



Food and Agriculture Organization
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IS AID TO AGRICULTURAL INNOVATION A PRIORITY FOR THE INTERNATIONAL COMMUNITY?

A COMPREHENSIVE ANALYSIS OF 2002 TO 2012 OECD DATA
ON FOREIGN ASSISTANCE TO RESEARCH AND EXTENSION IN
AGRICULTURE, FORESTRY AND FISHING.

OCCASIONAL PAPERS ON INNOVATION IN FAMILY FARMING

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AGRICULTURE, FORESTRY AND FISHING.

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RESEARCH AND EXTENSION UNIT

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ABBREVIATIONS USED IN THE TEXT

AR4D	Agricultural Research for Development
ASTI	Agricultural Science and Technology Indicators
CRS	Creditor Reporting System
DAC	Development Assistance Committee
GFAR	Global Forum on Agricultural Research
IDA	International Development Association
IFAD	International Fund for Agricultural Development
LDC	Least Developed Countries
ODA	Official Development Aid
OECD	Organisation For Economic Co-operation and Development
R&D	Research and Development
SDG	Sustainable Development Goal
USD	United States Dollars

SUMMARY

For a wide range of developing countries data concerning public and private spending on agricultural research and development is collected and assessed by the Agricultural Science and Technology Indicators (ASTI) initiative. Assessment of foreign assistance to agricultural, forestry and fishery research and to agricultural extension has received less attention. The present study used OECD data to analyse, during the period of 2002 to 2012, the amount and variability of foreign aid directed to agricultural research and extension, as well as to forestry and fishery research.

Overall investments in agricultural research and development have been consistently low, which also applies to foreign assistance. Out of the total Official Development Assistance (ODA) that went to the agriculture, forestry and fishing, on average, seven percent have found to be allocated to research and two percent to extension. From 2002 to 2012, the share of foreign assistance invested into research and extension has decreased or remained steady rather than increased. Furthermore, aid flows are concentrated in high-income as well as in a few large middle-income countries. The top ten contributors to ODA for agricultural, forestry and fishery research are France, the World Bank, UK, Australia, the EU Institutions, USA, Canada, Germany, Sweden and the Netherlands, while the top ten contributors to ODA for agricultural extension are the World Bank, IFAD, Canada, Sweden, Norway, UK, Germany, USA, Belgium and Australia.

Like public and private spending, foreign assistance proved to be volatile, causing challenges for planning and implementation. This corroborates existing evidence of sizable deadweight loss for developing countries due to volatile aid flows. Even if the volatility of ODA commitments is, in relative terms, lower for least developed and other low-income countries than for other regions, it remains high. Also, it has a comparatively more profound impact, since these countries are more reliant on foreign assistance. The international community needs to give more priority to addressing the problems brought about by insufficient and unpredictable investments in research and extension.

CHAPTER 1

INTRODUCTION: THE IMPORTANCE OF RESEARCH AND EXTENSION IN AGRICULTURE, FORESTRY AND FISHING

Empirical evidence shows that agricultural, forestry and fishery research, as well as agricultural extension, are key elements for increasing and improving the production of goods and services from agriculture, forestry and fishing achieving food security and promoting sustainable management of natural resources in developing countries (World Bank, 2007; FAO, 2014). Less developed countries cannot merely rely on the transfer of knowledge and technologies from more advanced economies, because innovations are often site-specific. Research and extension activities must be tailored taking into consideration the local environmental and social conditions, available resources and market requirements. Developing countries therefore require capacities to locally develop knowledge and technical expertise that fits the needs of their producers, especially small-scale producers, and other actors along agricultural value chains.

Nevertheless, investments in agricultural research and development at global level can be considered consistently low (Kennedy, 2014) and are concentrated in high-income countries as well as in a few large middle-income countries (Beintema *et al.*, 2012). Many low-income countries, especially least-developed countries (LDCs), constantly underinvest in agricultural research and extension, with foreign assistance often being the major source of funding for these activities (Beintema and Stads, 2014).

While the Agricultural Science and Technology Indicators (ASTI) initiative provides data and analysis of domestic public and private spending on agricultural research and development for a wide range of developing countries, the scholarly literature pays little attention, if any, to volume and quality of foreign assistance to agricultural, forestry and fishery research and agricultural extension.

The objective of the present study is to fill this gap. We use OECD data to analyse, across countries and regions, the amount and variability of foreign assistance directed to agricultural research and extension, as well as to fishery and forestry research, during the period 2002–2012. The first section of the paper presents the OECD database, the working definitions and the methodology. The second section describes the trends of overall foreign assistance commitments during the period 2002–2012 and of foreign assistance allocation across income classes and regions. This is followed by an analysis of aid volatility. The paper ends with a brief discussion of the results and puts forward some policy considerations.



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CHAPTER 2

MATERIAL AND METHODS

THE OECD CREDITOR REPORTING SYSTEM

The present study uses the OECD's Creditor Reporting System (CRS) to provide information on Official Development Aid (ODA) to agricultural, forestry and fishery research, as well as agricultural extension¹. This is a well-known database, which reports data on ODA at project level and represents the most comprehensive source of information on foreign assistance flows to agriculture, fishing and forestry. The CRS was selected because of three characteristics: it provides accurate and comparable information on assistance flows; it includes a large number of donors and receivers; and it allows differentiating assistance by subsectors, regions, recipient countries and donors.

The donor list (see Annex 1) includes all member states of the OECD's Development Assistance Committee (DAC), 30 multilateral organizations, 8 non-DAC countries, and 1 private donor². The DAC list of ODA recipients includes all low- and middle-income countries, based on the World Bank definition, and excludes G8 members, EU members, and countries with a definite date for EU accession. Besides DAC recipients, the CRS also includes a few non-DAC recipients. While CRS statistics dating back to the 1970s are available, reliable in-depth analysis can only be carried out from 2000 onwards because of the limited coverage of earlier data and changes in reporting guidelines (Piva and Dodd, 2009). The number of countries for which foreign assistance is recorded has increased over the years. The completeness of CRS data on ODA commitments by DAC members has increased from 70 percent in 1995 to over 90 percent in 2000, and achieved almost 100 percent from 2003 onwards, whereas the coverage for CRS data on disbursements has exceeded 90 percent since 2002 and reached approximately 100 percent from 2007 onwards. This study therefore focuses on commitments rather than disbursements. The quality of CRS data on commitments can be considered good for the period of investigation, with missing data being of very little concern.

¹ Data are available at www.oecd.org/dac/stats/idsonline.

² Bill and Melinda Gates Foundation.

OECD member states report their bilateral ODA to the CRS. Data are collected through donors' statements based on their official statistics on commitments. The quality of the reported aid activity data are continuously monitored and verified by the OECD/DAC Secretariat³ focusing on the completeness of reporting and its conformity with definitions.

Strict statistical reporting requirements and definitions are established in order to obtain detailed and comparable data over time and across countries (Petras, 2009). Destination sectors are selected considering the economic or social area for which the resources are intended. Each activity can be assigned only to one purpose and one recipient country, to avoid double counting.

The CRS states that not all ODA can be assigned to a specific sector or country as each project might benefit several sectors or countries. In the first case, ODA is recorded as *non-sector-allocable aid*. In the latter, it may be recorded as *regional or developing countries, unspecified*. The flows that benefit several recipients in one region are classified as regional, e.g. Africa or Africa, South of Sahara, while those that benefit several regions are classified as *developing countries unspecified*. This classification represents a weakness of the database, as a significant share of reported ODA is classified as such, which creates uncertainty in terms of where the aid really went. In fact, several studies and reports⁴ point out that OECD/DAC data do not necessarily reflect the correct aid amounts for agricultural research or extension of the reporting donors, since investments in agricultural research for development (AR4D) might be reported under other CRS codes. Multi-sectoral projects with several components might be classified under only one sector. Also, donors might report activities as AR4D, which strictly could not be considered as ODA. Greater clarity and consensus on definitions and country reporting guidelines for agricultural research and extension could improve the ability of donors to report and facilitate the assessment of how and where resources are being invested. Donors could be allowed to indicate more than one sector or subsector for each project and to specify the amount, or the percentage of the total budget, directed to each of them. The same approach might be applied to identify recipient countries within regional projects.

Multilateral aid is excluded and is reported as multilateral contribution by the corresponding agency. Data on multilateral flows are submitted by the agencies concerned on a voluntary

³ See OECD (2013) for a detailed description on data collection methodology.

⁴ Reports and studies include US government report on accountability (<http://www.state.gov/documents/organization/189889.pdf>), Overseas Development Institute Brief on aid (<http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/7588.pdf>) and a analysis of European assistance to agriculture in sub-Saharan Africa by several universities (<https://workspace.imperial.ac.uk/africanagriculturaldevelopment/Public/Preliminary%20Analysis%20of%20European%20Assistance%20to%20Agriculture%20in%20SSA%20FINAL.pdf>).

basis and are included in the database to the extent possible. The CRS excludes private grants. Another limitation is that OECD statistics do not include funds provided by non-OECD governments, such as China and India, and by wealthy Middle-Eastern countries. The real magnitude of aid flows might therefore be higher (Piva and Dodd, 2009).

A stakeholder workshop organized in 2012 by the Global Forum on Agricultural research (GFAR) on the subject of tracking investments in agricultural research for development (AR4D)⁵ provided a range of recommendations on improving data collection, management and dissemination: (i) measurement of global ODA flows (inputs) is not sufficient in itself to improve aid effectiveness in food security. It should be complemented by measuring private flows, and combined with assessing specific investment in AR4D, as well as measuring outputs (developmental impact) at a later stage; (ii) decision-makers in bilateral and multilateral agencies need to be better informed concerning the design and functioning of the OECD/DAC tracking system, and its setup and current data disaggregation; (iii) the feasibility of improving data quality and reporting under the OECD/DAC system by including data on agriculture (and specifically AR4D) needs to be further discussed.

DEFINITIONS

The present work relies on the definitions used in the CRS and its classification of regions and sectors in order to be consistent with the standard reporting of the OECD.

ODA is defined as

*“Flows of official financing administered with the promotion of the economic development and welfare of developing countries as the main objective, and which are concessional in character with a grant element of at least 25 percent (using a fixed 10 percent rate of discount). By convention, ODA flows comprise contributions of donor government agencies, at all levels, to developing countries (“bilateral ODA”) and to multilateral institutions. ODA receipts comprise disbursements by bilateral donors and multilateral institutions. Lending by export credit agencies—with the pure purpose of export promotion—is excluded”.*⁶

⁵ Workshop report available at <http://www.egfar.org/news/summary-report-stakeholder-workshop-tracking-investments-agricultural-research-development>.

