WIDER Working Paper No. 2013/061

International co-operation for agricultural development and food and nutrition security

New institutional arrangements for related public goods

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May 2013

Abstract

Following an overview on the fast changing global context of agriculture, and food and nutrition security, this paper provides a framework for identifying the set of essential international public goods for a well-functioning world agriculture and food system: natural resource management related to biodiversity, water, and soils; climate change adaptation and mitigation; trade and food reserves; competition policy and standards for foreign direct investment; international research and innovation; responding to and preventing food and nutrition emergencies; and trans-boundary food safety and health related investments and …/

Keywords: public goods, agriculture, food security, governance, economic development, international cooperation

JEL classification: F55, H41, O19, Q18

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This study has been prepared within the UNU-WIDER project 'ReCom—Research and Communication on Foreign Aid', directed by Tony Addison and Finn Tarp.

UNU-WIDER gratefully acknowledges specific programme contributions from the governments of Denmark (Ministry of Foreign Affairs, Danida) and Sweden (Swedish International Development Cooperation Agency—Sida) for ReCom. UNU-WIDER also gratefully acknowledges core financial support to its work programme from the governments of Denmark, Finland, Sweden, and the United Kingdom.

ISSN 1798-7237 ISBN 978-92-9230-638-0

… standards. The deficiencies of the current institutional arrangements in support of agricultural development and food and nutrition security are reviewed and a perspective for re-design is presented. It comprises three focal clusters of organizational setups under a global platform: a cluster on food and nutrition security for the poor; a second one on protection of natural resources; and a third one on enhanced sustainable intensification and productivity growth. A gradual approach toward re-design based on current building blocks of international organizations is proposed, allowing for more involvement of non-government global actors as well as intensified government-to-government (G-to-G) networking in order to improve international public goods delivery in support of development goals. Some re-design actually occurs already in this direction, but it is rather ad hoc. To move the re-design process forward more strategically, and less ad hoc needs a high-level, broad based, legitimized time-bound dialogue forum that embraces the whole set of international public goods for agricultural development and food and nutrition security, and addresses the organizational implications.

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Typescript prepared by Janis Vehmaan-Kreula at UNU-WIDER.

1 Introduction

The world food and agricultural system and the governance of its international dimensions show signs of serious malfunctioning. The incoherent and inadequate response to the acute food price crisis 2008 was a clear indication, and preparedness has only somewhat improved thereafter. Underlying symptoms of disarray include the low agricultural productivity growth. Too little investment in research and development (R&D) on the crops and technologies of most interest to poor farmers and the food insecure has been taking place at a global scale. Initiatives to reduce the risks of climate change for agriculture are insufficient. Water problems in agriculture increase, and cross-boundary disputes over water will become worse in the future. Soil degradation remains a serious challenge. Patterns of natural resource use pose threats to the global commons, such as biodiversity. In food markets, the absence of appropriate international institutions to guide competition has resulted in non-competitive markets, and trade restrictions at the global level are combining with excessive commodity price speculation which fosters price volatility. A global food reserve policy is non-existent and that fosters wasteful national policies of high stocks and re-activated self-sufficiency aims. Food emergencies are reacted to rather than prevented. A global nutrition policy is only slowly emerging, and widespread nutrition problems prevail with hunger declining too slow, obesity on the increase, and related chronic diseases and health risks as the final result. All these problems have important global dimensions, i.e. global public goods for agriculture, food and nutrition security are not delivered at sufficient levels.

Agricultural development assistance is essential to reversing these trends by creating opportunities for agricultural growth and economic development. Yet, international aid to developing countries' agriculture has dropped. The share of official development assistance (ODA, bilateral and multilateral) for agriculture, forestry and fisheries in total aid declined from 19 per cent in 1985/87 to 6 per cent in 2006/8; and development food aid and food security assistance declined from 7 to 1 per cent over the same period (Islam 2011). The decline in aid for agriculture was mainly driven by relative and absolute increases in aid for social infrastructure and services. Some increases in agricultural development assistance from these low levels have occurred since 2009, partly as a consequence of G20 commitments.

Globalization of agriculture and its dynamics and complexities has outpaced the capabilities of inherited organizations (Paarlberg 2002; von Braun and Diaz-Bonilla 2008). New institutional arrangements for international public goods in support of agricultural development and food security are called for. If a global governance system for agriculture, food, and nutrition were designed from scratch today, it certainly would not look like the current one. It needs re-design to better deliver agriculture and food related public goods and better governance, and that is the focus of this paper. While it might be a stimulating intellectual exercise to try to identify a comprehensive new governance system for the international public goods that are basic for agriculture and food security, it would also be naïve to expect fast institutional and organizational change in view of the well-known forces of resilience of present and inherited institutional arrangements. In this paper a position for accelerated adaptive change of better international institutional arrangements is taken. Moreover, aid-related organizations have to fit into such institutional arrangements. They can play an important supportive role, but—given global political and economic change—they are not the drivers of agricultural development and food security, and will be even less so in the future.

In support of UNU-WIDER's programme on 'Research and Communication on Foreign Aid' (ReCom), this paper asks 'what works' and 'what could work' in the area of international co-operation for agricultural development and food security. Some initial premises can be extrapolated up front from the above stated situation of agriculture and food system change:

- It underlines that public policies in support of sustainability need cross-cutting actions at small and large scales to be relevant for development.

- Development aid policy with its relatively small resources is challenged to adjust to and prioritize in a set of fundamental and powerful forces of change in agriculture and food systems, and has to increase from its inappropriately low levels.

- Aid policies' complementary potentials to national and local actions and to private and civil society actions may increasingly come through investments in the technological and institutional arrangements that facilitate sustainable utilization and protection of the international public goods on which agricultural development and food security depend. Such focus on international public goods, however, must not be up in the sky of generalities, but must stand the litmus test of impact on peoples' livelihoods and the ecologies they depend upon.

- An international public goods protection and enhancement approach requires explicit consideration of risks and uncertainties for the marginalized and for sustainable development, where development co-operation would mainly focus on prevention, management, and mitigation of large scale risks related to food and nutrition security.

2 Framework of assessment and design

2.1 Drivers of change

Any consideration of a changed set of institutional arrangements for international public goods in support of agricultural development and food security needs to consider the forces of emerging dynamic changes in agriculture and the food system. The sum of local and regional economic and environmental drivers of change and the impacts on agriculture and food security are profoundly global:

1. As agricultural development and food security have both, extremely local and extremely global dimensions, this divergence in scales put tremendous challenges for the design of institutions[1] at local, national and global levels and their support by development co-operation and partnership.

2. The fast transformation processes in agriculture, i.e. the accelerated transition of smallholder farming, farm technology, rapid expansion of large scale land holdings,

[1] Various definitions of institutions and organizations pervade the development literature. New Institutional Economics (NIE) maintains a view of institutions as the 'rules of the game', or the formal (laws, regulations, etc.) or informal (social norms, values, etc.) arrangements that influence transactions costs. Others blend this definition with a sociological perspective and thereby expanding institutions to not only include rules, regulations, and norms, but also *organizations* as their operation is influenced by the former. In this paper organizations are understood as the actors that '*operationalize'* rules and regulations.

demographic transformations with rural aging and feminization of farming in many parts of the developing world necessitate new approaches.

3. Another set of changes relates to the transformation of the food systems, with extended value chains, an increased role of processed food, supermarkets, urbanization of rural consumption, all integrating the agriculture and food system ever more with the larger economy in terms of labour markets, energy markets, and services, i.e. finance, and international commodity markets and foreign direct investment (FDI).

