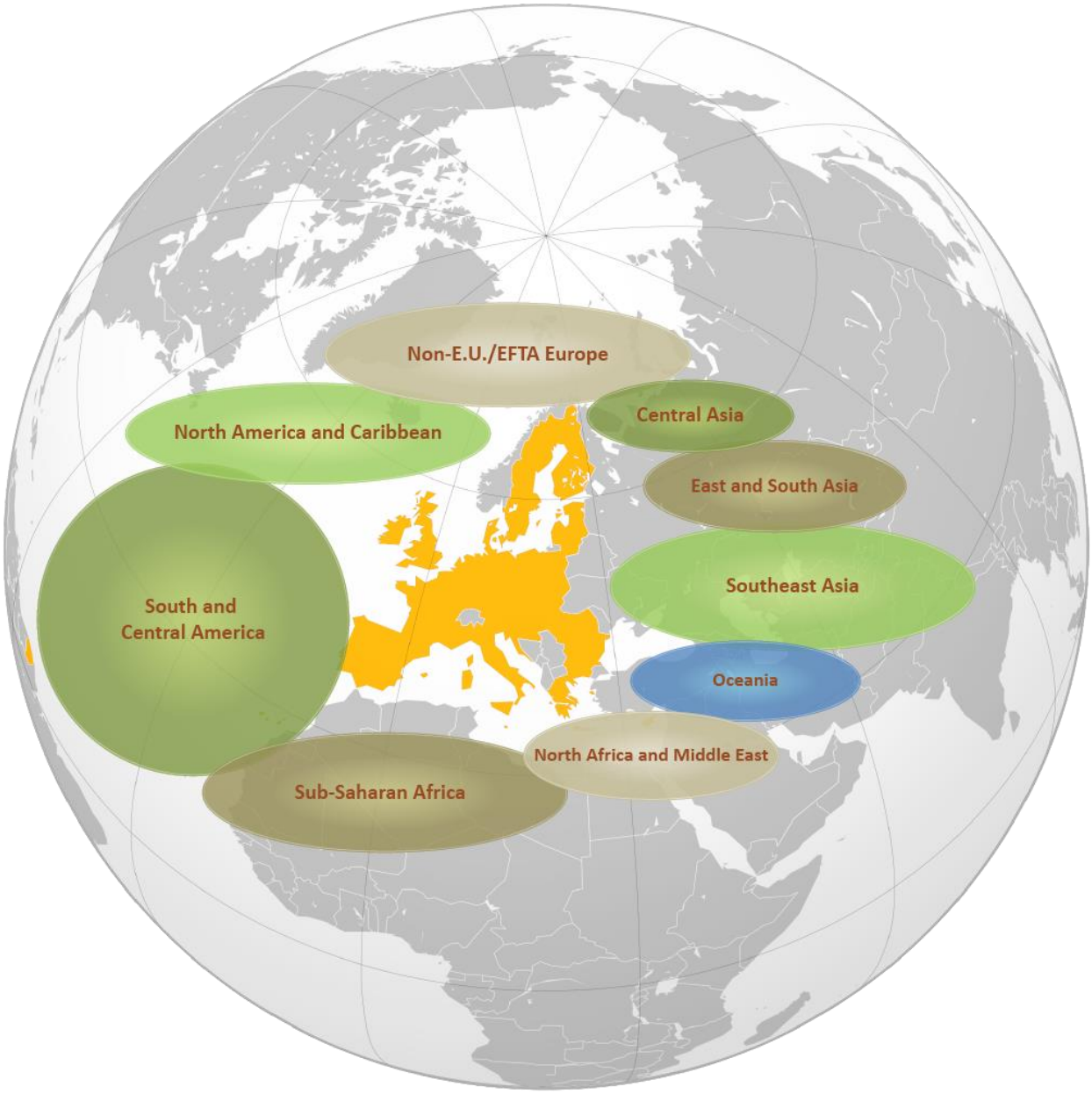
Potential Trade Effects on World Agricultural Exporters of European Union Regulations on Endocrine Disruptors



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February 2014

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Executive Summary

In 2009 the European Union revised its regulations on crop protection products with adoption of Regulation 1107/2009.[1] This regulation introduced a new "categorization" system for groups of active crop protection substances. For a number of these categories a regulatory policy based on the use of hazard-based cut-offs to remove products from the market was introduced. Under this policy a risk assessment process would not be used. Rather, regulatory policy would be based on the existence of a hazard, irrespective of exposure to the hazard, the risk of the hazard to human health or whether safe uses can be identified. Products would be removed from the market, and maximum residue limits (MRLs) in commodities produced with active crop protection substances identified under this categorization system could either be withdrawn entirely or set at a default level of 0.01 ppm.

The legislation specifies that this "hazard-based" system will be used in regulating crop protection products determined to be immunotoxic, mutagenic, carcinogenic, or having developmental toxicity, reproductive toxicity, or endocrine disrupting properties. For the later property the European Commission (E.C.) has been charged with developing criteria to identify substances which may be categorized as endocrine disruptors, and had a deadline of December 14, 2013 to complete this work. Publication of these criteria has been delayed while the European Commission conducts an impact assessment of the regulations. Work to date by the Commission's Environment Directorate (DG ENV) to develop criteria for how substances will be determined to be endocrine disruptors does not allow for a precise identification of which crop protection products may be subject to the hazard-based regulatory policy.

Based on an assessment of initial DG ENV work on criteria to define endocrine disruptors[2] the UK Health and Safety Executive Chemical Regulation Directorate (HSE CRD) developed a list of active substances that are either likely or possible to be subject to this regulation[3], and the UK Food and Environment Research Agency developed an additional list of active substances that could be subject to the regulation, including substances not yet assessed and for which further information is necessary (Appendix I).[4]

This report summarizes the potential effects on trade in agricultural products exported to the European Union of application of a hazard-based regulatory process for substances that may be classed as endocrine disruptors under Regulation 1107/2009. Trade data reflect the potential change in agricultural trade flows from the regions and individual countries to the E.U. It does not estimate total economic effects that may be caused by these changes in trade flows. Non-trade effects may include disruption in production, marketing and prices for affected commodities and development of resistance to remaining acceptable active substances.

