

# Dutch research and Climate Smart Agriculture

Towards improved alignment between policy and knowledge institutions & more effective collaborations with CGIAR-CRPs

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## Summary

Climate smart agriculture aims to unite the research and policy agendas for sustainable agriculture, economic development and climate change. It has been defined as agriculture that sustainably increases productivity and resilience (adaptation), reduces greenhouse gases (mitigation), and enhances food security and development. CSA is seen as a concept or process of agricultural planning, which requires knowledge-based, context-specific solutions while developing policies, markets and institutions to operationalize climate smart intensification. The Ministry of Economic Affairs (EA), Department AgroKnowledge has expressed the need for a more strategic programming of Dutch R&D in support of Climate Smart Agriculture. The current study was commissioned with the aim to provide guidance to the ministry on how to:

- A. improve synergies between Dutch policy and research on Climate Smart Agriculture
- B. enhance impact and visibility of Dutch research within the area of Climate Smart Agriculture
- C. develop more effective collaborations with the relevant CGIAR CRPs.

## Conclusions and recommendations

### A. IMPROVE SYNERGIES BETWEEN POLICY AND RESEARCH ON CLIMATE SMART AGRICULTURE

- Climate Smart Agriculture integrates global challenges. Alignment of research and policies at the national and international level is essential to deal with those challenges. At the global level the GRA is currently the main platform to link CSA research to policy, whereas the CSA alliance is under development. GRA focuses on science. CSA alliance focuses on policy and the science-policy interface. The CGIAR is an important player in global research on CSA and is well aligned with international initiatives/organizations such as GRA, FACCE-JPI, UNFCCC and the CSA alliance.
  - **The ministry of Economic Affairs is advised to adopt a cooperate model and to align their research programming with that of FACCE, GRA and the relevant CRPs (CAAFS, FTA, WLE and PIM), together with the ministry of Foreign Affairs (BZ), for example by tailoring research contracts with research institutes.**
  - **To improve synergies between research and policy a further integration of the GRA and CSA alliance is recommended.**
- National and European programming of research calls provide good opportunities to connect policy and research through a more strategic agenda which is aligned with GRA, CSA and CRPs. At the same time collaborations with relevant partners for impact on the ground such as NGOs and private sector can be stimulated.
  - **Strategic linkages between research, policy and actors on the ground to enhance impact of CSA research can be realised by including additional requirements in the current call mechanisms such as FACCE-JPI, ERANET, Horizon2020, NWO-WOTRO Global Challenges Fund and the Applied Research Fund.**

### B. ENHANCE IMPACT AND VISIBILITY OF DUTCH RESEARCH WITHIN THE AREA OF CLIMATE SMART AGRICULTURE

- Important strengths of Dutch research institutes that are particularly valued both nationally and internationally and are considered relevant for CSA include: (i) Strong expertise on sustainable agricultural practices; (ii) crop, farming system and landscape modelling and climate modelling; (iii) integrated system approaches including social (e.g. gender), institutional (incl market) and ecological aspects (iv) participatory action research and knowledge systems and (v) combining research with capacity building. Dutch research is good at linking fundamental science to practical solutions by working in an interdisciplinary approach. Another selling point of Dutch institutions are their experiences with impact-driven collaboration through Public Private Partnerships.

Collaborations with CGIAR-CRPs and actors on the ground (including private sector and NGOs) are key to greater impact of CSA research.

- **Linking the unique selling points of Dutch research with CSA research priorities through the GRA and CSA alliance should be the basis for a more strategic agenda in order to reduce fragmentation of research efforts and resources.**
  - **Funders should avoid fragmentation of their research funds and provide longer term commitment instead of allocating small amounts on an annual basis.**
- Breakthroughs in climate change research, including relations between mitigation and adaptation, require new arrangements that work cross-cutting across Dutch (or European) research institutes that have demonstrated excellence in relevant scientific fields. For example agriculture and life sciences (Wageningen UR), water research (for example TU Delft, Deltares), geoinformation sciences (ITC, Enschede) and governance (e.g. VU, Amsterdam). European research can have important spin-off at the global scale, provided that science and technology developments in Europe are valorised to confront global challenges.
    - **Linking scientific excellence across relevant disciplines and institutions should be a priority for the strategic research agenda in order to advance scientific progress and predictive understanding of climate change impacts and adaptation strategies.**
    - **Better opportunities for European projects to link up with international organizations such as the CGIAR or GRA and to develop research collaborations with developing countries should be created.**

