



EUROPEAN COMMISSION

Directorate-General Development and Relations with African, Caribbean and Pacific States

Development policy : Thematic issues

Sustainable management of natural resources

EUROPEAN COMMISSION NON PAPER

GUIDELINES ON AGRICULTURAL RESEARCH FOR DEVELOPMENT

JUNE 2008

CONTENT

1. Background and context	4
1.1 Introduction	4
1.2 Agriculture and development	4
1.2 Agricultural research for development	5
2. Major changes in the ARD context	6
2.1 Relevant policy priorities for ARD	6
2.2 Global challenges and opportunities	10
2.3 Institutional context	14
2.4 Extension and agricultural advisory services	18
2.5 Funding mechanisms and trends	19
3. Guidelines for ARD	21
3.1 Guiding principles	21
3.2 Need for a new approach	22
3.3 New/Enhanced thematic areas	23
3.4 Types and levels of intervention	27
3.5 Integration of the EC instruments	30

1. Background and context

1.1 Introduction

This document sets out the EC guidelines for supporting Agricultural Research for Development (ARD), recognizing the need for a greater coherence across the EU development policy and the EU international research policy, to ensure that both policies are together supportive of the Millennium Development Goals and of the mutual interest and benefit of Europe and partner countries.

The past few years have witnessed rapid evolution of the ARD context at policy, societal, institutional and scientific levels, which lead the members of the European Initiative on Agricultural Research for Development (EIARD) to elaborate a new European strategy. The guidelines presented here, note and incorporate these changes and the new strategy, aiming at providing simple and operational strategic guidelines for decision making with regard to EC support to ARD.

These guidelines represent the evolution and update of the previous EC documents on Agricultural Research for Development: the *EC Strategy on ARD* (2000, updated in 2004), the *Strategy pointers for support to Consultative Group on International Agricultural Research* (2000), the *Support to ARD at Sub-Regional level* (2002), and the *Revision of EC Priorities towards the Consultative Group on International Agricultural Research* (2006).

1.2 Agriculture and development

The European Commission (EC) is firmly committed to the achievement of the Millennium Development Goals (MDGs) by the year 2015. The agricultural sector plays a crucially important role in the achievement of these aims. It directly contributes to MDGs 1 and 7 (eradicate extreme poverty and hunger; ensure environmental sustainability), and indirectly to MDGs 2, 4, 6, and 8 (achieve universal primary education; reduce the mortality rate of children; combat HIV/AIDS, malaria and other diseases; develop a global partnership for development). There is a growing consensus, based on scientific economic analysis, about the essential role of agriculture as an instrument to meet the MDGs in the poorer countries. This was authoritatively confirmed by recent international initiatives: the 2006 OECD-DAC document on Agriculture and Poverty Reduction¹, the 2008 World Development Report², the International Assessment on Agricultural Science and Technology for Development (IAASTD)³.

As agriculture remains the economic base for the majority of the poor and as it constitutes a key economic sector in many developing countries, its importance in poverty reduction and sustainable development can not be overstressed. In least developed countries agriculture provides 60-90% of employment and is a major determinant of aggregate economic growth, accounting for 20 to 60 percent of GDP growth in agriculture-based countries (e.g. most of Sub-Saharan Africa). It offers important investment opportunities at all levels of economic development. Even in some economies where the share of agriculture in GDP is small, such as Brazil and Chile,

¹ <http://www.oecd.org/dataoecd/9/60/37922155.pdf>

² http://siteresources.worldbank.org/INTWDR2008/Resources/WDR_00_book.pdf

³ http://www.agassessment.org/index.cfm?Page=doc_library&ItemID=14

agriculture has been the fastest growing sector in the economy for over a decade, driven by major investment opportunities for commercial enterprises and also for large numbers of smallholders. In least developed countries, most agricultural production comes from small-scale farms and low-income farmers account for most of the staple food production. There are important linkages with the rest of the economy, implying a potentially high multiplier effect for agricultural growth. At the same time, most of the poor live in rural areas, where they depend, directly or indirectly, on agriculture for their livelihood. Agricultural production and sales affect food security and the nutritional status of household members. Agriculture has also an important role for diversification of livelihoods. Accelerating pro-poor growth in agriculture is therefore one of the major avenues for reducing poverty and hunger. Moreover, as much of agriculture in these countries is low-input, rainfall dependent, the use made of natural resources by agriculturalists is crucial in determining the sustainability of production systems and of biodiversity. Agriculture therefore has a pivotal role in economic growth, and is directly linked with social development, food security, and sustainable natural resource management.

The links of agriculture with food security are particularly important, as the number of undernourished people is still very high. Food insecurity is often exacerbated by conflicts and political instability, but increasingly regional agricultural marketing and food price developments become more and more important.

While agriculture is largely a private sector activity, it requires a policy framework for public sector and donor involvement for several reasons. First pro-poor growth is unlikely to be achieved by market forces alone. Second, the use of natural resources in agriculture implies the existence of environmental externalities, requiring public regulation and intervention in order to maintain sustainability. Third, there are high transaction costs and risks in agriculture, resulting in the prevalence of market failures.

1.2 Agricultural research for development

According to the new EIARD strategy, ARD is a multi-dimensions research that addresses the agricultural development challenges of developing and emerging countries. The agricultural domain includes crop production and animal husbandry, agro-forestry, fisheries and aquaculture, agribusiness and related enterprises, animal and human health related issues, as well as the sustainable management of the natural sources on which farming depends and the socio-cultural and bio-diverse landscapes, food systems and ecologies in which it is embedded. ARD provides technological, economic and institutional knowledge and innovations contributing to sustainable development. It encompasses research of a national and international public good character, as well as research that yields private gains.

Research played an important role for agricultural development both in developed and in developing countries. Research-led agricultural productivity growth has had a documented positive impact on poverty reduction in Africa, Asia, and Latin America⁴. An analysis of nearly 300 publications on agricultural research showed an exceptionally high average rate of return on investment of 100% per year⁵. In the case of plant

⁴ C. Thirtle, L. Lin, and J. Piesse The Impact of Research-led Agricultural productivity growth on poverty reduction in Africa, Asia, and Latin America – World Development Vol.31 No 12, 2003

⁵ Alston, Chan-Kang, Marra, Pardey and Wyatt (2004): IFPRI Research Report 113 – A meta-analysis of rates of return to agricultural R&D: Ex Pede Herculem

breeding, the total value of additional wheat grain, for example, produced in developing countries that can be attributed to international wheat improvement research ranges from US\$2.0 to 6.1 billion per year⁶. In the case of the International Rice Research Institute (IRRI), since 1975, 600 varieties have been released worldwide and it has been calculated that the average benefit of these varieties has been \$2.5m⁷. Over 50% of rice in China is now based on hybrids and 95% of Chinese hybrid rice varieties have IRRI parentage.

The green revolution has had important successes and impact on development and food security in Asia and in Latin America, although it has had in certain cases undesired negative impacts (e.g. environmental degradation, loss of biodiversity, social asset). Moreover it has not been able to reach effectively most of Sub-Saharan Africa.

The main lesson learnt from the past is that among the various rural investment categories, agricultural research for development (ARD) can give very high benefits, provided that: (i) there is careful identification of needs, priorities and opportunities, as well as of environmental externalities; (ii) a bottom-up approach is adopted enhancing farmers participation; and (iii) it is conceived as one component of agricultural development, taking into account the necessary links with other components (e.g. extension, inputs supply, financing institutions, markets, institutional development, infrastructure investment, capacity building, land, sustainable natural resources).

Three types of actor are involved in overall agricultural research; the private sector, public sector and civil society. The private sector is now the main source of funding in High Income countries, while the public sector has been the main source of funds for agricultural research in developing countries, directed at problems of small-scale farmers⁸. The role of civil society (e.g. farmers organisations, NGOs, private sector organisations, labourers organisations, consumers organisations, community based organisations, etc.) in setting research priorities and implementing solutions is increasingly being acknowledged.

Within the public sector, actors may operate at a range of geographic levels; global, regional and national/local and at each of the geographical levels public sector actors perform two kinds of functions: 1) research implementation - producing new knowledge and technologies through experiments and studies, and 2) research support activities (e.g. coordination, advocacy, dissemination, information, networking, capacity building, etc) creating the conditions to allow research to be undertaken effectively and efficiently.

2. Major changes in the ARD context

2.1 Relevant policy priorities for ARD

The international development agenda is continuously evolving toward a more harmonised approach, looking more and more for aid effectiveness, as well as for

⁶ Lantican, M.A., H.J. Dubin and M.L. Morris. 2005. Impacts of International Wheat Breeding Research in the Developing World, 1988-2002. Mexico, D.F.: CIMMYT.

⁷ Ecorys - Evaluation of EC Contribution to the Consultative Group on International Agricultural Research (CGIAR)- Draft Country Note on IRRI, the Philippines –2007

⁸ P.G. Pardey, N.Beintema, S.Dehter, and S. Wood – 2006 -Agricultural research: a growing global divide? – IFPRI Food policy Report -

coordination of actors, programmes and approaches. Thus also support to ARD needs to be placed into the wider development context.