Based on the assumptions and methods used in this report approximately €65 billion of E.U. imports of raw and semi-processed agricultural products could be affected by this policy change.

This report was commissioned by and financed by Crop Life International. The methodology, assumptions and all data presented in this report were independently prepared by the author.

Study Assumptions

Because E.U. policies on MRLs for active crop protection substances which could be subject to Regulation 1107/2009 are evolving, and existing data on both actual use of each of the substances on affected crops and residues of the substances on either raw commodities or their semi-processed products are incomplete, the following assumptions were made in the data presented under Results on pages 9-35.

- All active substances for which there is a Codex Alimentarius, regional or national MRL for a commodity may be used in production of that commodity. This cannot be fully confirmed through existing crop protection product databases. There are no public global databases of either MRLs or actual use of individual active substances on country-by-country basis. In preparing this report numerous MRL regulations were examined to confirm that active substances in Appendix I are included in MRL regulations in all major agricultural production regions and currently permitted in the E.U. The E.U. has established MRLs for sixty-three of the seventy substances identified in Appendix I.

- All raw agricultural commodities with a MRL and clearly identifiable semi-processed products from that commodity may contain detectible residues of the substance.

Methodology

- Using Codex, E.U. and national MRL lists, plant commodities and semi-processed products of those commodities likely to be produced using one or more of the active substances that may be subject to regulation 1107/2009 were identified and assigned to the appropriate 2- and 4-digit classifications of the Harmonized Tariff System (HTS) maintained by the International Customs Cooperation Council.[5] Data were gathered for nine 2-digit HTS chapters where identified active substances are widely used on raw agricultural commodities.[6] These chapters were examined to remove inapplicable 4-digit sub-classifications of inedible, industrial, animal-derived or highly processed products. A list of the 4-digit commodity classifications included in the study is found in Appendix II.

- There is imperfect concordance between the identification of commodities in MRLs and the harmonized tariff system. To the maximum extent possible the commodities identified in MRLs have been assigned to the HTS classification associated with their botanical identity.[7]

- The value of European Union imports of these products from world exporters was extracted from the International Trade database operated by Eurostat.[8] For each commodity, data for E.U. imports from world exporters were extracted at the 2- and 4-digit HTS level for the period January – December 2012, the last full year available, denominated in Euros.

- There are a number of sources of over- and under-estimation in the data presented in this report. The primary source of over-estimation is the use of 4-digit HTS classifications to

derive the base trade date used in the report. Each 4-digit HTS classification consists of anywhere from 10 to 65 6-digit commodity classifications. For the 75 countries within the 99th percentile of E.U. imports from the countries examined there are approximately 26,000 data points at the 6-digit HTS level. It is likely that some of these do not represent products where the active substances are used. It is not possible to determine this without a country-by-country examination of MRLs and trade data at the 6-digit HTS level.

The primary source of under-estimation is the exclusion of 2-digit HTS classifications of processed food products including: grain milling products (HTS 11); prepared cereal products (HTS 19); prepared fruits, vegetable and nut products (HTS 20; miscellaneous edible preparations (HTS 21); and beverage and spirits (HTS 22). Many of these products consist primarily of the commodities included in the study; however it is not possible to identify these products without examining 6-digit tariff classifications for these chapters. Because in most jurisdictions processed products are subject to the same MRLs as the raw commodities they are produced from it is likely their exclusion will underestimate trade effects. During 2012 the E.U. imported €14.1 billion of goods in these trade classifications.

Non-Trade Effects

Data in this report represent ceiling estimates of potential lost export sales to agricultural producers and exporters. Actual lost export sales will depend on final decisions of criteria determining the active substances that will be considered to be endocrine disruptors. Depending on these decisions a variety of other economic and agronomic effects are likely. Quantifying these effects is beyond the scope of this report. However, it is important to recognize these potential effects.

Disruptions in Commodity Marketing and Exporting

Depending on the specific active substances that are subject to the new criteria cut-offs, producers and exporters currently serving the E.U. market will be faced with several production and marketing options, all of which would result in increased costs and decreased profitability.

Some exporters could attempt to continue serving the E.U. market by sourcing commodities produced without affected actives substances, either by changing geographic sourcing or specifying that affected active substances not be used by supply-chain partners. Either would involve establishing new supply chains with increased logistical and compliance monitoring costs. If particular substances were not permitted to be used by exporters crop production costs would increase because producers would be precluded from using the most cost effective and agronomically efficient combination of crop protection products.

Conversely, exporters could seek to replace sales to the E.U. with sales to other export destinations. Supply chain costs would increase and increased supply to other markets would have a price depressing effect.

Increased Resistance to Remaining Products

If, in order to protect existing E.U. export markets, producers eliminate use of particular active substances no longer considered acceptable for use in commodities exported to the European Union, established programs to combat fungal, insect and herbicide resistance could be disrupted. Within the limited number of Codex MRLs for the active substances identified in Appendix I as more likely, less likely or requiring further information for criteria cut-off decisions (N=16) nearly 60% of the commodity groups have MRLs for five or more different substances.

Codex MRLs Per Commodity	Percent of Commodity Groups (4-digit)
One	9.3%
Two	16.3%%
Three	9.3%
Four	7.0%
Five or more	58.1%

Of these substances 44% are fungicides, 31% are herbicides and 25% are insecticides. This range of commodity/function/MRL combinations suggests a variety of potential effects depending on the final detail of the E.C. criteria and the number and type of substances which may have their existing MRLs eliminated or reduced to default levels.

