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ROSA Newsletter

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ZOOM

The role of agricultural research for the development of sustainable agriculture and food security in Sub-Saharan Africa

In July, the Africa agriculture science week was organised in Ghana, an event of the Forum for agricultural research in Africa (FARA) that takes place every three years. Written by *Christian Castellanet*, programme manager in Gret and former member of the CGIAR NGO committee, this month's Zoom shows the importance of agricultural research for development in Sub-Saharan Africa in order to overcome the challenges of food security, nutrition, increasing incomes and livelihoods of small famers while limiting the negative impacts on the environment. A new direction, sustainable intensification, is currently proposed. This implies a renovation of research methods, using more integrated and participatory approaches, as well as an increased participation to the definition of suitable public policies.

Agricultural Research and Rural Development Models

The goal of agricultural policies cannot merely be to increase production. They must also allow the incomes, nutrition and living conditions of family farmers—who make up the large majority of farmers in developing countries—to improve and provide positive benefits for all inhabitants, both urban and rural, by protecting the environment, preserving landscapes, and providing rural jobs[1].

Agricultural research is one of the main factors contributing to shifts in agricultural production systems and changes in the rural world. In particular, it is helping to improve productivity, to increase agricultural incomes, and to change agricultural practices. Various impact assessments have shown that it is one of the most effective investments when it comes to increasing agricultural production[2]. Although for many years the primary objective of agriculture research has been increases in yields and, production, it has recently evolved to contribute also to increasing resilience, improv-

[1] *Agriculture's multifunctional nature has been an integral part of the EU's Common Agricultural Policy since the early 2000s.*

[2] *See for example: Waibel, Hermann. 'Impact Assessment of Agricultural Research for Development and Poverty Reduction'. Working Paper 2006 No. 2 Development and Agricultural Economics. Faculty of Economics and Management, University of Hanover, Germany.* >>>

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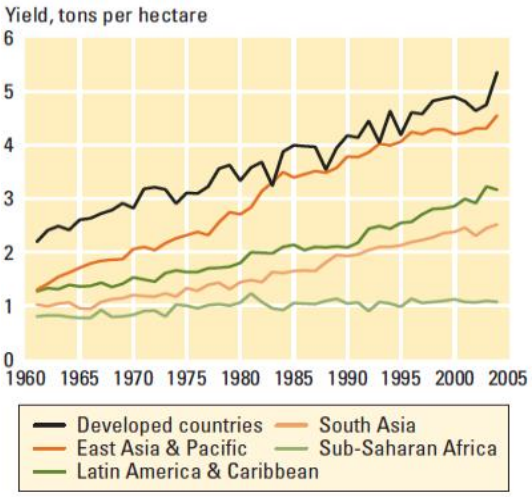
According to the World Bank (2007), the gap of cereal yields between SSA and other regions has increased over the past decades



ing nutrition and women empowerment.

The most recent data available on agricultural research spending levels date back to 2008[3]. These data show a considerable rise recently in public spending in this sector, from $26 billion in 2000 to $31.7 billion in 2008 (+22%). This rise can be attributed mainly to emerging countries while LDCs and other low-income developing countries experience very slow growth. African countries' spending is relatively low (0.6% of agricultural GDP) but still higher than that of China and India. [*more information in appendix 1, on ROSA website* >>>]

The Case of Sub-Saharan Africa

In sub-Saharan Africa, increasing agricultural production—alongside the growth in the population—has above all resulted from a rise in the amount of land cultivated rather than an improvement in yields or the intensification of agricultural practices. This is putting greater pressure on natural forests and pastures, with medium-term negative impacts on ecosystems and the reproduction of soil fertility as well as on biodiversity and the climate.

