4. The science and diplomacy of global challenges: Food security in EU-Africa relations

Authors:

Pauline Ravinet, Rafaël Cos, Mitchell Young

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1. Governance arrangement

1.1. Food Security: the EU commitment to a global concern

As a supranational actor committed to engaging more actively in international affairs, the EU has chosen to make knowledge central to its identity and policy system. Simultaneously, the EU has to face increasingly urgent and complex challenges, more interdependent and global in nature, and which require more and more scientific expertise to be addressed – food security is one of them.

Food security has been defined by the Food and Agriculture Organization (FAO) of the United Nations (UN) as:

> *"Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life. Household food security is the application of this concept to the family level, with individuals within households as the focus of concern"*[1].

Food security is a concept that covers several major dimensions : (i) the availability in sufficient quantities of food of appropriate nature and quality and in all parts of the national territory whatever the source of this food (local production, import or food aid); (ii) the access to the necessary food resource for a nourishing diet - these resources include both monetary resources and access rights to produce food; (iii) stability of access to food, that is, access to food for the population cannot be put at risk by any natural or economic shock; (iv) the appropriate use of food (good cooking and preparation of various foods) favouring an adequate supply of nutrients and energy in a context where the consumption of this food is safe for health (hygiene, drinking water, health or medical infrastructure)[2].

During the last 20-30 years, we actually observed institutional and scientific debates on the necessary reshaping of global food security goals. These debates are directly linked to the series of food crises and food scandals that, in the 1990s, challenged the post war implementation of the "Green Revolution" - a system based on quantity food production thanks to the use of fertilizers, on economic liberalization and international trade and which postulates that agro-industrial complex and open market would provide food security:

> *"The green revolution of the 1960s and 1970s depended on applications of fertilizers, pesticides and irrigation to create conditions in which high-yielding modern varieties could thrive. It provided the basis for a quantum leap forward in food production. But it also taught scientists and policy-makers some important lessons for the future."*[3]

The first Green revolution succeeded in improving yields in the breadbasket regions where it was implemented and increased food crop productivity (rice production in Asia and Southern America is an illustration). But, as former UN special rapporteur Olivier de Schutter writes, the Green revolution "*sometimes came at a high social and environmental cost, including the depletion of soils, pollution of groundwater, increased inequalities among famers, and the productivity gains were not always sustainable in the long term*."[4]

[1] FAO (2003): Trade Reforms and Food Security. Conceptualizing the Linkages. Rome: FAO.

[2] FAO (2008): The Right to Food and Access to Natural Resources. Using Human Rights Arguments and Mechanisms to Improve Resource Access for the Rural Poor. Rome: FAO.; FAO (2009): The State of Food Insecurity in the World. Economic crises – impacts and lessons learned. Rome: FAO.

[3] FAO: Towards a Green Revolution. Retrieved from: http://www.fao.org/3/x0262e/x0262e06.htm

[4] De Schutter, Olivier, Gaëtan Vanloqueren (2011): The New Green Revolution: How Twenty-First-Century Science can Feed the World. In: Solutions. Vol.2, 4, pp. 33-44.

Next to the necessary sustainability of soil and the necessary social equality for the production of food and for its access, climate change is another key factor for the rethinking of world agro-systems. Indeed, food production experts observed that climate changes already have dramatic consequences on agriculture and international food security[5]. 600 million additional people could be at risk of hunger as a direct result of climate changes[6] since the world population is estimated to increase to 9 billion by 2050, and while arable soils are diminishing.

In addition to this, experts remark that modern agriculture is dependent to oil and highly sensitive to oil prices[7]. Food production relies on oil or gas at many stages: pesticides and nitrogen fertilizers are made of oil and gas, irrigation, machinery runs, transports are all oil dependent, thus increasing the economic pressure on the food market and generating social conflicts. In this respect, the European Union and UN agencies report that hunger and malnutrition have increased between 2000 and 2010 (around 1 billion people in food insecurity in 2010, according to the EU*)* as a direct consequence of the economic crisis in 2008 when food prices on global market soared, and sparked "food riots" across Africa, Asia, and Latin America. Although prices stabilized in 2011, global food prices in May 2011 where higher than they were in June 2008.

All these social, environmental and economic risks forced the FAO to engage into the conceptualization of a more comprehensive "New Green Revolution" aiming at supporting not only food quantity crop, but the sustainable development of local farming systems and aiming at improving food safety all along the food chain.

> *"The new green revolution draws on the best of the technologies that have doubled production over the past 30 years. At the same time, it emphasizes alternative approaches and improved farm management and information systems in order to minimize environmental damage from external inputs and benefit poor farmers and marginal areas bypassed by the original green revolution[8]."*

In a comprehensive publication by the FAO in 2011 on global food security and food safety[9], food experts called for a shift from a quantity based food security conception toward a food security conception concerned also by the social-cultural and environmental impacts of food production with special emphasis on the preservation of natural resources – as renown "father" of the Green Revolution in India M. S. Swaminathan underlines, "*unsustainable consumption of natural resources presents a grave threat to food security"*[10]. From a general standpoint, food security has thus merged with new variables (energy, water, climate, migration) by introducing more linkages[11].

This shift from a security food supply policy to a policy also worried about social sustainability and environmental safety food production is supported by the EU. During the last 20 years, the EU developed a food security policy in close cooperation with Rome-based UN agencies, namely International Fund for Agricultural Development (IFAD), the Food and Agriculture Organization (FAO), and the World Food Program (WFP).