The EU policies relevant for ARD

The Treaty establishing the European Community sets out the principles to guide Community policy involving development activities⁹. In light of the more recent Amsterdam Treaty which entered into force in 1999, all policies must also incorporate environmental protection and sustainable development concerns. The overall EU policy orientation towards agricultural development in general is captured in several policy documents, and mainly in the 'European Consensus'¹⁰. These documents reiterate that agriculture and rural development are crucial for poverty reduction and growth. To contribute to growth, the Community has indicated it will focus on the sustainable intensification of productions in developing countries, and their competitiveness on regional and international markets. This should be facilitated by benefiting from technological development, supported through agricultural research and extension structures and mechanisms. Moreover, sustainable growth is predicated upon adequate access to resources (land, water, and finance) and effective management of natural resources, respecting the capacity of eco-systems.

The EC research policy on Food, Agriculture and Biotechnology for Europe is based upon the concept of the Knowledge Base Bio-economy (KBBE), which is directly in line with the Lisbon Strategy adopted by the EU in March 2000. The term "bio-economy" refers to all industries and economic sectors that produce, manage and otherwise exploit biological resources and related services, supply or consumer industries, such as agriculture, food, fisheries, forestry, etc. It assumes the complex task of transforming knowledge in life sciences into innovations for society and the economy. In 2006, the European research policy on Food Agriculture and Biotechnology has placed a special emphasis on the support of a KBBE in Europe. Future prosperity of Europe in this KBBE requires the access to high quality, safe, available and sustainable agricultural productions in developing countries.

The integration of development objectives will be promoted into the EC research and technology programmes, and developing countries will continue to be assisted in enhancing their domestic capacities. Research will address specific problems facing developing countries on the basis of mutual interest and mutual benefit, moving away from a traditional relationship to a real partnership characterised by equality and the pursuit of common objectives, building common responses to global challenges.

Focus on the needs of the poorest

The greatest and most urgent need for significantly increased investment in public goods research will continue to be for the poorest.

Poverty is high among many minorities and marginalized people and it's unlikely that poverty can be drastically reduced without attention to the needs of such groups. Discrimination and marginalization denies entire groups opportunities to participate in market and growth. For individual and households, it reduces assets ownership and

⁹ Art 177-181 of the Treaty establishing the European Community -

http://ec.europa.eu/development/icenter/repository/c_32520021224en00010184_en.pdf

¹⁰ Joint Statement by the Council and the Representatives of the Governments of the Member States meeting within the Council, the European Parliament and the Commission on European Union Development Policy: "The European Consensus", November 2005 -

http://ec.europa.eu/development/icenter/repository/eu_consensus_en.pdf

employment, aggravating low incomes and lack of participation in the economic and political sphere¹¹.

The majority of the poorest are in remote marginal rural areas. The severity of poverty and hunger varies across the regions of the world. Sub-Saharan Africa and South Asia are the areas where are most of the poor. The expected number of undernourished in millions in 2020 is 390 in Asia (Developing), 273 in Sub-Saharan Africa, 53 in Latina America and 55 in Middle-East and North Africa., for a total of 772¹². EC support to ARD should target those countries and regions where the incidence and depth of hunger demand urgent actions, which often correspond to remote, risk-prone and marginal areas. In terms of beneficiaries groups these should be smallholders farmers, and in particular women, who play an extremely important role in the agricultural systems of the poorest areas.

Joint Africa-EU Strategy

Cooperation in agricultural development will need to support Africa's agricultural agenda, which is currently set by the Comprehensive African Agricultural Development Programme (CAADP)¹³ endorsed by the African Heads of States and Governments as a vision for restoration of agricultural growth, food security and rural development in Africa. CAADP mainly operates at the national level, but has important facilitating and supportive roles identified at continental and regional levels. The Framework for African Agricultural Productivity (FAAP)¹⁴, which is CAADP Pillar 4, constitutes Africa's strategy for revitalising, expanding and reforming Africa's agricultural research, and technology dissemination and adoption efforts. A key component of the vision calls for improving agricultural productivity through enabling and accelerating innovation.

Following the EU Strategy for Africa¹⁵, the Joint Africa-EU Strategy¹⁶, adopted in Lisbon in December 2007, provides a long-term vision for a strategic partnership between Africa and the European Union. One objective is to make substantial progress towards achieving the Millennium Development Objective of halving the proportion of people who suffer from hunger and malnutrition by the year 2015 in all African countries. Expected outcomes include issues such as better access to food, increased agricultural growth rates, improved agricultural productivity and reduced rural poverty, improved governance in the agricultural sectors, enhanced intra-Africa trade in agriculture, reduced malnutrition, reduced maternal and child mortality, improved food-security early warning systems, wider application of safety-net / social transfer systems, reduced vulnerability in food-insecure communities.

Agricultural research is targeted as a key area for collaboration, to strengthen institutional cooperation and coordination between national agricultural research systems (NARS) and regional and international research programmes, notably with EU research institutes, in the framework of the partnership on agriculture between the EU

¹¹ Taking Action for the World's poor and hungry people. Joachim von Braun and Rajul Pandya-Lorch IFPRI 2007

¹² The World Food Situation – New Driving Forces and Required actions. J. von Braun – IFPRI 2007

¹³ <http://www.nepad.org/2005/files/caadp.php>

¹⁴ http://www.fara-africa.org/media/uploads/File/FARA%20Publications/FAAP_English.pdf

¹⁵ European Union Strategy for Africa: Towards a Euro-African pact to accelerate Africa's Development. COM(2005)489. October 2005.

¹⁶ http://ec.europa.eu/development/services/events/eu-africa-summit-2007/index_en.cfm?CFID=110566&CFTOKEN=69371775&jsessionid=243073f74e453f6a1929

and Africa (Communication Advancing African Agriculture¹⁷, adopted by the Council and the Parliament).

Donor coordination and harmonisation

The international consensus is that more should be done to tackle poverty, to do it differently, and to do it more efficiently. Improved donor coordination and cooperation is crucial. Following the Paris Declaration on Aid Effectiveness¹⁸, the EU agreed to establish a Road Map (COM 2006 (87))¹⁹ that should lead to a real EU complementary approach. The EU committed itself to double the percentage of assistance provided through budget support or Sector Wide Approach Programme arrangements. In principle when agriculture (including ARD), rural development or food security are targeted as a concentration sector, support will be provided more and more through sector wide programmes.

The European Union has also adopted a Donor Code of Conduct²⁰, which presents operational principles for EU donors regarding complementarity and division of labour. Its aim is to enhance effectiveness by reducing the transaction costs, improving overall development results and impact for poverty reduction, through a division of labour between donors.

Policy Coherence for Development

The coherence of EU policies with development objectives is an issue of major importance for the European Union.

The EU policy framework on PCD was set out in a Commission Communication of April 2005²¹, the ensuing Council Conclusions of May 2005²² which agreed on EU Coherence commitments in twelve policy areas, as well as at the international level with the 2005 Millennium Declaration.

The "European Consensus on Development", adopted by the Council and the representatives of the governments of the Member States meeting within, the European Parliament and the Commission in 2005, reaffirms the commitment to promoting Policy Coherence for Development. The European Consensus states that "the EU is fully committed to taking action to advance Policy Coherence for Development in a number of areas. It is important that non-development policies assist developing countries' efforts in achieving the MDGs." "Development objectives are goals in their own right. Development cooperation is one major element of a wider set of external actions, all of which are important and should be coherent, mutually supportive and not subordinate to each other."

On 20 September 2007 the European Commission issued the European Union's first Report on Policy Coherence for Development (PCD)²³. The Report highlights the interactions and complementarities between development policy and twelve other internal and external EU policies that have an impact on developing countries.

¹⁷ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0440:FIN:EN:PDF>

¹⁸ <http://www1.worldbank.org/harmonization/Paris/FINALPARISDECLARATION.pdf#search=%22paris%20declaration%20harmonisation%22>

¹⁹ <http://www.oecd.org/dataoecd/53/7/36764552.pdf>

²⁰ http://ec.europa.eu/development/icenter/repository/communication_labor_division_en.pdf

²¹ Commission Communication on 'Policy Coherence for Development - Accelerating progress towards attaining the Millennium Development Goals' - COM(2005) 134 final of 12 April 2005.

²² Conclusions of the Council and the Representatives of the Governments of the Member States Meeting within the Council on "Millennium Development Goals: EU Contribution to the Review of the MDGs at the UN 2005 High Level Event, 24 May 2005.

²³ Commission Staff Working Paper [SEC(2007)1201 – 20.09.2007] accompanying the Commission Working Paper "EU Report on Policy Coherence for Development" [COM(2007)545 final]

Research has been recognised by the EU as one of the twelve policy areas which can make an important contribution to development.

On Research and Innovation, the EU is increasing its support to development-related research. To ensure that developing countries benefit from technological development, the Community will support, amongst others, agricultural and environmental research in joint projects with European partners and at national, regional and global level. The EU is promoting the integration of development objectives, where appropriate, into its Research and innovation policies, and continues to assist developing countries in enhancing their domestic capacities in this area. The EU supports global, regional and national efforts in research for development to address the special needs of the poor, including among others agriculture, natural resources and environmental management.