One of the most visible impacts of agricultural research has been the Asian green revolution. However, the green revolution has not delivered the hoped -for results in Africa. There are several explanations for this. First, it was above all farmers in fertile areas with good rainfall (or efficient irrigation systems) that benefited from the green revolution. In practice, this excludes African small farmers engaged in manual production, located in semi-arid regions with uncertain rainfall. It is very difficult to adopt the green revolution's classic improved production techniques which are based on significant cash investment in inputs (seed, fertilizer) because of African farmers' limited monetary capacities. Even if a credit system was available, the climate hazard results in high risk of non-repayment in poor years. [*see Appendix 2: achievements and limits of the green revolution, on ROSA* website >>>]

Other factors can explain this relative stagnation of agricultural yields. First, there is the lack or weakness of agricultural support policies (prices/credit) whereas the deregulation of international agricultural markets has placed small African farmers in the poorest countries often in difficult positions because of the huge disparity between the labour productivity of small farmers working with hand tools and that of large mechanized farms in developed or intermediary countries[4]. Poor infrastructures, especially irrigation infrastructures in arid and semi-arid zones, are also at fault. Other factors related to the type of usage rights to the land and natural resources have also played a role: without land tenure security many investments are uncertain, particularly all those aiming to establish plantations, restore soil fertility and pasture productivity, and fight against erosion.

Current Debates in Africa

Today, there is a consensus on the fact that the objective is to increase agricultural production in SSA (by increasing per-hectare yields) and that this increase must suit local conditions and be based on new foundations that use fewer inputs and are less harmful to the environment than the green revolution. This is in line with the conclusions of the IAASTD, a collective expertise effort that mobilized hundreds of researchers from many disciplines and all regions of the world for four years. [*see Appendix 3 on IAASTD proposals on ROSA website* >>>]

However, a number of points are the subject of international debate for research, particularly in sub-Saharan Africa.

What farm size should be supported? To what extent should smallholders (most of

[3] *See www.asti.cgiar.org. The amounts are calculated in constant 2005 purchasing power parity dollars.*

[4] *IAASTD, 2008.* >>>

whom family farmers, who make up the vast majority of the rural population) be prioritized over a more modern development model based on much larger mechanized farms? The Forum for Agricultural Research in Africa[5] (FARA) notes that this question is the subject of debate among political leaders, development experts, researchers and the private sector, with often very set opinions on the matter. This debate must be viewed in connection with some national land policies that favour large concessions to local, even international, entrepreneurs, against a backdrop of 'land grabbing' by foreign investors under often non-transparent conditions. It must also be viewed in conjunction with the issue of demographic transition and the capacity of other urban sectors to absorb the huge inflow of labour caused by the combination of an accelerated rural exodus and the rapid growth of the population and young people of working age[6].

FARA also examines *which type of intensification to support*. Some researchers and decision-makers think that most development must come from the application of high input technologies, including GMOs, which are themselves highly debated. Others defend sustainable intensification through approaches centring on better resource management. FARA notes that these two debates come together in the two currently dominant paradigms for agricultural R&D: support for small farmers who use few inputs on one side, and support for large farmers who use inputs extensively on the other.

What Directions for Agricultural Research in SSA?

Research can provide on the one hand evidence, based on policy analysis, to give guidance on some of the issues outlined above and, on the other hand develop technologies that are geared to the needs of target groups such as poor smallholder farmers, as detailed below.

The Need to Develop Socioeconomic Research

The preceding considerations show that there is above all a strong need for socioeconomic research to clarify the policies and development model chosen so as to:

- Respond to agricultural policy stakes (opening markets, land policy and encouragement for mechanization/inputs, agrifood value chains) and place agricultural issues in context within national development policies (demographics and jobs). On this subject, FARA notes that there are vast situational differences between African countries when it comes to land availability, demographics and human resources; agricultural development and research strategies must therefore take into account these differences.
- Bring about changes in local land and natural resource management modes. This implies real research action systems involving the local authorities, users, customary authorities and the government. The aim is to develop joint management capacities for forests, pastures, waterways and irrigation schemes to allow optimal sustainable use of natural resources, particularly firewood, fishing, wildlife and lumber. This is the key to securing productive investments and limiting increasingly frequent and violent conflicts between sedentary and transhumant farmers and between locals and new arrivals.
- Support the emergence of farmers' organizations able to meet local challenges, market needs and opportunities, and mobilize themselves towards technical changes and self-training.