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[5] FAO (2008): Climate change and food security: framework document. Retrieved from: http://www.fao.org/forestry/15538-079b31d45081fe9c3dbc6ff34de4807e4.pdf

[6] De Schutter, Olivier, Gaëtan Vanloqueren (2011): The New Green Revolution: How Twenty-First-Century Science can Feed the World. In: Solutions. Vol.2, 4, pp. 33-44.

[7] Alghalith, Moawia (2010): The interaction between food prices and oil prices. In: Energy Economics. 32(6), pp. 1520-1522.

[8] FAO: Towards a Green Revolution. Retrieved from: http://www.fao.org/3/x0262e/x0262e06.htm

[9] FAO (2011): New Paradigm of Agriculture.

[10] Alghalith, Moawia (2010): The interaction between food prices and oil prices. In: Energy Economics. 32(6), p. 1521.

[11] Fattibene, Daniele (2016): Strengthening the EU's External Action: The Need for an EU Food Diplomacy? Istituto Affari Internazionali Working Paper.

The partnership between the EU and the UN agencies on International Governance System and on Food and Nutrition Security has been redefined in 2010 – two years after the food price shock of 2008 – in a key text: the *Policy Framework on Food Security (PFFS)*. The policy paper, which resulted of a joint effort taken by DG International Cooperation and Development (DEVCO) and DG European Civil Protection and Humanitarian Aid Operations (ECHO), is a communication from the Commission to the Council and the European Parliament which aimed at providing a Framework to assist developing countries in addressing food security challenges. The text follows recent reflections on the necessary transformation of global food systems. The Commission initiative completes and defines the key issues in the current food security agenda, such as nutrition, price volatility, social protection and safety nets, biofuels, food safety, research and innovation, and the "right to food" concept which states that each household either has the means to produce or buy its own food.

Food security projects are mainly treated as part of the Global Public Goods and Challenges (GPGC) thematic programme. About 1.5 billion euros have been allocated each year for "Food and Nutrition Security and Sustainable Agriculture" projects between 2014-2020[12]. Beyond the classical intergovernmental level, the EU food security policy is now two-layered. The international level involves, on the one hand, other regional or international actors: about 60 countries built their bilateral relations with the EU on food security projects. On the other hand, the EU is committed to cooperation with the growing number of international actors dealing with food security: the FAO, the African Union, the Economic Community of West African States (ECOWAS), the above-mentioned International Fund for Agricultural Development (IFAD), NGOs and international research organisations such as the International Food Policy Research Institute (IFPRI).

As for the internal level, it implies on the one hand Commission Directorate-Generals (DGs), especially DEVCO[13], which coordinates geographical funding instruments and thematic programmes dedicated to specific topics[14], AGRI, (both implied in promoting food safety and developing bilateral cooperation) and ECHO (mainly involved in humanitarian assistance policies). Through its international delegations, EEAS plays also a role "on the ground", mainly to shape the cross-cutting nature of food security and to coordinate the activities of DGs abroad.

In a nutshell, a set of institutions, concerns, competencies, partnerships and programmes draws the outlines of the EU food security diplomacy. Thus, a key question is to understand to what extend science plays a role in deploying this food security diplomacy – or in other words, to what extent there is a science diplomacy of the issue of food security.

1.2. Food security diplomacy and funded research: the EU-AU relationships case

The now classical categorisation of different forms of science diplomacy (i.e. diplomacy for science, science for diplomacy, and science in diplomacy) is helpful to apprehend the science diplomacy dimensions of Food security[15].

- Activities of international networking in food security research are a cooperation policy purpose, and for instance can clearly be understood as "**diplomacy for science**", or diplomacy facilitating international scientific cooperation.

[12] Idem.

[13] Before the Treaty of Lisbon entered into force, DEVCO prerogative were covered by the Europe Aid structure.

[14] European Commission: Food and Nutrition Security. Retrieved from: https://ec.europa.eu/europeaid/sectors/food-and-agriculture/food-and-nutrition-security_en

[15] The Royal Society / AAAS (2010): New Frontiers in Science Diplomacy. Navigating the changing balance of power. RS Policy document 01/10.

- The way the food security challenge is linked to issues of stability, conflict prevention, health, well-being, or migration also makes of Food security research activities a case of "**science for diplomacy**", or as science cooperation improving international relations. Food security is also an important market issue for EU relationships with different regions, especially Africa.
- What needs to be explored more precisely is then Food security as a case of "**Science in diplomacy**" or of science (here food security research) advising / informing diplomacy (here EU external relations).

A more comprehensive way to apprehend food security as science diplomacy issue for the EU is to analyse the interfaces between science (EU food security research) and diplomacy (food security as an issue for the EU as global actor). Given that food security is explicitly identified as one the major global challenges, that the EU is more and more acting as "knowledge power" capable of harnessing its knowledge capacity to address global challenges, and more especially given the fact that the EU is spending millions to fund food security research, especially in Horizon 2020, one would expect to observe clearly designed strategic interfaces between science and diplomacy on this topic. Is it the case? This is what this study will try determine[16].

In order to picture the importance of food security research for the EU, we can look at the issue of food security in Horizon 2020. Horizon 2020 identifies 7 so called "societal challenges", "*where targeted investment in research and innovation can have a real impact benefitting the citizen*"[17]. In terms of science diplomacy, societal challenges are interesting because they carry the idea that science has potential but not yet answers, and thus by extension requires a different approach by EU policy makers in general, and diplomats more particularly when global challenges are concerned. Within the pillar "societal challenges", the societal challenge n°2 is "Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research and the Bioeconomy". This societal challenge n°2 as a whole is not framed in a way that shows general foreign policy concerns (agricultural or forestry policies for instance seem more central). But when looking more precisely, for example, at Horizon 2020 work programmes 2016-2017 and 2018-2020, within the call "Sustainable food security", there is a dedicated section on "*Support to the Implementation of the EU-Africa Partnership on Food and Nutrition Security and Sustainable Agriculture*"[18]. Here the nexus between a foreign policy overarching objective (supporting the implementation of the EU-Africa partnership) and science is explicit, which makes the topics under this section particularly relevant for the S4D4C core questioning, and an ideal case to study.