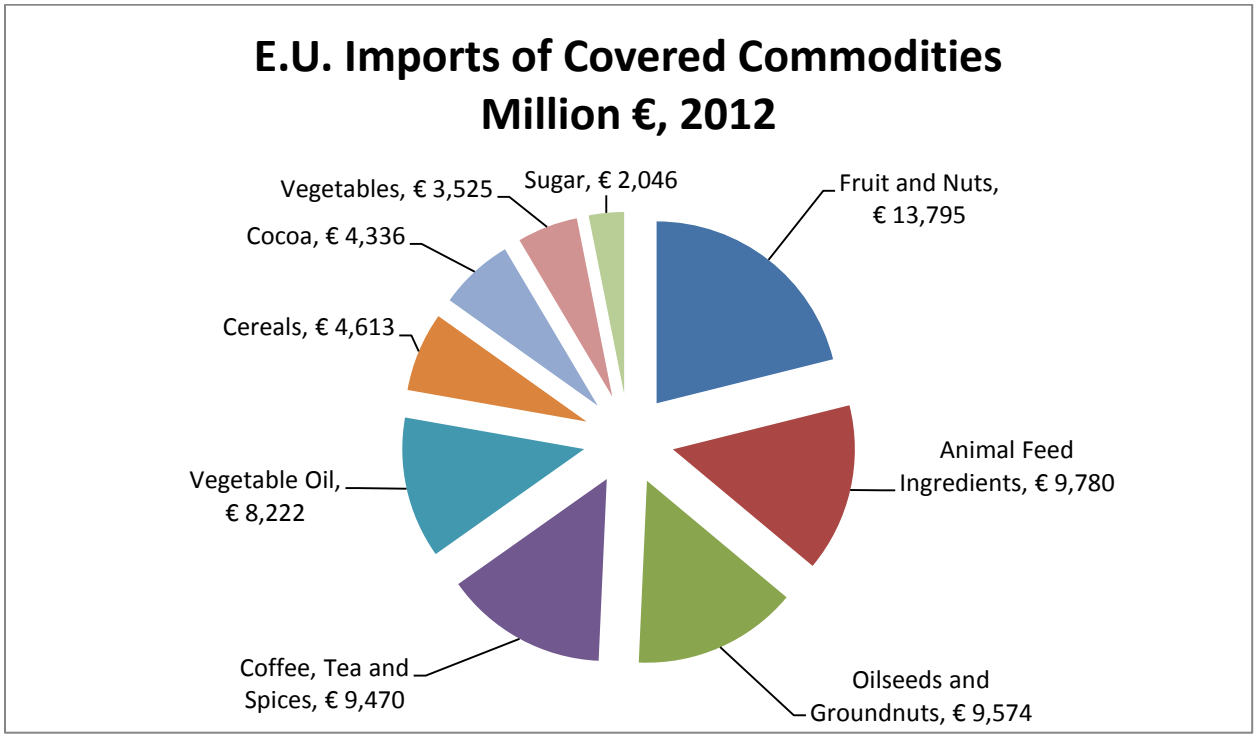
The substances with larger number of MRLs per commodity group (predominantly fungicides), are likely used in rotation as part of fungal resistance mitigation programs, and removal of an individual substance could decrease the effectiveness of the program and lead to resistance issues.[9] Products with more limited number of MRLs per commodity group may be widely used either for superior efficacy, cost or incorporation into a resistance mitigation program. Similar programs to combat insect and herbicide resistance could also be affected.

The Food and Environment Research Agency (FERA), an executive agency of the UK Department for Environment, Food and Rural Affairs, recently noted the danger of reliance on a narrowed range of active substances and modes of action on the development of resistance to remaining active substances.[10] FERA also noted issues with control of alien species in the event use of a number of active substances is no longer feasible, and potential financial losses to growers and increased resistance problems if active substances that may be used to partially replace now-suspended neonicotinoid insecticides are no longer available because they are classified as endocrine disruptors.