[5] *More information on FARA: http://www.fara-africa.org*

[6] *This is the subject of the Rural Struc research programme. Several reports can be downloaded from the this link >>>*

The Challenges of Agronomic Research: Sustainable (or 'Ecological') Intensification

Agronomic research must meet the challenge of intensification while adapting to the unique realities in SSA. Some speak of 'sustainable intensification' while others speak of 'ecologic intensification' and still others of 'agroecology'.

Overall, there is a consensus among researchers that the former 'top-down' approach to technology transfer, as well as the technical content from the green revolution are no longer adapted. It is then a matter of addressing several areas[7].

Optimizing agroecological processes

The aim is to make the best use of the properties of cultivated agroecosystems by maximizing use of light energy and water, optimizing land occupation and biomass production, developing mineral and organic matter cycles, avoiding water loss, playing on the dynamics between crop pests and their predators, and finally taking advantage of the characteristics of various species cultivated to minimize competition between them and maximize their complementarities.

Concretely, this requires strengthening the association of crop and livestock production, agroforestry, the development of organic fertilization, the development of associated crops, no-till techniques and mulching ('conservation agriculture'), integrated pest management (IPM)[8], anti-erosion developments on land and watershed basins, and organic farming as such (which adopts all these principles plus the obligation to not use any external chemical inputs).

These processes are unique to each location and agro-ecological milieu, they are 'site-specific'. The development of sustainable agricultural systems is therefore 'knowledge-intensive' insomuch it is based on the observations and detailed practices of farmers, who will, for example, identify plants that restore fertility (or indicate dropping fertility), plants that repel this or that pest, etc. They lead to combine farmers' knowledge with researchers' knowledge to develop site specific innovations that suit local conditions and ecosystems. It therefore implies a change of paradigm for agricultural research and development, as well as for extension systems, which were accustomed of developing "standard technical innovation" which could then be transferred over large regions. On the contrary, agro ecological and sustainable intensification approaches stress the need for adaptive research to test out complex agricultural systems in diversified locations.

These models are also 'labour-intensive' because good management of agroecosystems demands precise interventions by farmers on individual plant level to produce and manage organic matter.

Optimizing Input Use

The proponents of organic farming believe that it is possible to feed the world while renouncing chemical inputs and practicing this type of farming based on optimizing ecological processes and organic matter[9]. However, other experts point out that in Africa current input use levels are so low that they should be increased to improve yields whereas in developed countries and countries such as China that have massively adopted the green revolution it would be desirable to lower input use. Organic agriculture only obtains an average of two-thirds the yields of agriculture using high levels of chemical inputs with locally available organic matter (manure or compost) application. We can however note that given the current productivity of African agriculture, particularly in regard to cereals, organic agriculture would, based on these figures, theoretically already have the potential to double or triple yields[10]. Finally, to

[7] This section is largely based on the report by the Montpellier Panel titled 'Sustainable Intensification: A New Paradigm for African Agriculture' >>>

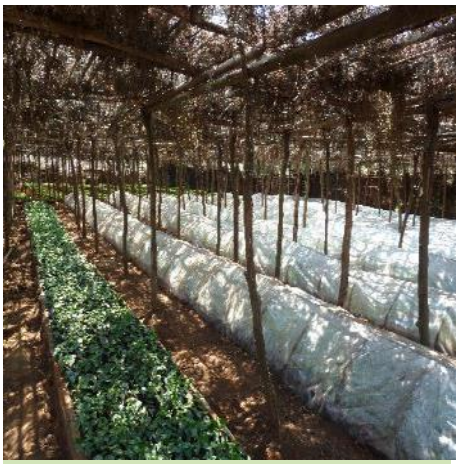
[8] The ADOPT project financed by the EU in 3 countries (Kenya, Tanzania and Ethiopia) promotes the 'push-pull' approach that consists of assembling various plants to attract (pull) and repel (push) pests. See the project's website: http://www.push-pull.net

[9] FAO, International Conférence on organic agriculture and food security, Report, May 2007 >>>

[10] If we take an average cereal yield in SSA of 1.2 T and a potential yield of 5 T in classic intensive agriculture (a cautious estimate, taking into account more pronounced weather hazards in semi-arid zones), we reach an estimated potential on the order of 3.3 T in organic agriculture, two and a half times current yields.

complete the discussions, some agroecologists believe that when soil is very degraded it is desirable to first restore its fertility by adding organic matter and additional chemical fertilizers to rebuild the soil's mineral stock and therefore undergo a transitional phase before then reconverting the system to agrobiology once fertility has been restored.