What is then more precisely the position and history of the food security issue for the African Union (AU) and for the EU-Africa relationships, and more especially of food security as a science diplomacy issue?

For a number of reasons, EU-AU food diplomatic channels can be seen as a key issue for both partners. On the African side, the starting point is that Africa remains the most food insecure region of the world and[19], as such, the African Union countries have come together

[16] For more details regarding the methodology used, please refer to the last section of this report

[17] European Commission: Societal Challenges. Retrieved from: https://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges

[18] European Commission: Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research and the Bioeconomy. Retrieved from: https://ec.europa.eu/programmes/horizon2020/en/h2020-section/food-security-sustainable-agriculture-and-forestry-marine-maritime-and-inland-water

[19] The UN Millennium Development Goals Report 2015 highlights that "in sub-Saharan Africa, projections for the 2014-2016 period indicate a rate of undernourishment of almost 23 per cent. While the hunger rate has fallen, the number of undernourished people has increased by 44 million since 1990, reflecting the region's high population growth rate." Retrieved from: https://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20(July%201).pdf

on this topic. In July 2003, African Heads of State and Government signed a declaration on Agriculture and Food Security in Maputo, Mozambique. The Maputo Declaration called for a pan-African flagship programme to enhance agriculture production and bring about food security on the continent. The Comprehensive African Agriculture Development Programme (CAADP) is the resulting African policy framework for attaining food security, nutrition and sustainable development through agriculture-led investment at both national and regional levels. CAADP aims to increase public investment in agriculture by a minimum of 10 per cent of national budgets, and to raise agricultural productivity by at least 6 per cent. To date, 44 African countries have signed the CAADP Compact to allocate 10 per cent of their national budgets to agriculture, and 39 countries have formulated national agriculture and food security investment plans.[20] More recently, the African Union's Science, Technology and Innovation Strategy for Africa 2024 (STISA-2024)[21], adopted in 2014, outlines six priority areas that will contribute to the AU Agenda 2063. Priority 1 is the eradication of hunger and achieving food security.

This brings us into the current era of 'agricultural diplomacy' towards food security in Africa, with major actors such as the USA, Brazil and China, among others, each approaching the issue of development aid from different perspectives. Several countries in Africa signed bilateral Science and Technology Cooperation Agreements with the European Union: South Africa (1996, entered into force 1997), Egypt (2005, entered into force 2008), Tunisia (2003, entered into force 2004), Morocco (2004, entered into force 2005) and Algeria (signed 2012, entered into force 2013). Current bi-lateral projects include efforts to improve food security and reducing poverty through intra-regional fish trade; strengthen institutional capacity to enhance governance of the fisheries sector in Africa; and a regional focus on animal genetic resources.

After depicting the general landscape of food security governance at the global level, and the relevance of looking at issue of food security in EU-AU relationships as a EU science diplomacy case, we will now study more in depth the stakeholders and governance practices, looking at the interfaces between food security research and diplomacy (section 2), and highlighting some challenges and weaknesses (section 3).

[20] NEPAD: Overview. Retrieved from: https://www.nepad.org/caadp/overview

[21] African Union: STISA-2024. Retrieved from: https://au.int/sites/default/files/newsevents/workingdocuments/33178-wd-stisa-english_-_final.pdf

2. Stakeholders & governance practices (1): exploring the science – diplomacy interfaces in funding policies

2.1. Science to increase foreign policy goal: the HLPD on S&T and the roadmap on FNSSA

A first question to raise is how does EU funded research on food security interact with diplomacy arena? What are the interfaces and contact points between Horizon 2020 Food security research and the EU foreign policy?

A starting point for the analysis is the Joint Africa-EU Strategy (JAES), adopted at the Lisbon Summit in 2007 by the Heads of State of both continents and transcribed in a Council policy note[22]. Its main objective was to deploy a long-term approach of "*how to ensure peace and security and leverage faster socio-economic growth and sustainable development in Africa*"[23], and insisted on the importance of food security issues as well as science cooperation. Institutional stakeholders of JAES are officially the Heads of State and Governments of EU Member States in the European Council and the Foreign Affairs Council of the EU. On the operational level, EEAS and DG DEVCO ensure policy and strategic coordination.

JAES gave a framework for deepening the partnership via the EU-Africa Summits and resulted in the implementation of the EU-Africa High Level Policy Dialogue (HLPD) on Science, Technology and Innovation at the 2nd Africa-EU Summit in Tripoli, in 2010.