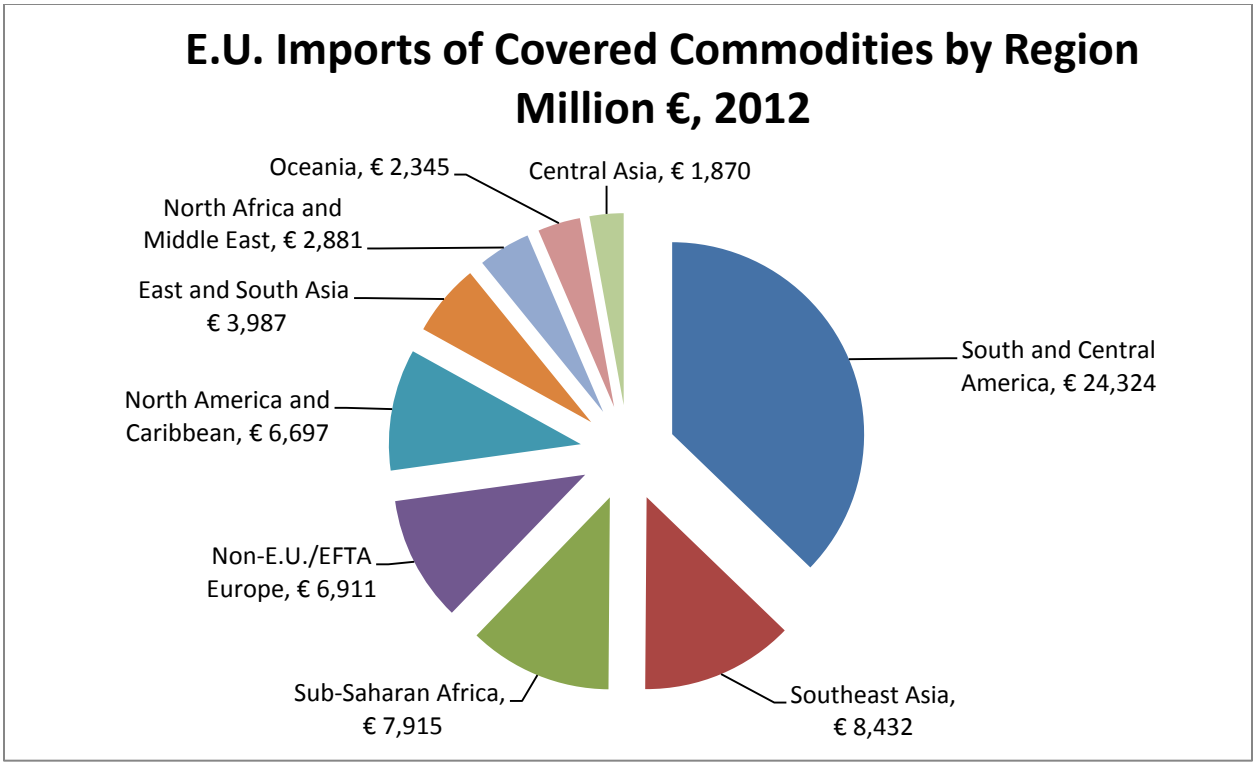
Global Results

Summary results of the combined MRL/trade database review for all E.U. imports and each major global region are below, in million Euros.[11] Detailed results for seventy-five countries supplying over €50 million each of these commodities are provided in a separate volume.

The commodities identified in this study which could be affected by the regulation account for approximately 60**%** of the value of all E.U. imports of agricultural products. [12] Potentially affected commodities are imported from every global region, and from developed, developing and least-developed countries.

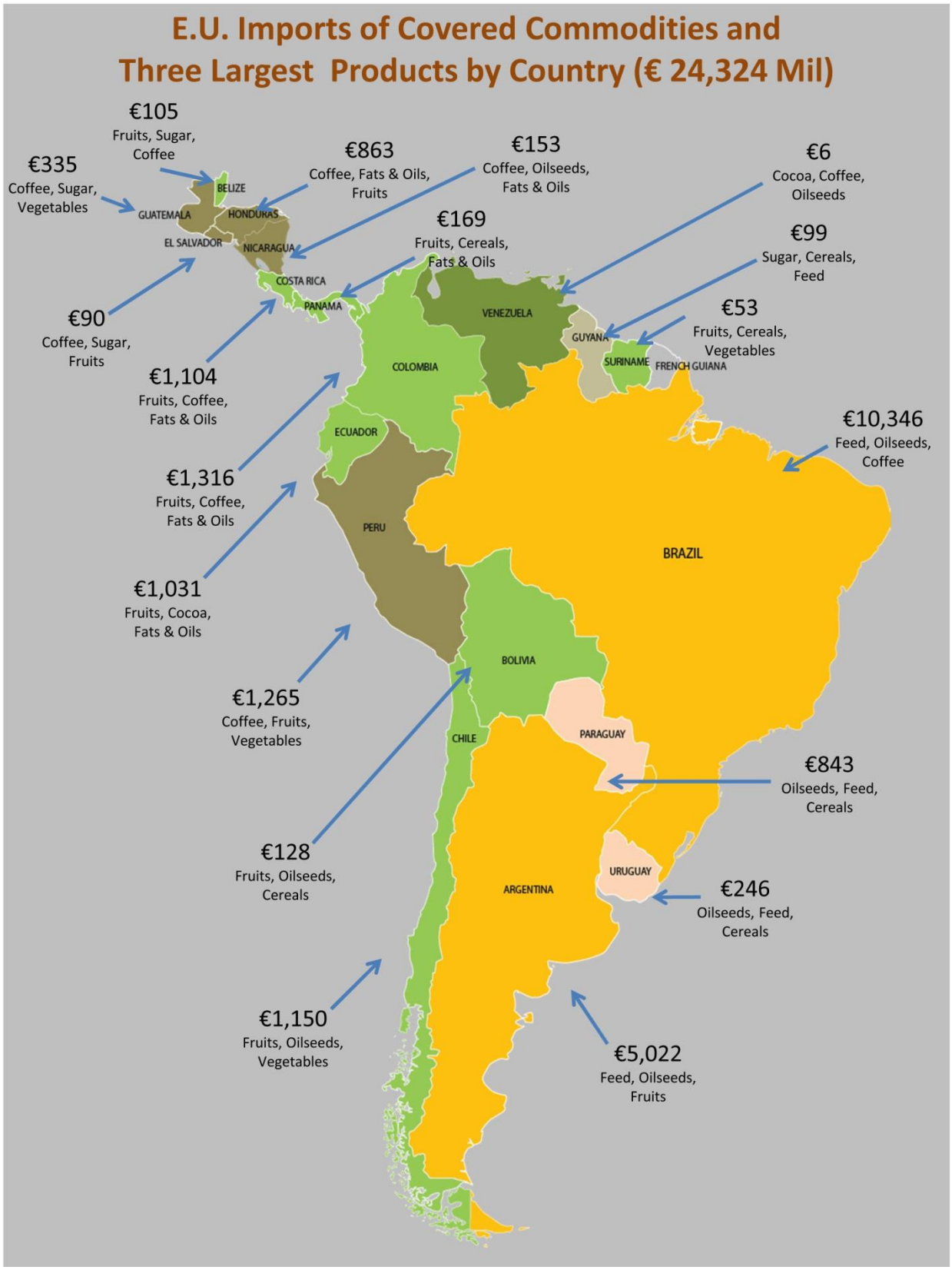


Tariff Chapter	Imports from World
	€ Million Jan-Dec 2012
Fruit and Nuts	€ 13,795
Animal Feed Ingredients	€ 9,780
Oilseeds and Groundnuts	€ 9,574
Coffee, Tea and Spices	€ 9,470
Vegetable Oil	€ 8,222
Cereals	€ 4,613
Cocoa	€ 4,336
Vegetables	€ 3,525
Sugar	€ 2,046
Total	€ 65,362