Aligning Global Programmes with Country led programmes

While the traditional sources of bilateral and multilateral aid remain the backbone of development finance, the donor support to global programs and funds (e.g. CGIAR, see paragraph 2.3) has increased in recent years. The sponsors of these programs and funds see them as instruments to address important global challenges - either to increase the supply of global public goods or to address global goals such as the MDGs. However, an important challenge is for the development community to improve the modalities of engagement of these programs at the country level to strengthen their alignment with national development strategies. It also involves increasing the linkages between such global funds and the long-term predictable aid provided through traditional instruments that support comprehensive country programs. Clearly, global programs and geographically based aid should reinforce one another in order to achieve development impact on the ground.

Access to food and agriculture plant genetic resources

The EC signed on 2002 and ratified on 2004 the International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGR).

One of the major results of the International Treaty is a multilateral system that facilitates access to plant genetic resources for food and agriculture and creates a mechanism for an equitable sharing of benefits derived from the use of these resources. The Treaty includes a list of crops and forages that are included in the multilateral system, provided they are under the control and management of parties to the agreement and in the public domain. People and organizations in member states gain access to all of the Annex 1 materials of all other states that are members of the Treaty, and also the collections of international organizations, like the CGIAR Centres who have signed agreements with the Governing Body to place the collections they hold under the Treaty.

The terms of the agreements signed between the FAO and CGIAR Centres stipulate that the germplasm within the in-trust collections will be made available without restriction to researchers around the world, on the understanding that no intellectual property protection can be applied to the material. Seed samples are thus made available by the individual Centres under a Standard Material Transfer Agreement (SMTA).

2.2 Global challenges and opportunities

In designing the ARD agenda and in its implementation there are a number of global challenges which should be addressed, considering that for the poorest most of these challenges constitute a threat, but in the meantime offer opportunities.

Food Security

Availability of food and access to food are the two essential determinants of food security. Availability however does not ensure access. Food security in developing countries is not only a question of daily calories, provided through staple crops, but also that of food quality (e.g. food safety, nutrition value, dietary diversification) and its relation with health and more generally with livelihoods. Understanding beneficial and harmful dietary components as well as the specific needs and habits of population groups, especially the more vulnerable ones, are crucial. This could lead to target research on agricultural diversification, and on transformation and nutritional value of agricultural products. After the Rome declaration²⁴ on Food security has emerged the concept of Food Sovereignty. This last is becoming a focus of interest for farmers' organizations, natural resource users and for many NGOs and civil society organizations. Behind the development of the concept of Food Sovereignty lies a global social network of NGOs, CSOs and social movements and many conferences, forums and declarations. The recent dynamics of agricultural prices is extremely relevant for food security, both in term of threats and opportunities. The rise of food prices has several drivers (e.g. increase of demand due to population growth and change in consume patterns in emerging countries, climate change, competition with bio-fuels, speculation), and the challenge is how to assist small-holders farmers in developing countries in increasing their share in the value chain, while keeping low prices for poor consumers.

Globalisation and trade

Globalisation of trade and communications offer new opportunities, but also new challenges such as: threat on natural resources and environment in developing countries, economic marginalisation of the poorest, spreading of emerging diseases, intellectual property rights on, and access to genetic resources and agricultural innovations, sanitary and phyto-sanitary measures, trade distortions induced by agricultural subsidies, bio-safety measures.

Tourism and migration are increasing demand of food from different geographical origins. Traditional foods, which either have traditional ingredients or are made according to time-honoured methods, are gaining popularity. Imports of food products from third countries require new quality assurance procedures adapted to their specific food chains. S&T cooperation on these food chains to prevent the emergence of non-tariff trade barriers appears essential. Underutilised crop value chains, an area of increasing interest but insufficiently known, offer great potential for international S&T cooperation. The new trade opportunities and the potential growing demand of high value crops (often labour intensive), pose new challenges in terms of labour and labour conditions. In a more market oriented agriculture, risk and risk management become an essential element to be considered, in particular for small-holders farmers.

Environmental degradation

Environmental degradation, affecting forests, water, soil and biodiversity continue to be a major concern worldwide, even more than before. Land is the primary agricultural resource and land degradation affects and is caused by agricultural activities. The sustainable management of forest resources and their contribution to livelihoods of poor people living in and near them is a central area of concern for growth, development and poverty alleviation. Forests are an important source of state revenue in many developing countries and important resources sustaining local economies. Forests are also a vital

²⁴ <http://www.fao.org/DOCREP/003/W3613E/W3613E00.HTM>

asset, with an estimated 1.6 billion poor people relying on them at least partly for a living. Billions of people - many among the worlds poorest - depend upon fuel wood for their energy needs. Forests are also necessary for a healthy environment, and serve to maintain water quality, provide habitat for wildlife, store carbon and guard against climate change. The RIO environmental conventions²⁵ provide the policy and regulatory framework for environmental conservation and sustainable development. Agricultural research must take into account the issue of environmental sustainability and contribute to equitable and sustainable environmental governance.

Climate change

Climate change is affecting the agricultural sector on a global scale, thus both in developed and developing countries. Developing countries will be hit first and hardest by climate change as they are most exposed and sensitive to climate change, and have the weakest adaptive capacity. Changed climate patterns may be favourable to new food and water borne pathogens. By mid-century, annual average river runoff and water availability are projected in some wet tropical areas, and decrease by 10-30% over some dry regions at mid-latitudes and in the dry tropics, some of which are presently water stressed areas. At lower latitudes, especially seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1-2°C), which would increase risk of hunger. Increases in the frequency of droughts and floods are projected to affect local crop production negatively, especially in subsistence sectors at low latitudes. The area suitable for agriculture, the length of growing seasons and yield potential, particularly along the margins of semi-arid and arid areas, are expected to decrease. This would further adversely affect food security and exacerbate malnutrition in the continent. In some countries, yields from rain-fed agriculture could be reduced by up to 50% by 2020. It is projected that crop yields could increase up to 20% in East and Southeast Asia while they could decrease up to 30% in Central and South Asia by the mid-21st century. Taken together and considering the influence of rapid population growth and urbanisation, the risk of famine is projected to remain very high in several developing countries²⁶. In Latin America in drier areas, climate change is expected to lead to salinisation and desertification of agricultural land. Productivity of some important crops is projected to decrease and livestock productivity to decline, with adverse consequences for food security.

Without adaptation of crops and agricultural systems, under changed climate conditions, food security will further deteriorate in many developing countries and rural development investments will be jeopardized. Agricultural research for development should help to: i) improve crop resilience to climate change, ii) reduce green house gas emissions from agriculture, and iii) develop adaptive sustainable land and water management practices to prevent and reverse land degradation and to increase water use efficiency.

Further research will be needed to understand the impact of climate change on individual countries and regions, and the measures needed to adapt their crops and agricultural systems to changed climatic conditions. Development cooperation programmes in the agricultural sector should take this information into consideration, and design interventions accordingly. Climate change will also impact on primary food production in Europe and consequently on food markets. Climate change could make Europe more dependent and vulnerable concerning food imports of tropical origin.

²⁵ <http://www.un.org/esa/sustdev/sdissues/sdissues.htm>

²⁶ IPCC – Working Group II - Climate Change 2007: Impacts, Adaptation and Vulnerability

Conversely it could offer new opportunities to the European food business through the exploitation of new crops previously only grown outside Europe.

Bioenergy

The emerging needs to increase biofuels production for transport uses will become an important issue for developing countries. In general, the production of biofuels could provide an opportunity to diversify agricultural activity, reduce dependence on fossil fuels, provide new market opportunities for agricultural products and contribute to economic growth of developing countries in a sustainable manner. However, a large-scale uncontrolled expansion of production of bioenergy crops raises environmental concerns relate to pressures on eco-sensitive areas, like rainforest, have to be recognised. There are also concerns regarding the effect on soil fertility, water availability and quality, pesticide use and food availability. Social effects concern potential dislocation of communities and competition between biofuel and food production, with adverse impact on food security. These concerns need specific analysis and quantification and, if necessary, should be addressed through strong regulatory frameworks.

Animal diseases and pandemics

Animal diseases, in particular infectious diseases, have devastating economic and social impacts (notably in case of zoonotic diseases) both in developed and developing countries. In the case of avian influenza, the consequences are even greater for its capability to infect humans and its potential to evolve into a pandemic. In developing countries, the wide prevalence of animal diseases is one of the biggest impediments for development and poverty alleviation. The diseases directly affect the livelihood of the poorest populations, are a severe constraint to market access for livestock and their products and an obstacle to face the increasing demand for animal proteins due to the expansion of the world population. For Europe, the control of the infectious diseases in developing countries is important for economic and sanitary reasons. This dimension is reflected in the European policy for animal health. The creation of the European Technology Platform for Global Animal Health (ETPGAH) constitutes an important step to unite efforts²⁷.