4. The protracted poverty and food insecurity in small farm households, which—while some improvement is noteworthy in the past two decades—still forms the world's largest group of the poor and hungry (von Braun et al. 2009), calls for appropriate consideration in any agricultural development policy.

5. A fifth challenge relates to the environmental aspects of agriculture and their dependencies on natural resources whose protection has partly public goods characteristics, i.e. water systems, fertile soils, biodiversity, climate.

Obviously, these five basic features of agriculture and food security are interlinked and that poses the challenging question, how to design the whole set of international mechanisms and organizations in order to improve food and nutrition security, and sustainable agricultural development?

2.2 Goals and processes of systems change

Sustainability requires a long term perspective without neglecting today's livelihood constraints of the poor. The pursuit of sustainable development with its three pillars—social, economic, and environmental sustainability—calls for a framework to deal coherently with the complex relationships among these components of sustainability in relation to agriculture and food security. This entails a *nexus-approach*, i.e. an explicit focus on complementarities among key domains such as energy, water and land use, and food security. As a consequence, 'sustainable development goals' as currently discussed by the United Nations (UN) toward the post 2015 agendas, are inseparable from 'human development goals'. For example, the goal to facilitate the right to have access to clean drinking water requires consideration of the sustainability of larger water systems. Access to affordable energy requires consideration of broader issues of energy supply and green house gas emissions. And the right to have access to healthy and sufficient food for all requires consideration of global value chains, their links in the emerging 'bioeconomy', and R&D for improved technology supply and access.

In recent years, the world has experienced major institutional shifts, technological and medical progress, and rapid cross-border trade and investment. Political changes include the strengthening of the rule of law and moves toward decentralization, devolution, and privatization. Globalization has brought advances in income, healthcare, education, and other basic needs to many of the world's citizens. Importantly, these are not mutually exclusive trends occurring independently of one another, but linked. The agriculture and food system is increasingly changing from a relatively large and distinct sector of the economy into a more pervasive, integrated system, in which consumers are linked via extended food and service chains with multiple market and non-market institutions shaping the system. The growth of

the retail industry, intensified supply-chain linkages, and new technologies influence globalization of agriculture in terms of global flows of agriculture and food related capital, flows of goods and services, flows of innovations, and flows of tastes and consumption habits.

In many countries, national governments are devolving natural resource management authority to sub-national and local governments or ceding roles to the private sector, civil society, or user groups. Essentially, a development is underway from a linear relationship between farmers, markets, agro-industry, and consumers toward systems of interaction between and among these, with policy making and institutional innovations cutting across the system in more complex fashions. These developments proceed to a different extent and at different speeds in different parts of the world; and when technology and other public goods investments are low, the transformation of agriculture proceeds slowly at best.

2.3 Farmers and the food insecure

The complexity of global agriculture and food security is illustrated by the definition of food security of the UN Food and Agricultural Organisation that lists four dimensions of food security:

- Food availability: the availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports.

- Food access: access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet.

- Utilization: utilization of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met.

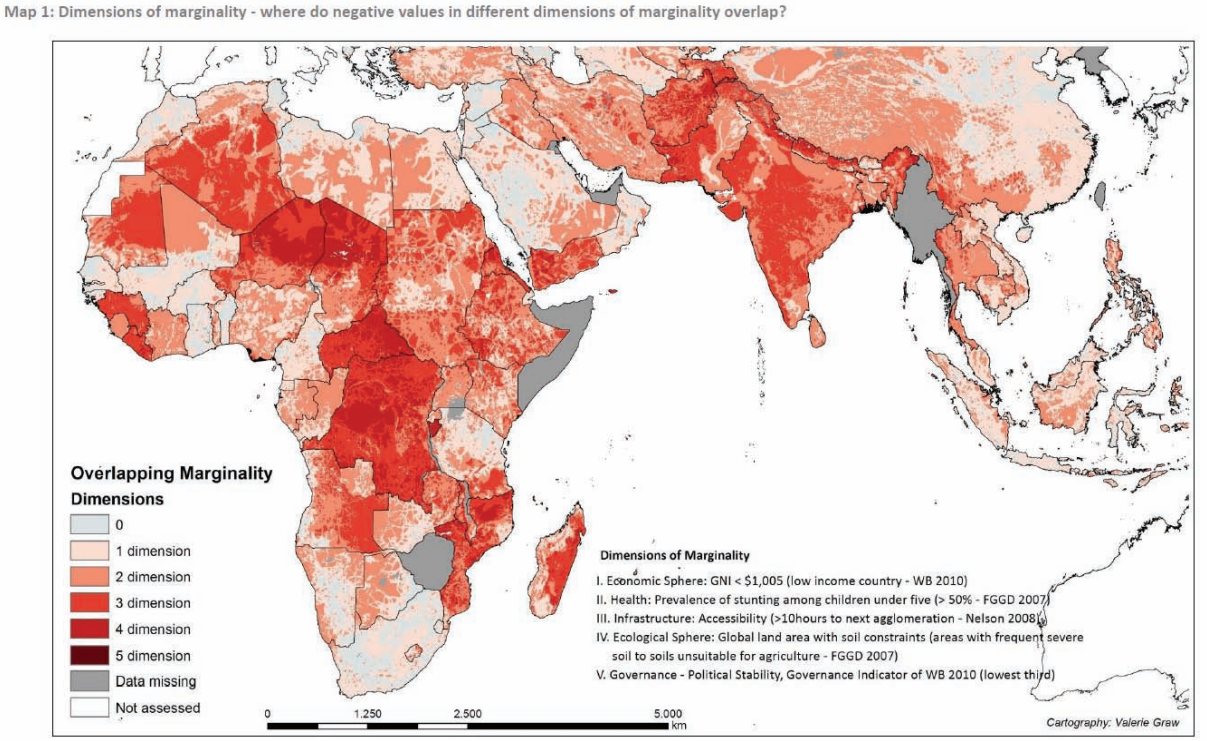
- Stability: to be food secure, a population, household or individual must have access to adequate food at all times.

The largest segments of the food insecure live in rural areas of low-income countries, but the share living in middle income countries is increasing. Globally, out of a world population of about 7 billion people, there are approximately 1.2 billion poor, of which 75 per cent—900 million people—live in rural areas.[1] Most of these individuals partly depend on smallholder farming as their primary economic activity. However, for many of these communities, which lack critically needed investment in rural areas, agricultural systems remain locked in low productivity and rural populations remain locked in poverty. Individuals in rural areas in developing countries are separated from their more wealthy counterparts in developed countries by not only income inequality, but also by inequality of access to basic services and public goods, such as healthcare, sanitation, safe drinking water, education, etc. In a sense, we are witnessing a bifurcation between agricultural systems in rich and poor countries, where farm size, agro-ecologies, technology adoption, market integration, and access to basic services are increasingly stratified along global and regional income lines.

[1] Poverty defined as those individuals surviving on the equivalent of less than US$1/day.

Moreover, a complex set of factors—including lack of rights, exclusion, livelihoods depending on difficult to manage ecologies—lead to marginality, not just income poverty and food insecurity (Figure 1). As so many of the rural poor are among the marginalized, the concept of marginality is particularly relevant for agricultural development and food security. It gives guidance to broader approaches for agricultural development and rights-based approaches as an integral part of international public goods (von Braun and Gatzweiler 2013). In light of this changing global context and renewed emphasis on agriculture and food security, a re-examination of the *framework* for agricultural development and food and nutrition security is called for.