This dialogue is designed to serve as the main interface for regular cooperation on research and innovation policy. Since 2011, its operational Bureau is co-chaired by DG Research and Innovation for the EU, and by African Ministerial Council on Science and Technology (AMCOST) for the African Union, but the dialogue gathers S&T representatives from the Member States of both continents. Its mandate was established in Addis Ababa. A first step of its activity consisted in carrying out a mapping study in order to draw the STI cooperation landscape between the EU and AU. A second step occurred in the 2013 Brussels HLPD meeting, whose one of the conclusions was that:

> *"There is a need for the EU-Africa HLPD to focus on a reduced number of common challenges for the STI cooperation to be effective, although there are many common challenges such as climate change, global health, and improved livelihood. The first priority will be the role of STI in promoting food and nutrition security and sustainable agriculture."*[24]

The EU-Africa Summit 2014 led to two important initiatives. First, it was established that as a cross-cutting challenge, STI

> *"contributes to the attainment of all other socio-economic development objectives, including the Millennium Development Goals (MDGs) and the future post-2015 and Sustainable Development Goals (SDG) targets. Investments in STI are vital to promote growth and employment, improve competitiveness and identify and address pressing global societal challenges such as climate change, affordable renewable energy and energy efficiency, infectious diseases or food and nutrition security"*[25].

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[22] Council of the European Union (2007): The Africa-EU Strategic Partnership. A Joint Africa-EU Strategy.

[23] European Commission: Africa, Policy Background. Retrieved from: http://ec.europa.eu/research/iscp/index.cfm?pg=africa#policydialogue

[24] European Commission (2013): Conclusions. EU-Africa High Level Policy Dialogue on STI Brussels, 28-29 November 2013, p.3.

[25] European Commission: Africa, Policy Background. Retrieved from: http://ec.europa.eu/research/iscp/index.cfm?pg=africa#policydialogue

Second, it set up an expert working group (EWG) to provide a roadmap for building a jointly funded research and innovation partnership focused on food and nutrition security and sustainable agriculture. The EWG established that the most useful instruments to implement this strategy were jointly funded competitive calls (ERA-NET[26], AU Research Grants[27], Horizon 2020). The work of the expert group was adopted in April 2016 in Addis Ababa by the HLPD Senior Officials Meeting and the "Roadmap towards an EU-Africa R&I Partnership on Food and Nutrition Security and Sustainable Agriculture (FNSSA)" emerged.

Key goals of the FNSSA partnership include boosting the impact of AU-EU joint research at local level by addressing the entire value-chain; strengthening capacity-building (human, research infrastructures and institutional); focusing on demonstration projects and pilot actions to bring research and innovation results to the users; increasing production of high quality food with appropriate inputs, to enhance income growth and promoting rural development[28].

These goals are achieved, in part, by two funding streams: African Union Research Grants, supported by the EU Pan-African programme, funded by the EU, but managed directly by the African Union Commission, with a view to building a system of competitive research grants at Pan-African level; and Horizon 2020 projects, created in response to targeted calls to Africa focusing on FNSSA, and allowing for synergies with emphasis on local multi-stakeholder action, among them, the ERA-NET co-fund LEAP-Agri (refer to the schematic below).

At the time of writing this report in spring 2019, Horizon 2020 feeds several with regional, but also infra-regional strategic partnerships, such as the ten-year initiative PRIMA (for Partnership for Research and Innovation in the Mediterranean Area). Since 2018, PRIMA consists in a joint programme improving solutions for water availability and sustainable agriculture production in the Mediterranean basin. On this basis, it includes nine EU Member States as well as Algeria, Egypt, Morocco and Tunisia[29].

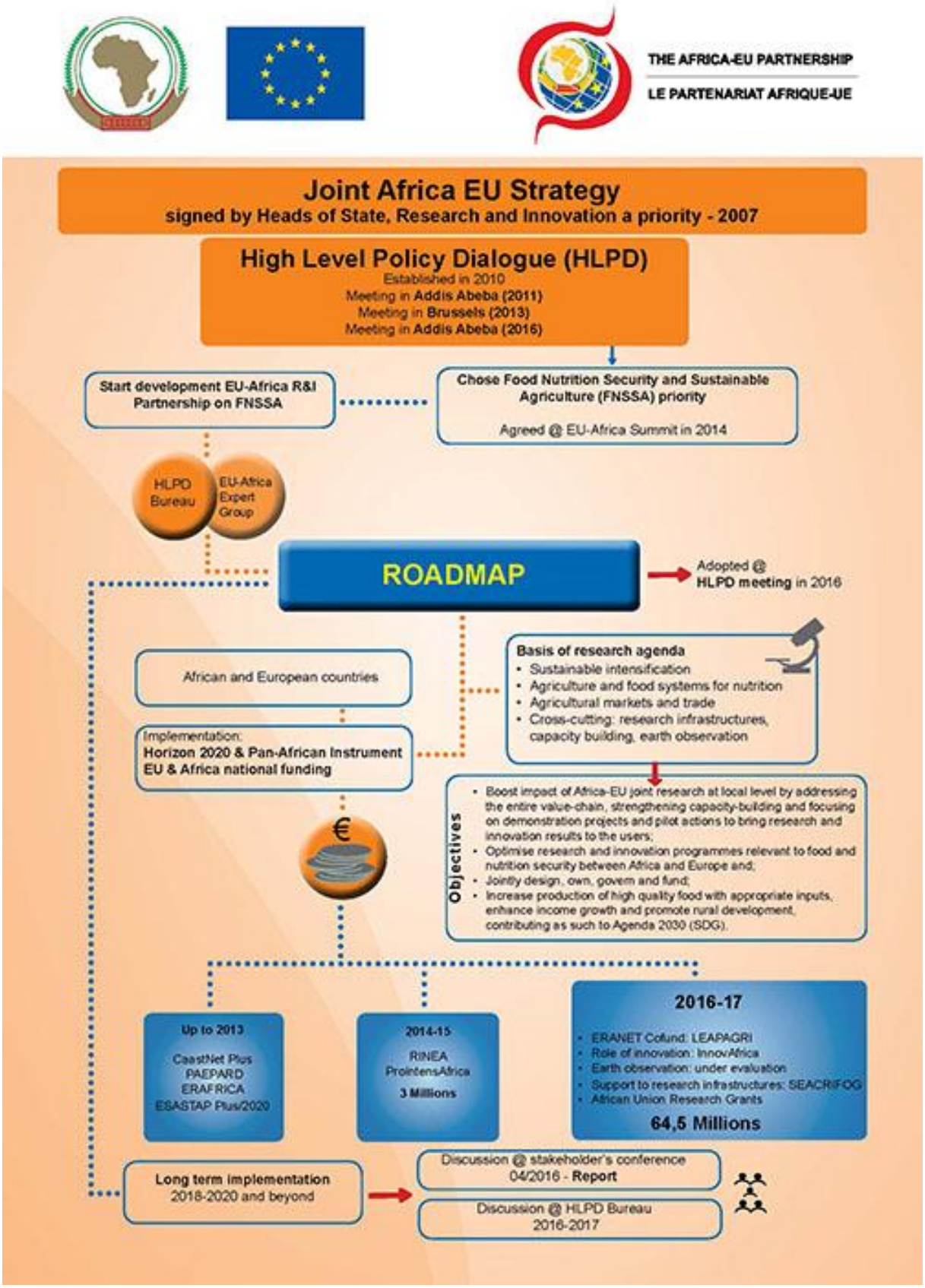
As such, Horizon 2020 instrument encloses a strong international science cooperation concern, but with a flexible cooperation arrangement (classical" cooperation arrangements would force African countries to put cash in the cooperation, which would not be possible, here the arrangement allows to involve in a more flexible way experts from both continents).