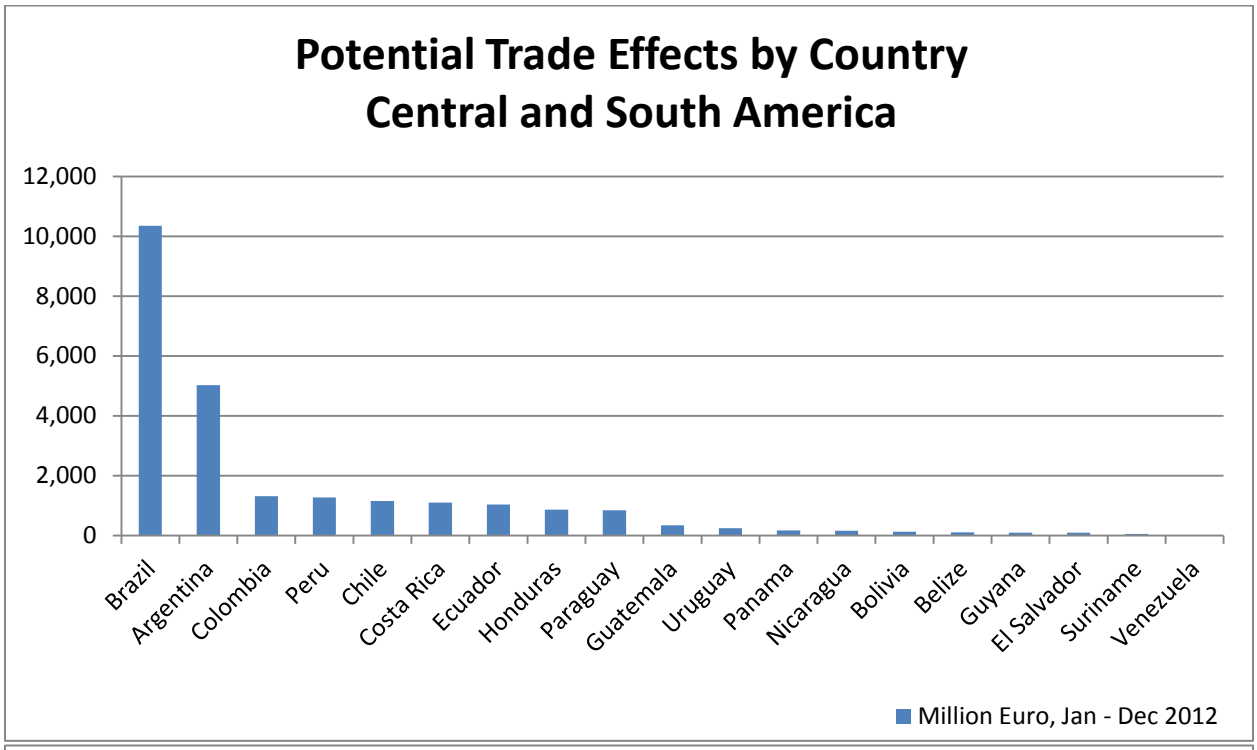
Region	Imports from World
	Million Euro, Jan - Dec 2012
South and Central America	€ 24,324
Southeast Asia	€ 8,432
Sub-Saharan Africa	€ 7,915
Non-E.U./EFTA Europe	€ 6,911
North America and Caribbean	€ 6,697
East and South Asia	€ 3,987
North Africa and Middle East	€ 2,881
Oceania	€ 2,345
Central Asia	€ 1,870
Total	€ 65,362