Figure 1: Marginality – mapping consequences of national and international public goods deficiencies



Source: Graw and Ladenburger (2012).

2.4 Conceptual frameworks to guide identification of public goods needs

Agricultural development and food and nutrition security are highly dependent upon international public goods. Public goods are, inherently, goods that are public in nature, accessible and available for all to consume (defined by non-excludability and non-rivalry) and create positive externalities, which the market does not always capture.[2] Depicting the

[2] Public goods are, inherently, goods that are public in nature, accessible and available for all to consume (defined by non-excludability and non-rivalry) and create positive externalities, which the market does not always capture. For instance, the marginal social benefit of public goods often exceeds the private benefit; therefore, public goods will not be supplied in sufficient amounts by the market alone. In an ideal world, the non-excludability and non-rivalry of public goods means that no one is kept from enjoying their benefits, yet informational gaps and high transactions costs keep public goods undersupplied. Too often, access to public goods is dependent on individual income level. A pure public good is one with complete non-excludability and non-rivalry (meaning that the good's value is not reduced by the number of people who consume it, nor is it restricted in its availability to all citizens). Very few public goods are 'pure' in this sense, because the ability to

needs for public goods provisioning in support of agricultural development and food security requires a perspective on the functioning of agricultural and food markets and systems. Five such perspectives are briefly presented here:

1. A traditional conceptual framework for global agriculture and food security would take the perspective of a 'world food equation', where supply and demand balances at a lower or higher level; technology and resources determine supply, and population and income growth drive demand upward; and commodity trade and prices—while to a considerable extent interfered by policies—are an endogenous result. International institutional arrangement issues arise in this framework mainly from the public goods nature of technology driven by public and private R&D, and from international trade regimes.

2. Another relevant perspective is that of a 'global food value chain'. With its six chain elements, it originates from (1) natural resources, to (2) input industries supply farmers, who are doing the (3) primary agricultural production, which is (4) processed by the (global and local) food processing industries, and (5) marketed by the retail industry (which is also increasingly an international business sector) catering to (6) consumers. Global institutional arrangement issues arise in this value chain mainly at the first stage of the chain—protection and sharing of natural resources—and at the 2nd, 4th and 5th elements of the chain, i.e. setting standards of product safety, corporate transparency, and competition rules.

3. Yet another important framework is provided by the appropriate segmentation of food security into its core elements of availability of food, peoples' access to sufficient food of good quality, nutrition as a result of food access and health interactions, and stability of the food system (FAO 2012). The international institutional issues arising from this concept are similar as in the world food equation above, plus the need to engage in trans-national nutrition problems, food emergencies, and adherence to the human right to food (FAO 2011).

While the above three conceptual frameworks are helpful for deriving needed international co-operation on public goods for agricultural development and food security, two additional conceptual frameworks can assist to capture the more recent developments and related insights:

4. The 'Nexus-concept' in which the food system is embedded in a much larger framework of inter-sectoral linkages among energy, water and land (Figure 2). Action fields relate to economy, society, environment here, and the international (and national) governance issues focus on cross-cutting enabling factors and incentives. In a nexus perspective, isolated agriculture and food policy are overcome. Civil society, including farmer organizations, and business need to also 'sit at the table' when it comes to policies for sustainable agricultural development strategy. The same applies to water and energy policies, which for too long have been pursued in isolation. Such a nexus approach also embraces the ecosystem service approach with its multi-criteria framework to describe the

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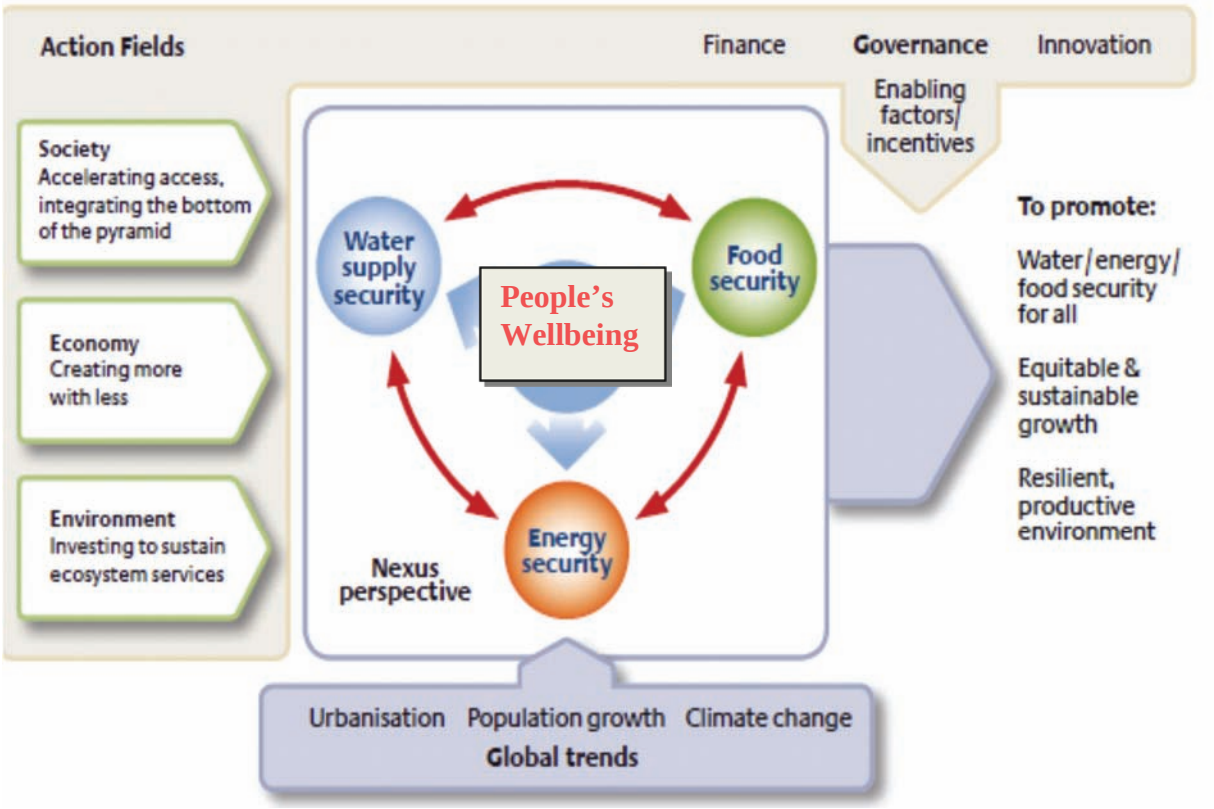
consume public goods often depends on an initial investment, which exclude the very poor; a pure public good becomes a 'club good'. Public goods—on local, national, and international levels—are crucial to poverty reduction, building the foundation for long term and successful economic growth, and are critically needed by the rural poor. Besley and Ghatak (2003) noted a surprising low level of attention to public goods in the mainstream development economics literature.

functioning of ecosystems and their embedded natural capital (TEEB 2010). Ecosystem services are complex public goods and essential for the food system functioning; regulation of greenhouse gas (GHG) emissions or pollination services are typical measures to facilitate ecosystem functioning in support of food production.