Demography and Urbanisation

The world's population is expected to be 9.1 billion in 2050²⁸, and almost all of this population growth will occur in developing countries. Since 2007 half of the world's population is living in urban areas for the first time in history. This urban/rural dynamics is a new challenge in terms of internal migration, territorial development (and in particular local governance) and land management, and offers new opportunities, such as the growth of new local and regional markets, while posing increasing threats to food security. In sub-Saharan Africa, where population growth has surpassed increases in agricultural productivity, food availability per capita has dropped, leading to rises in malnutrition and hunger. In that region, increases in agricultural productivity (of both land and labour) and improved governance and economic growth would together contribute to reduce poverty and hunger. The urban/rural dynamics, coupled with industrial development and change of consuming patterns, raises issues of competing claims on land, water and energy availability, and use efficiency.

Agriculture and Health

²⁷ <http://www.ifah.be/Europe/EUPlatform/Platform.htm>

²⁸ http://www.un.org/esa/population/publications/pop_challenges/Population_Challenges.pdf

At household level, in addition to a proper dietary intake, health determines the capacity of a given individual to utilise the nutrients s/he consumes. A sick person will not be able to digest or even to eat the food s/he needs. Health is in turn affected by the individual's nutritional status. Health is also determined by the living environment (access to clean water, sanitation and housing conditions, practices (hygiene) and access to appropriate health services, which in turn depend on the social infrastructure.

A major issue is that of HIV/AIDS pandemic, and other poverty related diseases (42 million people were infected with HIV/AIDS by the end of 2002, more than 29 million of them in SSA, and malaria kills 3000 people each day). HIV/AIDS has a strong impact on agriculture as it is devastating the agriculture labour force. The relationships between HIV/AIDS and agricultural technologies need to be taken into account when looking at innovation and innovation systems.

Technological change

The intensive ongoing technological change is stimulated by tremendous scientific advances made in the foundations of life, matter, and energy. As a consequence, a new development era, the one of knowledge society is gradually taking shape, replacing the industrial era. This new era presents the developing world with both challenges and opportunities. The new development process requires more knowledge and entrepreneurial spirit to actively participate in an environment of intensified global cooperation. The opportunities arise from the possibilities for modernization of traditional activities offered by new technologies. These should be built, in a gradual manner, upon resources and capabilities available in countries at their level of development and in taking into account of their specificities, including their conditions of governance, so to promote these changes which can help generating progress and growth in a sustainable way, as well as ethical considerations when dealing with living organisms and environmental issues.

Land

Rural poverty is particularly persistent where there are large inequalities in the ownership and access to productive assets, such as capital, rural infrastructure and land in particular. Regarding ownership and access to land, gender issues deserve a particular attention. Strategies to combat rural poverty must therefore tackle these inequity problems, common to most developing countries, while reflecting the diversity of rural areas and socioeconomic differences in the population. Land tenure issues are central to both rural poverty and natural resources management. The poor need access to land as well as secure, well-defined and enforceable land rights in order to manage natural resources sustainability and to invest in land improvements. Skewed land ownership and lack of access to land for the poor is, in many societies, one of the major causes of social conflict and instability. In societies where traditional land tenure systems exist, they often provide sufficient security and flexibility to meet livelihoods needs. In a number of countries however, land tenure is still a major constraint to investment, sustainable natural resources management and economic development.

2.3 Institutional context

Changes in the ARD system have lead to a differentiation and to an increasing role of ARD actors at different geographical levels. Mechanisms are in place to better coordinate ARD institutions with cross participation of actors in institutions such as the Consultative Group on International Agricultural Research (CGIAR), the Global Forum on Agricultural Research (GFAR) and its continental and sub-regional articulations.

Mechanisms are also in place to improve coordination among donors and ARD organisations. Transactions costs associated with these coordination mechanisms are increasing by consequence. These costs should be compared with the inefficiency of an uncoordinated system, where duplication and fragmentation of initiatives, as well as lack of complementarities and synergies, decrease efficiency, effectiveness and impact. In any case, these transaction costs will have to be kept at reasonable level, and generate a leverage effect on the benefits they induce for the poorest.

The Global Forum on Agricultural Research (GFAR)

The GFAR was established in 1996 as an initiative to promote cost-effective partnerships and strategic alliances amongst stakeholders involved in agricultural research. These stakeholders are: farmers' organisations, non-government organisations, the regional and sub-regional fora, advance research institutions of the north, international agricultural research institutions, the agri-business private sector, and a group of donors committed to the concept of collaborative partnerships amongst these stakeholder groups. A new promising area is that of highlighting the role of young professionals in the global ARD system.²⁹

GFAR has played an important role in the global ARD arena, and its relevance has been confirmed by its second External Review. During the 2006 GFAR General Meeting in New Delhi donors encouraged GFAR to develop a renewed and well focussed strategy.

The Consultative Group on International Agricultural Research CGIAR

The mission of the CGIAR is to achieve sustainable food security and reduce poverty in developing countries through scientific research and research-related activities in the fields of agriculture, livestock, forestry, fisheries, policy and natural resources management³⁰. The CGIAR represents a strategic alliance of countries, international and regional organisations, and private foundations supporting 15 specialised centres of high scientific standard. The CGIAR centres work together on a common programme of agricultural research producing global public goods.

In a response to changing needs for international public goods research, the CGIAR reached a new step in its reform process at strategic level, with a new set of research priorities, at programmatic level, with new regional medium-term plans in Africa set-up with national and sub-regional ARD partners, and at the structural level, with common research platforms and supporting services. In recent years, the Challenge Programmes has also proved to be an efficient way to implement innovative research in a partnership approach with research centres, national agricultural research systems (NARS) and advanced research institutes, in particular European ones. Recently the Alliance is emerging as a coordination mechanism between the Centres, which could improve the cohesion and the efficiency of the system.

The revised CGIAR System Priorities respond effectively to the need to better orient the CGIAR research toward the attainment of Millennium Development Goals, and poverty alleviation. The analysis of the revised CGIAR priorities in the context of the EC development policy framework suggests that there are many evident intersections with it.

Other actors at the global level

There is a growing number of actors, beyond the CGIAR centres, which should be considered when looking at the global ARD picture:

²⁹ www.ypard.org.

³⁰ www.cgiar.org

donor coordination mechanisms (e.g. the Global Donor Platform on Rural Development³¹ and the Neuchatel Initiative on extension and advisory services³²); research organisations and platforms (e.g. the International Centre for Research in Agriculture³³, the Global Horticultural Initiative³⁴, the International Centre for Underutilised Species³⁵); international NGOs and Civil Society Organisations (e.g. IPC Food Sovereignty³⁶, Oxfam/Novib³⁷, IFOAM The International Federation of Organic Agriculture Movements³⁸, CONCORD Confédération Européenne des ONG d'urgence et de Développement³⁹, Action Aid⁴⁰); professional organisations (e.g. the International Federation of Agricultural Producers⁴¹); UN and International Organisations (e.g. FAO, IFAD, WB); specialised International Organisations (e.g. the Global Crop Diversity Trust⁴²); private sector organisations (e.g. Syngenta Foundation for Sustainable Agriculture⁴³, the Sustainable Agriculture Platform⁴⁴); philanthropic organisations (e.g. the Rockefeller Foundation⁴⁵, the Bill and Melinda Gates Foundation⁴⁶, the Alliance for a Green Revolution in Africa⁴⁷); new donors (e.g. China, Brazil, India and South Africa).

These actors add important value to the global efforts, but there is an associated risk of fragmentation and duplication of initiatives, or of non efficient use of capacities, skills, and resources. Hence the need to increase coordination and harmonisation.

Continental and sub-regional organisations

Many countries in sub-Saharan Africa, Asia, Latin America and the Mediterranean have created regional and sub-regional organisations to enhance agricultural research through sharing the financial and human resource burden of carrying out agricultural research and pooling of research ideas and equipment. Regional agricultural research organisations and associations have the potential for enhancing national research capacity in countries that do not have the financial means or capacity to build fully fledged national systems.

The Regional Fora, a central and an integral component of the GFAR, link the national agricultural research systems and the various stakeholders at the regional level:

- Association of Agricultural Research Institutions in Near East and North Africa (AARINENA)⁴⁸

³¹ http://www.donorplatform.org/component/option,com_frontpage/Itemid,1/

³² <http://www.neuchatelinitiative.net/english/index.htm>

³³ <http://www.icra-edu.org/page.cfm?pageid=ardhome>

³⁴ <http://www.globalhort.org/>

³⁵ <http://www.icuc-iwmi.org/>

³⁶ <http://www.foodsovereignty.org/new/>

³⁷ <http://www.oxfamnovib.nl/id.html?lang=en&ch=onn&id=3737>

³⁸ <http://www.ifoam.org/>

³⁹ <http://www.concordeurope.org>

⁴⁰ <http://www.actionaid.org/>

⁴¹ <http://www.ifap.org/en/index.html>

⁴² <http://www.croprtrust.org/main/>

⁴³ <http://www.syngentafoundation.org/>

⁴⁴ <http://www.sustainableagriculture2007.eu/index.php?page=about-ciaa-sai-platform>

⁴⁵ <http://www.rockfound.org/initiatives/agra/agra.shtml>

⁴⁶ <http://www.gatesfoundation.org/GlobalDevelopment/Agriculture/>

⁴⁷ <http://www.agra-alliance.org/>

⁴⁸ <http://www.aarinena.org/>

- Asia Pacific Association of Agricultural Research Institutions (APAARI) ⁴⁹
- Central Asia and Caucasus Agricultural Research Institutions (CACAARI) ⁵⁰
- Foro Regional de Investigación y Desarrollo Tecnológico Agropecuario (FORAGRO) ⁵¹
- The Forum for Agricultural Research in Africa (FARA) ⁵²

FARA is articulated in three Sub Regional Organisations, with the same aim of effectively co-ordinating and developing collaboration in agricultural research and development at the sub-regional level in Africa, are currently operational; these are CORAF/WECARD⁵³ for West and Central Africa, ASARECA⁵⁴ for Eastern and Central Africa and SADC/FANR⁵⁵ for the SADC sub-region of Southern Africa. A MoU was signed with AARINENA at the 3rd FARA General Assembly in Entebbe to give representation to the countries of North Africa.