#### C. DEVELOP MORE EFFECTIVE COLLABORATIONS WITH THE RELEVANT CGIAR RESEARCH PROGRAMMES

- Both the Dutch research institutions and the CGIAR have a strong interest in collaborations based on complementarity and strengths. Working relations with the CGIAR offer important opportunities for Dutch research, in terms of impact, up-scaling and agenda setting. Many collaborations already exist, but resources and topics are scattered and often based on working relations between individual researchers. A need for more strategic collaboration is identified by both parties. Climate Smart Agriculture is a strategic theme of mutual interest and offers scope for broad support due to (inter)national policy attention.
  - **It is recommended to strengthen and concentrate the collaboration with the CGIAR based on a strategic national agenda focused on (connecting policy and) research for Climate Smart Agriculture. Such an agenda should be developed with a focus on mutual interests and priorities, as well as complementarity and strengths of Dutch research institutions.**
- Collaboration with CRPs offers better opportunities for strategic collaboration than individual centres. CCAFS is an obvious partner since Climate Smart Agriculture is most prominent in their agenda. FTA, WLE are important partners for Climate Smart Agriculture from a landscape perspective, while the link with PIM is important for the institutional embedding and involvement of private sector through market development or sustainable value chains. These four CRPs are currently financially supported by the Netherlands. **Being an important CG donor the Netherlands should stimulate partnerships and collaborations between the CGIAR and Dutch research institutes based on joint objectives and strengths of Dutch research. This can be done in different ways:**
  - **The existing support of ministries for contract research by Dutch research institutes can adopt special conditions to focus research on those topics that fit the national and international strategic agenda for CSA research, in collaboration with the relevant CRPs.**
  - **Part of the funds currently allocated to the CGIAR through the ministry of Foreign Affairs can be used to stimulate the desired partnerships, research topics and innovations. .**
  - **Bilateral funding through embassies could be directed to strengthen research on local innovations towards Climate Smart Agriculture, while linking up Dutch researchers with GRA and CRPs, NGO's and the private sector. Impact oriented collaboration should be rewarded.**



- A particular case is the linkage with the private sector. The CRPs are moving towards stronger linkages with the private sector. Agricultural research and policy in the Netherlands is characterized by strong relationships with the private sector, while involvement of the private sector has recently become an important focal area for the ministry of Foreign Affairs due to its focus on 'aid and trade'. This characteristic of Dutch R&D is also reflected in the Top Sectors who have indicated their interest in cooperating on global challenges around food and nutrition security. In addition, Climate KIC (Climate Knowledge and Innovation Community; <http://www.climate-kic.org/>) is working at the EU level on, amongst other issue, Climate Smart Agriculture by connecting private sector partners to research institutes. Leading Dutch research institutes and companies are taking part in this initiative. Dutch expertise and experience with Public-Private Partnerships could strengthen collaborations with the CRPs as well as impact on Climate Smart Agriculture through a focus on commodities, such as dairy, potato, cocoa and vegetables, and climate smart value chains. At the same time a broad focus that takes into account social and ecological trade-offs at the local, regional and global level is required to prevent unintended spill over effects and creating synergies where possible.
  - **A more strategic collaboration with CRPs should take into account the strong interest and experience Dutch Partners have in working in Public Private partnerships and private sector involvement in agricultural development. Benefits are mutual for CRPs and Dutch partner organizations.**
  - **We recommend that commodity-based approaches to CSA that allow for strong linkages with the private sector are combined with a system approach where social and ecological trade-offs and synergies at the landscape or regional levels are taken into account. Funding mechanisms would have to be designed/directed to support this focus.**
  - **In certain cases, international cooperation of the Top Sectors on research for Climate Smart Agriculture may play a role in stimulating innovation market development and up-scaling of new models for CSA. This can be effectuated through partnerships between research, the Dutch private sector and SMEs in partner countries with involvement of the CGIAR. Interesting are those cases were benefits for Dutch SME sector go hand in hand with poverty alleviation and food security in target countries However, it should be noted that topsector is aiming at short term business cases which does not necessarily fit in with the longer-term goals of CSA.**

# 1. Introduction

## 1.1 Background

Climate smart agriculture (CSA) has been defined as agriculture that sustainably increases productivity and resilience (adaptation), reduces greenhouse gases (mitigation), and enhances food security and development (FAO 2010; FACCE-JPI). CSA aims to unite the agendas of the agricultural, development and climate change communities. CSA is not seen as a practice or a system, but rather as a concept, or process of agricultural planning, which requires knowledge-based, context-specific solutions. This includes the development of technologies, policies, markets and institutions to operationalize climate smart intensification. CSA strategies (FAO 2012) therefore involve the coordination of activities that cut across a number of stakeholders, such as farmers, the retail and financial sector, the government as well as research and extension. In this process synergies and trade-offs between multiple objectives and outcomes set in diverse social, economic, and environmental contexts need to be taken into account (CSA 2014).

At the global level, CSA has been adopted by the Consultative Group on International Agricultural Research (CGIAR) as one of the focal themes in their research agenda. One of the overarching CGIAR research programmes (CRPs) is dedicated to this theme: CRP7-Climate Change, Agriculture and Food Security (CCAFS).

During recent years, the Dutch government has been very active in pursuing an agenda for improved synergy between policies and actions on the global challenges, such as agriculture, food security and climate change. The ministry of Economic Affairs, through the Directorate General Agri, is taking a leading role. CSA has become an important strategic theme that implies, through its integrated nature, many interconnections with the agendas of other government departments, especially the ministry of Foreign Affairs, Directorate-General for International Cooperation (DGIS). There are also many linkages with European and international policies and research agendas. Alignment of the policy agenda with the national and international research agenda and knowledge implementation is key to obtaining the envisaged impact on climate and food security.

In this context, there are several important developments and initiatives that aim to stimulate and align policy and research on CSA:

- As a follow up of the 2013 global policy conference on CSA (Johannesburg, December 2013) a Global Alliance for CSA will be established in the Netherlands in July 2014 and launched in September 2014 during the UN Climate Summit.
- In July 2014, the Netherlands will become chair of the Global Research Alliance on Agricultural Greenhouse Gases (GRA).
- The Ministry of Economic Affairs is involved in research funding of CSA through the European Joint Programming Initiative on Food, Agriculture and Climate Change (FACCE-JPI).
- The Netherlands coordinates a newly established European Working Group AR-ARD (under SCAR en EIARD) which explores opportunities to improve synergy between general research and research for development in EU funding.