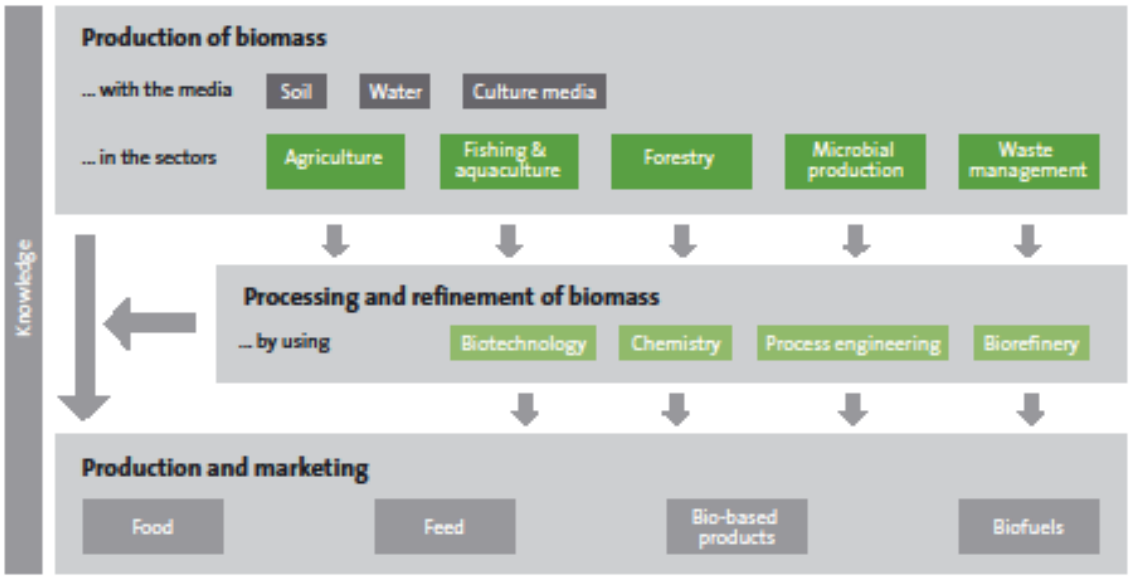
Figure 2: Nexus perspective of food security, water, energy



Source: adapted from Hoff (2011).

5. In recent years, the notion of interconnectedness of the food and agriculture 'sector' with the rest of the economy has gone toward the 'bioeconomy'. Bioeconomy is understood as the production and transformation of biologically-based materials, i.e. biomass and biomaterials from advanced biological or biotechnological processes, for example in food manufacturing, industrial production and bio-energy. Compared to the concept of value chain (No. 2 above), this concept leads to a different perspective of interlinked value chains, i.e. a value web (Figure 3). The foundation for this concept of a knowledge-based bioeconomy is the transfer of scientific knowledge into new, sustainable, eco-efficient as well as globally competitive products and processes. Industrial organization theory provides basic guidance to the bioeconomy framework. Many high and middle income countries have in recent years developed and adopted bioeconomy strategies, driven by the potentials of substitution of fossil fuels, and by the opportunities of innovative products in a new biochemical industry. The international institutional issues arising from this concept relate to new issues of standard setting, and a much broader need for public goods-oriented research and related sharing among high and low income countries, as the knowledge-based bioeconomy draws on strong basic research.

Figure 3: Bioeconomy – agriculture in the new interlinked value webb



Source: Bioeconomy Council of the Federal German Government (2010).

3 The current realities of agriculture and food related organizations

3.1 Who is involved in providing international public goods for agricultural development and food security?

Whose responsibility is it to provide public goods? Traditionally, the state is considered to be the main provider of public goods, but is it only one actor in a broader network of institutions that can provide public goods (Besley and Ghartak 2003)? Indeed, many development economists call for institutional innovation to promote new mechanisms and approaches to public/private/civil sector partnerships. The optimization of institutional provision of public goods ultimately depends on the strength of incentives, transactions costs, and informational symmetry, and varies based on local context. The state alone, just as in the case of the market may not be able to optimize the provision of public goods.

For most of the above mentioned public goods derived under the different yet complementary conceptual frameworks some organizations, conventions, and declarations do exist. The roles and structures of the global organizations addressing food, agriculture, and related nutrition and health issues have evolved over the past six decades. The related core organizations that closely relate to or somewhat touch on agricultural development and food and nutrition security at global level include:

- Food and Agriculture Organization of the United Nations (FAO)
- World Food Programme (WFP)
- International Fund for Agricultural Development (IFAD)
- World Health Organization (WHO)
- United Nations Children's Fund (UNICEF)
- United Nations Environment Program (UNEP)
- Consultative Group on International Agricultural Research (CGIAR)

- World Bank
- World Trade Organization (WTO)
- United Nations Framework Convention on Climate Change (UNFCCC)
- Convention on Biological Diversity, and its mechanisms
- United Nations Convention to Combat Desertification (UNCCD)
- United Nations Educational, Scientific and Cultural Organization (UNESCO)

They all serve important public goods provisioning functions, and all have in the past made important global contributions, such as the Green Revolution facilitated by CGIAR supported by the World Bank and others; many people's lives have been saved due to the WFP, and without the statistical information and advice of FAO priority setting would be impossible for many governments. The goal to quickly come to a world where each person has access to enough food of good quality to live a healthy and productive life is high on the agenda of development. While this task is largely one of national governments, the international organizations supported by aid must play their part too. That they do not deliver the public goods at needed scale and quality is the result of deficient resources, authority and governance quality, but also because rich and poor countries have different interests in the delivery of these public goods and such differences impact on levels of support and commitment to collective action (Ostrom 1990).

Global governance and public goods provisioning does not only—and actually not mainly—happen through formal global organizations. It increasingly occurs through a complex global web of government networks, where a collection of nation states communicate via heads of states, ministers, parliamentarians and the UN, and where corporations and NGOs participate in various ways. Government networks are networks of national governments and even province level governments whose officials come together on a regular basis to exchange information, co-ordinate activities, and adopt policies to address common problems at a global scale (Slaughter 2004). They already play key roles in global policy domains such as public health, crime prevention, and energy but not enough in areas of agriculture, food, and nutrition. As Slaughter (2004) points out 'government networks are ideal mechanisms of international co-operation on international problems that have domestic roots, as they directly engage participation and the credibility of the individuals who must ultimately be responsible for addressing those problems'. These circumstances do apply to agriculture and food and the related natural resource management challenges.

3.2 Messy structures and path-dependency in the system

World food and nutrition security itself can be seen as a global public good. The current, core global organizations for food governance listed above, which have evolved over the past six decades, all serve important functions, and all have separately and collectively in the past made important contributions. However, their segmented roles—and not functioning as a system—and their structures make them slow to act, their resources are too limited and their governance stifles abilities to respond to needs.

Some of the organizations have recently undergone independent reviews, which came back with rather critical assessments. The conclusion of the independent evaluation report on FAO (2007) stated, 'The Organization is today in a financial and programme crisis that imperils the Organization's future in delivering essential services to the world'. IFAD was evaluated in 2005 and CGIAR in 2008 and both reviews urged fundamental change in design and

strategies. All of the evaluations are now being responded to by the organizations with reform initiatives but the processes of reform are slow. It was a tragedy that key food organizations entered the world food crisis years of 2007-09 with major flaws. Most importantly, these individual reviews could not comprehensively address the question of how the entire global food system might work best as a whole.