⁶ OECD DAC Glossary of Key Terms and Concepts. <http://stats.oecd.org/glossary/detail.asp?ID=6043>.

Grants or loans to countries and territories on the DAC list of ODA recipients and to multilateral agencies are provided by official agencies, including state and local governments, or by their executive agencies (OECD, 2013). In addition to financial flows, technical cooperation is included in aid. Grants, loans and credits for military purposes are excluded. Transfer payments to private individuals (e.g. pensions, reparations or insurance payouts) are in general not counted.

The CRS purpose code provides definitions for each sector and subsector in the database. Sectors are “macro-areas” such as agriculture, fishing and forestry; these are split into several subsectors associated with a specific purpose as can be seen in Table 1.

Among these, we analysed ODA to research in agriculture, forestry and fishing; data on extension are only available for agriculture, thereby we were unable to consider aid flows to forestry and fishery extension in our study.

Table 1. List of CRS purpose codes related to the sectors Agriculture, Forestry and Fishing

CRS CODE	SECTOR / SUBSECTOR	CLARIFICATIONS AND ADDITIONAL NOTES ON COVERAGE
AGRICULTURE		
31110	Agricultural policy and administrative management	Agricultural sector policy, planning and programmes; aid to agricultural ministries; institution capacity building and advice; unspecified agriculture.
31120	Agricultural development	Integrated projects; farm development.
31130	Agricultural land resources	Including soil degradation control; soil improvement; drainage of waterlogged areas; soil desalination; agricultural land surveys; land reclamation; erosion control; desertification control.
31140	Agricultural water resources	Irrigation; reservoirs; hydraulic structures; groundwater exploitation for agricultural use.
31150	Agricultural inputs	Supply of seeds, fertilizers, agricultural machinery and equipment.
31161	Food crop production	Including grains (wheat, rice, barley, maize, rye, oats, millet, sorghum); horticulture; vegetables; fruit and berries; other annual and perennial crops. [Use code 32161 for agro-industries.]
31162	Industrial crops / export crops	Including sugar; coffee; cocoa; tea; oil seeds; nuts; kernels; fibre crops; tobacco; rubber. [Use code 32161 for agro-industries.]
31163	Livestock	Animal husbandry; animal feed.
31164	Agrarian reform	Including agricultural sector adjustment.
31165	Agricultural alternative development	Projects to reduce illicit drug cultivation through other agricultural marketing and production opportunities (see code 43050 for non-agricultural alternative development).

[→]

CRS CODE	SECTOR / SUBSECTOR	CLARIFICATIONS AND ADDITIONAL NOTES ON COVERAGE
31166	Agricultural extension	Non-formal training in agriculture.
31181	Agricultural education / training	
31182	Agricultural research	Plant breeding, physiology, genetic resources, ecology, taxonomy, disease control, agricultural biotechnology; and livestock research (animal health, breeding and genetics, nutrition, physiology).
31191	Agricultural services	Marketing policies and organization; storage and transportation; creation of strategic reserves.
31192	Plant and post-harvest protection and pest control	Including integrated plant protection, biological plant protection activities, supply and management of agrochemicals, supply of pesticides, plant protection policy and legislation.
31193	Agricultural financial services	Financial intermediaries for the agricultural sector, including credit schemes; crop insurance.
31194	Agricultural cooperatives	Including farmers' organizations.
31195	Livestock / veterinary services	Animal health and management, genetic resources, feed resources.
FORESTRY		
31210	Forestry policy and administrative management	Forestry sector policy, planning and programmes; institution capacity building and advice; forest surveys; unspecified forestry and agro-forestry activities.
31220	Forestry development	Afforestation for industrial and rural consumption; exploitation and utilization; erosion control; desertification control; integrated forestry projects.
31261	Fuelwood / charcoal	Forestry development whose primary purpose is production of fuelwood / charcoal.
31281	Forestry education / training	
31282	Forestry research	Including artificial regeneration, genetic improvement, production methods, fertilizer, harvesting.
31291	Forestry services	
FISHING		
31310	Fishing policy and administrative management	Fishing sector policy, planning and programmes; institution capacity building and advice; ocean and coastal fishing; marine and freshwater fish surveys and prospecting; fishing boats / equipment; unspecified fishing activities.
31320	Fishery development	Exploitation and utilization of fisheries; fish stock protection; aquaculture; integrated fishery projects.
31381	Fishery education / training	
31382	Fishery research	Pilot fish culture; marine / freshwater biological research.
31391	Fishery services	Fishing harbours; fish markets; fishery transport and cold storage.

DATA

Currently, the database includes data on ODA to agricultural, forestry and fishery research and agricultural extension for 38 donors and 152 recipients for the period 2002–2012. We are only considering those donor and recipient countries that actually targeted ODA to or received ODA for at least one of the subsectors of interest during the period 2002 to 2012. This means that all the countries of the 2012–2013 DAC list of ODA recipients are included, together with four non-DAC countries and territories.⁷ Several donors and multilateral agencies are excluded since they did not provide assistance to the three subsectors analysed.⁸ The choice of the period of analysis, 2002 to 2012, is based on two criteria:

- Data quality for the selected period (country coverage and the completeness of CRS data).
- Higher validity of comparisons within a well-defined time frame (consistent reporting of data and consistent definitions of evolving subsectors).

Our analysis predominantly focuses on ODA to agricultural, forestry and fishery research as well as to agricultural extension at the aggregate level. In this context, forestry and fishery research play a minor role in terms of amounts received. Therefore, in this study, CRS data for these two subsectors was combined with data on agricultural research.⁹ Data on agricultural extension, in contrast, was analysed separately.

CRS provides information on ODA in terms of both commitment and disbursement. A commitment is a firm written obligation by a government or official agency, backed by the appropriation or availability of the necessary funds, to provide resources of a specified amount under specified financial terms and conditions and for specified purposes. A disbursement, in contrast, is defined as the placement of resources at the disposal of a recipient country or agency (OECD, 2013).

ODA commitments and disbursements to agriculture are highly correlated at aggregate level (Lowder and Carisma, 2011). CRS data on agricultural, forestry and fishery research show that the two measures have the same trend, although disbursements are usually smaller in terms of amounts; there are exceptions, however, where disbursements exceed commitments, as shown in Figure 1. Similarly, the two measures of funding are correlated in terms of ODA to agricultural

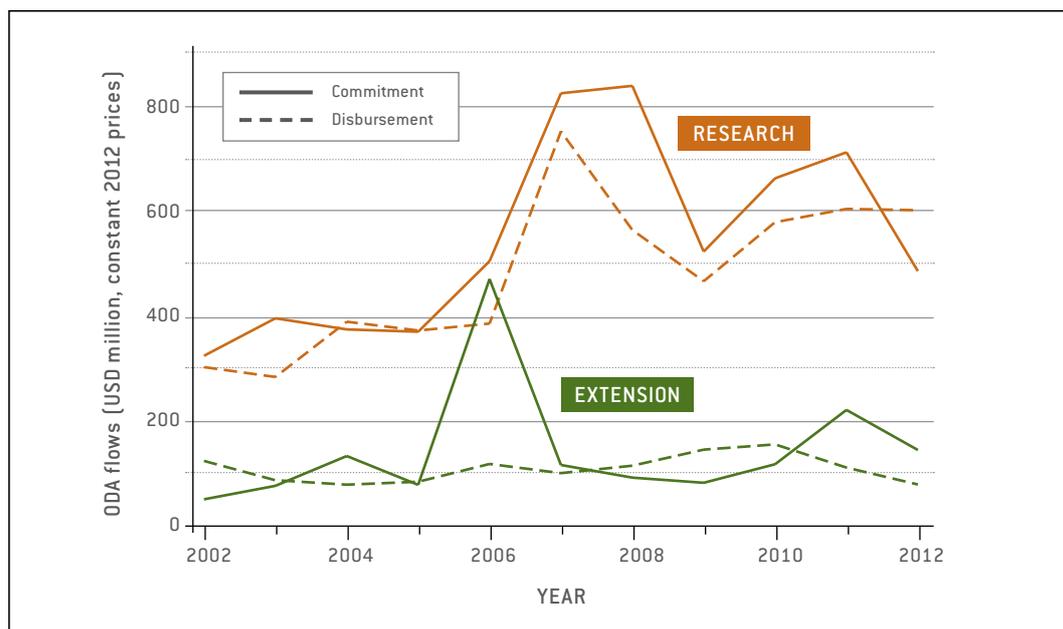
⁷ Four non DAC-countries and territories are included in the database: Croatia, States of Ex-Yugoslavia, Mayotte and Trinidad and Tobago. ODA to these countries are included for completeness and consistency with the CRS, although they are almost negligible. For instance, they overall account for about 0.3 percent of total ODA to agricultural, fishery, and forestry research in 2002–2012, and 0.13 percent of total ODA to agricultural extension in the same period. Further, a few countries included in the 2012–2013 DAC list of recipients countries did not receive any aid to the four subsectors; however, we included these countries for consistency with the DAC classification.

⁸ The donor list is provided in Annex I.

⁹ The choice of considering the three subsectors, agricultural, forestry and fishery research, is consistent with the proposed SDG number 2 which include forestry and fishery in addition to agriculture.

extension, except for 2006, when commitments increased sharply and disbursements remained steady. Differences between the two amounts might depend on several factors. First, multi-year commitments are fully recorded in the year they are signed, while disbursements are recorded when they are transferred from donors to recipients. Second, events might occur that partially prevent or postpone project implementation and the related disbursement.

Figure 1. ODA commitments and disbursements (USD million at constant 2012 value) to agriculture, forestry and fishery research and agricultural extension, 2002-2012



The paper focuses mainly on commitments since we are interested in understanding donors' aid policies rather than actual aid delivery. Commitments are good proxies of donors' intentions; they fluctuate as aid policies change and allow for analysis on how resources are targeted to specific purposes and recipient countries year by year (OECD, 2013). Furthermore, the CRS states that data on commitments are more reliable than those on disbursements. For the period 2002–2012, data are generally complete and reliable both in terms of commitment and disbursement flows, which permits comparison of the two measures, if necessary.

Aid is expressed in United States Dollars (USD) at constant 2012 prices. This allows analysis of trends in assistance flows over an extended period, since data reflect both changes in prices of goods and services in the donor currency, as well as variations in the exchange rate between donor currency and USD over the same period.¹⁰

¹⁰ Detailed information on DAC deflators are provided <http://www.oecd.org/dac/stats/informationnoteonthedacdeflators.htm>.