Nevertheless, the proponents of "integrated" or "precision" agriculture believe that there is a vast field of progress around optimizing the limited doses of inputs used in certain regions and around certain value chains. The high and rising cost of inputs alongside the relatively stagnant price of staples (although cereal prices have risen in recent years) makes the use of fertilizer fairly unattractive, especially in isolated regions. The efficiency of fertilizer use (in terms of additional tons of produce per kg applied) is therefore a condition for its wide dissemination. One example of this approach is ICRISAT's development of fertilization techniques using micro doses of fertilizer placed close to seeds, in the seed holes, allowing a significant increase in sorghum yields with low doses of 4 kg of fertilizer per hectare.



Improving tea plants with a local co-operative in Tanzania

Genetic Improvement

First, one must know that in nature there is no such thing as a "free lunch". Geneticists and ecologists have long known that crop varieties (or livestock breeds) are all compromises between productivity (speed of growth, share of biomass going to seed or fruit, etc.) and hardiness (resistance to stress and illness and the ability to survive in a hostile environment). Farmers and herders have selected local races and varieties for centuries specifically to be optimal in their usual environmental conditions. Since the environment is frequently fairly harsh in Africa, these species have little potential productivity but guarantee a minimum yield when conditions are very poor, for instance in the case of drought or pest attack.

Once one improves the environment for crops or livestock by increasing soil fertility, providing water and ensuring better feed and protection against parasites for animals, it becomes possible to use new, more productive, less hardy varieties or breeds to improve yields. Agricultural research can play an important role in this area both by working on classic genetic improvement in research stations and by collaborating with farmers on participatory selection of more suitable local varieties and breeds. It has to find, in each environment, the optimum between yield and hardiness. One example of the success of this approach is the creation and development of Nerica, a crossing of an African rice (Oryza glaberrima) that is resistant to drought and tolerant of poor, acidic soil with more productive Asian species with shorter cycles (O. sativa), obtained by tissue culture in laboratories.

Responding to new challenges

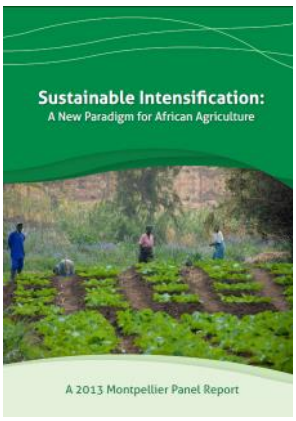
Agricultural research needs also to take into consideration new challenges, apart from production increase and intensification per se. This means focusing on nutrition, on resilience and adaptation to climate change, on equity in the use of natural resources, and on biodiversity conversation. Examples of such successful researches include the development and dissemination of enriched staple crops in micronutrients (such as vit..A enriched sweet potatoes in Mozambique[11]) and the development of agroforestry systems in the Sahelian areas which restore soil fertility and permit better resilience of the cropping systems in case of water stresses[12].

New Relationships Between Agricultural Research and Farmers

These new challenges require a systemic and participatory approach to agricultural research to be developed with the aim of finding solutions to the specific problems of this or that category of farmer in a given agro-ecologic milieu. However, experience

[11] *See the case study on EIARD (European initiative for agricultural research for development) website: http://www.eiard.org/key-documents/impact-case-studies/2013/#HarvestPlus*

[12] *http://www.eiard.org/key-documents/impact-case-studies/2013/#ICRAF*



has shown that it is not enough to adopt an ecosystem approach (as several international CGIAR research centres (such as ICRISAT, ICARDA and CIAT) did in the 1980s and 1990s), one must also be able to organize a true dialogue with those who use the research—in this case the farmers—to identify appropriate solutions that suit their constraints and implementation capacities. It is also a matter of effectively combining farmers' local and traditional knowledge with scientific knowledge by developing new research modalities, research in partnership and even research initiated by farmers themselves according to the 'farmer-to-farmer' model. There are however still many obstacles to establishing this research based on user demand and even more to establishing 'research in partnership'. They require changes in practices, research methods and how research centres are organized as well as changes in the culture and practices of farmers and farmers' organizations. NGOs can play an important role as mediators and partners in building these relationships and implementing research in partnership.