Dutch research institutes are well known and widely recognised for their capacity in applied sciences related to sustainable land and water management and food systems. From the perspective of the Dutch Ministry of Economic Affairs improved alignment of the CSA policy agenda with national research, and more effective collaboration within the global research community, is needed to enhance the visibility and impact of Dutch research for CSA. Therefore, the Ministry of Economic Affairs (Department AgroKnowledge) has commissioned a strategic study on how to make national research programming on CSA more robust and more closely aligned with global (e.g. CCAFS) and European (e.g. JPI-FACCE, IntensAfrica under Horizon2020) research programming.

## 1.2 Objectives and approach

This study has the aim to provide guidance to the Ministry of Economic Affairs on how to:

- a) improve synergies between policy and research on Climate Smart Agriculture,
- b) enhance impact and visibility of Dutch R&D institutions within the area of Climate Smart Agriculture,
- c) develop more effective collaborations with the CGIAR-CRPs.

This study was conducted following a stepwise approach:

1. a literature study on Climate Smart Agriculture
2. an inventory of the most important policy developments (national, EU).
3. a description of what characterizes CRP strategies and work programmes on Climate Smart Agriculture.
4. identification of the strengths of Dutch research institutions, and their current involvement in the relevant CRPs.
5. an inventory of barriers and opportunities to stimulate research for Climate Smart Agriculture, including more strategic collaborations with CRP's.
6. recommendations for improved effectiveness of Dutch R&D, including collaboration with CRPs, on Climate Smart Agriculture.

We used key policy documents provided by the ministries, information from relevant presentations and available scientific literature. Selected contact persons in the relevant ministries, NGOs, universities, research institutions and private partners, as well as researchers involved in CCAFS or other CRPs were interviewed. As a starting point we used the list of collaborations between WUR and the CGIAR that was available through Wageningen International (version December 2014). We also identified persons in our networks who are involved in CCAFS or in other relevant collaborations with the CGIAR. Additionally, we used a second list of Dutch CCAFS partners provided by the CCAFS secretariat. Interviews were structured according to a list of questions from which we posed the ones that were relevant depending on the interviewee.

Parallel to this study the ministry of Foreign Affairs conducted a similar study (Van den Bos, 2014) focussing on the alignment of Dutch policy with CGIAR as a whole. The two study teams coordinated and shared methods and information to avoid overlap and to learn from each others' insight.

## 2. Climate Smart Agriculture and the Dutch policy agenda

### 2.1 Key observations

- A convergence of agendas between the Dutch ministries of Economic Affairs and Foreign Affairs is taking place. Climate Smart Agriculture could be an important umbrella overarching food- and water security and trade, and may unite the future sustainable development goals.
- CSA integrates global challenges; it provides a common ground to work on alignment of policy agendas and research needs. It also allows for linking sustainable agriculture to related issues such as natural resources and biodiversity.
- The Netherlands is already taking an important role in international initiatives on CSA by investing in the CSA Alliance, FACCE-JPI and the GRA.
- Funding from the Dutch government to the CGIAR flows via core financing of two windows (1 and 2), steered by the International Fund Council of which DGIS is a member.

### 2.2 Relevant policy developments and relations between ministries

Global challenges and their interrelatedness are important drivers leading to increased convergence of focal areas between ministries of Economic Affairs and Foreign Affairs. Many connections exist between the agendas. An example of how ministries combine forces is provided by the shared policy brief on food security (Anonymous, 2011) by the former Minister for European Affairs and International Cooperation (Foreign Affairs) and Agriculture (Economic Affairs) in 2011. Food security is a major focal area for Development Cooperation, which has been elaborated into four pillars for which specific indicators have been identified: (i) increased and sustainable production, (ii) access to better food (iii) more efficient markets (iv) improved enabling environment for private sector involvement. The latter two pillars illustrate the increased emphasis on innovation and markets as part of the solution to global challenges. The embassies have an important role in the coordination of activities under this policy. Strong collaboration with public and private actors and capitalization on Dutch knowledge and capacities is considered of great value to create impact.

The policy document 'What the world deserves: A new agenda for aid, trade and investment' (Anonymous, 2013a) describes how the Netherlands is transitioning from an aid to a trade relationship to stimulate mutual economic benefits to eradicate extreme poverty and promote sustainable and inclusive growth, and to facilitate success for Dutch companies doing business abroad. Within the context of this policy change involvement of the private sector in low and middle-income countries on the basis of Corporate Social Responsibility principles is stimulated through mechanisms such as the Dutch Good Growth Fund (or PSI funds). 'What the world deserves' recognizes that new and more flexible ('hybrid') types of cooperation are needed with private companies, research institutes and NGOs.

In addition, the ministry of Economic Affairs has issued an action plan on 'Natural Capital: conservation and sustainable use of biodiversity' (Anonymous, 2013b). In this agenda climate change and environment are included in the two main themes: i) water and food security and ii) trade policy.

The policy brief 'Internationaal Landbouwbeleid' (Anonymous, 2014) describes the vision of the State Secretary on Dutch agriculture in an international context, and in relation to food security. According to this policy brief the Ministry of Economic Affairs emphasizes the important role of the Dutch agro sector in sustainable agricultural innovation and specifically climate smart agriculture globally. Efforts will consist of: productivity enhancement, sustainable and efficient value chains, improved access to markets and an improved environment for entrepreneurship. With Dutch knowledge and experience in the agro sector the government, private sector, knowledge institutes, and NGO's all will contribute to the development of agriculture and food security in the world, while CSA is considered one of the potential mechanisms or guiding principles to achieve food security. Climate

Smart Agriculture is able to further connect food security and related global challenges in a more integrated approach. Further cooperation between ministries on food security issues can improve Dutch efforts on both food security and climate smart agriculture.

