate change and agricultural technology adoption: the case of drought tolerant maize in rural Nigeria / Tambo, JA ; Abdoulaye, T. MAR 2012. 1. Univ Copenhagen, Fac Life Sci, Copenhagen, Denmark 2. Int Inst Trop Agr, Ibadan, Nigeria	4	1	2	2
		Implications of a changing climate on food security and smallholders' livelihoods in Bogotá, Colombia / Anton Eitzinger; Peter Läderach; Christian Bunn; Audberto Quiroga; Andreas Benedikter; Antonio Pantoja; Jason Gordon; Michele Bruni. 2012. 1. International Center for Tropical Agriculture (CIAT), A.A. 6713 Cali, Colombia 2. International Center for Tropical Agriculture (CIAT), Managua, Nicaragua 3. Humboldt University (Faculty of Agriculture and Horticulture), Berlin, Germany 4. University of West Indies (UWI), Mona Campus, Kingston, Jamaica 5. Oxfam GB - Latin America Caribbean Region, Mexico City, Mexico	N/A	1	4	8
Molecular breeding	3.251					
		Recombinant microsatellite amplification: a rapid method for developing simple sequence repeat markers / Wu, Bin; Lu, Ping; Zhang, Zongwen. JAN 2012. 1. Chinese Acad Agr Sci CAAS, Inst Crop Sci, Beijing 100081, Peoples R China 2. CAAS, Off E Asia, Biovers Int, Beijing 100081, Peoples R China	1	1	2	3
Mountain research and development	0.934					
		Climate Change in a Small Transboundary Tributary of the Syr Darya Calls for Effective Cooperation and Adaptation / Stucker, D ; Kazbekov, J ; Yakubov, M ; Wegerich, K. AUG 2012. 1. Sustainabil (sic) Leaders Network, Hartland, VT 05048 USA 2. Int Water Management Inst, Cent Asia Off, Tashkent 100000, Uzbekistan	0	1	1	4
Nature climate change	14.472					
		Agriculture: Forecasting food / Challinor, Andrew. MAY 2011. 1. Univ Leeds, Sch Earth & Environm, Leeds LS2 9JT, W Yorkshire, England	6	0	1	1
Philosophical Transactions of the Royal Society Series A	2.891					

		Agriculture and food systems in sub-Saharan Africa in a 4 degrees C+ world / Thornton, Philip K.; Jones, Peter G.; Ericksen, Polly J.; Challinor, Andrew J. JAN 2011. 1. ILRI, CGIAR ESSP Program CCAFS, Nairobi 00100, Kenya 2. Waen Associates, Dolgellau LL40 1TS, Gwynedd, Wales 3. Univ Oxford, Ctr Environm, GECAFS Programme, Environm Change Inst, Oxford OX1 3QY, England 4. Univ Leeds, Inst Climate & Atmospher Sci, Sch Earth & Environm, Leeds LS2 9JT, W Yorkshire, England	30	1	4	4
Plant and soil	2.638					
		Effects of organic and mineral fertilizer nitrogen on greenhouse gas emissions and plant-captured carbon under maize cropping in Zimbabwe / Mapanda, Farai; Wuta, Menas; Nyamangara, Justice; Rees, Robert M. JUN 2011. 1. Chem & Soil Res Inst, Dept Res, Harare, Zimbabwe 2. Chem & Soil Res Inst, Specialist Serv, Harare, Zimbabwe 3. Univ Zimbabwe, Dept Soil Sci & Agr Engn, Harare, Zimbabwe 4. Int Crops Res Inst Semi Arid Trop, Matopos Res Stn, Bulawayo, Zimbabwe 5. Scottish Agr Coll, Edinburgh EH9 3JG, Midlothian, Scotland	6	1	4	4
		Soil water content, maize yield and its stability as affected by tillage and crop residue management in rainfed semi-arid highlands / Verhulst, Nele; Nelissen, Victoria; Jespers, Niels; Haven, Heleen; Sayre, Ken D.; Raes, Dirk; Deckers, Jozef; Govaerts, Bram. JUL 2011. 1. CIMMYT, Int Maize & Wheat Improvement Ctr, Mexico City 06600, DF, Mexico 2. Katholieke Univ Leuven, Dept Earth & Environm Sci, B-3001 Louvain, Belgium	8	1	2	8