CHAPTER 3

RESULTS

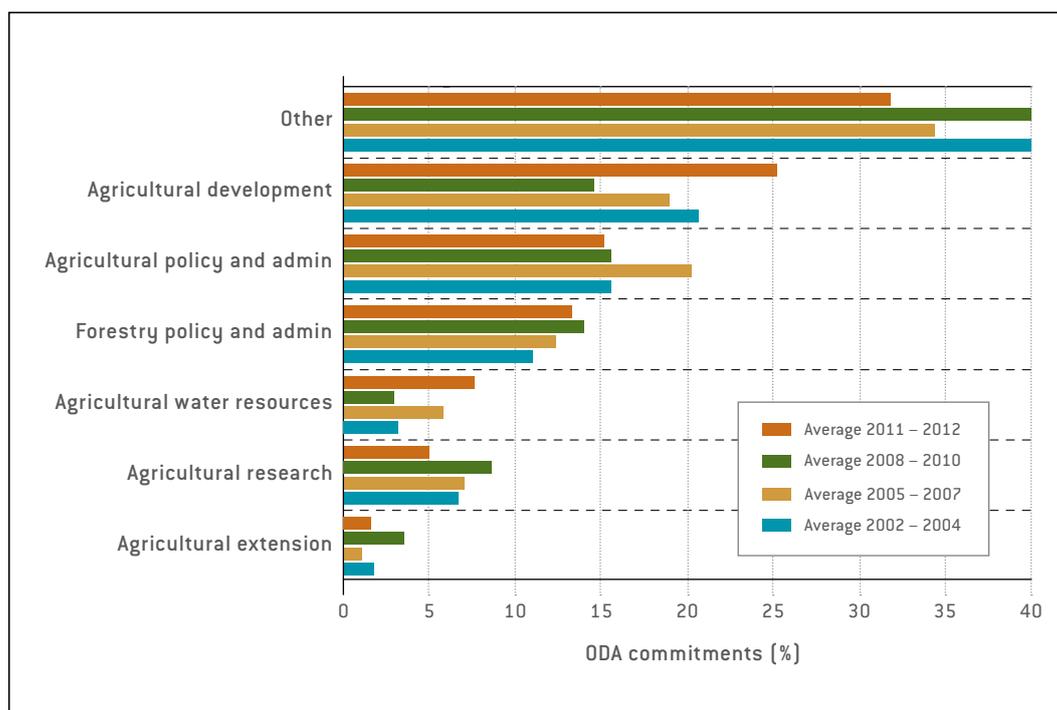
OVERVIEW: ODA TO AGRICULTURE, FORESTRY AND FISHING BY SUBSECTORS

As shown in Figure 2, the subsectors that received most of the resources during the period from 2002 to 2012 were: (i) agricultural development (code 31120); (ii) agricultural policy and administration management (code 31110); (iii) forestry policy and administration management (code 31210); (iv) agricultural water resources (code 31140); and (v) agricultural research (code 31182).¹¹ These subsectors accounted for more than 50 percent of total ODA to agriculture, forestry and fishing during 2002 to 2004, and for more than 70 percent during 2011 to 2012. Other subsectors, including extension (ca. 2 percent during 2011 to 2012), attract the remaining ODA.

While the five subsectors listed above maintained their position as main ODA channels, it can be said that the share of agricultural, forestry and fishery ODA aimed at individual subsectors varied considerably over the years.¹² Over the whole period, flows to agricultural, forestry and fishery research represented on average 7.2 percent of the total ODA allotted to the three sectors. Of these flows, 94 percent was directed to agricultural research and 3 percent each to forestry and fishery research. This difference is mainly due to the fact that foreign assistance to agriculture as a whole is also much bigger than foreign assistance directed to the other two sectors. Furthermore, within the agricultural sector, a comparatively larger share of total external funding is dedicated to research activities (see Table 2). Generally however, ODA to research represents only a small share of total development assistance to agriculture, forestry and fishing, with the percentage of agricultural extension being even smaller.

¹¹ The 2012 CRS purpose code lists and defines all the subsectors involved in agriculture, forestry and fishing. It is available at <http://www.oecd.org/dac/stats/purposecodessectorclassification.htm#bottom>.

¹² Similar results are observed in terms of disbursements.

Figure 2. ODA commitments to agriculture, forestry and fishing by main subsectors

GLOBAL TRENDS IN FOREIGN ASSISTANCE

Using constant 2012 prices, ODA allocated annually to agriculture, forestry and fishing increased almost constantly from USD 5 billion in 2002 to USD 11.5 billion in 2012, equivalent to an increase of 228 percent. The overall commitments to research in agriculture, forestry and fishing increased markedly between 2005 and 2008, when they reached USD 839 million, but then dropped dramatically to USD 523.9 million in 2009. After this year, a slight increase was recorded in 2010, but a cut was experienced in 2012, when ODA to agricultural, forestry and fishery research amounted to USD 486.7 million. It is interesting to note that the reduction of commitments in 2009 followed a decline in disbursements after 2007 (see Figure 1). This trend is mainly driven by external assistance to agricultural research, which, as mentioned before, is much bigger than the other subsectors. Foreign funding to agricultural research, indeed, increased from USD 296.4 million in 2002 to USD 811 million in 2008, declined to USD 495 million in the following year, and then rose again to USD 635 million in 2011. Finally, it decreased once more to USD 467.9 million in 2012, as the data in Table 2 demonstrate.

Foreign assistance to forestry and fishery research shows frequent and wide fluctuations over the years. ODA to fishery research ranged between USD 5 million in 2006 and USD 48 million in 2011, after which it dropped to USD 8 million in 2012. ODA to forestry research reached its peak of USD 33 million in 2007, and then dropped to USD 8 million in 2009, increasing again to USD 30 million in 2011. As in the case of fishery and agricultural research, ODA to forestry research was sharply reduced in 2012, when it amounted to USD 11 million.

Table 2. Relevant sector/subsector ODA commitments (in USD million at constant 2012 value)

YEAR	ODA TO AF&F	ODA TO AF&F RESEARCH AND AGRI. EXTENSION	ODA TO AGRI. EXTENSION	ODA TO AF&F RESEARCH	ODA TO AGRI. RESEARCH	ODA TO FISHERY RESEARCH	ODA TO FORESTRY RESEARCH
1	2	3 [= 4+5]	4	5 [= 6+7+8]	6	7	8
2002	5 042.1	378.2	52.6	325.6	296.4	18.8	10.4
2003	5 012.2	475.2	78.2	397.0	355.8	28.8	12.5
2004	5 048.2	510.8	134.9	375.8	354.5	7.2	14.0
2005	5 677.8	451.5	80.09	371.4	351.0	8.2	12.2
2006	5 680.9	977.3	471.6	505.7	484.5	5.2	16.0
2007	7 577.5	943.0	117.9	825.2	768.7	23.5	33.0
2008	8 230.4	933.1	93.9	839.3	811.0	13.2	15.1
2009	9 331.7	607.9	84.0	523.9	494.9	20.6	8.3
2010	9 922.5	782.6	119.3	663.3	625.0	19.7	18.6
2011	10 344.8	935.5	222.7	712.8	635.3	47.5	29.9
2012	11 473.3	633.2	146.4	486.8	467.9	7.8	11.1
Average	7 576.5	693.4	145.6	547.9	513.2	18.2	16.5

Note: AF&F = agriculture, forestry and fishing.

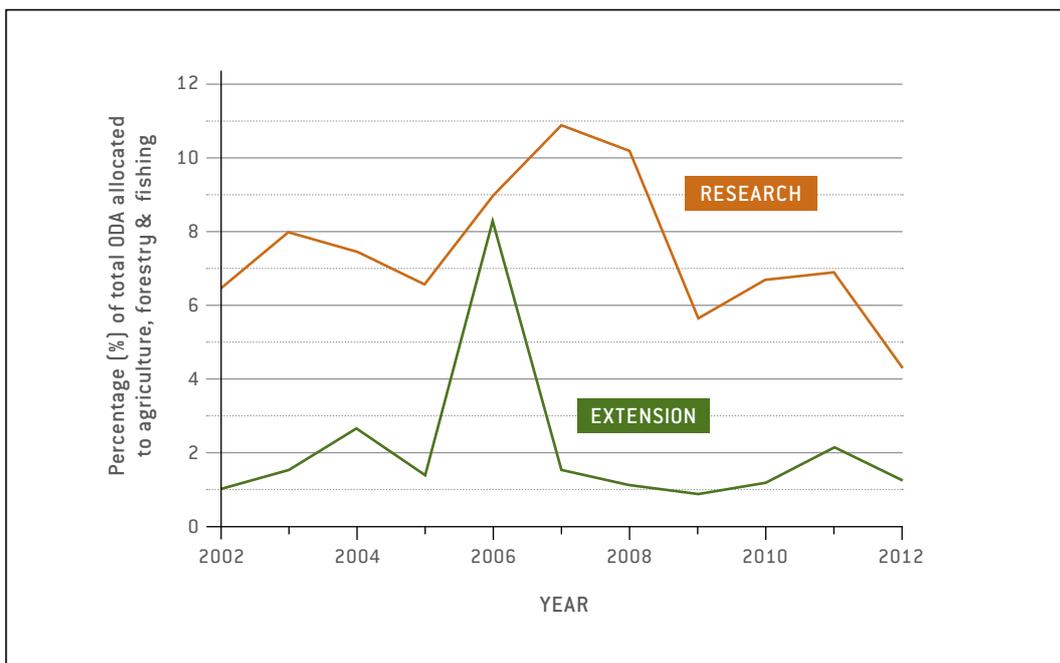
ODA allocated to agricultural extension also varied substantially from year to year. It reached a climax in 2006 (USD 472 million), but fell to USD 118 million the next year. In 2011 it increased to USD 223 million, and then fell again to USD 146 million in 2012 (Table 2).

The percentage of ODA to agricultural, forestry and fishing committed to research and extension varied considerably over the years, ranging from 17 percent in 2006 to 6 percent in 2012, which is illustrated by Figure 3. Even if there is an upward trend for total funding flows to

agricultural, forestry and fishing in absolute terms, the share aimed at research has actually been decreasing over the last decade. This result suggests that research activities have become less attractive for donors over time.