Various initiatives have been launched with the support of the EU to facilitate this drawing together of research, small farmers and the private sector in Africa around regional agricultural research fora and the Global Forum on Agricultural Research (GFAR) as well as the PAEPARD[13] programme, INSARD[14] and the Sub-Saharan Africa Challenge Programme[15] implemented by FARA.

There are many challenges involved in developing this approach. First, participatory processes are long and come with high transaction costs. Elaborating a research project and the necessary back-and-forth communication between researchers and farmers takes between one and two years. Then, the time needed for most competitive funds to process requests is often one year. In all, this means that three years—the most frequent length of a support project—are necessary merely to attain a designed and funded project. How can processes that necessarily take longer be supported with projects of limited duration? How can one effectively guarantee support for research projects elaborated jointly following a co-construction process, or at least for a significant portion of them? How can the criteria of excellence and relevance linked to how they are negotiated with the farmers concerned be brought to coexist in competitive research funds? How can this be coordinated with other donors supporting research within GFAR and CGIAR?

Conclusion

To overcome the considerable challenges to come in regard to food security, nutrition, and increasing incomes and living conditions of small farmers while limiting the negative impacts on the environment, sustainable agricultural intensification is needed, especially in sub-Saharan Africa. This sustainable intensification relies on a combination of modern techniques and the optimization of agro-ecological processes. Agricultural research for development has a large role to play in this process. It must adopt a more inclusive and participatory approach by developing close collaboration with farmers regarding both planning and implementation. It must also contribute to public policies by answering the questions of which agricultural development models to promote, helping increase land tenure security and set up mechanisms for concerted management of natural resource, and supporting institution building locally, nationally and regionally.

Further reading

► African agricultural R&D in the new millennium, Beintema and Stads, IFPRI, ASTI, 2011 >>> and country reports >>>

► Sustainable intensification: A new paradigm for African agriculture, Montpellier Panel, 2013 Report >>>

► GCARD Conference 2010: several thematic and geographic reports >>>

► Global Forum for Agricultural Research (GFAR) website >>>

► Forum for Agricultural Research in Africa (FARA) website >>>

► Impact case studies of the European Initiative for Agricultural Research for Development (EIARD) >>>

► Agriculture for development, WDR 2008, World Bank, 2007 >>>

[13] http://paepard.org
[14] http://www.repaoc.org/insard/
[15] http://www.fara-africa.org/our-projects/ssa-cp/

The author would like to thank David Radcliffe (EuropeAid) and Didier Pillot (Montpellier Supagro IRC) for their precious comments and inputs.

Past events

- **CGIAR research programs engagement with donors & stakeholders meetings - CGIAR, Montpellier, 17-18 June 2013:** These series of meetings are linked with the reform process of CGIAR (Consultative Group on International Agricultural Research), initiated in 2008 and marked by the Strategic result framework adopted in 2012. The event was dedicated to presenting and discussing the different research programmes of CGIAR portfolio, results achieved and programming for the coming years. These works were shared in 4 2-days sessions in order to cover the 16 research programmes. Researchers, NGOs, donors and other development partners agreed that the adoption rate of agricultural innovations among poor farmers was often inadequate. Solutions nurtured by scientists are not always adapted to the local needs of farmers. Constraints from within or outside the agriculture sector, such as poor infrastructure or dysfunctional institutions, may also prevent scaling-up. Development organizations may also be unaware of potentially valuable new technologies or farming practices, or institutional innovations that could improve rural household incomes, food security and nutrition in a sustainable manner. >>>