National Agricultural Research Systems (NARS)

NARS are the building blocks of the global ARD system. They include various stakeholders such as national agricultural research institutions (NARIs), universities, NGOs, extension services, farmer's organisations, farmers, private sector etc and have primary responsibility for generating, adapting and transferring technologies that farmers need to ensure food security and equitable, sustainable development. Strong NARS exist in some developing countries (e.g. South Africa), but are not well established elsewhere.

NARIs often occupy a prominent position in expressing national research priorities and in setting up and implementing the national research agenda. The other actors of the NARS (farmers organisations, civil society, private sector, etc.) often bring very limited (if any) inputs, resulting in a lack of synergies, duplication of effort, loss of efficiency in ARD programmes and unsatisfactory implementation of research outputs by the beneficiaries.

European platforms and coordination mechanisms

At the European level, many European stakeholders are involved in the field of ARD and since the mid 1990s, major progresses have been accomplished by these stakeholders.

European States (EU Member States plus Norway and Switzerland) and European Commission set up in 1995 the European Initiative for Agricultural Research for Development (EIARD)⁵⁶ in order to develop and implement coherent and coordinated European policies on ARD at global, regional and sub-regional levels, and to support ARD stakeholder to better coordinate their efforts. EIARD was made official in 1997 by the Commission's Communication to the European Council and Parliament⁵⁷. Since then, EIARD has been supporting the following initiatives.

⁴⁹ <http://www.apaari.org/>

⁵⁰ <http://www.cacaari.org/>

⁵¹ <http://www.iica.int/foragro/>

⁵² <http://www.fara-africa.org>

⁵³ <http://www.coraf.org>

⁵⁴ <http://www.asareca.org>

⁵⁵ <http://www.sadc.int/english/fanr/>

⁵⁶ www.eiard.org

⁵⁷ Perspectives for International Cooperation in Research and Technological Development COM(95)489, October 1995.

The European Forum for Agricultural Research for Development (EFARD)⁵⁸ was founded in 1997 in Montpellier, to participate in the activities of the Global Forum on Agricultural Research (GFAR). EFARD offers a platform for strategic dialogue among the various European stakeholders in ARD to promote research partnerships linking Europe and the South. The following categories of European ARD stakeholders are part of EFARD: universities and research institutions represented in particular by NATURA⁵⁹ and ECART⁶⁰; private sector; nongovernmental and producers organizations; donors represented by EIARD.

From EFARD emerged the proposal to build the ARD dimension of the European Research Area. The European Commission financed a project under the 6th Framework Programme to build the ERA-ARD⁶¹, aiming at strengthening cooperation and coordination at the Governmental level among 14 European national ARD programs.

A number of Civil Society Organisations platforms and coordination mechanisms, as well as farmers and private sector organisations have evolved in Europe with a focus on agriculture, food security and rural development (e.g. AGRICORD⁶²). These organisations have not shown a strong interest in the past on ARD, although some of the developments NGOs have been involved in GFAR, EFARD and field activities involving a research component (e.g. ETC-Ecoculture⁶³, and GRET⁶⁴).

A special role for the EC is that of the Centre for Technical Cooperation on Agriculture (CTA), which is an EU-ACP institution⁶⁵, with a comparative advantage on issues such as communication and information technologies, knowledge management, stakeholders participation.

Many of these organisations have their direct and efficient links with southern partners. A challenge for EFARD is how to establish a dialogue with research organisations and civil society stakeholders at the EU level.

2.4 Extension and agricultural advisory services

Agricultural extension helps farmers learn how to augment their productivity, raise their incomes, and collaborate with one another and with agribusiness and agricultural research. Accordingly, extension programs are shifting from prescribing technological practices (delivery model), to focusing more on building capacity among rural people to identify and take advantage of available opportunities, both technical and economic (empowerment model).⁶⁶

58 www.efard.org. The Network of European Agricultural (Tropically and sub-tropically oriented) Universities and scientific complexes Related with Agricultural development (NATURA) was created in October 1988 and registered as an international association in November 1994. The network currently has 28 members from throughout Europe

59 <http://natura.czu.cz> The European Consortium for Agricultural Research for the Tropics (ECART) was created in 1992 and established as a European economic interest group (EEIG) in November 2004. Its mandate is to better coordinate European research and facilitate access to European skills and know-how in ARD. The EEIG comprises six research institutions and five Member States and brings together over 1,600 scientists and technical personnel

60 www.ecart-eeig.org.

61 www.era-ard.org

62 www.agricord.org

63 <http://www.etc-ecoculture.org/>

64 <http://www.gret.org/>

65 <http://www.cta.int/>

66 World Development Report 2008, World Bank.

The replacement of traditional public extension systems and supply-driven approaches by demand-led participatory approaches has been the most significant and challenging change for managers and practitioners socialized in the traditional research and extension systems pursued in most African countries from the 60's through the 80's. A central lesson arising from experience since 1990 is that learning processes by farmers, research and extension personnel are more cyclical than linear and problem identification and solution seeking at farm level, to be valid and legitimate, has to be conducted through bona fide participatory processes where all knowledge and experience is valued, analyzed and exchanged.

The Second European Forum on Sustainable Rural Development (Berlin 2007) highlighted the importance of research and extension systems, which should be more demand-driven, multi-stakeholder and multi-sector⁶⁷.

While agricultural research is organized at national, regional and continental level, and has received substantial donor support, agricultural advisory services have not received comparable attention at regional and continental level. Linkages between research and extension systems have in the past been weak and remain so in many developing countries despite various efforts to integrate technology development and dissemination systems. Therefore, it seems therefore critical to revitalize advisory services, complementing the investments being made in agricultural research.

2.5 Funding mechanisms and trends

Global situation

Knowledge is a key factor in development, and is perhaps the clearest example of a public good. However if left to market forces alone, there would always be a tendency to under-invest in the generation of knowledge, or to invest in knowledge only for the benefit of developed countries. Major trends witnessed by ARD knowledge creation and dissemination in the last two decades, in particular the tension between global opportunities for knowledge diffusion and the increasing role of intellectual property provision in restricting access to knowledge relevant to production processes, affect in particular developing countries.

Investments in agricultural research have continued to grow worldwide during the last decade, although at a slower pace. Public investments in agricultural research increased by 51 percent over the past two decades, from an estimated \$15.2 billion in 1981, to \$23.0 billion in 2000. This increase is a result of a complex picture. Few developing countries (e.g. emerging economies) show higher amounts and higher intensity (per unit of land or per unit of product) of investment in ARD. On the contrary ARD investment in a large number of developing countries (in particular the least developed countries) is declining both in terms of the total amount and its intensity⁶⁸.

Despite the importance of the agricultural sector in the GDP of developing countries, and clear evidence of its high returns and relevance to poverty reduction, developing countries' spending on ARD typically amounts to less than 1% of agricultural GDP⁶⁹. Similarly, private sector companies are hesitant to support ARD initiatives due to high risks involved with relevant investments.

⁶⁷ www.donorplatform.org/org/content/view/162/117 or www.ruralforum.info

⁶⁸ Pardey et al, 2006 "Agriculture research: a global growing divide?"
<http://www.ifpri.org/pubs/fpr/pr17.pdf>

⁶⁹ See also Pardey, P., & Beintema, N. (2001). Losing ground? What's happened with agricultural research in less developing countries (background paper) in *UNDP Human Development Report 2001*. United Nations Development Programme.

New ARD donors are playing a growing role such as emerging economies (e.g. China⁷⁰, Brazil) and private Foundations⁷¹. The Bill & Melinda Gates Foundation recently announced a \$306 million package of agricultural development grants designed to boost the yields and incomes of millions of small farmers in Africa and other parts of the developing world so they can lift themselves and their families out of hunger and poverty.

The role of the private sector in the developing world, in particular in Sub-Saharan Africa, is still small, when compared with the developed world. Many of the private-sector activities in developing countries focus on the provision of input technologies or technological services for agricultural production, but most of the technologies are produced in the developed world. Private sector research is mostly on commodities. In Sub-Saharan Africa the private sector funded agricultural research accounted for 2.3% of total expenditures in the Year 2000⁷².