Overall, aid flows to agricultural extension are significantly smaller than those aimed at agricultural research; the share of agricultural ODA directed to extension has tended to remain stable over time, with a peak in 2006. In contrast to research and extension, flows to other subsectors tended to increase during the period 2002–2012, including agricultural development, and agricultural as well as forestry policy and administration management. Whereas agricultural research appears to become less important in terms of ODA flows within agriculture, forestry and fishing, the following subsectors have gained ground: agricultural land resources, agricultural financial services, and food crop production.

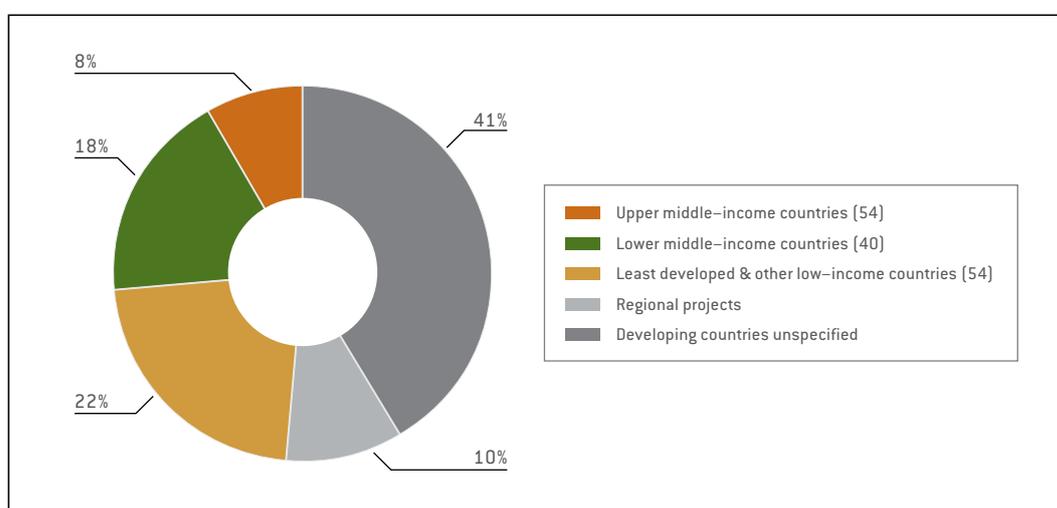
Figure 3. Share of total agriculture, forestry and fishery ODA allocated to research and extension, 2002-2012



ALLOCATION OF ODA TO AGRICULTURAL, FORESTRY AND FISHERY RESEARCH BY INCOME CLASS OF RECIPIENT COUNTRIES

This section presents the analysis of ODA to agricultural, forestry and fishery research by income class of recipient country, using the DAC classification.¹³ Unfortunately, data do not allow for a comprehensive analysis by recipient since a large part (more than half) of total ODA is classified as *regional* or as *developing countries unspecified*.

Figure 4. Share of total ODA commitments allocated to agricultural, forestry and fishery research by income class of recipient countries, average values 2002-2012



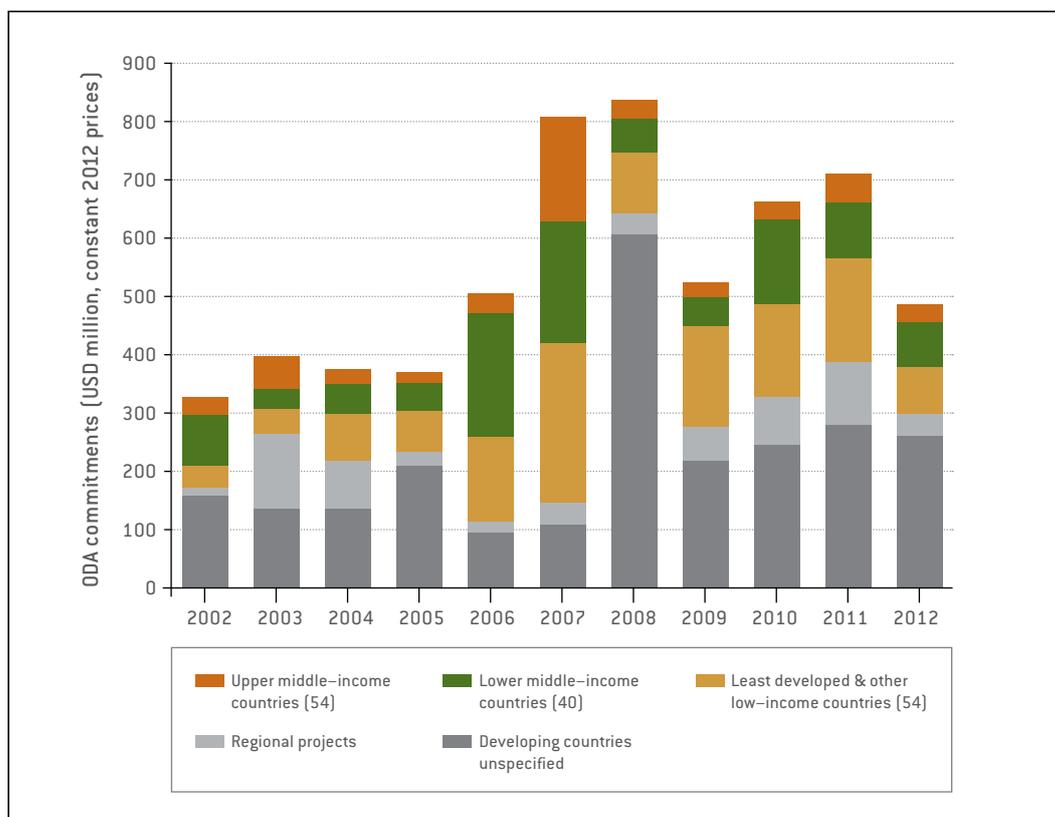
Notes: Numbers of countries within each class are indicated in brackets. Regional projects include Europe, Africa, America, Asia, Oceania, North of Sahara, South of Sahara, North & Central America, South America, Far East Asia, South & Central Asia, and Middle East.

As illustrated in Figure 4, in the period from 2002 to 2012, 22 percent of total ODA to agricultural, forestry and fishery research was allocated to least developed and other low-income countries; 18 percent to lower middle-income; 8 percent to upper middle-income countries and territories; 10 percent to regional projects; and 41 percent to developing countries unspecified.

Over the years, least developed and other low-income countries received on average USD 120 million, lower middle-income USD 99 million and upper middle-income countries USD 47 million.

¹³ According to the DAC List of ODA Recipients, effective for reporting on 2012 and 2013.

Figure 5. ODA commitments allocated to agricultural, forestry and fishery research by income class of the recipient country, 2002-2012



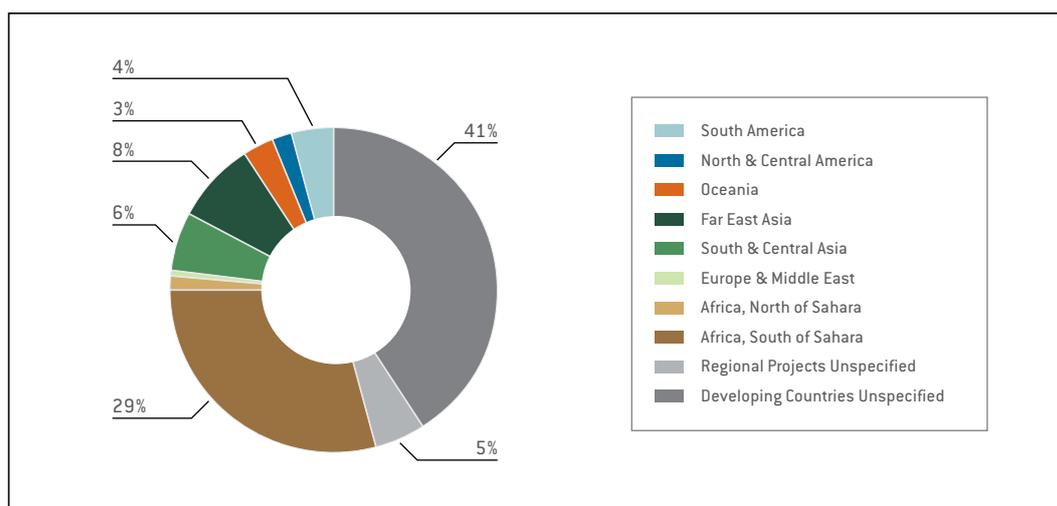
Notes: Numbers of countries within each class indicated in brackets. Regional projects include Europe, Africa, America, Asia, Oceania, North of Sahara, South of Sahara, North & Central America, South America, Far East Asia, South & Central Asia, and Middle East.

Figure 5 shows how allocation of ODA to agricultural, forestry and fishery research varied across income classes during the last eleven years. In 2002 least developed and other low-income countries received 11 percent of the total amount (USD 36 million); lower middle-income countries received 26 percent (USD 86 million); and upper middle-income countries and territories 10 percent (USD 31 million); the remainder was split between developing countries unspecified (49 percent) and regional projects. In the following years, the distribution of ODA to agricultural, forestry and fishery research among income classes of recipient countries varied constantly, without an apparently consistent trend. In 2012, the ODA share directed to least developed and other low-income countries accounted for 17 percent (USD 81 million), while lower and upper middle-income countries received 16 percent (USD 78 million) and 6 percent (USD 28 million) respectively. The commitments classified as *developing countries unspecified* increased from 40 percent in 2011 to 54 percent in 2012. The high share of this category creates significant uncertainty for more detailed analysis of aid allocation.

ALLOCATION OF ODA TO AGRICULTURAL, FORESTRY AND FISHERY RESEARCH BY REGIONS AND COUNTRIES

Figure 6 shows how ODA to agricultural, forestry and fishery research was allocated across regions. During the period 2002-2012, 29 percent of commitments to agricultural, forestry and fishery research have been directed to Africa, South of Sahara, 4 percent to South America, 8 percent to Far East Asia, 7 percent to South and Central Asia, and 3 percent to Oceania; while Europe, North and Central America and Middle East received only a small portion of the aid. In addition, 41 percent was reported as unspecified developing countries and 5 percent as regional projects.