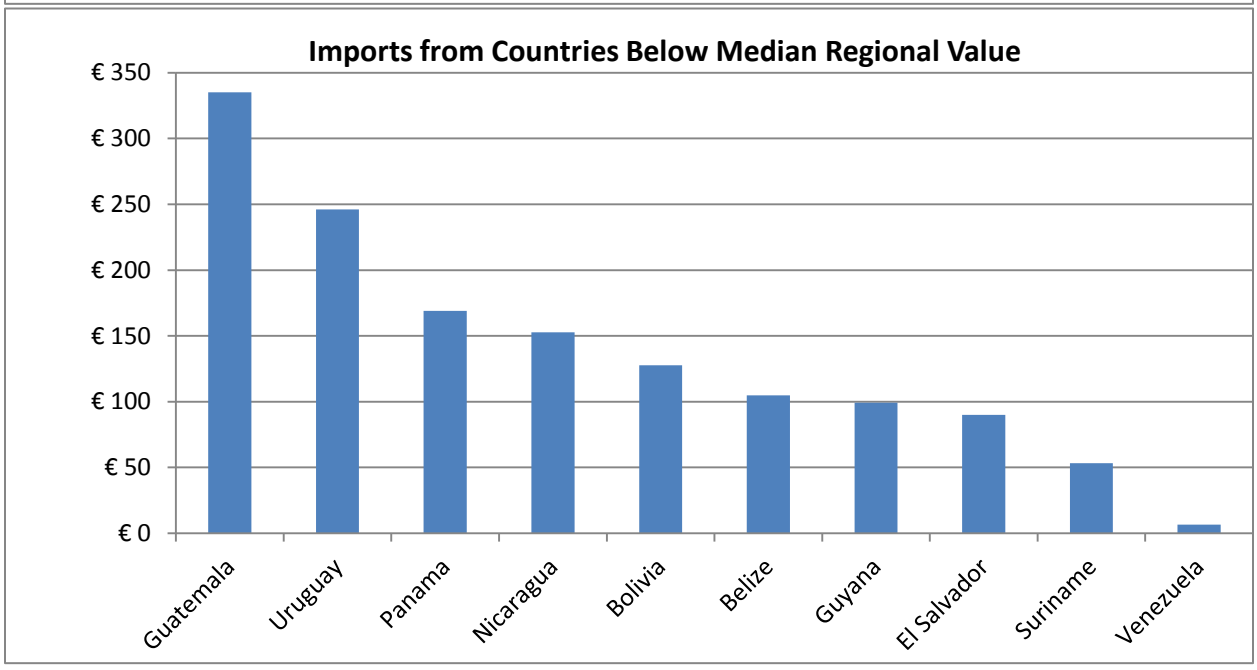
Results for Central and South America

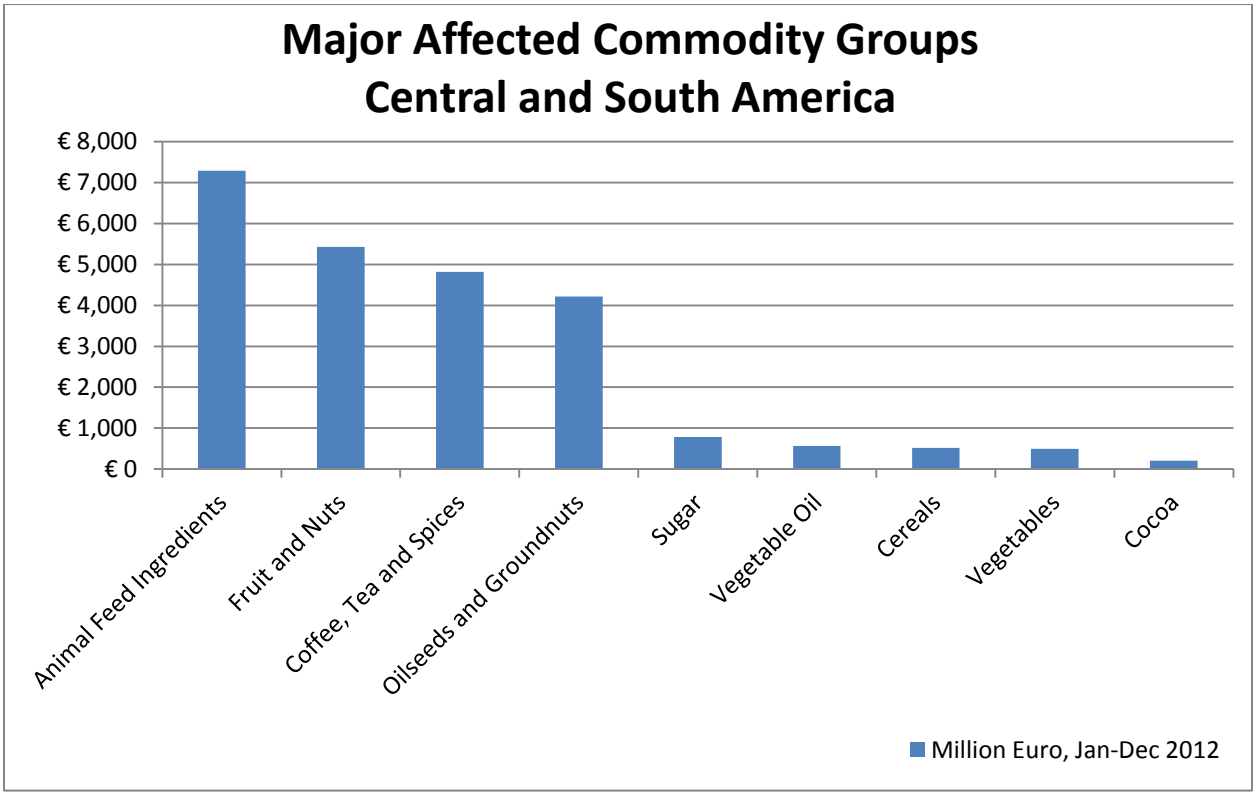


Among world regions Central and South America would see the largest potential effect from implementation of Regulation 1107/2009. A total of €24.3 billion of crop products exported from the region may be produced using active substances in Appendix I.

The graphs below show the value of all covered commodities imported by the E.U. for each country in the region and the major commodity groups comprising these imports. Soy, processed soy, coffee, fruits and nuts dominate E.U. imports from the region.