[26] The ERA-NET scheme gathers research activities at a national or regional level (notably regarding digital food systems). European Commission: ERA-Net Cofund scheme. Retrieved from: https://ec.europa.eu/programmes/horizon2020/en/h2020-section/era-net

[27] The AU grants are managed by the AU but deal with smaller projects (between three to five partners). The budget is mainly coming from DG DEVCO.

[28] African Union: EU-Africa Research and Innovation Partnership on Food and Nutrition Security and Sustainable Agriculture. Retrieved from: https://ec.europa.eu/research/iscp/pdf/policy/eu-africa_research_innovation_cooperation_on_fnssa_en.pdf

[29] European Commission: Partnership for Research and Innovation in the Mediterranean Area (PRIMA). Retrieved from: http://ec.europa.eu/research/environment/index.cfm?pg=prima



Source: https://www.africa-eu-sti-portal

In short, food security has been framed as an important science topic as well it has been considered as a top-priority issue for EU-AU international cooperation: official initiatives, strategy documents, *ad hoc* bodies and foreign policy aims actually make food security a real science diplomacy object.

2.2. At the EU internal level, a cross-cutting concern for science international cooperation

This international dynamic directly interacts with internal EU changes: once the EU's growth strategy (Europe 2020) has given a major role to research and innovation, Horizon 2020 has become a strategic tool to developing international cooperation and addressing the grand societal challenges (themselves being commitments to sustainable developments goals)[30].

How is EU funded research on FNNSA designed so as to affect EU foreign relations and cooperation development policy? Given that a substantial part of this cooperation framework is based on FP/H2020 projects, we will now examine how "science diplomacy" is used on the issue of food security in the area of European Union-African Union relationships.

A significant share of the EU budget is now dedicated to food security researches: 3,851 of the 80 billion euro Horizon 2020 programme are dedicated to the societal challenge 2, which includes (around of 5% of the overall budget), which includes food security, sustainable agriculture and forestry, marine maritime and inland water research and the Bioeconomy[31]. On the operational level, funding is mobilized through existing instruments: Horizon 2020 and AU grants.

A high level working group gathering representatives of different DGs has been set up to steer the EU-AU partnership, to put projects into clusters and to roll out the monitoring framework.

The Horizon 2020 topic writing process is rather complex, and reveals the cross-cutting mobilization of multiple institutions of the EU on an issue such as food security: several DGs – RTD, DEVCO, AGRI –; two different directorates at EEAS (Africa, multilateral challenges), and the EU Delegation to the AU. Though we are looking at a *research* program, DGs AGRI and DEVCO participate in the funding in important proportions (each one has its own budgetary line[32]), according to their policy jurisdictions[33]. DG RTD is for example more involved in food and nutrition, while DG AGRI funds soil, sustainable intensification, or food systems research projects.

Across this institutional division of work and the specific competencies pattern, all the players share internal tools to provide upstream expertise for enlightening the "calls" for FP/H2020 from a scientific point of view. Relations between DGs and advisory groups enable scientific advice for the calls writing. As a matter of fact, DGs mobilize their own background expertise (the research unit at DG AGRI for instance) to shape the topics. As a DG AGRI official tells us: "*you have yourself to be a scientist to understand what they [the scientists] research, and which research trends are interesting for a topic of the program*"[34]. They can also rely on the Commission's dedicated Joint Research Centre,

[30] Idem.

[31] European Commission: Horizon 2020 Presentation material. Retrieved from: https://ec.europa.eu/programmes/horizon2020/en/background-material

[32] DG DEVCO budget is for example 9 billion in the 2014-2020 multiannual financial framework for 60 countries (*ie.* 1.5 billion a year), mainly for supporting the local delegates. This budget distribution is going to change with the implementation of Horizon Europe.

[33] H2020 on agriculture is for example designed and funded 80% by DG AGRI.