From this perspective, one can see that these organizations leave holes in food governance that they are not able to fill. Examples lie with the trade distortions that harm the poor, ongoing existence of risky subsidies and quota for biofuel crops in many nations including the USA and Europe, lack of capacity to enhance sustainable crop productivity, and ad hoc operations in addressing infectious animal diseases. When nations responded to rising prices and food insecurity by shutting down trade, there was nothing to stop such collective action failures at a global level. While such actions may each be rational from national perspectives, there was a big system failure. Existing bodies were too inflexible to give themselves power to address these acute issues, and addressing the huge chronic child nutrition problems was further marginalized in crisis management. The global public goods related to food, nutrition and agriculture were not delivered effectively.

3.3 Co-ordination and consultation – unsystematic response

The recent food crisis shocked the global players in agriculture and food and the response has largely been attempts for better co-ordination. That resulted in four parallel efforts with a lot of consultations. G8 and G20 extensively discussed food security at the heads of state meetings in 2008 and 2009 and committed to co-ordinated action and pledged US$22 billion for the next three years. Implementation mechanisms were not specified and plans for a special fund for food security did not materialize. A transparent monitoring mechanism for the pledged funds is not yet established.

A High Level Task Force on the Global Food Crisis, chaired by the UN Secretary General with 22 members (composed of 13 heads of UN organizations, 8 heads of UN offices and UN departments and the OECD) was established. Organizations from the developing regions where the food crisis hit most were not included here, and neither are industry and NGOs. A secretariat was established and an important guiding document on the 'Comprehensive Framework for Actions for Global Food Security' was prepared. While the World Bank significantly expanded its support for agriculture in national programmes, the attempt to establish a large incremental global fund did not materialize.

High level conferences were held in 2008 and 2009 including summits under the auspices of FAO, and a reform agenda for the Committee on World Food Security (CFS) was established. The intended reform shall give this intergovernmental committee some roles of co-ordination at global level and support and advice to countries and regions. Later, it shall also promote accountability and play a strategic role to guide synchronized action. It does include participation of NGOs and industry.

Besides governmental conferences, and partly prompted by the lack of action and to fill the vacuum of strategic orientation in established international organizations, business communities, civil society, and academia have established new international fora and communities and now increasingly provide thought leadership that is guiding action. Examples are the World Economic Forum's (Davos) Agenda Council for Food Security, the

New Vision for Agriculture by industries, the Montpellier Panel (focused on Europe and Africa), the Chicago Council (focused on the USA), and others. Their objective is to innovate and prioritize action and to stimulate investment as well as institutional re-design. The accelerated flow of conferences on agriculture and food security since 2008 has created a complex market place of ideas and action proposals like never before, which—with considerable overlaps—shapes the international agenda setting today.

Actual investment initiatives for food security mainly came about at national levels: a new European Union 'Policy framework to assist developing countries in addressing food security challenges' in 2010, a US Global Hunger and Food Security Initiative in 2009 with more than US$3 billion, several African countries actions for Comprehensive African Agricultural Development Programs (CAADP), and most notably, large investment expansions for food security in India and China. World Bank and regional development Banks also chipped in with new funding initiatives. Well co-ordinated global public goods actions, however, are lacking.

The concept in general has been to seek salvation in co-ordination and consultation at global level. It is the way to initiate action in the short run and it should make us feel optimistic that so much more talk about agriculture and food issues now happens at the highest levels. But the dialogue is overdue on what a well functioning future global institutional architecture and governance of agriculture and food might look like and how it might be achieved. Such re-design needs to be based on a set of principles and a concept.

4 Which international public goods (IPGs) under what institutional arrangements and what roles for aid?

Public goods do not materialize on their own, and not in a linear relation with rising income; instead, they are created, co-ordinated, and delivered through institutional and organizational arrangements. Some broad criteria for selection of international public goods shall briefly be outlined in the following, before the question of 'which IPGs' is going to be addressed.

4.1 People and rights focus

Ultimately the investment of political and financial capital in the provision of international public goods for agricultural development and food security needs to directly or indirectly serve protection and improvement of human well-being. Thus assessment and valuation of public goods needs to have a people focus. Components of public goods need to be seen in the Nexus-perspective, as highlighted above for water, energy, food security etc., and the nexus approach needs to have people's well-being as its outcome focus, not just a natural resources focus. Poverty and hunger in the developing world's rural areas continue to exist in disproportionately vast numbers. Affected people frequently live on marginal lands, where agricultural productivity is low, and have little access to technology, healthcare, education, safe drinking water, and often live in countries with a weak rule of law, political rights, and low funding for innovation. All of these derive from deficiencies in *public goods* that are crucial for development. An important part of relevant international public goods is the very protection and advancement of the human right to food. The right-to-food based approach to food security is based on a commitment to the value of human dignity, and it is based on obligations undertaken by governments. It should be seen as a wider, more encompassing,

and distinct objective in itself as part of the broader human rights agenda (Mechlem 2004; de Shutter 2009).

4.2 National level

A further important issue is to delineate which public goods are to be delivered either at a national level or at an international level. While certainly very important, it is not only economies of scale that determine the answer to this question. Actual organizational capabilities of countries at certain stages of development do need consideration as well, and that is where aid comes into play (Heller 2011). Furthermore, the responsibility for public goods provision does not only rest in the hands of the state, but optimal public goods provision can involve co-ordination by diverse players, including the private sector and civil society organizations.

How international public goods best relate to decentralized government is a complex matter. Decentralization involves the transfer of rights and responsibilities from higher to lower levels of government. Whether political, administrative, and fiscal, these rights and responsibilities are geared to enable a stronger *incentive* for co-operation between local and central governments. For public goods requiring high initial costs such as agricultural research, a more centralized mode is probably more appropriate in the short-term. In conjunction, however, there is a need to incorporate local institutions to co-ordinate with centralized agricultural R&D efforts, in order to reflect local needs and preferences, and to enable a better understanding of local knowledge and conditions. For other public goods such as health, education, local roads, and to some extent agricultural extension, a more decentralized mode may be more appropriate. However, it *is* clear that administrative decentralization without fiscal decentralization leaves local governments often powerless to strengthen their institutional capacity for public goods provision. This is often the case where local governments possess the human resource, administrative, and accountability structure to administer public goods, yet crucially lack the necessary public funding. There is no clear-cut relationship between decentralization and poverty reduction. Government decentralization may help in public goods delivery to the rural poor, but whether that actually applies depends on the nature of the public good in question on the one hand, and sound financial decentralization, informational symmetry between local and state levels, and access to information by rural populations on the other hand. High transaction costs act as a barrier to better co-ordination and public goods delivery.

Public goods investments in agricultural development and food security will have a low rate of return without the appropriate organizations and management. Institutional failure is often the reason for many development programmes gone awry, i.e. lack of effective and efficient rules, legal/judicial systems, rights, government agencies, markets, civil organizations. If public goods are not available at a national or local level, the immediate consequence should not be to call for their offering at an international level. Aid may induce misguided incentives to do just that, and this needs to be carefully watched.

4.3 International level

The optimality of the appropriate bundle of international public goods is not fixed. It is shifting over time and space, varies especially by local context, and changes with the state of development. Indeed, investments in individual international public goods have different

impacts on growth, income distribution, and poverty reduction. Diverse regions respond in unique ways to rural public goods investment. For instance, past public goods investments in international agricultural research has delivered more benefits to farmers in more favourable areas, such as irrigated areas in India and coastal areas in China. It can be said, however, that for most rural sectors, poverty reduction will be associated with increased spending for agricultural R&D, infrastructure (such as roads), and education. The latter two are generally to be considered as mainly national public goods, except for the international aid financing them. In view of the general situation that public goods are not a fixed set of 'goods and services' but change over time, the set of the international public goods portfolio also needs to adapt to change and new risks and uncertainties, and that requires adaptable organizational arrangements, not a set of fixed global organizations with fixed 'mandates'.