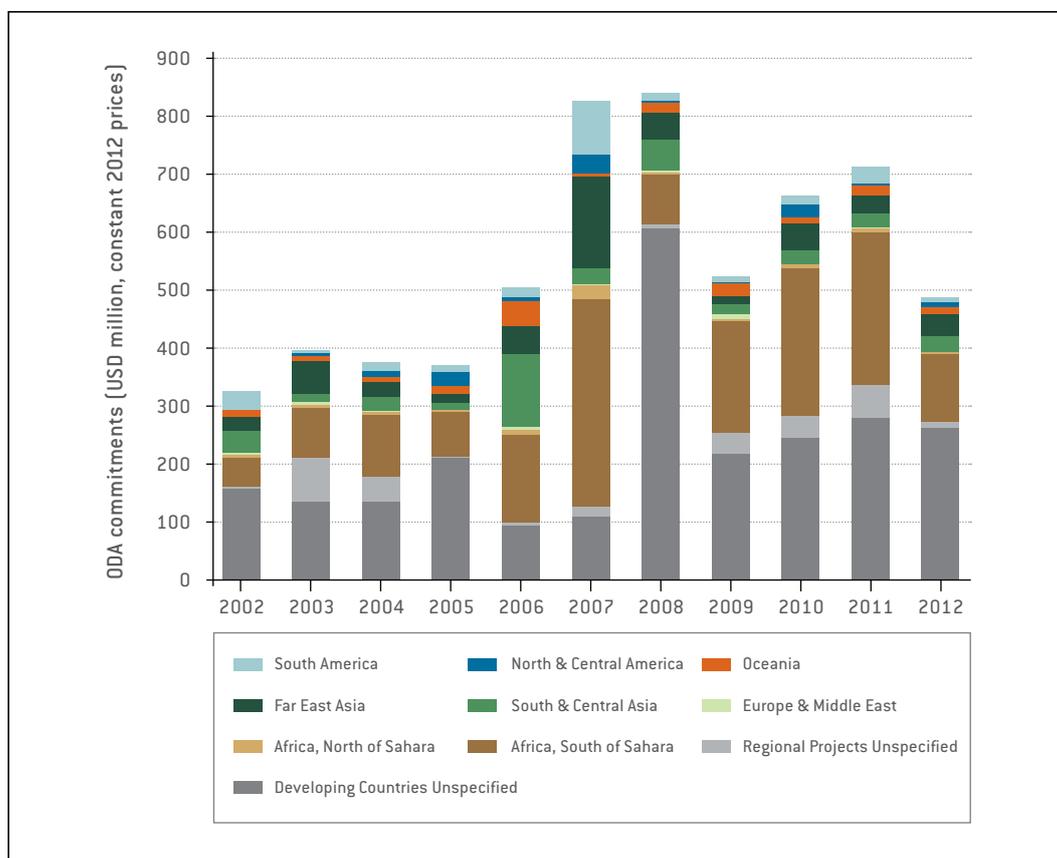
Figure 6. Percentage (%) of total ODA commitments to agriculture, forestry and fishery research by region, average values 2002-2012



Note: Regional projects include Europe, Oceania, Africa, America, and Asia

Figure 7 shows the year-by-year allocation of ODA to agricultural, forestry and fishery research by region of the recipient country. As expected, Africa, South of Sahara has constantly received the biggest share of total ODA, which is a result of investments being increasingly focused on least-developed and other low-income countries. In 2002, the region received 15 percent of total ODA to agriculture, forestry and fishery research, South America almost 10 percent, Far East Asia 7 percent, and South and Central Asia over 11 percent. In the following years, the distribution of ODA to agricultural, forestry and fishery research among regions varied significantly, without following any evident trend, not least because the quota allocated to Developing Countries Unspecified is large and fluctuated considerably.

Figure 7. ODA commitments allocated to agricultural, forestry and fishery research by region, 2002-2012



Note: Regional projects include Europe, Oceania, Africa, America, and Asia.

In 2012, Africa, South of the Sahara received 24 percent of total ODA to agricultural, forestry and fishery research, South America 2 percent, Far East Asia 7 percent, and South and Central Asia 6 percent. In this context, allocation by region of recipient countries seems to be consistent with the classification based on income classes. The upward trend in ODA to agricultural, forestry and fishery research in Africa, South of Sahara was mainly driven by an increasing donor focus on least developed and other low-income countries. In fact, 39 out of 51 countries in Africa, South of Sahara are classified as least developed or other low-income countries and are thus relevant beneficiaries.

Ethiopia, Kenya, Madagascar, Mali, Senegal, and Uganda¹⁴ are among the top 10 recipients for 2002–2012 and, altogether, represented over 33 percent of ODA to agricultural, forestry and fishery research allocated to the region. All these countries experienced high aid volatility in

¹⁴ Income classes specified according to classification provided by the DAC List of ODA recipients, effective for reporting on 2012 and 2013.

terms of amounts received across years. South American countries are mainly classified as lower or upper middle-income economies. Among the 13 countries included in this area, Bolivia and Brazil are the major beneficiaries of ODA to agricultural, forestry and fishery research. Brazil is classified as an upper middle-income country and for the region received more than 45 percent of the total ODA commitments studied here, whereas Bolivia is a lower middle-income country and totaled 26 percent of ODA commitments to agricultural, forestry and fishery research in South America in 2002–2012.

Far East Asia includes several main recipients, such as China, Indonesia, Laos, Thailand and Viet Nam. Viet Nam was the beneficiary of 32 percent of ODA to agricultural, forestry and fishery research allocated to this region during the period analysed, while China absorbed 16 percent of these resources.

During the period 2002–2012, India received more than USD 200 million, equal to over 54 percent of total ODA to agricultural, forestry and fishery research allocated to South and Central Asia. Flows to Bangladesh have always been modest, except for 2008, when it received USD 44.6 million.

Oceania accounted for 3 percent of ODA to agricultural, forestry or fishery research; Papua New Guinea received 66 percent of external resources to this region from 2002 to 2012. For instance, in 2006, it was given more than USD 41 million, while total assistance directed to Oceania was USD 42.9 million USD.

Northern African countries received no more than 1 percent of total ODA to agricultural, forestry and fishery research during the period 2002–2012. This result is not surprising as only 5 countries are included in this category and most of them are lower or upper middle-income countries. Among these, Morocco is the major recipient; it received over 50 percent of the ODA to agricultural, forestry and fishery research in the region.

From 2002 to 2012, North and Central American countries attracted 2 percent of total ODA to agricultural, forestry and fishery research; Costa Rica and Nicaragua received the biggest share, followed by Honduras and Mexico.

Finally, European countries do not receive significant assistance to agricultural, forestry or fishery research, since only few countries are included in the DAC list of ODA recipients and most of these are upper middle-income countries. Similarly, Middle East does not benefit from development assistance to research in the three subsectors.



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Figures 8a and 8b show the distribution of ODA to agricultural, forestry and fishery research among recipient countries during the period 2002–2012 (total values). Most of the recipient countries are classified as least developed, such as Ethiopia, Kenya, Madagascar, Mali and Senegal, or lower middle-income countries, such as India, Papua New Guinea, Uganda and Viet Nam. Two interesting exceptions are represented by Brazil and China, which are upper middle-income countries and are large recipients of ODA to agricultural, forestry and fishery research. ODA to agricultural, forestry and fishery research allocated to all of these countries experienced severe fluctuations across years, as can be seen from Table 3, which reports the ten top recipient countries according to the volume of foreign assistance received by year. A few countries, such as India, Kenya, Papua New Guinea and Viet Nam seem to be almost constantly at the centre of donors' interest. Several other recipient countries receive less steady international funding for their agricultural, forestry and fishery research, although they get relevant amounts in some years, such as Mauritius (USD 8.6 million) and Colombia (USD 3.3 million) in 2002; Philippines (USD 3.9 million) in 2004; Morocco (USD 20.3 million) in 2007; and Namibia (USD 25.2 million) and Togo (USD 11.8 million) in 2011. In other words, many developing countries experience high aid volatility across years.

Figure 8. ODA commitments to agricultural, forestry and fishery research by main recipient countries, 2002-2012

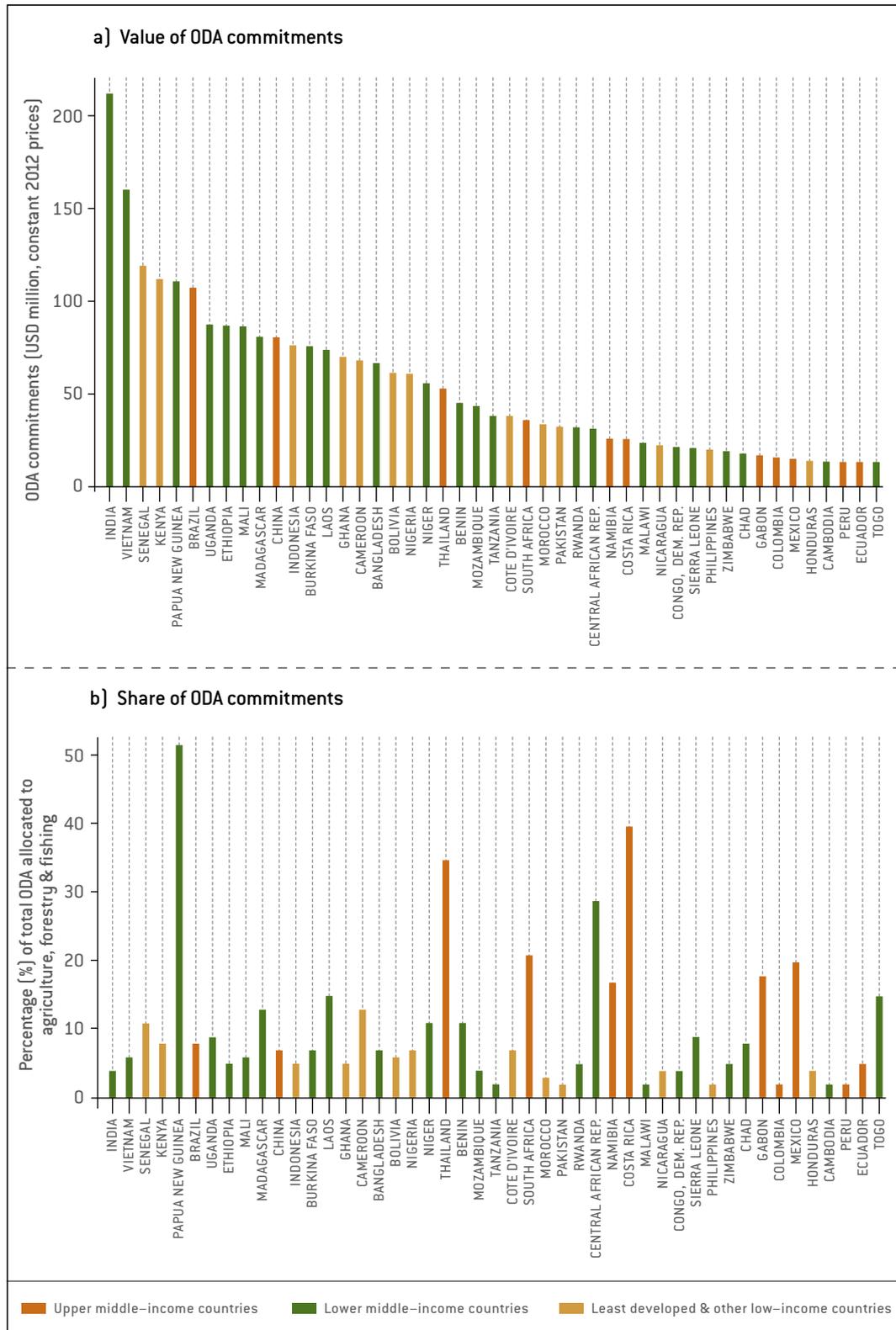


Table 3. Main recipient countries in terms of ODA commitments (in USD million at constant 2012 values) to agricultural, forestry and fishery research, 2002–2012, by year