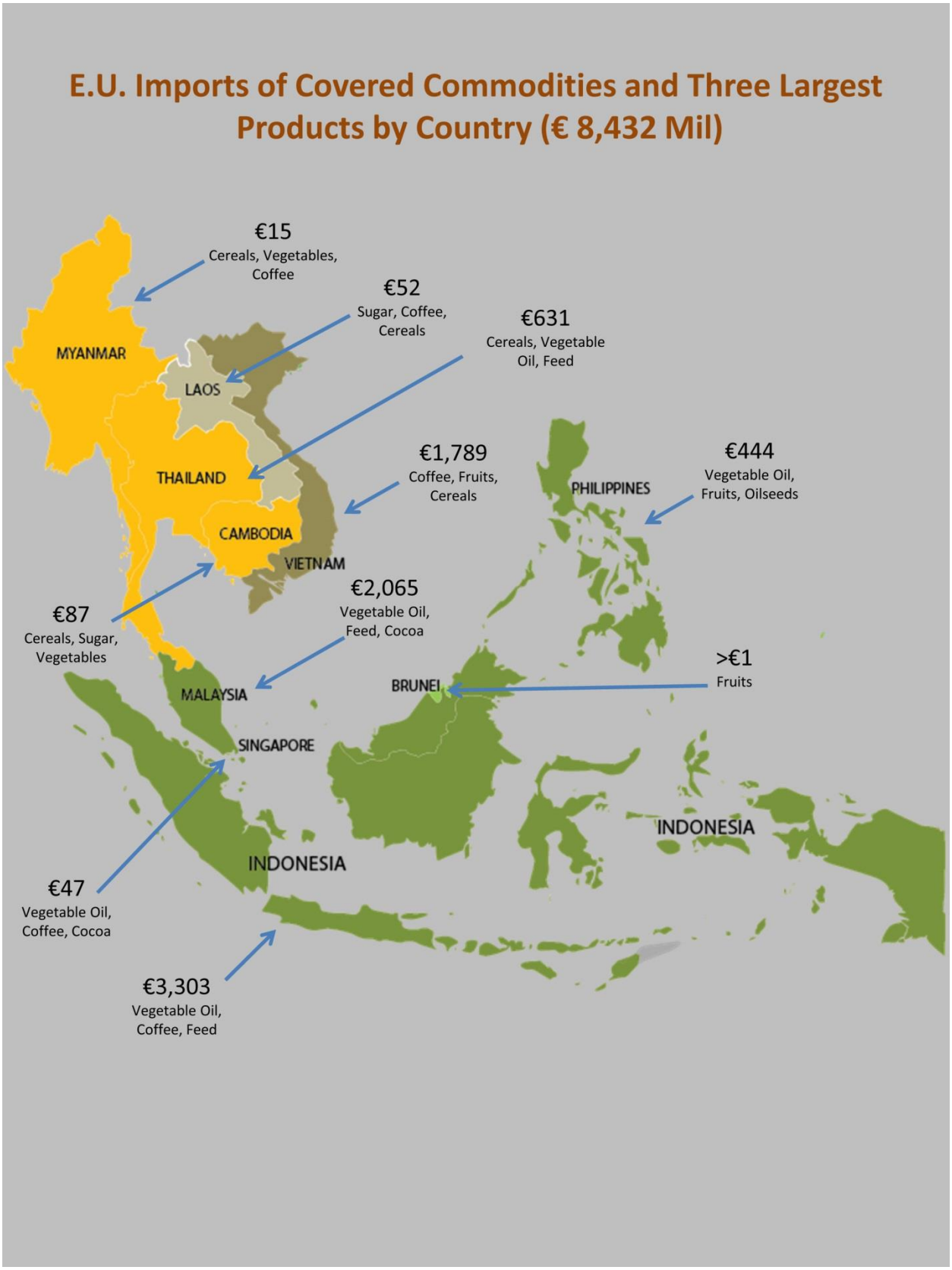




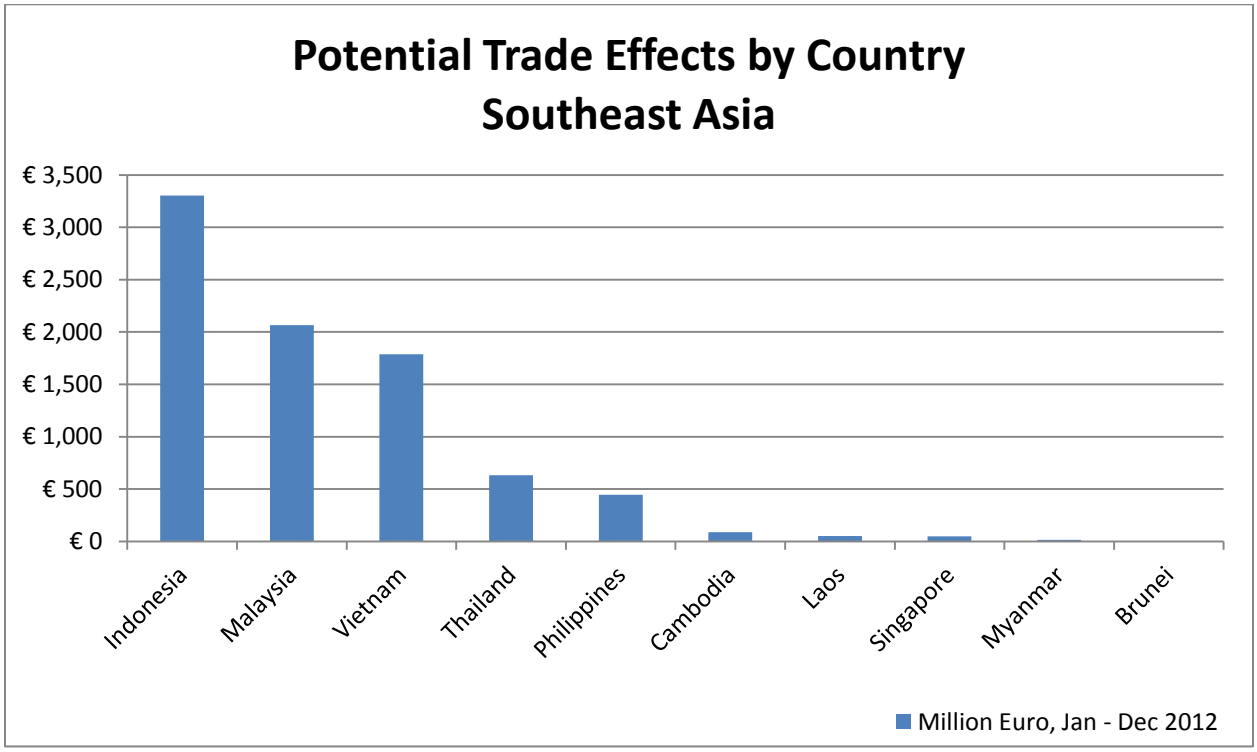
Central and South America supply a substantial amount, and in several cases, the majority of European Union imports of commodities included in this study. The E.U. reliance on the Central and South American region for its animal feed needs is masked by the inclusion of groundnuts in HTS classification 12. If only the 4-digit tariff classifications of 1201 (soybeans) and 2304 (soybean meal) are considered, the region supplies 83% of European imports. The table below shows E.U. imports of these commodities from the world, the region and the percentage of imports from the world supplied by the region.