Plant cell and environment	5.135					

		<p>Acclimation to high CO2 in maize is related to water status and dependent on leaf rank/ Prins, Anneke; Mukubi, Josephine Muchwesi; Pellny, Till K.; ; Verrier, PJ ; Beyene, G ; Lopes, MS ; Emami, K ; Treumann, A ; Lelarge-Trouverie, C ; Noctor, G ; Kunert, KJ ; Kerchev, P ; Foyer, CH. FEB 2011.</p> <ol style="list-style-type: none"> <li>1. Univ Leeds, Fac Biol Sci, Inst Integrat &amp; Comparat Biol, Ctr Plant Sci, Leeds LS2 9JT, UK</li> <li>2. Univ Pretoria, Dept Plant Sci, Forestry &amp; Agr Biotechnol Inst, ZA-0002 Pretoria, South Africa</li> <li>3. Rothamsted Res, Dept Plant Sci, Ctr Crop Genet Improvement, Harpenden, Herts, England</li> <li>4. Rothamsted Res, Dept Biomath &amp; Bioinformat, Ctr Math &amp; Computat Biol, Harpenden, UK</li> <li>5. CIMMYT, Mexico City 06600, DF, Mexico</li> <li>6. Newcastle Univ, NEPAF Proteome Anal Facil, Newcastle Upon Tyne NE1 7RU, Tyne &amp; Wear, UK</li> <li>7. Univ Paris 11, Inst Biol Plantes, F-91405 Orsay, France</li> </ol>	7	1	6	13
Plant disease	2.455					
		<p>Assessing the Adequacy of the Simulation Model LATEBLIGHT Under Nicaraguan Conditions / Ulises Blandon-Diaz, Jorge; Forbes, Gregory A.; Andrade-Piedra, Jorge L.; et al. JUL 2011.</p> <ol style="list-style-type: none"> <li>1. Natl Univ Agr UNA, Dept Plant &amp; Forest Protect, Managua, Nicaragua.</li> <li>2. Swedish Univ Agr Sci, Dept Forest Mycol &amp; Pathol, S-75007 Uppsala, Sweden.</li> <li>3. Int Potato Ctr CIP, Lima 12, Peru.</li> <li>4. CIP, Quito, Ecuador</li> </ol>	0	1	3	4
		<p>International Agricultural Research Tackling the Effects of Global and Climate Changes on Plant Diseases in the Developing World / Savary, Serge; Nelson, Andrew; Sparks, Adam H.; Willocquet, L ; Hodson, D ; Duveiller, E ; Mahuku, G ; Padgham, J ; Forbes, G ; Pande, S ; Sharma, M ; Garrett, KA ; Yuen, J ; Djurle, A. OCT 2011.</p> <ol style="list-style-type: none"> <li>1. Int Rice Res Inst, Los Banos, Philippines</li> <li>2. Int Maize &amp; Wheat Improvement Ctr CIMMYT, Mexico City, DF, Mexico</li> <li>3. Int Potato Ctr CIP, Lima, Peru</li> <li>4. Kansas State Univ, Manhattan, KS 66506 USA</li> <li>5. FAO, AGP Div, I-00100 Rome, Italy</li> <li>6. Syst Anal Res &amp; Training START, Washington, DC USA</li> <li>7. Int Crops Res Inst Semi Arid Trop, Patancheru 502324, Andhra Pradesh, India</li> <li>8. Swedish Univ Agr Sci, Uppsala, Sweden</li> </ol>	11	4	8	14

Plant genetic resources	0.728					
		Evaluation of cowpea ( <i>Vigna unguiculata</i> (L.) Walp.) germplasm lines for tolerance to drought / Fatokun, CA ; Boukar, O ; Muranaka, S. DEC 2012. 1. Int Inst Trop Agr, Oyo Rd,PMB 5320, Ibadan, Nigeria	1	1	1	3
Plant pathology	2.729					