## 2.3 Role of ministries in research funding

### 2.3.1 Ministry of Economic Affairs

The Ministry of Economic Affairs is involved in research funding of CSA through the European Joint Programming Initiative on Food, Agriculture and Climate Change (FACCE-JPI). The Netherlands also coordinates a newly established European Working Group ARCH (under SCAR en EIARD) which explores opportunities for improved synergy between European agricultural research and research for development. Wageningen UR is funded by EZ to support GRA initiatives.

The network of agricultural counsellors abroad is pursuing a private-public-knowledge sector approach and has been working with Dutch research organizations. Agricultural counselors had the opportunity to make use of the Seed Money instrument of Topsector AgriFood to develop research proposals with private companies. However, climate smart agriculture was not a main theme. The topsectors focus on short term business cases which do not necessarily fit in with the longer-term goals of CSA.

### 2.3.2 Ministry of Foreign Affairs

The ministry of Foreign Affairs aims at reducing poverty and hunger by focusing on global public goods such as food and nutrition security. Research is a considerable part of their means in achieving these goals. Large part of the budget is directed to international organizations such as the International Fund for Agricultural Development (IFAD) which implements for example the Agricultural Smallholder Adaptation Programme (ASAP) aiming at increased resilience of smallholder farmers to climate change. Another major beneficiary is the CGIAR. Dutch funding to the CGIAR is allocated to Windows 1 (unrestricted) and 2 (CRPs) with no additional conditions other than those formulated by the CGIAR Fund Council of which DGIS is a member. The mechanism by which the Dutch government has some control over research spending is through the selection of CRPs to be funded. Apart from DGIS, the preferences of the ministries of Economic Affairs (CCAFS) and Infrastructure and Environment (WLE, FTA) for certain CRPs is taken into account. Decisions on allocation of Dutch funds to the CGIAR are taken every four years and will be revisited in 2015. By contrast, other countries like Germany or France opt to have a stronger control of the programs they fund and the collaboration with national research institutes (see Van den Bos, 2014).

Another responsibility of DGIS is capacity building, which is funded through grant programmes such as NUFFIC/niche and TVET (Technical and Vocational Education and Training).

## 3. Global initiatives: GRA and CSA Alliance

### 3.1 GRA

In July 2014, the Netherlands will become chair of the Global Research Alliance on Agricultural Greenhouse Gases (GRA). This Global Research Alliance was initiated after the World Summit on Climate Change in Copenhagen under the leadership of New Zealand. The Alliance focuses on research, development and extension of technologies that deliver ways to grow more food without increasing greenhouse gas emission intensities. Increasingly there is a focus towards climate adaptation (climate-resilient food systems).

The GRA connects researchers via thematic programs on 1. paddy rice, 2. livestock, 3. croplands, 4. soil carbon and nitrogen cycling and 5. inventories and measurements. The GRA brings together countries and international institutions to stimulate collaborations, share knowledge and best practices, and capacity building. Currently there are 40 Alliance Member Countries and 7 partner organisations:

- African Development Bank
- Centro Agronómico Tropical de Investigación y Educación (CATIE)
- Consultative Group on International Agricultural Research (CGIAR)
- Food and Agriculture Organization (FAO)
- Inter-American Institute for Cooperation on Agriculture (IICA)
- World Bank
- World Farmers Organisation (WFO)

Wageningen UR supports the ministry of Economic Affairs in coordinating GRA activities.

### 3.2 CSA

Since the first global policy conference on Climate Change, Food Security and Agriculture (The Hague, 2010), the concept of CSA has gained increasing attention at international and national levels and commitment to a common policy agenda has been demonstrated. Scientific objectives and research challenges have been identified and addressed at the scientific conferences in Wageningen (2011) and Davis (2013). As a follow up of the 2013 global policy conference on CSA in Johannesburg a Global Alliance for CSA will be established. The CSA Alliance will be launched in September 2014 during the UN Climate Summit in New York. In Johannesburg it has also been decided that a knowledge platform for CSA will be established and led by FAO and CCAFS. Aim is to develop a global research agenda, which better connects science with policy. The next CSA science conference is planned to take place in Montpellier in March 2015. The CSA Alliance will be comprised of governments, formal institutions, civil society, and the business sector. A knowledge platform for CSA will be led by FAO and CCAFS with the aim to further develop a global research agenda that connects science with policy.

### 3.3 Complementarity of GRA and CSA

A better integration of GRA en the newly established CSA Alliance has been advocated (Rabbinge, 2014) because of strong complementarity. Whereas GRA acts principally as an international research network, CSA emphasises the importance of policies and multi-stakeholder platforms that set the conditions for innovation and facilitate the implementation of climate smart technologies. The GRA is dominated by researchers who analyse agricultural systems and identify options towards climate smart technologies and pathways. The responsibility for a societal transformation towards climate smart agriculture lies with the various end users. Close collaborations between GRA and the CSA Alliance can therefore deliver important progress in this direction.