- **Harnessing ecosystem-based approaches for food security and adaptation to climate change in Africa - FAO, UNEP, Nairobi, 20-21 August 2013 :** The First Africa food security & adaptation conference explored ecosystem-based approaches to enhance food security, ecosystem productivity and climate change adaptation in Africa. 700 participants from 54 countries attended the conference, including representatives of governments, civil society and intergovernmental organizations. The objective of the workshop was to facilitate experience sharing and to discuss the lessons learnt from case studies around the continent regarding food security adaptation to climate change. At the end of the conference, the participants adopted a declaration on food security and climate change adaptation, which recognizes ecosystem-based adaptation approaches as the first step towards building resilient food systems. The participant's booklet summarize the case studies presented during the conference, which are also available on the website of the event. >>>

- **Agricultural transformation in Africa. Brussels Briefing - CTA, ACP Secretariat, Brussels – 2nd October 2013:** The event consisted of two different parts. The first part has shown how agriculture is a major driver for economic and social transformation in Africa. The panellist have presented the way African agriculture fits in the global context, the question of job creation in rural environment (case of Kenya) and the role of private sector. The second session draw on the proven success and best practices in the agricultural sector. After a general outline by IFPRI, the panellists have focussed on 3 specific topics: monitoring the progress of Maputo commitments, public-private partnerships, leveraging private investments. The reader of the event provides extensive research on the topic. The video record and all presentations and background notes are available from Brussels briefing website. >>>

Upcoming events

16 October : World food day: ''Sustainable food systems for food security and nutrition'' >>>

29 November : Opening conference of the IYFF: ''Family farming: A dialogue towards more sustainable and resilient farming in Europe and the world'', EC, Brussels >>>

Don't hesitate to post event on Rosa collaborative platform >>>

EC's latest news

eudevdays.eu

26-27 November 2013
Brussels - Tour & Taxis

- **European Development Days 2013 - Building a consensus for a new development agenda, 26-27 November:** Organised by the European commission, European Development Days (EDD) is the gathering of European development practitioners and their partners worldwide. This year's EDD will focus on the Millennium Development Goals (MDGs) and the need for a strong common European position to addressing global poverty and sustainable development after 2015. The topic is very timely as 2015 (the MDGs target date) is fast approaching, and also in the light of the UN Special Event on the MDGs held in New York on 25th September and its outcome adopted by the UN General Assembly in October.

Among other topics, EDD13 will deal with food and nutrition security, resilience and sustainable agriculture. High-level experts and decision-makers are taking parts to the different sessions:

- Agriculture in Africa today, telling facts from the myths: academic presentation developed from integrated surveys on agriculture and living standards conducted in 6 African countries. >>>
- Resilience building for improved food security. From policy engagement to sustained change: with presentations from IFPRI and CTA directors. >>>
- Small farmers, big business? From controversial debate to concrete solutions: Building on case studies, this session will discuss the roles of private and public actors in up-scaling inclusive partnerships. >>>
- Food security and food justice: a panel discussion organised by the European Parliament. >>>
- Innovative solutions for food security. A problem-solving workshop to enhance resilience to the challenges of food insecurity: a participatory brainstorming session organised by Nottingham Trent University to explore innovative solutions for resilience. >>>
- Feed the change. Boosting resilience, food and nutrition security through innovative partnerships: a discussion on high-level partnerships, with governments, development agencies, private sector and civil society representatives. >>>
- Global food security and policy coherence for development. A multi-stakeholder approach: a roundtable on PCD involving OECD, EC and governments. >>>

All debates will be translated into French and English. Visit EDD website for practical information on how to participate to the event.

You can follow updates and news on EDD13 on ROSA website. **>>>**

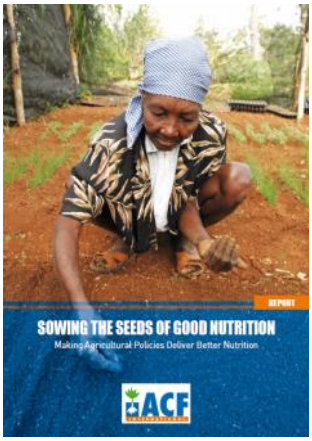
New online resources

- ***Wake up before it is too late: Make agriculture truly sustainable now for food security in a changing climate, UNCTAD – September 2013:*** The Trade and environment review 2013 from UNCTAD focuses entirely on agriculture. The key message is that developing and developed countries need a paradigm shift in agricultural development: from a "green revolution" to a "truly ecological intensification" approach. The report is comprised of 5 chapters written by development practitioners and academics: agriculture transformation, livestock, extension, land use and trade. Each chapters is followed by a set of commentaries from a range of experts