[34] Interview, DG Agri.

whose both missions are to struggle against expertise fragmentation and to provide science knowledge for EU policy making by sharing collected knowledge[35]. More particularly, the Knowledge Centre for Global Food and Nutrition Security (KC-FNS) puts together members of DGs (notably DEVCO) and JRC so as to develop knowledge on priority sub-topics, such as food crises and agricology[36]. Together with other DGs (via focal points and contact persons), it contributes to build the priority topics of the calls.

How were the "food security" societal challenge calls negotiated in general? Can we identify any diplomacy concern or anticipated feedback loops clearly involved? By comparing the different Work Programmes under Societal Challenge 2, we observe de facto the rise of a strong and explicit foreign policy concern in the formulation of the food security topic in Horizon 2020. While it was absent of the previous work programmes, the former call includes a "targeted international cooperation" section:

> *"Activities promoted address global challenges and allow for significant international cooperation, exchanges and sharing of resources. In addition to general openings for international cooperation, targeted activities are foreseen to support the implementation of the EU-Africa Partnership on Food and Nutrition Security and Sustainable Agriculture (FNSSA) and implement the EU-China FAB Flagship initiative"[37].*

This diplomatic concern in the work program text is not only a superficial framing. **Interviews reveal an actual diplomatic awareness of the actors involved in the drafting of the topic.** Whereas the above mentioned High Level Policy Dialogue deals more with bureaucratic issues than with a political concern, the DGs services have developed specific ways of working in order both to underline the policy-oriented dimension of science, and their diplomacy background. Interviews provide interesting information on the way all the EU players have 'incorporated' related know-how, which is for instance particularly observable in a series of activities and meetings organised in the topic drafting process.

For example, those **established practices** refer to the "**boundary people**" some of the EU players have learnt to identify as the ideal to work with and invite for science policy events: indeed, they need scientists who are not only good in strict scientific terms, but also good in communication and dissemination, and able to present research issues and findings 'in black and white', i.e. in a simple and striking manner. They rely on known scientists who are in the 'circuit' who they keep a database on. The best ones for this role are heads of science organizations, as they speak not only for themselves, but for scientists as a group and are already involved in science policy. In other words, it is better to use executive directors than merely good scientists[38].

In addition to this policy-oriented attention to competency, they also insist during preliminary "info days" with project teams in a presentation of the policy background of FNSSA, and the topics global framework: the science diplomacy dimension here is about **explaining/translating the diplomatic dimension of the call**. As one said, "*in the way we formulate the topics, we try to articulate with the challenges for the continent*"[39]. During these explanatory meetings, another more implicit strategy is about creating networks, by gathering different people on a given topic, and potentially let them get in touch, without

[35] European Commission: Joint Research Centre. Retrieved from: https://ec.europa.eu/info/departments/joint-research-centre_en

[36] KC-FNS is designed to complement the International Food Policy Research Institute.

[37] Horizon 2020 Work Programme 2018-2020. 9 - Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy, p. 56. Societal challenge n°2 covers four flagships: All Atlantic Ocean Research Alliance Flagship; EU-Africa Partnership on Food and Nutrition Security and Sustainable Agriculture (FNSSA); EU-China FAB Flagship initiative; The Future of Seas and Oceans Flagship Initiative.

[38] Interview, DG Research.

[39] Interview, DG Agri.

any explicit Commission interference, for potential common projects applications once the call is out. **Science diplomacy emerges out here as connecting scientists on relevant topics.**

Later in the process of research funding, a typical science diplomacy activity of these EU policy science actors involved in the administration of Horizon 2020 topics consist in the diplomatic dimension 'briefing' they do for experts in the evaluation phase. While Horizon 2020 topics actors have no say in the evaluation of applications itself done by external independent experts and coordinated by the Research Executive Agency (REA), they attend evaluation meeting and do "*a presentation of the policy background of FNSSA, and why the topic and so on*"[40]. Here they see their role as **explaining/ translating the diplomatic dimension of the call for the experts responsible for the selection of the projects**.

In short, we observe the institutionalisation of the general aims which shape the global science cooperation framework into **know-how and relational and translational skills**, which can be understood as constitutive of science diplomacy activities.

2.3. S&T attachés: Science diplomats as brokers?

Beyond these science diplomacy skills and know-how observable in the cross cutting policy activities of the design and management of research funding (but generally not objectified by actors as "science diplomacy"), science diplomacy also passes through specific and **established roles and positions of dedicated "science diplomats"**, namely the S&T attachés in the EU delegations. "Science attachés" in the EU delegations have actually played a key role over a certain period, like one did in Addis Ababa for this food security case between 2012 and 2016.

As an important interlocutor for the African Union S&T Department, he played a key function for building networking resources and shared understandings. His mission included a political dialogue dimension and a more practical cooperation dimension (through the framework programs). The attaché operated as a **facilitator**, meeting regularly and socially with the African actors. His mission was about working with the AU, but also about meeting people at the national level – in particular with some countries where agreements are well developed, as with South Africa[41]. He also actively participated in the HLPD development.

This concrete coordination work could also appear as a key function in a context where material resources are scarce sometimes: technological communications are weak, and lack of data (exact figures country by country of the type of funding available at the national level, if any…) have also been pointed out.

More fundamentally, the practical role of the attaché was also to measure, to construe and to take into account the institutional fragilities of the AU. The resources of the AU to implement programs are actually sparse: in terms of funding, in terms of structures, in terms of staff. The AU is very dependent on contributions from donors (around half of its budget), meaning that on many activities, the AU does not decide the agenda (which is likely to depend on donors). The weak political mandate of the AU commission on science cooperation also makes the inter-regional cooperation tricky. It is up to the S&T Division

[40] Interview, DG RTD.