A new focus on institutions and the way in which funds, assistance, and technical guidance can be directed to strengthening and improving institutional capacity, as well as a deeper understanding of the role and functions of varying institutions in providing public goods holds promising prospects for agriculture and food security.

4.4 The set of IPGs needed

The need for adaptability applies in particular to public goods for the food and agricultural sector, since this domain is in rapid transformation, as described at the beginning of this paper. In the current world context, as identified in the above set of conceptual frameworks, an institutional architecture is needed to ensure that the following functions in the agriculture and food system operate effectively and efficiently at the international level, and the related global public goods are delivered. They are structured along key elements of the agricultural value chains and their safety, and overarching trans-boundary issues:

1. Natural resource management related to biodiversity, water, and soils
2. Climate change adaptation and mitigation
3. Trade and food reserves
4. Sound competition policy and standards for FDI
5. International research and innovation in food and agriculture
6. Responding to and preventing food and nutrition emergencies
7. Trans-boundary food safety and health related investments and standards

The case for each of these shall be elaborated below and the potential roles of aid, i.e. international funding and organizational support be identified.

Re 1. Natural resource management related to water, land and biodiversity

The relevant natural resource base of agriculture comprises plant and animal genetic resources and its diversity, i.e. biodiversity, trans-boundary water systems, and soils and land use. The international importance of biodiversity has been recognized for a long time and is captured by the related convention. International water systems are ruled by a large set of river basin agreements of different sorts, and a host of international platforms and partnerships address water management and governance, including contributions by UNEP and UNESCO. A comprehensive convention is not in place. The least attention among basic resources has been paid to land use and soils, although their unsustainable management has

potentially large international externalities. Recently some aspects of that have received increased attention under the conventions of UNCCD, and a first 'Global Soils Week' was held in 2012. Accelerated international land transactions indicating the emergence of an international land market have triggered voluntary guidelines for such transactions. Obviously the three resources should not be considered in isolation; when land and soils are mismanaged, biodiversity suffers. When irrigation systems are mismanaged, land and soils are degrading. The nexus-perspective provides the framework for such inter-linkages. While they are largely local, their international ramifications through the supply side of the world food equation cannot be negated and off-site effects of unsustainable land and water management can be transnational. A more comprehensive approach to provide management guidelines and information bases for these resources is needed as public goods, such as world soil degradation mapping services, water systems monitoring, and support for monitoring cross-cutting effects among the resources. New remote sensing technology has large economies of scale and is an international public good. Ground truthing of large scale information gathering on soils, water, and biodiversity require standards that are also a public good. There are clearly some significant gaps in the public goods provisioning regarding sustainable natural resource management. There is a diverse set of agencies with each being focused on singular aspects of the resources, and limited co-ordination among them. A people focus is lacking when an individual resource focus, such as on water or biodiversity dominate.

Re 2. Climate change adaptation and mitigation related to food security and agriculture

There should be no doubt that climate policy for agriculture and food security is needed as international public good. Agriculture is both, a contributor to GHG emissions and part of solutions to reduce GHG emissions, related to land use change and animal (ruminants) production. Still, agriculture has found it difficult to get attention in the climate change debates, and was generally sidelined at the big international climate conferences under UNFCCC. Similarly, the food security concerns of shifting climate with more volatile weather patterns is often noted but not explicitly considered, while energy and water advocates had stronger voices in the debates, possibly because of the higher relevance of these concerns for richer countries. As adaptation to climate change will require a large internationally co-ordinated research and financing effort to develop seeds and breeds adapted to the uncertain climatic conditions in the future and to design resilient and eco-efficient crop and livestock systems, while ensuring the conservation of soil, water and genetic resources, the climate- and agriculture-related public goods agenda is mainly a science (Soussana et al. 2012) and an international (aid) finance agenda. That research effort has global insurance characteristics, and any large scale insurance scheme is a public good. 'Agro-ecological engineering through the increased use of genetic and species diversity at field and landscape scales and eco-technologies to recycle farm wastes, to monitor greenhouse gases, verify soil carbon stocks and to adapt water management will play a key role. Investments in crop and animal disease and in invasive species monitoring will be required to preserve plant, animal and human health' (ibid.). A second set of international public goods is the agriculture-related monitoring information and exchange of international and regional modelling methods and findings to understand, predict, and guide mitigation and adaptation. UNFCC provides the umbrella, under which agriculture and food security needs more explicit consideration. A third set of public goods relates to institutional rules and standards for land use, and carbon sequestration with their enforcement and compensation schemes. In view of the complex linkages of these climate policy related public goods of relevance to agriculture and food security of the poor it seems necessary to call for a more

prominent integral positioning of agriculture in climate policies, not separate institutional arrangements for agriculture.

Re 3. Trade regimes and food reserves

Rule-based trade is an essential international public good for food security, in particular for the stability aspect of food security. The WTO is supposed to provide the framework. Food security is considered by WTO (WTO 2011), but the WTO was not able to deal with the acute problems of export restrictions that made the recent food crises worse. Preventing such collective actions failure is of central importance for global trade governance. A reform of WTO decision-making is long overdue, but unlikely to be achieved. Many other regional and bilateral trade agreements have be established in the past two decades. Some of them have elements of food security related rules, such as ASEAN, SARC, TPP, etc.

Of importance at global level are regimes that might reduce food price volatility and extreme price spikes. Probable sources of volatility are (1) the variation in grain stocks that change the effect of demand and supply shocks, (2) energy price volatility associated with the demand and supply of (bio-) fuels, (3) the speculative behaviour in more de-regulated futures markets, and (4) spill-over effects to the food markets from financial crisis. Food price volatility affects the poor the most and undermines their health and nutrition. Economic assessment of the costs of volatility that neglects the human effects is flawed. Extreme price volatility also hinders investment and leads to misallocation of resources.

Extreme price volatility is an international issue that requires international action. Together, national actions such as increasing grain stocks or restricting trade are inefficient and make global matters worse. There is some evidence that the price formation at the main international commodity markets was significantly influenced by speculation that drove spot prices upward beyond market fundamentals (Robles et al. 2009; von Braun and Tadesse 2012). To prevent extreme volatility, it is essential to ensure open trade, and transparent, appropriately regulated market institutions. There is an institutional vacuum at the international level to address these matters. Two sets of measures are proposed here: (1) *Better regulation*. The deregulation of commodity markets in the past decade went too far and contributed to the high economic costs of volatility mentioned earlier. Regulation should curb excessive speculation in food commodities—that is, future trading needs to be more transparent (providing information on actors and transactions), and costs of speculation should increase when prices spike (through, for example, capital deposit regulations that increase at times of spikes for non-commercial and index trading but can be insignificant under normal market situations). Simply excluding food from speculative futures markets would be wrong, because these activities also play a useful intelligence role in identifying prices. (2) *Institutional innovation*. Global collective action for grain policy that enhances food security is needed to overcome the collective action failures in grain markets. The instruments should be composed of two elements.