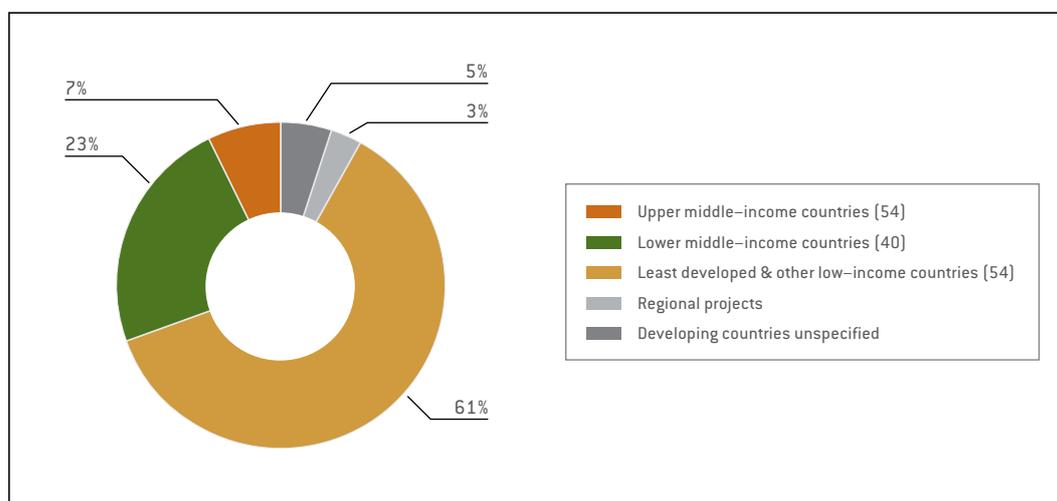
RANK	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1	India 29.0	China 43.7	Kenya 25.0	Congo, DR 11.6	Senegal 32.9	Brazil 71.6	Bangladesh 44.6	Kenya 50.1	Uganda 59.7	Niger 29.9	India 20.8
2	Bolivia 24.3	Chad 8.5	India 11.7	Cent. Afr. Rep. 10.9	Ethiopia 26.2	Viet Nam 59.9	Viet Nam 21.0	Ethiopia 30.1	Nigeria 40.2	Namibia 25.2	Ghana 19.8
3	Mauritius 8.6	PNG 7.6	Chad 9.9	Nicaragua 10.7	Burkina Faso 19.7	Madagascar 53.7	Mozambique 13.5	Tanzania 25.5	Cote d'Ivoire 27.1	Bolivia 19.6	Senegal 15.5
4	PNG 8.3	Bangladesh 7.0	Uganda 8.9	Honduras 9.1	Laos 16.6	Mali 41.3	Mali 8.1	India 12.4	Viet Nam 26.4	Ghana 18.7	Viet Nam 9.7
5	Viet Nam 8.0	Nigeria 6.8	Senegal 7.8	Malawi 9.1	Kenya 12.3	Senegal 38.5	Brazil 7.1	Uganda 8.7	Mali 22.1	Rwanda 18.5	Ethiopia 9.2
6	China 7.6	Viet Nam 5.2	Viet Nam 7.8	Senegal 6.8	Thailand 11.7	Cameroon 36.1	China 6.7	Mozambique 7.2	Burkina Faso 14.9	Benin 17.6	Niger 6.6
7	Niger 5.8	Yemen 3.2	Benin 6.3	Mauritania 5.5	Nigeria 9.9	Laos 33.1	Laos 6.4	Senegal 6.5	Pakistan 13.3	Mozambique 15.2	Cameron 6.3
8	Benin 5.7	Tanzania 3.0	Cameroon 5.1	Sierra Leone 4.3	Cote d'Ivoire 9.6	Indonesia 33.1	Madagascar 5.2	Madagascar 5.1	Nicaragua 8.2	Togo 11.8	Indonesia 5.3
9	Indonesia 3.6	Nepal 2.9	Thailand 4.5	Thailand 3.7	Viet Nam 9.5	Ghana 22.9	Ghana 4.6	Iraq 4.6	Ethiopia 7.7	Sierra Leone 11.7	Laos 4.8
10	Colombia 3.3	Rwanda 2.8	Philippines 3.9	Viet Nam 3.5	Bolivia 8.9	Morocco 20.3	India 4.4	Brazil 4.6	Kenya 5.4	Burkina Faso 10.8	China 4.6

Notes: PNG = Papua New Guinea;

ODA COMMITMENTS TO AGRICULTURAL EXTENSION BY INCOME CLASS AND REGION OF RECIPIENT COUNTRIES

Figure 9 shows how ODA to agricultural extension was allocated according to the income class of the recipient countries. Least developed and other low income countries received on average 61 percent of total ODA to agricultural extension (ca. USD 100 million annually), while lower middle-income countries received 24 percent and upper middle income 6 percent (ca. USD 10 million annually).

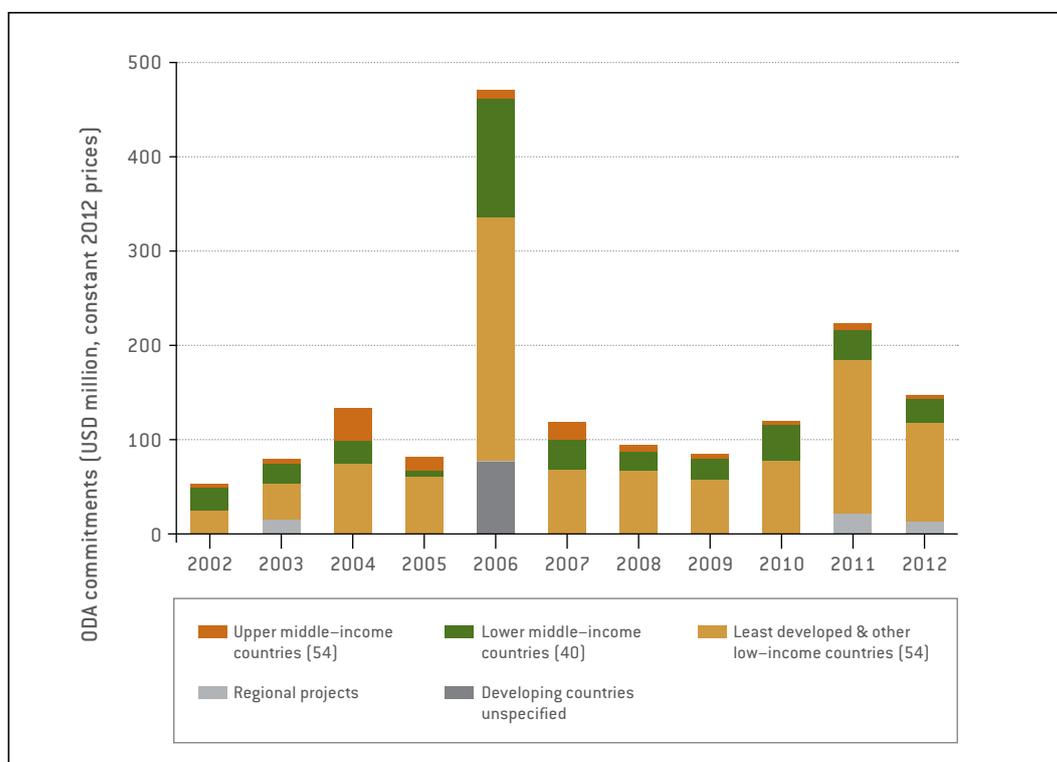
Figure 9. Percentage (%) of total ODA commitments allocated to agricultural extension by income class, average values 2002–2012



Notes: Numbers of countries within each class indicated in brackets. Regional projects include 9 areas: Europe; Oceania; Africa, North of Sahara; Africa, South of Sahara; North & Central America; South America; Far East Asia; South & Central Asia; and Middle East.

As shown in Figure 10, foreign aid flows to agricultural extension have always been much lower than those aimed at agricultural research; the only exception was in 2006, when ODA to agricultural extension increased to USD 471 million. Most of these resources were transferred to least developed and other low-income countries, as well as to lower middle-income states. The first group received USD 257.4 million, while the second one received USD 125.8 million. In the following years, aid to this sector returned to previous levels, until 2011, when commitments to least developed and other low-income countries increased again to USD 161 million.

Figure 10. ODA commitments allocated to agricultural extension by income class of recipient countries and by year, 2002–2012



Notes: Numbers of countries within each class indicated in brackets. Regional projects include 10 areas: Europe; Asia; Oceania; Africa, North of Sahara; Africa, South of Sahara; North & Central America; South America; Far East Asia; South & Central Asia; and Middle East.

Africa, South of the Sahara obtained a large proportion (57 percent) of external funding to agricultural extension, followed by South and Central Asia, which received 15 percent of total commitments (see Figure 11). Other regions received a lower portion of the total foreign assistance for extension. Africa, South of Sahara and South and Central Asia recorded a fast increase in 2006, when the former shifted to USD 246 million and the latter to USD 134 million. Within Africa, South of Sahara, Kenya and Tanzania received USD 56 million and USD 41 million respectively, while Zambia, Ethiopia and Burundi obtained more than USD 22 million. Furthermore, commitments to India rose from zero in 2005 to USD 105 million in 2006, explaining the large increase in aid to that region (see Figure 12).