		Complexity in climate-change impacts: an analytical framework for effects mediated by plant disease / Garrett, K. A.; Forbes, G. A.; Savary, S.; Skelsey, P ; Sparks, AH ; Valdivia, C ; van Bruggen, AHC ; Willocquet, L ; Djurle, A ; Duveiller, E ; Eckersten, H ; Pande, S ; Cruz, CV ; Yuen, J. FEB 2011. 1. Kansas State Univ, Dept Plant Pathol, Manhattan, KS 66506 USA 2. Int Potato Ctr CIP, Lima, Peru 3. Int Rice Res Inst, Manila 1099, Philippines 4. Univ Missouri, Dept Agr & Appl Econ, Columbia, MO 65211 USA 5. Univ Florida, Dept Plant Pathol, Gainesville, FL 32611 USA 6. Univ Florida, Emerging Pathogens Inst, Gainesville, FL 32611 USA 7. Swedish Univ Agr Sci, Dept Forest Mycol & Pathol, S-75007 Uppsala, Sweden 8. Int Maize & Wheat Improvement Ctr CIMMYT, Mexico City, DF, Mexico 9. Int Crops Res Inst Semi Arid Trop, Patancheru 502324, Andhra Pradesh, India	19	4	8	14
Plos One	3.73					
		Improving Index-Based Drought Insurance in Varying Topography: Evaluating Basis Risk Based on Perceptions of Nicaraguan Hillside Farmers / Kost, A ; Laderach, P ; Fisher, M ; Cook, S ; Gomez, L. DEC 2012. 1. Univ Bonn, Dept Geog, Bonn, Germany 2. Ctr Int Agr Trop, Managua, Nicaragua 3. Ctr Int Agr Trop, Cali, Colombia 4. Int Water Management Inst, Pelawatte, Battaramulla, Sri Lanka	0	2	3	5
		Seasonal Response of Grasslands to Climate Change on the Tibetan Plateau / Yu, Haiying; Xu, Jianchu; Okuto, Erick; Luedeling, Eike. NOV 2012. 1. World Agroforestry Ctr, Nairobi, Kenya 2. Chinese Acad Sci, Kunming Inst Bot, Key Lab Biodivers & Biogeog, Kunming, Peoples R China 3. E Asia Program, World Agroforestry Ctr, Kunming, Peoples R China	4	1	2	4

		Weather indices for designing micro-insurance products for small-holder farmers in the tropics / Diaz Nieto, Jacqueline; Fisher, Myles; Cook, Simon; Laderach, Peter; Lundy, Mark. JUN 2012. 1. Univ Sheffield, Kroto Res Inst, Catchment Sci Ctr, Sheffield, S Yorkshire, England 2. Ctr Int Agr Trop, Cali, Colombia	1	1	2	4
		Climate Change Affects Winter Chill for Temperate Fruit and Nut Trees / Luedeling, Eike; Girvetz, Evan H.; Semenov, Mikhail A.; Brown, Patrick H. MAY 2011. 1. World Agroforestry Ctr ICRAF, Nairobi, Kenya 2. Nature Conservancy, Seattle, WA USA 3. Rothamsted Res, Harpenden, Herts, England 4. Univ Calif Davis, Dept Plant Sci, Davis, CA 95616 USA	18	1	4	4
PNAS	9.737					
		Assessing the vulnerability of traditional maize seed systems in Mexico to climate change / Bellon, Mauricio R.; Hodson, David; Hellin, Jon. AUG 2011. 1. Biovers Int, Divers Livelihoods Programme, I-00057 Maccaresse, Italy. 2. UN, Food & Agr Org, Plant Prod & Protect Div, I-00153 Rome, Italy. 3. Int Maize & Wheat Improvement Ctr, Socioecon Program, Mexico City 06600, DF, Mexico	13	2	3	3
		Benefits of tropical crops for food security / Vermeulen, Sonja J.; Wollenberg, Eva K. MAR 2011. 1. Univ Copenhagen, CGIAR Res Program Climate Change Agr & Food Secur, DK-1958 Frederiksberg, Denmark 2. Univ Vermont, Burlington, VT 05405 USA	1	1	2	2
Potato journal	N/A					
		Perception of Gujarat farmers on heat-tolerant potato varieties / Rana, R. K. ; Neeraj Sharma ; Kadian, M. S. ; Girish, B. H. ; Arya, S. ; Campilan, D. ; Pandey, S. K. ; Carli, C. ; Patel, N. H. ; Singh, B. P. 2011. 1. Central Potato Research Institute, Shimla - 171 001, Himachal Pradesh, India 2. CIP-SWCA, NASC Complex, New Delhi 3. Jain Irrigation Systems Ltd, Jalgaon-425 001, Maharashtra, India 4. CIP-CAC, Murtazaeva Str. 6, Tashkent, Uzbekistan 5. Potato Research Station, Deesa, Banaskantha, Gujarat, India	1	1	3	10