that provide case studies or more details on specific concepts. The report emphasizes that a shift is necessary towards diverse production patterns that reflect the "multi -functionality" of agriculture and enhance closed nutrient cycles. Moreover, as the environmental costs of industrial agriculture are largely not accounted for, governments should act to ensure that more food is grown where it is needed. It recommends adjusting trade rules that allow "*as much regionalized/localized food production as possible; as much traded food as necessary*." **>>>**

- ***Sustainable intensification: A new paradigm for African agriculture, Montpellier Panel report 2013 – July 2013:*** The report was published in the framework of the Montpellier Panel – a group of international experts from the fields of agriculture, sustainable development, trade, policy, and global development chaired by Sir Gordon Conway (see this month's Zoom). The report provides innovative thinking and examples into the way in which the techniques of sustainable intensification are being used by smallholder farmers in Africa to address the continent's food and nutrition crisis. It begins by examining the process and elements of Intensification itself, before considering how we then ensure that the intensification is sustainable, and concludes with practical solutions in action today across the African continent, that underline the positive impacts the framework can produce if scaled up more effectively. **>>>**

- ***Sowing the seeds of good nutrition. Making agricultural policies deliver better nutrition, ACF, Cirad, Gret – September 2013:*** Linking agriculture with nutrition and improving the nutritional impact of agriculture programmes and interventions is a topic of growing interest in the international agenda (see ROSA Newsletter 46). The objective of this report is to assess to what extent this global agenda is actually translating into action at country level. The authors analysed the agricultural policy frameworks of three countries that have recently committed to improving the alignment of their agricultural policies with their commitments to reducing undernutrition: Burkina Faso, Kenya and Peru. The case studies are based on the following questions: i) How do national agricultural policies integrate nutrition issues? ii) What are the main constraints to improving the contribution of agriculture policies to the reduction of undernutrition? iii) How could these constraints be alleviated? **>>>**



- ***Policy coherence for inclusive and sustainable development, OECD – June 2013:*** This recent OECD paper discusses how to create the enabling environment and policy coherence needed for the post-2015 MDG framework. It draws on OECD policy coherence for development (PCD) work. The article reviews global changes and recommends a broader PCD approach based on, inter alia: collective action, common but differentiated responsibilities and mutual benefits; multiple levels of coherence; inclusive policy dialogue; and a focus on fostering positive synergies across sectors and among policies. It is part of the broad OECD reflection on post-2015 framework. This narrative will also be discussed during the European Development Days, at the lab on Global Food Security and Policy Coherence for Development (Wednesday, 27 November 2013). **>>>**

- ***Lessons for effective resilience programs: a case study of the RAIN program in Ethiopia, Mercy Corps – August 2013:*** This learning study explores how innovative elements of the programme - namely the combination of flexible humanitarian funding, a multi-year project time-frame, and relief to development design - were implemented in practice. It also highlights the key role that adaptive management played in maximizing these programme features. The purpose of this study is to provide guidance for the design and management of future resilience programmes. **>>>**

External resources and blogs

- ***IFPRI 2020 Policy consultation. Building resilience for food and nutrition security:*** IFPRI has launched a two-year global consultative policy process on resilience. The centerpiece of this initiative will be a global conference held on May 15-17, 2014, in Addis Ababa, Ethiopia. A website has been established to guide the process and provide useful information on the topic. **>>>**

As part of this initiative, a roundtable on 'Investing in strengthening the resilience of smallholder farmers' is organised on 21st October and will be webcasted on the website. **>>>**

- ***Interventions to improve water quality and supply, sanitation and hygiene practices, and their effects on the nutritional status of children, Dangour et al., Cochrane collaboration – July 2013:*** Systemic review on the links between undernutrition and WASH intervention using the data from 14 studies in 8 countries. **>>>**

Contacts:
EuropeAid-ROSA@ec.europa.eu
animation@reseau-rosa.eu

This bulletin was written by the GRET team in charge of animating ROSA.

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