[41] The EU and South Africa established an Action Plan for their Strategic partnership in May 2007. Regarding the food security topic, South Africa is actively involved in several ERANET projects and FNSSA. The South African National Research Foundation is also the only African R&I funding agency involved in the Belmont Forum which addresses, together with the EC, some of the grand research challenges such as food security. See European Commission (2018): Roadmap for EU-South Africa S&T cooperation. Policy document.

at the AU[42] to consult their member states, but they struggle to mobilize them. Moreover, there are complexities and challenges for Europe/Africa scientific cooperation at the level of the projects and the research teams: in many African countries, the administrative capacity to understand and deal with the management of an EU grant is still fragile.

All in all, by interpreting institutional backdrop and complexities of the inter-regional EU-AU dialogue, S&T attachés act as diplomats usually do. They **work as a broker, an intermediary between continents, between regional organisations, between diplomacy and science within the same regional organisation**.

Since 2016, there is no more S&T attaché position in Addis (this mandate was the first and last one): because of budget cuts, the experience has been prematurely halted. Besides the issue of the resources which are *de facto* discontinued, this choice also raises the question of how the future Roadmap will be implemented[43]. In the implementation, there is consequently not really a clear and continuous channel through which EU funded research on FNSSA affects or fuels EU foreign policy.

3. Stakeholders & governance practice (3): weaknesses & challenges

Given that food security is a major EU global challenge on the one hand, and that the EU is spending millions to fund food security research on the other hand, one would expect to observe clearly designed strategic interfaces between science and diplomacy on this topic. Yet, it seems that in spite of a more or less widespread use of the label, there is **no shared understanding** of "science diplomacy", nor a clearly identified institutional circuit of how food security research can contribute to European foreign policy.

3.1. No shared understanding of what is (or should be) "science" for/in diplomacy

A real challenge for food security "science diplomacy" is the importance of internal segmentations inside the EU organizational landscape. Interviews actually suggest that marked differences between organisational interests and institutional subcultures of each player make the endorsement of common objectives rather difficult. Despite the EU attempts to go beyond segmentation – e.g. with the recent establishment of the Knowledge centre for global food and nutrition security – DGs are still characterized by their organisational autonomy. Each player has its own rationale and aims/standards for success: RTD seeks excellence and impact, DEVCO development impact, ENVIRONMENT is more focused on ecological issues, etc.

This is especially so in legitimate uses of "science". There is indeed **no agreement on what kind of sciences should be fostered**. A first principle of division refers to the **excellence / relevance opposition**. For example, there is a conflict between the sort of "applied" and "scalable" research needed in Africa (as DG DEVCO seeks) and the aims of "excellence" (science for itself) both embedded in Horizon 2020 (as DG RTD and especially DG AGRI targets – see below for more details)[44]. "Development impact" is here opposed to "excellence" Horizon 2020's focus, which can interfere with the sort of research that is needed. Reciprocally, in DG AGRI, the main use of the Horizon 2020 is to create opportunities for African researchers to become part of international networks, and part of the FNSSA is invested in such way to help them get involved in those international

[42] African Union: Science and Technology Division. Retrieved from: https://au.int/en/st-division

[43] Interview, DG Agri.

[44] Interview, DG Agri.

networks. Promoting high quality research development and research capacities in general in Africa is here one of the main objectives.

An interesting paradox here is that it is mainly DG AGRI which advocates the "excellence" objective. DG RTD spotlights other aims also referring to the "impact" focus and use of multi actor projects (researchers and businesses), as one explained:

> *"It's part of the science diplomacy: using science for just the **political deals**, but also **economic diplomacy**. Because it also creates the potential for the markets, particularly when I speak about innovation. Then it's also the scaling up, getting to the markets. Also say for our start-up companies and using this market potential"*[45].

Those differences have effects on the topic drafting and on the research topography. Thus, even if open calls in 2019 for Horizon 2020 will include enlarged participation of African countries, their participation is not linear: there was an important participation of African partners in FP7, much more than in Horizon 2020. One of the reasons for this is that Horizon 2020 pushed towards innovation, which resulted in the decrease of collaborations with developing countries.

From this perspective, "science diplomacy" doesn't obey to a clear and shared strategy, but labels different ways to using science to achieve different foreign policy goals.

3.2. EU science diplomacy and asymmetries

Besides the internal Commission divides, we also can identify **frailties of the cross-cutting diplomatic channel**. While the EEAS officially considers that "s*cience diplomacy is a way to make diplomacy through "parallel means""* and concur with the Commission statement that it is an *"instrument of soft power"*, it also conceded in 2016 that science diplomacy "*still need[ed] to be mainstreamed*"[46]. Our interviews *de facto* suggest that **contacts between different DGs & EEAS are rather scarce and weakly institutionalized**.

In terms of diplomatic process, the EU delegation interlocutor is the EEAS. So in order to stay "in the loop", DG RTD usually needs to identify the attaché covering R&D and establish direct contacts. This seems to be an ***ad hoc* process, which remains dependent on the mutual interest** in maintaining these. Reciprocally, the former attaché in Addis Ababa mainly reported to DG Research. The contacts with colleagues in delegations are mainly personal contacts than structured ones. Above all, DGs testimonies regularly point out the **EEAS is little involved**: direct meetings are scare, and feedbacks channels regard the general information only, as confirmed by the EEAS officials we met. G5 "Development & cooperation" is actually not endowed with many technical resources and obliged to prioritise its own issues (they first and foremost need briefings to make "politically informed choices"): as a player said, "*in two hours, you speak about peace, not science*".