Proceedings of the Royal Society B	5.683					

		<p>Food security and climate change: on the potential to adapt global crop production by active selection to rising atmospheric carbon dioxide / Ziska, Lewis H.; Bunce, James A.; Shimono, Hiroyuki; Gealy, DR ; Baker, JT ; Newton, PCD ; Reynolds, MP; Jagadish, KSV ; Zhu, CW ; Howden, M ; Wilson, LT. OCT 2012.</p> <ol style="list-style-type: none"> <li>1. USDA ARS, Crop Syst &amp; Global Change Lab, Beltsville, MD 20705 USA</li> <li>2. Iwate Univ, Fac Agr, Morioka, Iwate 020, Japan</li> <li>3. USDA ARS, Dale Bumpers Natl Rice Res Ctr, Stuttgart, AR 72160 USA</li> <li>4. USDA ARS, Wind Eros &amp; Water Conservat Lab, Big Spring, TX 79720 USA</li> <li>5. AgResearch, Land &amp; Environm Grp, Palmerston North, New Zealand</li> <li>6. Int Maize &amp; Wheat Improvement Ctr CIMMYT, Texcoco 06600, Mexico</li> <li>7. Int Rice Res Inst, Crop &amp; Environm Sci Div, Manila, Philippines</li> <li>8. Chinese Acad Sci, State Key Lab Soil &amp; Sustainable Agr, Nanjing 210008, Jiangsu, Peoples R China</li> <li>9. CSIRO Climate Adaptat Flagship, Adapt Primary Ind &amp; Enterprises, Canberra</li> <li>10. Texas A&amp;M Univ, Agrilife Res &amp; Extens Ctr, Beaumont, TX 77713 USA</li> </ol>	8	2	8	11
Rangeland ecology and management	1.733					
		<p>Is Proactive Adaptation to Climate Change Necessary in Grazed Rangelands? / Ash, Andrew; Thornton, Philip; Stokes, Chris; Togtohyn, C. NOV 2012.</p> <ol style="list-style-type: none"> <li>1. CSIRO Climate Adaptat Flagship, Brisbane, Qld 4001, Australia</li> <li>2. Int Livestock Res Inst ILRI, Nairobi 00100, Kenya</li> <li>3. CSIRO Ecosyst Sci, Townsville, Qld 4814, Australia</li> <li>4. Natl Univ Mongolia, Ulaanbaatar 14250, Mongol Peo Rep</li> <li>5. Dryland Sustainabil Inst, Ulaanbaatar 14250, Mongol Peo Rep</li> </ol>	3	1	3	4
Regional environmental change	1.945					
		<p>Options for water storage and rainwater harvesting to improve health and resilience against climate change in Africa / Boelee, E ; Yohannes, M ; Poda, JN ; McCartney, M ; Cecchi, P ; Kibret, S ; Hagos, F ; Laamrani, H. JUN 2013.</p> <ol style="list-style-type: none"> <li>1. IWMI, Colombo, Sri Lanka</li> <li>2. Mekelle Univ, Mekelle, Ethiopia</li> <li>3. CNRST, IRSS, Ouagadougou, Burkina Faso</li> <li>4. IWMI, Addis Ababa, Ethiopia</li> <li>5. IRD UMR G EAU, IRD, Montpellier, France</li> <li>6. Univ Addis Ababa, Addis Ababa, Ethiopia</li> <li>7. IDRC, Cairo, Egypt</li> </ol>	1	1	6	8



		Derivation of a household-level vulnerability index for empirically testing measures of adaptive capacity and vulnerability (title differs slightly from one in list) / Notenbaert, A ; Karanja, SN ; Herrero, M; Felisberto, M ; Moyo, S. APR 2013. 1. CGIAR (location unknown. In article: "implemented by ILRI in Nairobi and IAM in Mozambique")	0	1	1	5
		Climate change perception and adaptation of agro-pastoral communities in Kenya / Silvestri, S ; Bryan, E ; Ringler, C ; Herrero, M ; Okoba, B. DEC 2012. 1. ILRI, Nairobi 00100, Kenya 2. IFPRI, Washington, DC 20006 USA 3. KARI, NPC Soil & Water Management & Conservat Agr, Nairobi, Kenya	3	2	3	5