Figure 11. Percentage (%) of total ODA commitments allocated to agricultural extension by region, average values 2002–2012

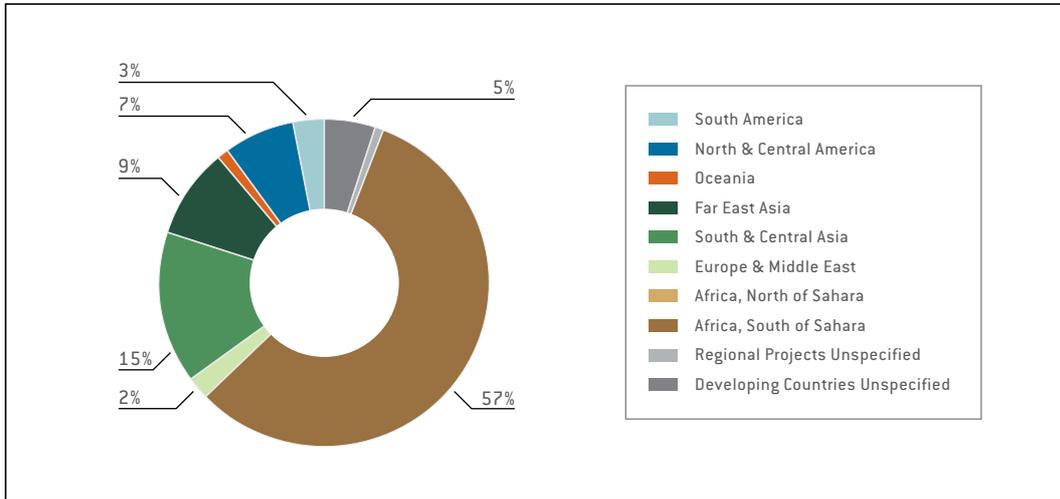
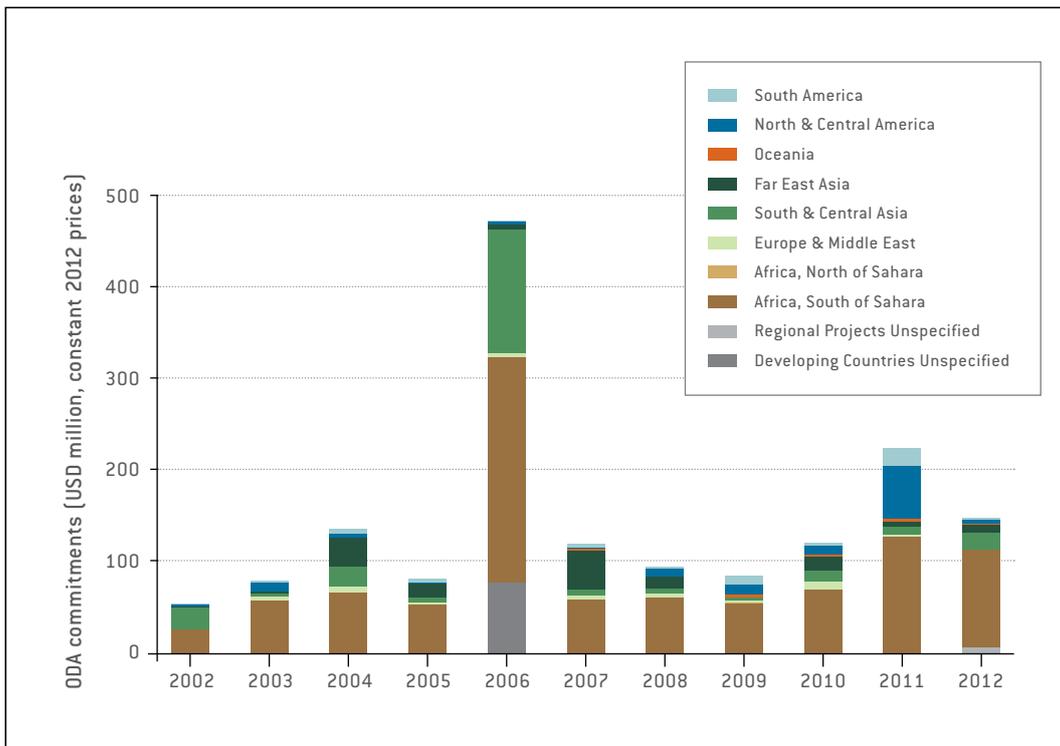


Figure 12. ODA commitments allocated to agricultural extension by region and by year, 2002–2012



Note: Regional projects include Europe, Oceania, Africa, the Americas, and Asia.

VOLATILITY IN ODA TO AGRICULTURAL, FORESTRY AND FISHERY RESEARCH

To obtain tangible benefits from investments in research activities, long-term stability of funding is necessary. Nevertheless, in several developing countries, funding for agricultural research and development (R&D), and thus R&D expenditures, are unstable and subject to severe fluctuations from one year to another [Beintema *et al.*, 2012]. In this context, foreign assistance often represents a significant alternative source of funding for agricultural, forestry and fishery research. To measure the degree of volatility of yearly assistance levels we computed the standard deviation of the natural logarithm of the annual growth of ODA to agricultural, forestry and fishery research over the period 2002–2012. This calculation follows the method proposed by Stads [2011]. The lower the volatility coefficient, the steadier external funding.

Table 4 reports volatility coefficients of annual ODA commitments to agricultural, forestry and fishery research by income class and region of the recipient country for the period 2002-2012. Aid flows are usually characterized by a high degree of volatility due to events in recipient countries, donors' behaviour, bad planning or shifting priorities [Stads, 2011]. Volatility coefficients of ODA to agricultural, forestry and fishery research related to least developed and other low-income countries are lower than those related countries belonging to the other two income classes. Thereby, funding to least developed and other low-income countries, which are likely to be the most dependent on international aid, seems to be more stable over time. This result is interesting, since public agricultural R&D spending levels in these countries are considerably more unstable than those in middle-income countries, which in turn experience higher volatility than those in high-income countries [Beintema *et al.*, 2012].

Table 4. Volatility of yearly ODA commitments to agricultural, forestry and fishery research, 2002–2012

INCOME CLASS	VOLATILITY COEFFICIENT (2002–2012)
Least developed and other low-income countries	0.570
Lower middle-income countries and territories	0.774
Upper middle-income countries and territories	0.902
REGION	VOLATILITY COEFFICIENT (2002-2012)
Europe	1.799
Africa, North of Sahara	0.903
Africa, South of Sahara	0.710
North & Central America	1.427
South America	1.186
Far East Asia	0.930
South & Central Asia	1.055
Middle East	2.161
Oceania	0.834

Note: Volatility coefficient for Middle East refers to the period 2002–2011.

The volatility coefficient of ODA commitments to agricultural, forestry and fishery research in Africa, South of Sahara is much lower than in other regions, although it is still high (0.710). Agricultural R&D agencies in this region, indeed, are more dependent on external funding than those in other developing areas and donors remain significant main drivers of volatility (Beye, 2002; Beintema *et al.*, 2012). ODA to agricultural, forestry and fishery research in Oceania is relatively stable; this result can be explained by almost constant aid flows to Papua New Guinea. The volatility coefficient for ODA commitments to agricultural, forestry and fishery research for Middle East is very high.

As shown in Table 5, ODA to agricultural extension generally proved to be more volatile than ODA to agricultural, forestry and fishery research for the period 2002–2012. Again, we observe that the volatility coefficient is lower for least developed and low-income countries. The degree of volatility is higher for lower middle-income countries than upper middle-income countries. Aid volatility in Africa, South of Sahara (0.284) is significantly lower than in other regions, followed by Oceania (1.115).

Table 5. Volatility of yearly ODA commitments to agricultural extension, 2002–2012

INCOME CLASS	VOLATILITY COEFFICIENT (2002–2012)
Least developed and other low income countries (54)	0.732
Lower middle-income countries (40)	1.173
Upper middle-income countries (54)	0.860
REGION	VOLATILITY COEFFICIENT (2002–2012)
Europe	1.361
Africa, North of Sahara	1.342
Africa, South of Sahara	0.284
North & Central America	1.237
South America	1.131
Far East Asia	1.674
South & Central Asia	1.582
Middle East	n/a
Oceania	1.115

MAIN DONOR COUNTRIES IN TERMS OF ODA COMMITMENTS TO AGRICULTURAL, FORESTRY AND FISHERY RESEARCH AND AGRICULTURAL EXTENSION (2002–2012)

As shown in Table 6, France was the main donor in terms of volume of ODA commitments to agricultural, forestry and fishery research during the period 2002–2012, followed by the International Development Association (IDA),¹⁵ United Kingdom, Australia and EU institutions. Since 2004, these actors have been almost constantly among the five top donors. As expected, this result is mostly due to commitments to agricultural research, which are higher than those allocated to the other subsectors and are provided by relatively few donors. During the same period, Finland and the Netherlands were the main donors for forestry and fishery research, respectively, whereas IDA and IFAD are those that invested the most in agricultural extension.

Table 6. Main donors in terms of ODA commitments (in USD million at constant 2012 value) to agricultural, forestry and fishery research and agricultural extension (2002–2012)

AGRICULTURAL, FORESTRY & FISHERY RESEARCH		AGRICULTURAL RESEARCH		FISHERY RESEARCH		FORESTRY RESEARCH		AGRICULTURAL EXTENSION	
France	1 826 564	France	1 801 052	Finland	26 154	Netherlands	43 459	IDA	514 665
IDA	902 581	IDA	871 025	EU Inst.	25 293	Australia	38 208	IFAD	337 024
UK	551 939	UK	544 165	IDA	22 448	Germany	18 026	Canada	142 038
Australia	413 613	Australia	360 470	France	22 160	Norway	14 916	Sweden	107 434
EU Inst.	335 113	USA	324 750	Norway	20 980	Denmark	14 331	Norway	94 103
USA	326 087	EU Inst.	300 998	Japan	20 030	Canada	12 106	UK	72 631
Canada	305 131	Canada	292 482	Spain	17 534	IDA	9 107	Germany	64 456
Germany	244 395	Germany	225 559	Australia	14 935	EU Inst.	8 822	USA	35 975
Sweden	186 490	Sweden	177 783	Sweden	8 112	UK	6 037	Belgium	30 870
Netherlands	136 042	Belgium	100 421	Denmark	6 739	Finland	3 653	Australia	24 884

Notes: EU Inst. = EU Institutions; UK = United Kingdom; USA = United States of America.

Overall, only a few DAC donors and multilateral organizations cover the majority of ODA targeted at agricultural, forestry and fishery research, and agricultural extension; EU Institutions do not appear among the main donors for agricultural extension, while they are a relevant

¹⁵ IDA is the World Bank's fund that aims to reduce poverty by providing loans and grants to the world's poorest countries.

donor for agricultural, forestry and fishery research. In addition to the donors listed in Table 6, Iceland (USD 600 000), Luxemburg (USD 100 000), Greece (USD 1.9 million), Portugal (USD 7.7 million), Italy (USD 10 million), Austria (USD 12 million), New Zealand (USD 14 million) and Ireland (USD 22 million) offered ODA to research activities in agriculture, forestry and fishing during the period 2002–2012.