## 4. CGIAR Research Programmes and Climate Smart Agriculture

### 4.1 Key observations

- The Netherlands is a major donor to the CGIAR.
- Considering CSA 4 CRPs are highly relevant: Policies, Institutions and Markets (PIM), Climate Change, Agriculture and Food Security (CAAFS), Forest, Trees and Agroforestry (FTA) and Water, Land and Ecosystems (WLE). These CRPs are all subsidized by The Netherlands.
- CCAFS is specifically designed to address climate change and agriculture. FTA and WLE are important partners for CSA for a more integrated landscape focus. PIM is important for institutional embedding and private sector involvement through markets development and sustainable value chains.
- CCAFS aims at developing stronger linkages with the private sector.
- CCAFS is well aligned with global initiatives and organizations such as GRA, CSA alliance, UNFCCC and FACCE-JPI.

### 4.2 Organizational background and (Dutch) funding

The Consultative Group on International Agricultural Research (CGIAR) is a key player in global agricultural research and development. CGIAR research is dedicated to reducing rural poverty, increasing food security, improving human health and nutrition, and ensuring more sustainable management of natural resources. The CGIAR consists of 15 Centers, that work in collaboration with partner organizations, including national research institutes, NGOs, universities, and the private sector ([www.cgiar.org](http://www.cgiar.org)). In 2008 the CGIAR underwent a major reform allowing for a more strategic research agenda, which was urgently needed to be able to effectively address global challenges. Sixteen CGIAR Research Programs (CRPs) were developed and provide space for strategic research and stronger collaboration between the centres. What further characterizes the CRPs is that they are very much impact-oriented. CGIAR donors are united in the CGIAR fund which finances research carried out by the Centers through the CRPs.

The CGIAR underwent a steep increase in funding over the past few years with the budget exceeding 950 Billion USD in 2013. The funding is distributed over three Windows according to which donors can designate their contribution. Window 1 represent the least restricted type of funding for which the Fund Council makes decisions about the use, such as allocation to CGIAR Research Programs (CRPs) and payment of System costs. Window 2 contributions are designated to specific CRPs. Window 3 consists of funds allocated to specific Centers.

The Dutch government, through the Ministry of Foreign Affairs is a major donor to the CGIAR and has played a significant role in the CGIAR reform. For the period 2012-2015 the total contribution is 160 M US\$ (28 M€ per year) of which 25% has been allocated to Window 1 (unrestricted) and 75% to Window 2. CRPs that have been selected for Dutch funding under Window 2 include the CRPs Policies, Institutions and Markets (PIM), Climate Change, Agriculture and Food Security (CAAFS), Forest, Trees and Agroforestry (FTA) and Water, Land and Ecosystems (WLE). For a more extensive overview of the CGIAR fund council and different arrangements made by different donor countries we refer to the study of Anne van den Bos for DGIS (Van den Bos, 2014).

Current CRP contracts end in 2014 or 2015. The first set of CRPs was very much determined by the institutional transformation process in which the value for money for development outcomes was not as central as it could have been. The second round will be focused around Intermediary Development Outcomes and will pay more attention to linkages between CRPs and the coherence of the overall portfolio. The current status is that all existing CRPs will be extended to the end of 2016 and that the second round will start in 2017.

### 4.3 CGIAR Research Programmes and Climate Smart Agriculture

Climate Smart Agriculture has been adopted by the CGIAR as one of their focal themes and one of their CRPs, CCAFS, is dedicated to this theme. The CRPs Forests, Trees and Agroforestry (FTA) and Water Land, and Ecosystems (WLE) are also involved in CSA. From the policy and markets point of view, an important aspect of CSA implementation, the CRP Policies, Institutions and Markets (PIM), led by IFPRI, plays an important role.

CCAFS work is led by CIAT in collaboration with the other CGIAR Centres and five core partners that lead specific research activities (e.g. Climate change scenario analysis, which is led by University of Oxford). The CCAFS office is hosted at the University of Copenhagen. Other core partners are Leeds University; Columbia University and the University of Vermont). CCAFS also collaborates closely with Future Earth, an international research initiative of the global change community. CCAFS focuses on research and research informed development through science-policy platforms in 5 regions (East Africa, West Africa, Latin America, Southeast Asia and South Asia) (<http://ccaafs.cgiar.org>).

In the second phase of CCAFS the goals for climate-smart agriculture, food systems and landscapes will be focused around five Intermediate Development Outcomes (IDOs) (Table 1; CCAFS, 2013). Four Flagships contribute to the 5 IDOs. Competitive research calls on CCAFS Flagships are open for concept notes and offer chances for collaboration in which Dutch research institutes can participate or lead, although according to several Dutch researchers more clarity and transparency about the selection process/criteria would be needed. The Global Alliance for Research of Agricultural Greenhouse Gasses (GRA) will be a key partner in Flagship 3 (Table 1). Countries that have shown interest in developing low emission development policies or are members of the GRA are targeted as key partners in the initial work of the Flagship (e.g. Colombia, Vietnam and Kenya). Some of these countries may also provide opportunities to start bilateral projects, linking to CSA and GRA objectives, via the agricultural counsellors. CCAFS has prepared global and regional engagement strategies, where key partners along the impact pathway have been identified and partnerships formed to deliver on the development outcomes. A similar process will be conducted at country level. CCAFS aims to spend 30% of its budget on partners.