Concerning the modalities of funding, competitive grant schemes are increasingly being used to fund agricultural research. Under these schemes organisations are invited to submit research proposals to a committee which then selects the best proposals for funding according to their strategy, priorities etc. Such systems have been adopted in sub-Saharan Africa (e.g. sub-regional research funds, SSA-CP, etc.). Some of these schemes have been developed in collaboration with GFAR (e.g. DURAS⁷³, PROLINNOVA⁷⁴), other innovative schemes have been developed to promote local innovation and farmers participation at the national level (e.g. Maendaleo Agricultural Technology Fund⁷⁵)

Generally there is a positive evaluation of such mechanisms, although they require additional effort to strengthen capacities of research organisation. What needs to be improved is the level of coordination of these mechanisms, at least at the continental levels, avoiding the risks of duplications and inefficiencies.

EU and EC support to ARD

According to a survey carried out by ERA-ARD in 2006, the total annual investment from EU Member States plus Switzerland on ARD is about 415 M€ resources are mobilised through 136 different funding mechanisms, involving 1812 organisations, engaged in 689 on-going projects.

EC funding through development cooperation has been provided at the national and regional levels through the European Development Fund (EDF) and at the global level through the Food Security Budget Lines (FSBL) and recently Food Security Thematic Programme (FSTP).

Examples at the regional level include the support given to institutional and networking functions, training, capacity building, and competitive research funds. The three regional Framework Programmes which have been financed are managed by three regional ARD Fora (CORAF, ASARECA, and SADC-FANR), for a total amount of 58.7 M€ during the period 2000-2007.

⁷⁰ <http://www.chinaembassy.org.zw/eng/xwdt/t280603.htm>

⁷¹ the Rockefeller and Bill and Melinda Gates foundations recently announced 150 M\$ investment to Improve Africa's Seed Systems

⁷² Investing in Sub-Saharan African Agricultural Research:

Recent Trends Nienke M. Beintema and Gert-Jan Stads <http://www.ifpri.org/pubs/ib/ib24.pdf>

⁷³ <http://www.duras-project.net/>

⁷⁴ <http://www.prolinnova.net/aboutprolinnova.php>

⁷⁵ <http://www.farmafrica.org.uk/programme.cfm?programmeID=23&context=region®ionID=4>

At the regional level the Commission has supported the Centre Regional de Recherche sur la Banane Plantain (CARBAP) for 2 M€ for Central Africa and a project on Land and Water Management Research in Southern Africa for 4.8 M€

At the national level funding through the 9th EDF has been limited. The three main initiatives have been in Kenya, Uganda, and Congo Democratic Republic. In the 10th EDF the share of the agricultural, rural development and food security sector is about 9% of the total, for an amount of approximately 1 Billion €

Under the Food Security Thematic Programme it is allocated €33.1 million to agricultural research and development for the period 2007-2010.⁷⁶ This support is intended for agricultural research at the global, continental and regional level.

At global level, EC has been supporting the implementation of agricultural research of an international public goods nature, carried out by the CGIAR through the Food Security Budget Line. Financing CGIAR has been focussing on generating international public goods relating to areas of research in which the CGIAR has clear comparative advantages: genetic resources (genetic improvement and preservation of biodiversity), and international policies.

The CGIAR budget accounts for approximately 1.5% of all public sector expenditure on agricultural research⁷⁷. The EC joined the CGIAR in 1977 and is its second largest multilateral donor with a contribution of 5% of the \$500 millions annual budget.

The 6th Framework Programme the (FP6/INCO projects) contributed to MDGs through research dedicated toward sustainable socio-economic development and global competitiveness. The research areas of Health, Natural Resources, and Food Security, have supported 227 projects in developing countries for a total amount 112 M€

Other Development Partners and Country initiatives

Development partners (e.g. WB, IFAD, FAO, regional development banks) and individual Countries have put in place a number of initiatives and programmes, adopting specific approaches, with differences along the so-called "research to development continuum". Coordinating and harmonising these initiatives is a major challenge, as well as aligning them with Countries own programmes.

3 Guidelines for ARD

Based on the analysis of policies, challenges, institutional context, and funding trends, the following principles, approach, thematic areas, and types and levels of intervention have been identified for supporting ARD in the near future.

3.1 Guiding principles

With respect to supporting agricultural research in development and research cooperation, the EC will adopt an approach which is characterized by a number of principles:

- Greatest Impact on poverty reduction and sustainable development

⁷⁶ http://ec.europa.eu/europeaid/where/worldwide/food-security/documents/fstp_strategypaper_en.pdf

⁷⁷ Pardey et al. Agricultural Research: a growing global divide? IFPRI 2006

- to invest in ARD on a medium and long term time frame, reflecting the European development policy, aiming at the attainment of MDGs;
- to promote the building of the European Research Area with a strong international cooperation in S&T in particular with developing countries⁷⁸.
- to strengthen European ARD donor co-ordination, harmonisation and division of labour through the European Initiative for Agricultural Research for Development (EIARD)⁷⁹, contributing to the general objective of donor coordination at the global level;
- to promote the involvement of European ARD research capacities, when there is a comparative advantage in doing so, and their partnership with developing and emerging countries;
- to ensure coherence and complementarity between EC funding instruments;
- to ensure participation of the Civil Society and other ARD stakeholders (from north and south)through, for example, the European Forum on Agricultural Research for Development (EFARD);
- to adopt a demand driven and innovation system approach;
- to focus on smallholders farmers
- to strengthen public institutions dealing with agriculture
- to embrace the principles of gender equality and to fight all forms of gender inequality; women around the world are engaged in a wide range of agricultural activities and therefore are a key actor in agricultural development and agricultural research, and the gender focus needs to be taken into account when shaping the ARD agenda.
- to place public funding on ARD in the context of an adequate policy framework, institutional innovation, donors' coordination, and innovative research approaches, ensuring that it continues to serve the public good, from a social, environmental and economic point of view, rather than being designed to serve narrow economic interests.
- to foster private/public partnerships
- to adopt, whenever possible, a programmatic/sector approach rather fund individual projects aiming also at a stronger sustainability.

3.2 Need for a new approach

The ambition of the policy objectives and the dimension of the challenges require broadening the current EC ARD thematic agenda and the way of doing things. The new approach should favour more inter-disciplinary, systemic and integrated approaches, although strong disciplinary research will be still needed.

First and foremost, ARD needs to tackle the issue of how to effectively enhance local knowledge production and translate knowledge into innovation, and how to better link researchers with farmers and end-users, which should be at the centre of research programmes.

⁷⁸ Green Paper 'The European Research Area: New Perspectives' - COM(2007)161 – April 2007.

⁷⁹ European States (Member States plus Norway and Switzerland) and Commission set up in 1995 the European Initiative for Agricultural Research for Development (EIARD) in order to develop and implement coherent and coordinated European policies on ARD at global, regional and sub-regional levels, and to support ARD stakeholder to better coordinate their efforts. EIARD was made official in 1997 by the Commission's Communication to the European Council and Parliament

The emerging concept of agricultural innovation systems includes a vast array of stakeholders, linking them in a dynamic process that needs to be supported by appropriate institutional framework – not just policies but also financial, business and educational systems; innovation platforms should allow an effective linkage between farmers and local communities with research, institutions, markets, agro-industry and consumers. The new approach will need to integrate formal science with traditional knowledge.

In many countries, research agendas are still largely decided by scientists, with too little involvement of citizens, consumers, farmers, producers, and policy makers.

Making agricultural research more demand-led is a key task that requires responsiveness changes in organizational culture, structure and systems. Assisting national agricultural research systems to implement such changes is a major development challenge.

Research systems need to be integrated with appropriately designed and sustainable agricultural extension/advisory systems that are able to: support farmer innovation and experimentation; facilitate learning between farmers and researchers; and provide farmers with the information they need to make choices about production processes. Innovation system require research to be integrated, systemic and interdisciplinary (e.g. bio-physical and socio-economic disciplines). A practical example of this approach is the Participatory Plant Breeding, through which scientists, extension agents, local communities, NGOs and farmers are engaged in common research platforms to develop new plant varieties⁸⁰.

This approach, which has been known for long, needs now to be scaled-up and generalised.

The role of higher education is central for the long term sustainability of the new ARD agenda. Curricula of Tertiary education systems should be updated to introduce the new vision and approach. Research organisations should establish strategic partnership with universities and academic institutions, facilitating collaboration and exchanges.

As a general rule, the EC will encourage research actors to develop ex-ante strategies and plans that identify potential beneficiaries, involve them and representatives of various societal stakeholders in the design, implementation and monitoring of research projects; and identify and ensure an effective pathway for the delivery and dissemination of research results to intermediate and end beneficiaries.

Another important characteristic for ARD to be pro-poor is the integration along the value chain, from the field to the transformed products.

New technologies will help in designing and implementing the new approach. Information and Communication Technologies (ICTs) offer new opportunities for enhancing the impact of research, and are crucial for a broader access to knowledge and knowledge sharing. Many applications of geo-spatial information technologies and Geographic Information Systems (GIS) have a potential multiplier effect, a key role in sustainable natural resource management and in providing reliable information for decision-making.