		Coping with climate-induced water stresses through time and space in the mountains of Southwest China / Su, YF ; Xu, JC ; Wilkes, A ; Lu, J ; Li, QH ; Fu, Y ; Ma, X ; Grumbine, RE. DEC 2012. 1. World Agroforestry Ctr, Heilongtan 650204, Kunming, Peoples R China 2. Yunnan Acad Social Sci, Inst Econ, Kunming 650034, Peoples R China 3. Kunming Inst Bot, Heilongtan 650204, Kunming, Peoples R China	0	1	3	8
		Participatory scenarios as a tool to link science and policy on food security under climate change in East Africa / Chaudhury, M ; Vervoort, J ; Kristjanson, P ; Ericksen, P ; Ainslie, A. APR 2013. 1. CGIAR Res Program Climate Change Agr & Food Secur, Nairobi, Kenya 2. Univ Oxford, Oxford, England 3. Int Livestock Res Inst, Nairobi, Kenya 4. Oxford Brookes Univ, Oxford OX3 0BP, England	1	2	3	5
		Smallholder farmers' perceptions of and adaptations to climate change in the Nigerian savanna / Tambo, JA ; Abdoulaye, T. APR 2013. 1. Univ Bonn, Ctr Dev Res ZEF, Bonn, Germany 2. Int Inst Trop Agr, Ibadan, Nigeria	0	1	2	2
Review of development economics	N/A					

		Economic Development under Climate Change / Arndt, Channing; Chinowsky, Paul; Robinson, Sherman; et al. AUG 2012. 1. Univ Copenhagen, Dept Econ, DK-1353 Copenhagen K, Denmark 2. Univ Colorado, Boulder, CO 80309 USA 3. Univ Sussex, Inst Dev Studies, Brighton BN1 9RE, E Sussex, England 4. MIT, Joint Program Sci & Policy Global Change, Cambridge, MA 02139 USA 5. UNU WIDER, FI-00160 Helsinki, Finland	1	0	5	3
		A Dynamic General Equilibrium Analysis of Adaptation to Climate Change in Ethiopia / Robinson, Sherman; Willenbockel, Dirk; Strzepek, Kenneth. AUG 2012. 1. IFPRI, Washington, DC 20006 USA 2. Univ Sussex, Inst Dev Studies, Brighton BN1 9RE, E Sussex, England 3. MIT, Joint Program Sci & Policy Global Change, Cambridge, MA 02139 USA	2	1	3	3
Rice	2.381					
		Spikelet Proteomic Response to Combined Water Deficit and Heat Stress in Rice ( <i>Oryza sativa</i> cv. N22) / Jagadish, S. V. Krishna; Muthurajan, Raveendran; Rang, Zhongwen W.; Malo, Richard; Heuer, Sigrid; Bennett, John; Craufurd, Peter Q. MAR 2011. 1. Int Rice Res Inst, Plant Breeding Genet & Biotechnol Div, Manila, Philippines 2. Univ Reading, Plant Environm Lab, Reading RG2 9AF, Berks, England 3. Hunan Agr Univ, Coll Agron, Changsha 410128, Hunan, Peoples R China	8	1	3	8
Science	31.027					
		What Next for Agriculture After Durban? / Beddington, J. R.; Asaduzzaman, M.; Clark, M. E.; et al. JAN 2012. 1. Univ Wisconsin, Madison, WI 53706 USA. 2. Univ Autonoma Metropolitana, Mexico City, DF, Mexico. 3. Univ Leeds, Leeds LS2 9JT, W Yorkshire, England	17	1	14	14
Science of the total environment	3.258					

		Greenhouse gas emissions under conservation agriculture compared to traditional cultivation of maize in the central highlands of Mexico / Dendooven, L ; Gutierrez-Oliva, VF ; Patino-Zuniga, L ; Ramirez-Villanueva, DA ; Verhulst, N ; Luna-Guido, M ; Marsch, R ; Montes-Molina, J ; Gutierrez-Miceli, FA ; Vasquez-Murrieta, S ; Govaerts, B. 2012. 1. CINVESTAV, ABACUS, Lab Soil Ecol, Mexico City 07360, DF, Mexico 2. Inst Tecnol Tuxtla Gutierrez, Plant Biotechnol Lab, Tuxtla Gutierrez, Chiapas, Mexico 3. IPN, Escuela Nacl Ciencias Biol, Dept Microbiol, Mexico City 11340, DF, Mexico 4. CIMMYT, Int Maize & Wheat Improvement Ctr, Mexico City 06600, DF, Mexico	2	1	4	11