*Table 1 How CCAFS Flagships contribute to Intermediate Development Outcomes (CCAFS, 2013).*

CCAFS flagships	Intermediate Development Outcomes (IDOs)				
	Food security	Gender & social differentiations	Adaptive capacities	Policies & institutions	Mitigation
Climate-smart practices	X	X	X		X
Climate information services and climate-informed safety nets	X	X	X	X	
Low-emissions agricultural development		X		X	X
Policies and institutions for climate-resilient food systems	X	X	X	X	

### 4.4 CCAFS and links with the private sector

Strengthening the cooperation with the private sector is an important objective for CCAFS. According to CCAFS director Bruce Campbell and other CIAT researchers, CCAFS has some experiences and successful examples with insurance industry, telecommunications, input suppliers, seed companies, etcetera but CCAFS would like to see more



private sector involvement in their portfolios. CCAFS is therefore planning a strategic study on the (potential) linkages with the private sector to see how the collaborations can be improved. As expertise and experience is available at Wageningen UR, the close linkages between CCAFS and Wageningen could be valuable in this respect, as an example involvement of the dairy sector was mentioned. CCAFS is also closely aligned with FACCE-JPI and sees opportunities to translate or expand knowledge or tools for CSA which are generated at the EU level to the global level, for example improved climate-related models.

## 4.5 FTA, WLE and PIM

The CRP Forests, Trees and Agroforestry (FTA) is led by ICRAF, with strong involvement of CIFOR, Bioversity and CIAT and collaboration with other research institutes such as the French organisation CIRAD and CATIE in Costa Rica. FTA focuses on adaptation and mitigation through land use (e.g. agroforestry) and the synergies between adaptation and mitigation (<http://www.cgiar.org/our-research/cgiar-research-programs/>). Forests and trees in agricultural plots or landscapes can act as buffers in the landscape that provide ecosystem services such as water cycling and climate regulation and maintenance of soil fertility. An important highlight of recent research is the impact of forests on regional rainfall patterns through their impact on short-cycle rainfall derived from evapotranspiration over land (van Noordwijk *et al.* 2014). In addition to the long-term climate regulating effects of forests and trees through C sequestration, understanding the short term impacts on rainfall patterns and temperature moderation requires more attention. Strong collaborations between hydrologists, climate modellers, ecologists and agronomists is important to move this further.

Water, Land and Ecosystems (WLE) focuses on four objectives: (i) increase agricultural productivity, while protecting the environment; (ii) stop degradation of the natural resource base for agriculture; (iii) boost agricultural growth through scientific inquiry and policy analysis; (iv) research on agricultural and ecosystem interactions.

Policies Institutions and Markets (PIM) is dedicated to pro-poor, sustainable agricultural growth, particularly for small producers. This CRP focuses on macroeconomic dimensions, environmental inputs and outcomes, and important enabling conditions, such as rural infrastructure, effective markets, and complementary services like credit and agricultural extension. Emphasis is on supporting country-led, country-driven, and country-owned development processes through collaborative research, partnership, and capacity building. The decision of DGIS to select PIM for funding under Window 2 fits well the 'aid and trade' approach of the Dutch government.

## 5. Dutch research for Climate Smart Agriculture

### 5.1 Key observations

- In the agricultural and water sectors Dutch research is amongst the top players. Cross-linkages between excellent research groups within different scientific areas can create scientific breakthrough for climate smart agriculture.
- Dutch research is strong in linking fundamental and applied sciences and has a strong interest and experience with working with the private sector (including Topsectors), providing a basis for impact-oriented research.
- The Topsectors Agri & Food and Horticulture & propagation material have indicated their interest in cooperating on CSA.
- At the EU level Climate KIC is working, amongst other issues, on CSA by connecting private sector partners to research institutes with strong involvement of key Dutch companies and research institutes. Under JPI-FACCE, Dutch researchers will cooperate in European projects aiming at climate adaptation. At the global level, collaboration on CSA exists between Dutch research institutes and the CGIAR, and also among members of the GRA.
- The Netherlands is internationally recognized for its strong expertise in system approaches and modelling, which is important for creating integrated solutions and understanding of social and ecological trade-offs.

### 5.2 Strengths and key actors

Agriculture and Life Sciences, Water and Geosciences are the broad scientific fields that are of particular interest for Climate Smart Agriculture. A key characteristic of Dutch research is the strong link between fundamental science and applied science, which provides a platform for the development of practical solutions. Over the past ten years research has progressed towards working more in an interdisciplinary manner. This has also resulted in more impact-driven collaboration through Public Private Partnerships.

Key research institutions that are most relevant for CSA are:

- *Wageningen University and Research centre*: Food and Life Sciences (Animal Sciences, Plant Sciences, Environmental Sciences, Agro-technology and Food Sciences and Social Sciences). Areas where CSA could particularly benefit from Wageningen UR expertise are crop breeding, disease management, horticulture, soil management and smart-farming technologies for sustainable intensification).
- *Free University Amsterdam*: Governance
- *University of Twente & ITC, Enschede*: Geo-information science and earth observation.
- *Technical University Delft & Deltares*: Water management, Delta Management Climate Institute deltas, coastal regions and river basins. water management
- *Utrecht University*: Biology environment (climate change)
- *SOW-VU*: policies and markets

Our interviewees (both national and within the CGIAR) particularly valued Dutch research for the following expertise:

- Strong scientific expertise on sustainable agricultural practices
- Crop, farming system and landscape modelling, and climate models
- Integrated system approaches including social aspects (e.g. gender)
- Participatory action research and knowledge systems
- Combining research with capacity building.

## 5.3 Public-private partnerships

Linking to the private sector and civil society is expected to increase impact and improved efficiency and valorisation of research. Agricultural research and policy in the Netherlands are characterized by strong relationships with the private sector. Moreover, involvement of the private sector has recently become an important focal area for the ministry of Foreign Affairs due to its focus on 'aid and trade'.