First, an independent grain reserve (that includes other healthy foods) should be established exclusively for emergency response and humanitarian assistance. Such a reserve possibly managed by the WFP could be handled in a decentralized way and backed by an international agreement that assures free movement of grains to address food emergencies at all times. Second, and more far-reaching, an 'International Grain Reserves Bank' should be established and tasked specifically with protecting the currency of the poor—grain prices—from crisis-type spikes. It would be governed like an independent central bank and equipped with

resources similar to those of a central bank: it would have a modest reserve shared by nations at the regional or global level and a financial fund that positions it as a potentially active market player. This reserve bank concept should not function as a general price stabilization fund, but only as an institutional tool for reducing the risk of large spikes that cause hunger and trade disruptions.

Regional policy bodies, such as the Association of Southeast Asian Nations (ASEAN), South Asian Association for Regional Co-operation (SARC), and African regional and sub-regional bodies have partly implemented joint reserve policies, which could be one step in the proposed direction. A regional set of arrangements, however, is suboptimal and may run into trust problems in regions with one or two dominating regional powers. A key role could be played by more open trade and stock release policies by India and China who both sit on large grain stocks. More trade liberalization in general and especially by these two nations could improve the global food security situation (Ganesh-Kumar et al. 2010).

Re 4. Sound competition policy, and standards for foreign direct investment in food and agriculture

Despite numerous interventions, agriculture has become a more globally integrated sector. Appropriate rules for assuring fairness and efficiency enhancing international investment policies guiding FDI for both sides of investment—investors and countries invested in—become more relevant. Trade and FDI policies are increasingly inseparable elements of global public goods. This applies to FDI along the whole value chain, from land (with access to water) to processing, and retailing. An international land market has evolved and is a particularly complex matter for global governance. For investments in land and other agricultural resources, voluntary guidelines have been established recently (FAO 2011). They need further strengthening toward enforcement in key elements, i.e. transparency in negotiations, respect for existing land rights, including customary and common property rights, sharing of benefits with local communities and environmental sustainability. Because of the transnational nature of such arrangements, no single institutional mechanism will ensure this outcome. Rather, a combination of international law, government policies, and the involvement of civil society, the media, and local communities is needed to minimize the threats and realize the benefits. This could be a domain of intensified and more structured government-to-government institutional arrangements.

Re 5. International research and innovation in food and agriculture

Some—not all—technological advancement in agriculture has public goods characteristics. The backbone of technological change is research, and for developing countries agricultural research in particular is a public good that is vital to poverty reduction. Recognizing that science has a significant role to play for international economic development is an important first step toward a science policy for agricultural development. Separation between development policy and science policy would be misleading: investment in science systems is part of any successful development policy. The ratio of spending on science in high income economies versus low income countries is more than 100 to 1. Today, the sharing of knowledge is even more important than the transfer of financial capital. To take advantage of the opportunities that are arising, developing countries need to invest in building their own science systems. At the same time, access to basic science—which is hard to buy from abroad—needs to be facilitated more. The science community today must rise to the challenge to connect to the debate on human and sustainable development goals. For instance

a goal of zero-land degradation is inseparable from an end-hunger goal. At the same time, the development community must connect with existing science systems. If these nexus problems are resolved, a huge opportunity for development supported by scientific evidence will arise.

The R&D driven component of agricultural growth, i.e. total factor productivity, accounted for about two thirds of total global agricultural productivity growth (Fugli et al. 2012). So one can say, it is R&D that feeds the world today. Technology—both agro-scientific and information technologies—is an important method to overcoming food insecurity. One of the challenges in this field is to identify institutional and incentive systems for transferring technological innovations of relevance to low income countries' farmers and food processors. Another challenge is for public policy to provide institutional arrangements that facilitate private sector innovations that reach and serve the food insecure. Currently, the private sector investments in technology may be creating a vast number of very helpful innovations that never reach low income countries. They are partly discarded halfway through their testing and realization because of missing markets (that is, lack of short-term commercialization potential) and deficient public-private partnerships. If this hypothesis is correct, the global knowledge system, especially in the private sector related to agriculture, is not functioning efficiently under a social cost perspective. New institutional research may help overcome these failures, and the CGIAR might play a leading role in this.

In the past two decades, *information and communications technologies* (ICTs) reduced transactions costs and improved the quality of public goods provision, such as research-extension linkages in agriculture. ICTs also contribute to new institutional arrangements and consequent strengthening of peoples' rights. Furthermore, unlike other infrastructure investments like roads, ICTs generate network externalities which mean that their returns can increase over time. In addition, ICTs contribute to lowering the costs of market use for farm households and small rural enterprises; more effective use of existing social networks or their expansion. It is important to keep in mind that access to information through ICTs is a question not only of *connectivity*, but also of *capability* to use the new tools and of *content* or relevant information in accessible and useful forms.

Re 6. Responding to and preventing food emergencies and nutrition

An international capacity to respond to and prevent food emergencies is a basic international public good. This need is defined by scales of trans-boundary emergencies, for instance regional droughts, and by negative spillovers (externalities) of large national calamities and complex emergencies related to combinations of conflicts and natural disasters. Both of these often cannot be handled by low income nation states. The international capacity to address such problems has improved over the years, and frequencies of famines declined as a result. But food assistance in failed states and war affected regions remains a tremendous challenge that goes far beyond food agency capacities, such as the WFP. The UN needs further support and strengthening to effectively play its potential role in these conflict situations with food emergencies. A more comprehensive emergency aid mechanism is called for, in which the food and nutrition element covered by WFP remains essential. The growing problem of insecurity in large and widely scattered sub-regions is a basic problem of food insecurity. The complex nature of the problem calls for an equally complex institutional arrangement at international level, and not just one entity to handle it all.

Another problem is it that nutrition as a global problem currently has no well defined organizational home, despite its dual global problem—undernutrition and obesity. Many

nation states are obviously not capable to address the nutrition problems effectively. Much positive externalities could be tapped by trans-national learning and joint actions. The recently emerging SUN Movement (Scaling Up Nutrition) involving more than 35 countries with the UN playing a facilitating role is one promising effort to overcome this deficiency. A consolidated and structured home for sustained global nutrition action will be needed in the future.

Re 7. Trans-boundary food safety and health related standards

Food safety is also a basic public good. While it largely can be left to national policy of control and enforcement, international food trade and the demands by consumers for sound standards makes parts of it an essential international public good (Oosterveer 2007). Setting standards for transparency and safe and comparable foods (i.e. Codex Alimentarius at FAO) has a long standing tradition. Less well established are preventive measures for trans-boundary food and agriculture related health risks, such as livestock-originated human diseases (e.g. bird flu, SARS etc.). Early detection seems to have improved, and the WHO plays the important role in that, but emergency measures to address the root causes of such agriculture-linked infection risks remain too ad hoc. This set of food risks calls for international arrangements that facilitates swift and strong government-to-government co-operation, not just a strong international body. Moreover, harmonized and strictly enforced regulations by governments should be combined with incentives for self regulation to prevent food related health risks by trans-boundary corporations, which play a key role in today's world food system.

4.5 Tapping into synergies among public goods

The seven sets of essential international public goods elaborated above should not be seen in isolation. Addressing one has positive spillover effects to other public goods. For instance, addressing climate change adaptation and mitigation is supported by sound trade and food reserves policy; international research and innovation in food and agriculture helps to stabilize the food system and serves virtually all other public goods; responding to and preventing food and nutrition emergencies is basic and is helped by trade; trans-boundary food safety and health related investments and standards have large benefits for the smooth functioning of the food system. And in the long-term, sound international natural resource management related to biodiversity, water, and soils prevents future food emergencies, as does climate change mitigation and adaptation. Such synergies are to be considered when aiming for institutional arrangements. Not every public good needs its individual international organization.