Scientia agricultura sinica	N/A					
		Construction and application of SSR molecular markers system for genetic diversity analysis of Chinese tartary buckwheat germplasm resources / Gao Fan ; Zhang ZongWen ; Wu Bin. 2012. 1. College of Life Science of Shanxi University, Taiyuan 030006, China	0	0	1	3
Systematic botany	1.287					
		Biogeographic Implications of the Striking Discovery of a 4,000 Kilometer Disjunct Population of the Wild Potato Solanum morelliforme in South America / Simon, Reinhard; Fuentes, Alfredo F.; Spooner, David M. OCT-DEC 2011. 1. Univ Wisconsin, USDA, Agr Res Serv, Dept Hort, Madison, WI 53706 USA 2. Herbario Nacl Bolivia, La Paz, Bolivia 3. Missouri Bot Garden, La Paz, Bolivia 4. Int Potato Ctr, Lima 12, Peru	2	1	4	3
Theoretical and applied climatology	1.759					
		Wetting tendency in the Central Mekong Basin consistent with climate change-induced atmospheric disturbances already observed in East Asia / Lacombe, G.; Smakhtin, V.; Hoanh, C. T. JAN 2013. 1. Int Water Management Inst, SE Asia Reg Off, Viangchan, Laos 2. Int Water Management Inst, Colombo, Sri Lanka	0	1	1	2
Trends in plant science	11.808					

		<p>Agricultural biotechnology for crop improvement in a variable climate: hope or hype? / Varshney, Rajeev K.; Bansal, Kailash C.; Aggarwal, Pramod K.; Datta, Swapan K.; Craufurd, Peter Q. JUL 2011.</p> <ol style="list-style-type: none"> <li>1. Int Crops Res Inst Semi Arid Trop, Patancheru 502324, Andhra Pradesh, India</li> <li>2. CIMMYT, CGIAR Generat Challenge Programme, Mexico City 06600, DF, Mexico</li> <li>3. Univ Western Australia, Fac Nat &amp; Agr Sci, Sch Plant Biol M084, Crawley, WA 6009, Australia</li> <li>4. NRCPB, New Delhi 110012, India</li> <li>5. NBPGR, New Delhi 110012, India</li> <li>6. Indian Agr Res Inst, Div Environm Sci, New Delhi 110012, India</li> <li>7. IWMI, CGIAR Challenge Program Climate Change Agr &amp; Food, New Delhi 110012, India</li> <li>8. ICAR Res Complex, Div Crop Sci, New Delhi 110114, India</li> </ol>	23	3	6	5
Tropical plant biology	N/A					
		<p>Cassava production and pest management: present and potential threats in a changing environment / Bellotti, A.; Herrera Campo, B. V.; Hyman, G. 2012</p> <ol style="list-style-type: none"> <li>1. International Center for Tropical Agriculture, A.A.6713, Cali, Colombia</li> </ol>	4	1	1	3
		<p>Is cassava the answer to African climate change adaptation? / Jarvis, A. ; Ramirez-Villegas, J. ; Herrera Campo, B. V. ; Navarro-Racines, C. 2012.</p> <ol style="list-style-type: none"> <li>1. International Center for Tropical Agriculture (CIAT), Cali, Colombia</li> <li>2. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), Cali, Colombia</li> <li>3. Institute for Climatic and Atmospheric Science (ICAS), School of Earth and Environment, University of Leeds, UK</li> </ol>	1	1	2	4
Water international	0.705					
		<p>Water productivity responses and adaptation to climate change in the lower Mekong basin / Mainuddin, Mohammed; Mac Kirby; Hoanh, Chu Thai. 2012.</p> <ol style="list-style-type: none"> <li>1. CSIRO, Land &amp; Water, Canberra</li> <li>2. SE Asia Reg Off, Int Water Management Inst, Viangchan, Lao Pdr, Laos</li> </ol>	0	1	2	3