A Top Sectors approach for public-private partnerships (PPPs) with involvement of researchers and the private sector in government co-funded research programs has been adopted by the Dutch government (the so-called 'golden triangle'). For Agri-food the focus is on innovation and productivity, for the horticulture and propagation materials sector pioneers the development of crops that for example are less sensitive to variable weather conditions, or require fewer pesticides. In the Dutch Top Sectors approach the private sector is steering research questions and innovation aiming at converting knowledge into new products and services. So within the Topsectors there is a clear focus on market opportunities.

The Topsectors have indicated interest in PPPs with developing countries and initiatives are on-going that could potentially be linked with CSA (e.g. on breeding). However some barriers warrant attention and need to be overcome, such as issues around intellectual property rights, lack of clarity on financial terms and the proposal selection process. Moreover, the focus of Topsectors on immediate business opportunities may not fit well with the long-term perspective and broad scope of CSA. Currently, there does not seem to be a major role for Topsectors in CSA research, other than some specific cases. The Topsector funded research is applicable especially in those cases where there is room to find common interests on public and private goods.

Interviewees within the CGIAR and Dutch research institutes provided several examples of collaborations between the CGIAR and private partners. Examples of the former are PPPs between CIAT and Dow AgroSciences LLC on the commercialization of improved fodder hybrids, or between CIAT and National Starch (a subsidiary of AkzoNobel) on the evaluation of cassava properties, with the aim to create benefits for cassava farmers through the use cassava as a cash crop along with its traditional role as a staple food (CIAT, 2014). No examples of existing of Dutch public-private partnerships cooperating with the CGIAR/CRPs were identified but the examples provided show that such opportunities exist and could be stimulated, e.g. through interactions with Dutch embassies or ministries.

## 6. Collaboration between Dutch research and the CGIAR/CRPs

### 6.1 Key observations

- Both NL and CRPs have a strong interest in collaborations based on complementarity and strengths. There are many on-going collaborations. Most of them have developed based on relations between individual researchers/groups and ad hoc.
- Both parties identify a need for coordinated collaboration, but there is no clear strategy to stimulate this at the institutional level.
- Climate Smart Agriculture is a strategic theme of mutual interest and offers scope for broad support due to (inter)national policy attention.
- Universities are more flexible in collaborating within CRPs, e.g. through joint PhDs. For other institutes funding for salary costs is a major barrier limiting collaboration. Opportunities for joint project formulation exist (e.g. Horizon 2020). WUR is currently involved in such an initiative for IntensAfrica.
- Existing policy and research planning and programming processes can be used to strengthening collaboration
- Dutch expertise and experience with Public-Private Partnerships is a benefit to collaborations with the CRPs and impact on CSA through a focus on commodities relevant for the Netherlands, such as dairy, potato, cocoa and vegetables, and climate smart value chains.

### 6.2 Examples existing NL-CG partnerships; barriers and opportunities

- During the interview viewpoints were collected on (i) the main motivations for collaborations between NL research institutions and CRPs from the point of view of Dutch researchers and NGOs (ii) the type of capacities for which Dutch research institutions are recognized by CRPs or NGOs are listed below:
  - a) Motivation for collaboration with CGIAR/CRPs:
    - Enhance impact (Dutch research institutions, NGOs)
    - Good infrastructure and network in places that are not always easy to work in (Dutch research institutions, NGOs).
    - Influencing the CRP agenda or mode of working (less top-down technologies, more local adaptation and innovation) (NGOs)
    - Capacity building (Dutch researchers)
  - b) Strengths of Dutch research institutions for CSA research
    - Climate modelling (CCAFS, researchers, government)
    - Crop modelling (CCAFS, researchers, government)
    - Systems modelling (CCAFS, researchers)
    - Systems approach, including social aspects (CCAFS, researchers, government)
    - Public-private partnerships (government, researchers)
    - Climate Smart Technologies for crop and/or livestock systems (CCAFS, researchers)
    - Social sciences, gender, action research, knowledge systems (CCAFS, NGOs)
    - Capacity building (CGIAR researchers, Dutch researchers)

In short, the motivation to work with the CGIAR/CRPs is based on overlap and complementarity of research interests, capacity building and the quality of the CGIAR networks and infrastructure for Dutch researchers. Recognizing the complementarities in terms of knowledge, skills and facilities is important for guiding future collaboration.

Examples of existing partnerships between the CGIAR and Dutch research institutes were identified through the partnership lists of Wageningen International and CCAFS and through interviews. It became clear that:

- A large number (>35) of collaborations is listed on the WI list. Some of them represent joint workshops or publications or the intention to develop joint project proposals. But in most cases there is collaboration through joint research projects (e.g. EU, BMGF), shared PhD supervision or shared postdoc or staff positions that are partly funded by a CRP or CG institute.
- Collaborations are often based on long term working relationships between individual researchers, in which Dutch researcher bring in their own research money, e.g. through joint PhDs. Examples of joint research projects also exist.
- Collaborations are based on a large variety of topics. Interviewees reported that most collaborations were not very strategic but rather ad-hoc.
- Collaborations exist both at the level of the individual CGIAR centres as well as through CRPs, the number of CRP collaborations on the WI list increased since the previous inventory from 2012.
- The CCAFS list contains the contractual collaborations but many interactions between CCAFS and Dutch organisations exist such as organization of conferences, joint publications that are not listed here.