5 Features of international institutional arrangements for sustainable agriculture and food security serving emerging needs

5.1 Principles for organizational arrangements

For a strategy of international public goods provision, not only the question of *what kind of public goods, but also the how of organizational arrangements* needs to be addressed. Key principles for sound international governance of public goods in general, and also related to agriculture and food are adherence to *legitimacy* combined with *accountability* (i.e. the

decision-making body has a legitimate basis and is accountable) and *effectiveness* (i.e. the chosen governance structure is the most cost-effective option among alternatives in delivering public goods). And given the fast changing and uncertain nature of the drivers of global food and agriculture, such as climate change or food related health risks, a third principle needs to be *inventiveness* (i.e. the capacity to innovate and adapt to changing circumstances). While the current governance system with a host of UN agencies is strong in legitimacy it lacks effectiveness and inventiveness for efficient public goods delivery.

The conceptual framework for addressing the *effectiveness* principle can draw on transaction costs theory (Williamson 1981). Cost-effectiveness analysis aims to identify the governance structures that make it possible to achieve a specified outcome at lowest possible costs. In designing global governance structures, policy-makers need to decide what shall be handled at global levels, to which extent should different types of transactions be delegated to autonomous public agencies, to which extent might they be outsourced, and to what extent do they need to be funded by aid. Governance takes time when many are involved and thus there is the dilemma of trade-offs between principles (e.g. lots of governance legitimacy can slow down effectiveness).

The *inventiveness* principle requires capacity and freedom to experiment and to link to and among innovators in the research and innovation systems. Experimental designs can provide substantive inputs for re-design. The typical hierarchical structures of global organizations seldom provide the suitable context for that. More nimble and flexible structures are needed. A global food and agriculture architecture needs the capacity to adopt and test innovations generated in the public and private innovation systems. This speaks for independent research bodies as part of the global architecture for agriculture and food.

5.2 The proposed re-design

As mentioned above, the recent efforts to address the global governance vacuum around agriculture and food and nutrition security mainly seek salvation in co-ordination and consultation. That is partly the right approach, but does not go far enough. Two institutional re-design mechanisms are needed: (1) a platform that facilitates public goods policy actions, and (2) a science and research based global assessment mechanism to provide evidence base for strategic direction for action.

5.3 The platform

A legitimate, nimble and innovative set of strategic bodies to help co-ordinate the actions of others (i.e. some of the existing international organizations) is needed: a *platform* that can facilitate global action as well as government-to-government networks, with inclusion of private sector industry and civil society actors. It should have legalized political authority to watch over and broadly facilitate public goods delivery in support of global agricultural development and food and nutrition security. This platform should be flat in hierarchical structure, and thus able to respond quickly to new risks, making decisions based on a small number of players if need be (not everyone needs to be at the table all the time on all issues). A candidate could be a truly independently-governed Committee on World Food Security (CFS). The CFS reports annually to Economic and Social Council of the United Nations (ECOSOC) and is made up of members, participants and observers. The membership of the Committee is open to all member states of the FAO, IFAD or WFP and non-Member States

of FAO that are Member States of the United Nations. Participants can be from representatives of UN agencies and bodies, civil society and non-governmental organizations and their networks, international and regional financial institutions and representatives of private sector associations and private philanthropic foundations. It currently lacks independent governance structures and budgetary authorities. An appropriately re-designed CFS-type body should for instance be able to call with authority upon the WTO to engage in the prevention of export bans in crises, and guide towards meaningful global grain reserves policies to address the volatility in markets, for example task the science-based assessment mechanism with a comprehensive review of biofuels policies, or work with corporations and governments to end land-grabs that act against poor local communities.

A system is only as strong as its weakest parts, so this global strategic body needs to be able to rely on more effective global agencies. For that, the FAO should be re-invented, and strengthened to deliver the public goods that facilitate sustainable agricultural intensification and growth under climate change, food security information and global food safety services. Second, global nutrition policy needs an organizational home and not split among five agencies; third, WFP needs to be supported to better mitigate and respond to emergency food crises by getting a reliable global food store and funding that permits flexible response. Institutional re-design would be best arranged around focus areas that facilitate IPG delivery in order to facilitate public goods inter-linkages.

Three such *focal clusters* of organizational setups may be considered at the level of such a platform:

Focus 1: on food and nutrition security of the poor;
Focus 2: protection of natural resources;
Focus 3: enhanced sustainable intensification and productivity growth.

The proposed organizational solution should not be a call for one global mega-organization, but a system that combines government-to-government networks with inclusion of corporate and civil society organizations and combined with a small set of global organizations of the traditional type. The system re-design should aim for the following architectural building blocks for governance of the global public goods related to agriculture, food and nutrition:

1. G-to-G for food safety and competition: a platform facilitating nimble and innovative government-to-government networks with legalized political authorities and inclusion of private sector industry and civil society actors, to address competition issues and food safety.

2. Finance and trade: a network of organizational arrangements that tackle the non-agricultural drivers of food security risks, resulting from financial markets and commodity market inter-linkages, and handling the trade regime and food reserve issues.

3. Sustainable intensification and growth: a food and agriculture organization accountable for the agricultural growth and food security information and services critical for global investment actions. It can be built on a re-invented FAO.

4. Emergencies: a crisis response and emergency-mitigating global organization. It can be built on a strengthened WFP with reliable and needs-dependent flexible financial resources.

5. Nutrition: a mechanism that could tackle the dual chronic nutrition problem (undernutrition and obesity), i.e. an effectively functioning home for the huge nutrition tasks with support by WHO, WFP, and UNICEF, but not only including UN and governments, but blocks of civil society and business representation. It might evolve from the SUN Movement.

5.4 The science-based assessment mechanism

The current and future challenges of agricultural development and food and nutrition security require a strong mechanism for science and research-based assessment as a permanent institutional arrangement. A global body tasked with this could be mapped along the lines of the IPCC, but avoiding its well-known pitfalls from the outset. It needs to have a perspective for the coming two to three decades as the agriculture and food issues are filled with uncertainties and opportunities. It is not a one-off assessment task or a set of studies, but an integral part of a sound international public goods delivery system for agriculture, food and nutrition security. An independent IPCC-type global research body that facilitates the peer-reviewed assessments on agriculture, food and nutrition is needed for delivering evidence based analyses for action with foresight. This function goes beyond the existing CGIAR, and calls on the whole international science system related to agriculture, food and nutrition.

5.5 Way forward

Some re-design actually occurs already in the direction stated above, but it is rather ad hoc and piece meal. To move the re-design process forward more strategically, and less ad hoc needs a high-level, broad based, legitimized time-bound dialogue forum that embraces the whole set of international public goods for agricultural development and food and nutrition security, and addresses the organizational implications. The re-design of the system should be done step by step. The steps could be guided by the above-mentioned cost effectiveness assessments, with adherence to the principles of legitimacy with accountability, effectiveness, and inventiveness. Coming to a meaningful implementation of this re-design option will require leadership. Leadership for change could come from the developing countries via the UN and the G20 which could play a key role to initiate the change. If the re-design will not happen soon it will come about in the context of the next large scale food crisis at the latest. But for the sake of the poor and hungry change is needed now to prevent future food crises.

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