Countries in Africa, South of Sahara, including Ethiopia, Kenya, Madagascar, Mali and Senegal, received ODA for agricultural, forestry and fishery research, mainly from IDA (USD 607.8 million), France (USD 508.5 million), Canada (USD 115.3 million) and EU Institutions (USD 110.6 million). India received most of its external funding from IDA (USD 156 million), and Viet Nam from France (USD 40 million), Australia (USD 36 million) and Asian Development Bank (USD 34 million). In addition, Papa New Guinea received assistance almost exclusively from Australia (USD 111.8 million), while Brazil received substantial assistance from France, which donated USD 102.8 million. The main donor for China was Spain, which donated about USD 40 million to agricultural research in 2003.¹⁶

During the period 2002–2012, ODA to agricultural extension to countries in Africa, South of the Sahara was mainly provided by IDA (USD 229 million), IFAD (USD 184 million) and Sweden (USD 107 million). Similarly, for South and Central Asia countries the main donor was IFAD, which donated USD 137 million. Most of these funds were directed to India, receiving USD 121 million in the same period.

¹⁶ Once again, it is important to recall that the most of these aid flows are aimed at agricultural research rather than forestry and fishery research. For instance, Papa New Guinea received USD 112 million for agricultural, forestry and fishery research, but USD 107.8 million of this was aimed at agricultural research. Similarly, in Brazil, USD 106.8 million were directed to agricultural research out of USD 109.7 million aimed at agriculture, forestry and fishery research as a whole.

CHAPTER 4

DISCUSSION AND POLICY RECOMMENDATIONS

The first conclusion that can be drawn from the analysis of the data presented in this paper is that donor commitments to both research and extension are relatively small, considering that from 2002 to 2012 they allocated only an average of 7 percent to research and 2 percent to extension out of total ODA to agriculture, forestry and fishing. Furthermore, the share of agricultural ODA committed to agricultural research and extension has decreased over the period investigated as overall aid flows to agriculture, forestry and fishing have increased faster than ODA allotted to agricultural, forestry and fishery research and agricultural extension over the period.

If adequate levels of funding for research are crucial, long-term stability of funding is equally vital (FAO, 2014). In his analysis of the cost of aid volatility, Kharas (2008) provided evidence of sizable deadweight loss for developing countries due to volatile aid flows. Research projects in particular require several years of steadily funded activities to produce results that can be reliably translated into practice. High volatility in external funding may have a negative impact on research and extension outputs, especially for those developing countries that are highly dependent on external resources. It should be noted, however, that in cases where government funding is substantial and stable, the volatility of donor investment is less likely to be of great concern. Beintema *et al.* (2012) maintain that the main driver of volatility has been the short-term perspective of donors and development banks. The high dependency on donor funding is often the main cause of the high volatility in expenditures in R&D in many developing countries, especially in Africa, South of Sahara (Stads, 2011).

Unfortunately, we were not able to analyse aid dependency at country level, because data on external assistance and public expenditure are not comparable, and we believe that this should be the object of future research. It is interesting to observe that, overall, international aid privileges least developed and other low income countries and countries in Africa, South of Sahara. Donor funding as a share of total agricultural R&D funding is quite small in most South American or Middle Eastern countries, while in Africa, external assistance accounted for nearly



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30 percent of total agricultural R&D funding in 2011¹⁷. If you exclude salary costs from total R&D costs (which are typically funded by governments), the donor share to African agricultural R&D would be even higher. Therefore, the volatility of ODA commitments has a comparatively more profound impact in least developed and other low-income countries, even if the volatility coefficient is, in relative terms, lower than for other regions, but still quite high. Middle-income countries received progressively less ODA for agricultural, forestry and fishery research and extension, and underwent a higher growth rate in public expenditures in agricultural R&D; among these countries, India and China were the forerunners, together with Brazil.¹⁸ The volatility of ODA commitments might be higher here, but is of lesser importance.

In conclusion, ODA flows for agricultural, forestry and fishery research have been and are becoming more and more insufficient and unpredictable. The same applies to ODA flows for agricultural extension, which are smaller in volume, and more volatile. These results confirm the findings of three regional assessment studies recently conducted in low-income countries by the Tropical Agriculture Platform (Aerni *et al.*, 2015).

¹⁷ See chapter 8 of ASTI Africa regional report 2014: <http://www.asti.cgiar.org/pdf/AfricaRegionalReport2014.pdf>

¹⁸ Agricultural innovation is on the agenda of all these countries who have substantially increased their funding to agricultural R&D, although they were among the main ODA recipients for this subsector; for instance, ODA to agricultural research in China has been decreasing over time, while public expenditures increased significantly, up to 13 percent of total public spending on agricultural R&D in 2008 (Beintema *et al.*, 2012).

REFERENCES

- Aerni, P., Nichterlein, K., Rudgard, S. & Sonnino, A.** 2015. Making Agricultural Innovation Systems (AIS) work for development in tropical countries. *Sustainability*, 7: 831–850.
- Beintema, N. & Stads, G.J.** 2014. Is Africa investing enough? 2013 Global Food Policy Report. International Food Policy Research Institute, Washington DC, USA.
- Beintema, N., Stads, G.J., Fuglie, K. & Heisey, P.** 2012. ASTI Global Assessment of Agricultural R&D Spending. International Food Policy Research Institute, Washington DC, USA.
- Beye, G.** 2002. Impact of foreign assistance on institutional development of national agricultural research systems in Sub-Saharan Africa. *Research and Technology Paper*, no. 10. FAO, Rome, Italy.
- Kharas, H.** 2008. Measuring the cost of aid volatility. *Wolfensohn Center for Development Working Paper*, No. 3. Brookings Institution, Washington, DC, USA.
- FAO.** 2014. *State of Food and Agriculture: Innovation in family farming*. FAO, Rome, Italy.
- Kennedy, D.** 2014. Building agricultural research. *Science*, 346(6205): 13.
- Lowder, S.K. & Carisma, B.** 2011. Financial resource flows to agriculture. A review of data on government spending, official development assistance and foreign direct investment. *ESA Working Paper*, No. 11., See www.fao.org/economic/esa.
- OECD [Organisation for Economic Co-operation and Development].** 2013. Converged Statistical Reporting Directives for the Creditor Reporting System (CRS) and the Annual DAC Questionnaire, OECD, Paris. [http://www.oecd.org/dac/stats/documentupload/DCD-DAC\(2013\)15-FINAL-ENG.pdf](http://www.oecd.org/dac/stats/documentupload/DCD-DAC(2013)15-FINAL-ENG.pdf).
- Petras, R.** 2009. Comparative Study of Data Reported to the OECD Creditor Reporting System (CRS) and to the Aid Management Platform (AMP). OECD/DGF, Paris, France.
- Piva, P. & Dodd, B.** 2009. Where did all the aid go? An in-depth analysis of increased health aid flows over the past 10 years. *Bulletin of the World Health Organization*, No. 87.
- Stads, G.J.** 2011. Africa's agricultural R&D funding rollercoaster: an analysis of the elements of funding volatility. In: *Agricultural R&D: Investing in Africa's Future – Analysing Trends, Challenges, and Opportunities*. IFPRI, Washington, DC, USA, and FARA, Africa.
- World Bank.** 2007. World Development Report 2008. *Agriculture for Development*. World Bank, Washington, DC, USA.

ANNEX I

DONOR LIST 2002–2012¹⁹

DAC members

Australia, Austria, Belgium, Canada, Denmark, EU Institutions, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Republic of Korea, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States of America.

Non-DAC Countries

Kuwait

Multilateral Organizations

AsDB (Special Funds), Asian Development Bank
AfDF, African Development Fund
IDA, International Development Association (World Bank)
IDB (Special Funds), Inter-American Development Bank
IFAD, International Fund for Agricultural Development
GEF, Global Environment Facility
Islamic Development Bank
UNDP, United Nation Development Programme

¹⁹ All those countries or multilateral organization which are not in listed above but are included in the DAC data submitter did not report positive ODA to agricultural, forestry and fishery research nor agricultural extension, during the period 2002–2012.

ANNEX II

RECIPIENT COUNTRIES LISTED BY REGION

EUROPE	Albania, Belarus, Bosnia-Herzegovina, Croatia, Kosovo, Former Yugoslav Republic of Macedonia, Moldova, Montenegro, Serbia, Ex-Yugoslavia States, Turkey, Ukraine.
AFRICA, NORTH OF SAHARA	Algeria, Egypt, Libya, Morocco, Tunisia.
AFRICA, SOUTH OF SAHARA	Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Democratic Republic of Congo, Cote d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mayotte, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome & Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, St. Helena, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe.
NORTH & CENTRAL AMERICA	Anguilla, Antigua and Barbuda, Belize, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Haiti, Honduras, Jamaica, Mexico, Montserrat, Netherlands Antilles, Nicaragua, Panama, St. Kitts-Nevis, St. Lucia, St. Vincent & Grenadines, Trinidad and Tobago.
SOUTH AMERICA	Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela
FAR EAST ASIA	Brunei, Cambodia, China, Indonesia, Democratic People's Republic of Korea, Laos, Macao, Malaysia, Mongolia, Philippines, Thailand, Timor-Leste, Viet Nam.
SOUTH & CENTRAL ASIA	Afghanistan, Armenia, Azerbaijan, Bangladesh, Bhutan, Georgia, India, Kazakhstan, Kyrgyz Republic, Maldives, Myanmar, Nepal, Pakistan, Sri Lanka, Tajikistan, Turkmenistan, Uzbekistan.
MIDDLE EAST	Iran, Iraq, Jordan, Lebanon, Syria, West Bank & Gaza Strip, Yemen.
OCEANIA	Cook Islands, Fiji, Kiribati, Marshall Islands, Fed. States of Micronesia, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, Wallis & Futuna.

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For a wide range of developing countries data concerning public and private spending on agricultural research and development is collected and assessed by the Agricultural Science and Technology Indicators (ASTI) initiative. Assessment of foreign assistance to agricultural, forestry and fishing research and to agricultural extension has received less attention. The present study used OECD data to analyse the amount and variability of foreign aid directed to agricultural research and extension, as well as to forestry and fishery research, during the period of 2002 to 2012.

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