3.3 New/Enhanced thematic areas

⁸⁰ <http://www.prgaprogram.org/index.php?module=htmlpages&func=display&pid=9>

The type and extent of challenges and opportunities require broadening the EC ARD agenda, currently including biodiversity, genetic improvement and international policies, towards research areas which are either new, or neglected in the past.

Agricultural Innovation Systems: a shifting paradigm on ARD

Innovation in developing countries has to operate in contexts which are, by nature, problematic, characterized by poor business and governance conditions, weak institutions, low educational levels, and mediocre infrastructure. This raises particular challenges for the promotion of innovation. The concept of “innovation” encompasses not only “technological innovation”, i.e. the diffusion of new products and services of a technological nature into the economy, but equally it includes non-technological forms of innovation, such as institutional and organizational innovations.

The situation is rendered more complicated because the “developing world” presents very diverse situations in terms of levels of development, culture, etc. Consequently, innovation policy schemes have to be tailored to countries’ specific characteristics in line with the recognized fact that “one size does not fit all”, and the need for working much more on national peculiarities in all walks of development economics and policies. Innovation systems are not only a different way of doing business, but represent a new research area, which requires interdisciplinary approach.

Rural socio-economic research

The emerging global challenges require paying attention to the specific agricultural and rural development problems in developing countries, including the future of subsistence and semi-subsistence smallholder farming, which is the food and income basis for the majority of the world's poor.

This will include looking at approaches for empowering farmers and rural communities on issues such as value chains, linking farmers with markets, and tools for risk management. This area of research will address capacities for reducing risks related to climate change, natural disasters and price shocks, with a focus on organisational questions and financial instruments.

Socio-economic analysis of farms/households and rural development is necessary to improve and further develop ex-ante and ex-post quantitative and qualitative policy analysis tools. In support of policy making in the area of farm sustainability, it is necessary to look at those intangible attributes that can contribute to increasing value added to agricultural products, such as: organic agriculture, high quality products, specific origin products, etc. Research should concern all levels of the supply chain, with a view of enhancing income and reducing risk (e.g. outgrower arrangements, contract farming, links with supermarket chains, and links with input suppliers).

A new research area is governance of agricultural and rural development sector reflecting issues associated with the increasing societal demands for environmental, and social services.

Traditional knowledge

The concept of traditional knowledge (also known as indigenous or local knowledge) refers to the bodies of knowledge, know-how, practices and representations that are maintained and developed by peoples with long histories of interaction with the natural environment. These sets of understandings, interpretations and meanings encompass language, naming and classification systems, ways of using resources, traditional plants and animals, as well as cultural aspects.

There is a growing recognition of traditional knowledge and its actual and potential role for sustainable development at local level, but also through the testing and

dissemination of best practices and innovations, and through their scaling-up and South-South replication.

Traditional knowledge helps in understanding the challenges faced by local communities, as well as their values and priorities; hence it helps to build technically sound and sustainable solutions to complex development issues.

Biotechnologies

Life sciences and biotechnologies hold great promise in meeting some of the fundamental needs of the developing world and biotechnologies are an important element of ARD. Biotechnologies in agricultural research include several technologies such as molecular markers, tissue culture, DNA, immuno-diagnostic techniques and genetically modified organisms. Through increasing yields, improving resistance to biotic and abiotic stresses, and improving the nutritional quality of the end product, they can contribute to increase productivity of both crops and livestock. Despite the great promise there now some controversial indications. The debate about the potential role of biotechnologies in boosting food production tends to be dominated by controversy over the characteristics of genetically modified crops and the implications of their use (mostly on human health and on the environment). But this has tended to overshadow consideration of the many other contributions that cutting-edge research can make to increasing crop productivity.

The European Commission carried out a comprehensive public consultation on biotechnologies and their applications during 2001⁸¹ and produced a strategy document in 2002.⁸²

In 2007 there has been a mid-term review⁸³ of the implementation of the 2002 Strategy. According to the review⁸⁴, development issues should continue to be taken into account, special attention being given to:

- engaging in scientific partnerships with developing countries so that they benefit from technological development, amongst others, in the field of agricultural and environmental research;
- addressing specific problems that third countries face or that have a global character, and where biotechnology can contribute to finding solutions;
- in the field of genetic resources the review concluded that the action aiming at enhancing cooperation with the developing world should be pursued and Commission and Member States should continue their active engagement in the relevant international fora (TRIPs⁸⁵, CBD⁸⁶, WIPO⁸⁷ and FAO⁸⁸) on issues such as the Bonn Guidelines on Access and Benefit Sharing and of the FAO International Treaty on Plant Genetic Resources for Food and Agriculture.
- the action aiming at promoting a responsible and careful use of biotechnology in developing countries should be continued. This includes, amongst other measures, continuous involvement in projects in relation to the implementation of the Cartagena Protocol on Biosafety⁸⁹, such as those from UNEP-GEF.

⁸¹ COM(2001)454 Commission communication 'Towards a strategic vision of life sciences and biotechnology: consultation document'

⁸² COM(2002)27 Life Sciences and biotechnology – A strategy for Europe

⁸³ COM(2007)175 Mid term review of the Strategy on Life Sciences and Biotechnology

⁸⁴ http://ec.europa.eu/biotechnology/docs/commission_staff_working_document_sec_2007_441_en.pdf

⁸⁵ http://www.wto.org/english/tratop_e/trips_e/trips_e.htm

⁸⁶ <http://www.biodiv.org/default.shtml>

⁸⁷ <http://www.wipo.int/portal/index.html.en>

⁸⁸ <http://www.fao.org/>

⁸⁹ <http://www.biodiv.org/biosafety/default.aspx>

The review affirms that there is a strong need to continue promoting the development of life sciences and biotechnologies, in particular by increasing research and promoting competitiveness. It also appears that, whilst the technology is promising, there is also a call for a reasoned use of some of its applications, in particular in the agro-food area, as well as for closer public scrutiny and forward looking regulatory control. For this reason, priorities such as the development of life sciences in accordance with societal values and the improvement of the implementation of the legislation appear particularly relevant. The importance of such a debate should not be underestimated to allow an optimal and accepted use of biotechnologies. The benefits and limits of the development of biotechnology in agriculture need to be understood and supported by the general public and the decision makers.

EC intends to produce a strategic paper, detailing the implementation of the 2002 Strategy mentioned above on this subject with regard to developing countries, while considering the needs of poorest populations and the appropriate developments that biotechnologies could offer.

Information and Communication Technologies

Information and Communication Technologies (ICTs) offer new opportunities for agricultural research for development. ICTs can play an essential role in several areas: agricultural knowledge and information systems, sharing of experience and knowledge, assisting the governance of the agricultural sector, management of relational data-base (e.g. market information systems), linking farmers to agricultural services (e.g. markets, technical assistance, and veterinary services). ICT greatly enhance access to and assessment of the scientific and technical knowledge required to solve problems crucial to local societies as well as to overcoming the inequality that exists in 'knowledge assets' and reducing existing knowledge gaps.

Geomatics information technologies

There are many applications of Geomatics information technologies and Geographic Information Systems (GIS) which are relevant for ARD. The possibility offered by earth observation to analyze and monitor wide areas in a relative short time and at a reasonable cost, represents an important instrument for developing countries: land cover and land use mapping, crop statistics, environmental monitoring, land use planning. Geomatics information technologies offer the scientific basis to integrate bio-physical and socio-economic data to analyze processes and trends (e.g. land use and land cover changes, deforestation, land degradation, etc). Geographical information systems are essential for sustainable land management and for territorial development, providing basic support to Rural Development and Agricultural policies, they can be a support for land tenure, traceability or monitoring of climate change mitigation programmes. The utilisation of GIS and spatial analysis is essential for agricultural research (socio-economic and environmental analysis, pilot sites selection, information management, market information, crop information systems, out-scaling and up-scaling of results).

Agroecology

Agroecology is the science of applying ecological concepts and principles to the design, development, and management of sustainable agricultural and food systems. It includes the socio-economic and environmental dimensions of sustainable development. The ecosystem approach is fundamental to determine if a particular innovation will contribute or will negatively affect the long term sustainability of the agro-ecosystem. Agroecology has already generated improved agricultural system extensively used in

some developed (e.g. USA) and developing countries (e.g. Brazil) and has a great potential for smallholders and labour intensive multifunctional farming. One of the major challenges is to develop new and cost-effective techniques to help the poorest of the poor to improve the productivity (in terms of land and labour) of their farming systems while preserving soil quality. Evidence emerging from analysis of agroecological projects, shows that the combination of stable and diverse production, internally generated and maintainable inputs, favourable energy input/output ratios, and articulation with both subsistence and market needs, comprises an effective approach to achieve food security, income generation, and environmental conservation. Agroecology requires an integrated and multi-disciplinary approach to biophysical sciences, including soil sciences, and socio-economic sciences.

3.4 Types and levels of intervention

Two main categories of ARD activities are identified for the EC support:

- capacity development (coordination, advocacy, dissemination, information, networking, training, education, institutional development, etc);
- research activities (research programmes and projects, including field and laboratory activities).

These two sets of activities are deeply interlinked when adopting an innovation system paradigm.