Thus, the configuration of players offers a contrasted science – diplomacy interaction layout. The strong and explicit **foreign policy concerns** in the formulation of the food security topic in Horizon 2020 are **more held by DG RTD, DG DEVCO, DG AGRI actors than by the EEAS**. It is even more paradoxical that **non-diplomatic players can sometimes be rather reluctant in endorsing the label of "science diplomacy"**. From that point of view, the "diplomatic" dimension of DG's role is not self-evident, partly because some fear that it might be understood by EU partners as "hidden agenda" of

[45] Interview, DG RTD.

[46] European External Action Service: Science Diplomacy. Retrieved from: https://eeas.europa.eu/topics/science-diplomacy/410/science-diplomacy_en

science cooperation, partly because the **"science diplomacy" term is viewed as ex-post, non-embedded from ordinary concerns or defined by social scientists**.

The way actors involved in science diplomacy interfaces perceive their role and mission reveals an **asymmetrical awareness** of science diplomacy. This is certainly not specific to the issue of food security, but appears in quite a striking manner on this issue. On the side of the actors of EU science policy, whether at DG RTD, or at research units of DG AGRI for instance, we actually do observe a strong awareness of diplomacy issues. Global challenges and EU global strategy to address them are not only known by science policy actors, but quite much re-appropriated by discussing how food security links to issues of stability, conflict prevention, health, well-being, migration, etc. There is awareness that the future of EU science cannot be thought regardless of EU global challenges, and a real ability of EU science policy officers to formulate a discourse saying so. **They don't think of themselves as diplomats, but are aware of the diplomatic dimension of their work**, and most of the time familiar with notion of "science diplomacy" – though they might define it in very different ways with more or less positive connotations.

Science policy actors are more aware of diplomacy issues than diplomats of science issues. On the side of EEAS actors met for this case, whether involved in inter-regional affairs, or multi-lateral challenges direction, the awareness of the importance of science for EU foreign relations appears quite weak. The notion that EU funded science on global challenges may fuel EU global actions remains quite alien. There is not apparently such expectation from EEAS actors, **nor any clear organizational process designed so that the main findings of EU funded food security research are known and appropriated by EEAS actors**. As for the **label "science diplomacy", it is not used in practice**, or maybe **considered as a threat** (which in the perspective of some EEAS actors would be coming from actors of science policy wanting to "play the diplomats", while having no general expertise in foreign relations).

This asymmetrical awareness might be associated to an **asymmetrical relative recognition or prestige of positions** (dealing with international cooperation in science policy, or dealing with science and technology issues in foreign policy). It seems that positions and activities related to science diplomacy are quite valued in EU science policy field and often held by actors with both a high profile and strong convictions on these topics. This is why a potential reorganisation of DG RTD mainstreaming international issues, and suppressing the international cooperation directorate was not always welcomed by the actors so far most dedicated to science diplomacy issues.

Even if the ideas of soft power, and of the need for knowledge-based solutions to address global challenges are more and more present in EU foreign policy discourse, it apparently does not really affect the way diplomats perceive the relative prestige of positions related to science in EU foreign policy. Holding a position dealing with science diplomacy issues obviously is not the most pursued professional objective and EU diplomats generally do not consider it would the best career-booster to hold such a position.

Without surprise, these asymmetrical science diplomacy awareness and asymmetrical relative recognition of SD related positions result in an **asymmetrical appreciation of the shortfalls and potentials of science diplomacy**. The ambitions for EU science diplomacy are sometimes great on the side of science policy actors, and so might the disillusions or frustrations facing the shortfall of EU actions and weak prioritising of the EU in this direction. On the side of EU diplomats, for the aforementioned reasons, there are not so strong expectations regarding the role of science diplomacy, and consequently less disappointment (as well as attention).

4. Conclusions: What the food security case tells about EU Science diplomacy?

Considering science and technology innovation is framed as a driver for socio-economic growth and stability within the EU, as well as for the EU global strategy, we have been witnessing for a number of years a triple intricate dynamic: 1) the **growing institutionalisation** of instruments between science and diplomacy arenas; 2) the setting of a cross-cutting attention from internal services for science policies and, consequently, the rise of a foreign policy **concern for different "global challenges" in science funding**; 3) the emergence of a **dedicated "science diplomat" role** in the figure of the S&T attachés in EU delegations. Let us look at this triple dynamic for the case of food security research. Global framings (geopolitical and market connected issue, cooperation purpose), specific instruments (HLPD, H2020) and practical know-how (DG's officers awareness and relational skills) thus shape a real science diplomacy framework.

However, **consistency and boundaries** of "science diplomacy" shouldn't be overstate because of remaining vague and unclear. Conversely, we shouldn't overlook the **frictions** both between EC and EEAS, and between DGs themselves: the analysis of professional practices reveals **asymmetrical relations** between players of research arenas (who retain some degree of autonomy), science diplomats (who seem to be quiet often marginalized in their own spaces), and diplomats (to whom science is not a key issue).

5. Empirical material

Document analysis:

- H2020 project material (calls, database of H2020 projects)
- EU publications
- Detailed analysis of the "Food security - Support to the Implementation of the EU-Africa Partnership on Food and Nutrition Security and Sustainable Agriculture" section of the work programs
- Document analysis/secondary data analysis: Academic publications, "Sustainable food security- FNSSA" projects
- Key documents on EU-Africa partnership and FNSSA

10 interviews with actors from the following agencies & services:

- DG RTD
- DG DEVCO
- DG AGRI
- JRC
- EEAS

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