Successful research projects (i.e. beyond the stage of exploring or joint workshops) and more long-term collaborations were characterized by:

- Partners bringing in their own source of funding (ranging from EU projects to BMG Foundation, NWO and sandwich PhD students).
- Shared positions contribute to long-term collaborations based on time and cost sharing (e.g. post docs senior researchers or endowed chairs). Many examples of shared positions from postdocs to professors are available.
- From the point of view of the CRPs successful collaborations should fit the CRP agendas. In those cases CRPs are willing to invest time and funds. One example is the collaboration between CCAFs and Kasper Kok (chair group Land Dynamics at Wageningen University), who was hired by CCAFS for part of his time for scientific leadership in scenario studies (Bruce Campbell, personal communication).

DLO researchers identified the lack of funding for salary costs as the main bottleneck for partnerships with CRPs. In the case of availability of funds that can potentially be used for international projects in the Top sectors or KB schemes, there is also strong competition within Wageningen UR for the limited amount of funds available. The difficulties for the applied research institutes to find funding is not surprising as the general trend is that most funding schemes are decreasing or that the requirements for funding are getting more challenging.

Examples of joint project development are the EU projects 'Animal Change' (Teun Vellinga, ASG, ILRI, and coordinated by INRA); or 'RAP' with WUR and CRP 3.3, the Global Rice Science Partnership CRP or the BMGF funded project N2AFRICA, led by Wageningen University in collaboration with IITA, CIAT and the Water, Land and Ecosystems CRP).

University researchers did generally not see the funding as the most important barrier. Through flexibility and creativity a lot can be achieved in the university system. Joint supervision of PhD students (e.g. through Nuffic or WOTRO grants, or with CGIAR funding) is one of the mechanisms by which this can be arranged as the salary costs of university researchers are (partly) recovered when the PhD successfully defends the thesis. Those and other types of barriers and possible solutions that were mentioned during the interviews are listed in Table 2. Opportunity costs in terms of time in meetings were identified as a major problem by university researchers.

*Table 2 Barriers and opportunities for collaboration between Dutch research institutions and CRPs as identified during interviews with key informants.*

<b>Barriers</b>	<b>Opportunities/solutions</b>	<b>Action required by</b>
Salary costs that are not covered by CRPS	Bring in own project money or develop joint projects	Dutch researchers University researchers,
No restrictions to Dutch funding to CGIAR		Wageningen International, Foreign Affairs
	Joint PhD students	University researchers
Shortage of suitable grants for collaboration	Better matching of national DLO funding or 'Topsectoren' to the desired partnerships	DLO researchers and Ministry of Economic Affairs
Too many meetings (high transaction costs, at the expense of research time are incompatible with the university system)	Shared positions / part-time subcontracting of coordinators	University researchers
Funding for international collaborations (e.g. ERANET) are below the funding threshold of CG Centres	Work in collaboration through parallel projects with related objectives (strategic collaboration)	University researchers, DLO
CGIAR Centres often work with short-term funding	Collaborate with CRPs (4 yr funding)	University researchers
Lack of long term planning, too ad-hoc/scattered when collaborating with Centres	More strategic collaborations through CRPs, but be careful not to lose flexibility.	University researchers
Lack of strategic collaboration, too ad-hoc/scattered	Collaboration through Flagship projects	CCAFS, University researchers
Lack of fit of proposed work with the strategic plans and priorities of the CRPS	More strategic collaboration based on research agenda of joint interest	CRPS
Lack of fit of proposed work with the strategic plans and priorities of the CRPS	Collaboration through Flagship projects	CCAFS

Mutual expectations of collaboration between CGIAR and Dutch research institutions are not always clear. Moreover the mode and expectations of collaboration have changed with the reform of CGIAR. Shared positions seem to provide a mechanism by which this problem can be overcome and collaboration can be strengthened through time and cost sharing between CRPs and research institutions.

## 6.3 Potential for more strategic collaboration; options and roles

Dutch research institutes, the Ministry of Economic Affairs and CRPs such as CCAFS have expressed a need for more strategic collaboration. From the above we identified several options to better align Dutch research with the CRPs through more strategic research programming (core financing and competitive calls). The expected benefits are improved synergies, enhanced impact and more effective collaborations. Options and the roles of different actors in the process are presented in Table 3. The key or lead actors for each of these activities is listed, the exact role of the actor or manner in which this options can be handled is not worked out.

*Table 3 provides insight in the various options and which actors are linked to these options.*

<b>Options</b>	<b>Actors</b>
Ensure that Dutch international and national research funding are geared towards collaboration building on the strengths and priorities of Dutch research	Economic Affairs & Foreign Affairs
Bilateral funding through embassies could be directed to strengthen research on local innovations towards CSA adaptation while linking up with the GRA, CGIAR and Dutch researchers	Economic Affairs & Foreign Affairs
Coordination research funds with CGIAR	Economic Affairs & Foreign Affairs Research institutes
More strategic collaborations on selected topics linking the unique selling points of Dutch research with CSA research priorities	Universities, Research institutes Economic Affairs & Foreign Affairs
Improved matching of national DLO funding or 'Topsectoren' to the desired partnerships	DLO researchers Economic Affairs
Formulate a strategic agenda focused on CSA. Such an agenda should be developed with a focus on mutual interests and priorities, as well as complementarity and strengths of Dutch research institutions	Universities, Research institutes
Coordination research funds with CGIAR	Universities, Research institutes
Bring in own project money or develop joint projects	Universities, Research institutes
Joint PhD students	Universities, Research institutes
Shared positions / part-time subcontracting of coordinators	Universities, Research institutes

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