EC support will be articulated at three different levels of intervention: national, continental/regional, and global. The EC will support a coherent, cost-effective and efficient ARD that links the three levels of intervention into a single system, oriented towards a bottom-up, inter-disciplinary and multi-stakeholders approach. The optimal level of intervention should be based upon the principles of subsidiarity, in order to avoid duplication and overlapping of responsibilities, cost-effectiveness to make the best use of available resources, and critical mass to achieve the desired impact. Intervention at the continental and at the global levels should be aligned with national programmes and priorities, defining roles and responsibilities at each level.

For each type of activity and for each level of intervention, there might be specific priorities, partners and operational modes, as well as specific links across the two types and three levels of intervention.

3.4.1 National level

At national level the EC should support the establishment / strengthening of genuine National Agricultural Research Systems (NARS) that can truly represent all the parties that must be involved. Essential support to NARS should be in the field of capacity development (research management, project formulation, monitoring and evaluation, impact assessment), strengthening research linkages with producers, responsiveness to research needs, dissemination of results; empowering agricultural producers and their organizations; fostering public-private research cooperation, as well as cooperation with civil society; promoting harmonization and strategic prioritization of research agendas; and strengthening and widening agricultural support services.

3.4.2 Continental/regional level

At continental/regional level, the EC should continue to support the establishment and strengthening of umbrella organisations involved in co-ordinating and facilitating agricultural research agenda setting of regional and sub-regional importance.

Support to continental/regional organisation should include coordination, advocacy, dissemination, information, networking, and capacity development to empower developing countries to acquire their own scientific and technical skills, master the technology needed for their development and target their research agenda to find solutions to environmental, economic and social problems aimed at improving livelihoods of the poorest and the quality of life and well being of people. Support could include research implementation carried out at sub-regional and national level, within the framework of an agreed regional strategy and priorities defined by its NARS. The aim is to assist the creation of critical masses of researchers linked through networks, providing economies of scale. It will also support capacity building and strengthening of NARS, including research organisations, farmers and producers' organisations, tertiary education systems, and extension systems. Limited resources will also be allocated to research institutions with regional remits which are involved in the implementation of regional priorities.

At the African level the programme will support continental, regional and sub-regional programmes and institutions which coordinate and support national agricultural research systems. The Framework for African Agricultural Productivity (FAAP) will be used to address the challenges of the African Union's New Partnerships for African Development (AU-NEPAD)/Comprehensive Africa Agricultural Development Programme (CAADP). The Forum on Agricultural Research in Africa and sub-regional research organisations will be the main partners.

At the level of the other continents, support will be channelled in collaboration with GFAR and through the regional research organisations.

3.4.3 Global level

At the global level, implementation of agricultural research of an international public goods nature carried out by the International Agricultural Research Centres of the CGIAR will continue to be supported, while opening to other providers of global public goods in the field of agricultural research.

Support to advocacy, facilitation and co-ordination mechanisms at international level will be channelled through the Global Forum on Agricultural Research, in which NARS and Regional Research Organisations and other stakeholders can participate effectively to ensuring synergy between national, regional and international levels.

Biodiversity conservation, genetic improvement and improving international policies will continue to be focal areas in the domain of global public goods.

To respond to global emerging challenges it will be necessary to include other thematic areas, such as:

- sustainable and integrated management of natural resources (water, soil and biodiversity), which is key for preserving the productive potential of resource poor farmers, while responding to the environmental challenges;

- agricultural diversification (e.g. research into value-adding post-harvest and agro-processing technologies for cereals, root crops, fruit, vegetables, fish, animal and forest products, as well as research into cash, niche and under-utilised crops), which is key for reducing rural poverty, through creating new income generation opportunities.

CGIAR

The share of the allocation to programmes involving several centres (System-Wide Programmes) and non-CGIAR stakeholders (Global Challenge Programmes) will be up to 50% of the total CGIAR allocation.

The EC will continue to promote, through a common European vision and approach promoted by EIARD, a reform of the CGIAR system along the following lines:

- Development of a single cohesive organisation, with a corporate vision, mission and strategy.
- Simplification of the governance, with a transparent and efficient decision making mechanism.
- Progressive harmonisation of funding, reporting and accounting to increase efficiency and reduce transaction costs.
- Clear definition of roles and responsibilities of the different stake-holders groups, and mechanisms for their effective participation.
- Increased accountability of the system to, and participation by and equal partnership with, developing country partners - governments and civil society organisations.
- Increased collaboration of the system with other organisations, through strategic partnerships.
- Performance management system and incentives in place which focus Centres on achieving objectives and results..
- Improved communications with the systems stakeholders.

The EC approach to CGIAR will be progressively based on a partnership model (vs contractual model) and on programmatic/core support (vs restricted/project support), compatibly with the progress of the reform process.

Other providers of global public goods

Other providers of global public goods (e.g. European research and academic institutions specialised on ARD, NGO networks, etc.) may have other comparative advantages vis-à-vis the CGIAR and should play a more active role in the generation of public goods in the field of agricultural research contributing to food security. Without being exhaustive, the following research themes are particularly relevant for the challenges highlighted in this context: integrated multidisciplinary approach, participatory approaches, innovation systems, commodities chains, access to markets, competing claims on natural resources, multifunctional agriculture, food quality and food safety, horticulture, integrated natural resources management, biotechnologies, agroecology.

3.5 Integration of the EC instruments

In order to have a coherent approach to ARD financing, it is necessary to ensure the complementarity and coherence of the EC instruments.

The EC instruments allocating financial resources to support ARD during the next years are:

Research instrument

- RTD Framework Programme on Research and Technology (FP7) 2007-2013

External cooperation instruments

- European Development Fund (10th EDF) 2008-2013
- Development Cooperation Instrument (DCI)- Geographic and Thematic (Food Security Thematic Programme- FSTP) 2007-2013)
- European Neighbourhood and Partnership Instrument (ENPI) 2007-2013

The following table explains how the different programmes cross each type of research activity and each level of intervention.

	Financial Instruments 1 (Geographic)		
	EDF	DCI (Geographic)	ENPI
Strategic orientation (in relation with MDGs)	to reduce and eventually eradicate poverty consistently with the objectives of sustainable development and the gradual integration of the ACP countries into the world economy.	Eradication of poverty in partner countries and regions in the context of sustainable development, including pursuit of MDGs	Cross border cooperation. Promoting economic and social development in regions of both sides, working together to address common challenges,
Preferential level of intervention	national (and regional)	national (and regional)	National (and regional)
Main type of activity	capacity development	Promoting scientific and technological cooperation	Support to scientific research, promote research exchanges, research policies, research systems
Programming mechanism	CSP/NIP/project cycle	Similar to EDF	Similar to EDF
Management	decentralised / Delegations	decentralised / Delegations	decentralised / Delegations
Implementation	components of sector wide programmes (Rural Development/ Food Security/ Agriculture)	Components of country/sector programmes, support to agricultural research only in exceptional cases	Components of country/sector programmes, support to agricultural research only in exceptional cases
Main Research Partners (Farmers organisations, NGOs, Private sector, Community base organisations should be included at all levels)	National Agricultural Research Institutes	To be identified through country dialogue	To be identified through country dialogue
Priorities	Established through country dialogue	Established through country dialogue	Established through country dialogue
Geographic focus (not exclusive)	ACP countries (Sub-Saharan Africa, Caribbean and Pacific)	DCI countries (Asia, Central Asia, Middle East, Latin America, South Africa)	ENPI countries (Southern Mediterranean, Eastern Europe, Southern Caucasus, Near East)

	Financial Instruments 2 (Thematic)		
	DCI – Thematic (FSTP)		FP7
Strategic orientation (in relation with MDGs)	to improve food security in favour of the poorest and the most vulnerable and contribute to achieving the first MDG		to address specific problems that third countries face or that have a global character, such as the attainment of the MDGs, on the basis of mutual interest and mutual benefit.
Preferential level of intervention	continental/regional	global	all
Main type of activity	capacity development	research	Research , support actions
Programming mechanism	Multi-Annual Indicative Plan + Annual Action Plan	Multi-Annual Indicative Plan + Annual Action Plan	Annual Work Programme
Management	centralised/ EuropeAid / DEV (MIP)	centralised/ EuropeAid / DEV (MIP)	Centralised/RTD
Implementation	Targeted programmes	Targeted programmes/global calls	Research projects. Competitive calls and selection through independent and external review panels
Main Research Partners (Farmers organisations, NGOs, Private sector, Community base organisations should be included at all levels)	Continental and regional research organisations	<ul style="list-style-type: none"> ➔ CGIAR ➔ Other providers of international/global public goods 	<i>Cooperation</i> Research consortia <i>Capacities</i> Multi-stakeholders networks
Priorities	networking, coordination, advocacy, dissemination, extension systems, information, institutional development, tertiary education systems,	sustaining biodiversity; genetic improvements; improving policies and institutional innovation; sustainable management of water, land and forest resources; agricultural diversification	<i>Cooperation</i> research topics established through internal process and open consultations with MSs, Expert Groups, and international community <i>Capacities</i> Bi-regional dialogue (INCO-Nets)
Geographic focus (not exclusive)	Africa, Latin America, Asia	All regions, in particular SSA and South Asia	Developing countries, emerging economies, countries in transition