		Integrating cost and benefit considerations with supply- and demand-based strategies for basin-scale groundwater management in South-West India / Kumar, S ; Lagudu, S ; Pavelic, P ; Davidson, B. 2012. 1. Int Water Management Inst, Hyderabad, Andhra Pradesh, India 2. Univ Melbourne, Melbourne, Vic, Australia	2	1	2	4
		The nature and impact of climate change in the Challenge Program on Water and Food (CPWF) basins / Mulligan, Mark; Fisher, Myles; Sharma, Bharat; Xu, Z. X.; Ringler, Claudia; Mahe, Gil; Jarvis, Andy; Ramirez, Julian; Clanet, Jean-Charles; Ogilvie, Andrew; Ahmad, Mobin-ud-Din. 2011. 1. Kings Coll London, Environm Monitoring & Modelling Res Grp, London WC2R 2LS, England 2. Int Ctr Trop Agr CIAT, Cali, Colombia 3. Int Water Management Inst, New Delhi, India 4. Beijing Normal Univ, Key Lab Water & Sediment Sci, Beijing 100875, Peoples R China 5. Int Food Policy Res Inst, Washington, DC USA 6. UMR HydroSci, Montpellier, France 7. IRSTEA, Montpellier, France 8. CSIRO Land & Water, Canberra.	5	3	8	10
Water policy	1.603					
		Freshwater, climate change and adaptation in the Ganges River Basin / Hosterman, HR ; McCornick, PG ; Kistin, EJ ; Sharma, B ; Bharati, L. 2012. 1. Duke Univ, Nicholas Inst Environm Policy Solut, Durham, NC 27708 USA 2. Delhi Off, Int Water Management Inst, New Delhi 110012, India 3. Nepal Off, Int Water Management Inst, Dept Irrigat, Kathmandu, Nepal	1	1	2	5
Water practice and technology	N/A					

		Impacts of meso-scale Watershed Development in Andhra Pradesh (India) and their implications for designing and implementing improved WSD policies and programs / Croke, B. ; Herron, N.; Pavelic, P.; Ahmed, S. ; Reddy, V. R.; Ranjan, R. ; Syme, G ; Samad, M. ; Rao, K. V. 2012. 1. National Centre for Groundwater Research and Training and Department of Mathematics, Fenner School of Environment and Society, ANU, Canberra 2. Bureau of Meteorology, 14 Childers St, Canberra 3. International Water Management Institute, ICRISAT, Patancheru 502324, AP, India 4. National Geophysical Research Institute, Uppal Road, Hyderabad 500606, Andhra Pradesh, India 5. Livelihoods and Natural Resource Management Institute, 12-2-417/18 Sarada Nagar, Mehdipatnam, Hyderabad 500067, Andhra Pradesh, India 6. Graduate School of the Environment, Macquarie University, NSW 2109 7. Centre for Planning, Edith Cowan University, Joondalup Perth WA 6027 8. Central Research Institute for Dryland Agriculture, Santoshnagar, Hyderabad 500059, Andhra Pradesh, India	0	1	8	9
Water SA	0.876					
		Water-balance approach for assessing potential for smallholder groundwater irrigation in Sub-Saharan Africa / Pavelic, P ; Smakhtin, V ; Favreau, G ; Villholth, KG. 2012. 1. Int Water Management Inst, Viangchan, Laos 2. Int Water Management Inst, Colombo, Sri Lanka 3. HydroSci Montpellier, IRD, Montpellier, France 4. Int Water Management Inst, Pretoria, South Africa	3	1	2	4
	Mean Impact factor			Mean No Centers	Mean No Institutions	Mean No Authors
	3.02463			1.1296296	3.41975309	5.5123457