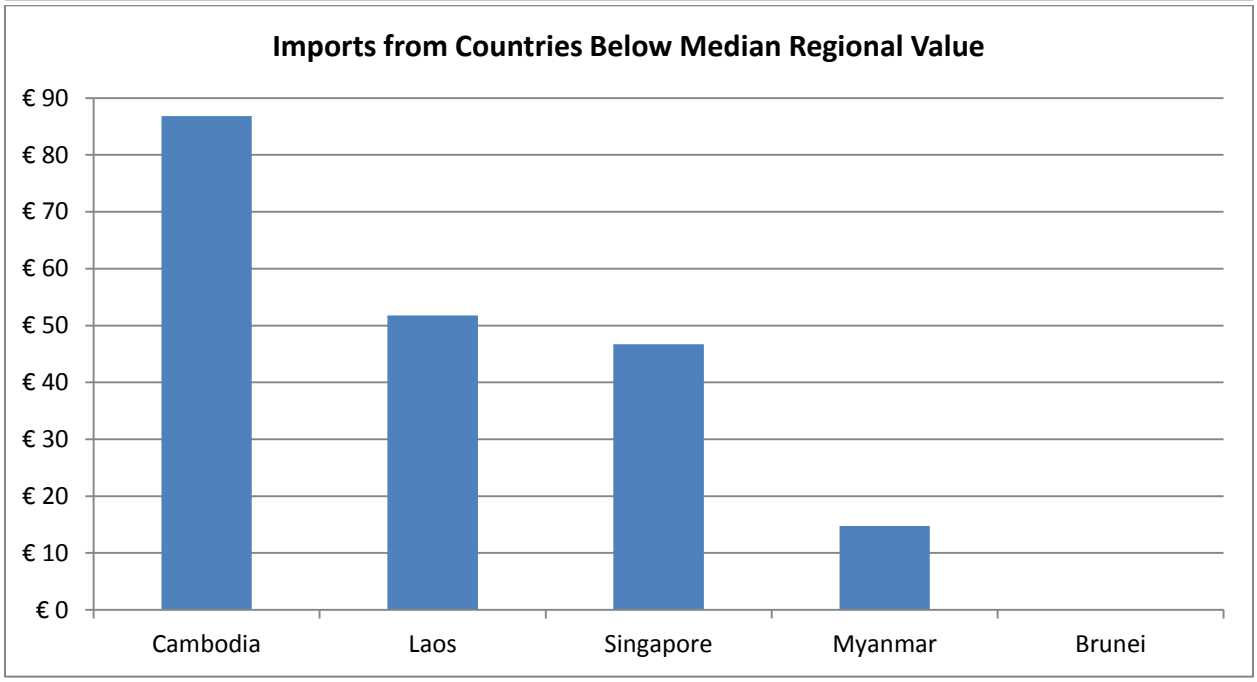
Commodity Group		Million Euro, Jan-Dec 2012	Percent
	E.U. Imports from World	From Central and South America	
Animal Feed Ingredients	€ 9,780	€ 7,293	75%
Coffee, Tea and Spices	€ 9,470	€ 4,818	51%
Oilseeds and Groundnuts	€ 9,574	€ 4,215	44%
Fruit and Nuts	€ 13,795	€ 5,433	39%
Sugar	€ 2,046	€ 785	38%
Vegetable Oil	€ 8,222	€ 566	7%
Vegetables	€ 3,525	€ 493	14%
Cereals	€ 4,613	€ 517	11%
Cocoa	€ 4,336	€ 204	5%
Total	€ 65,362	€ 24,324	37%

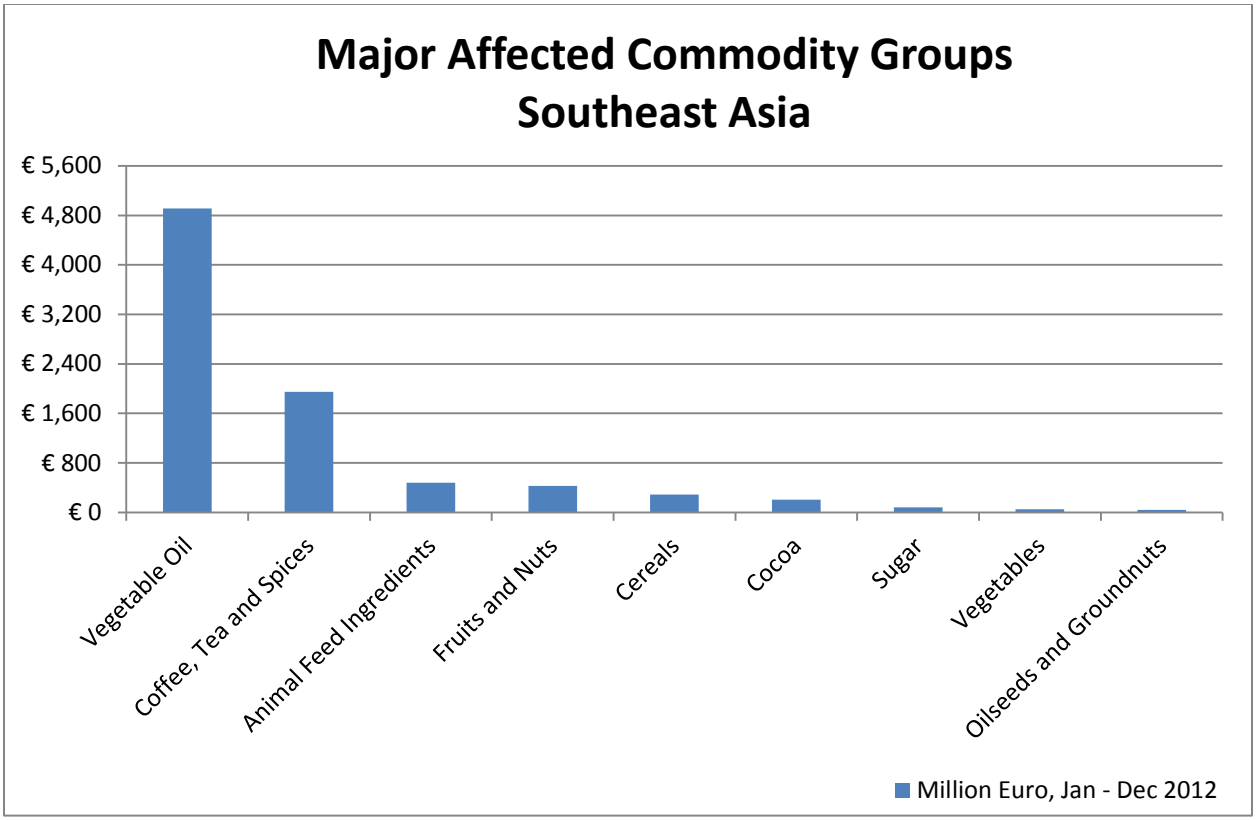
Results for Southeast Asia



Southeast Asia supplies the E.U. with €8.4 billion of commodities that may be affected by cut-off criteria in Regulation 1107/2009. The graphs below show the value of all covered commodities imported by the E.U. for each country in the region and the major commodity groups comprising these imports



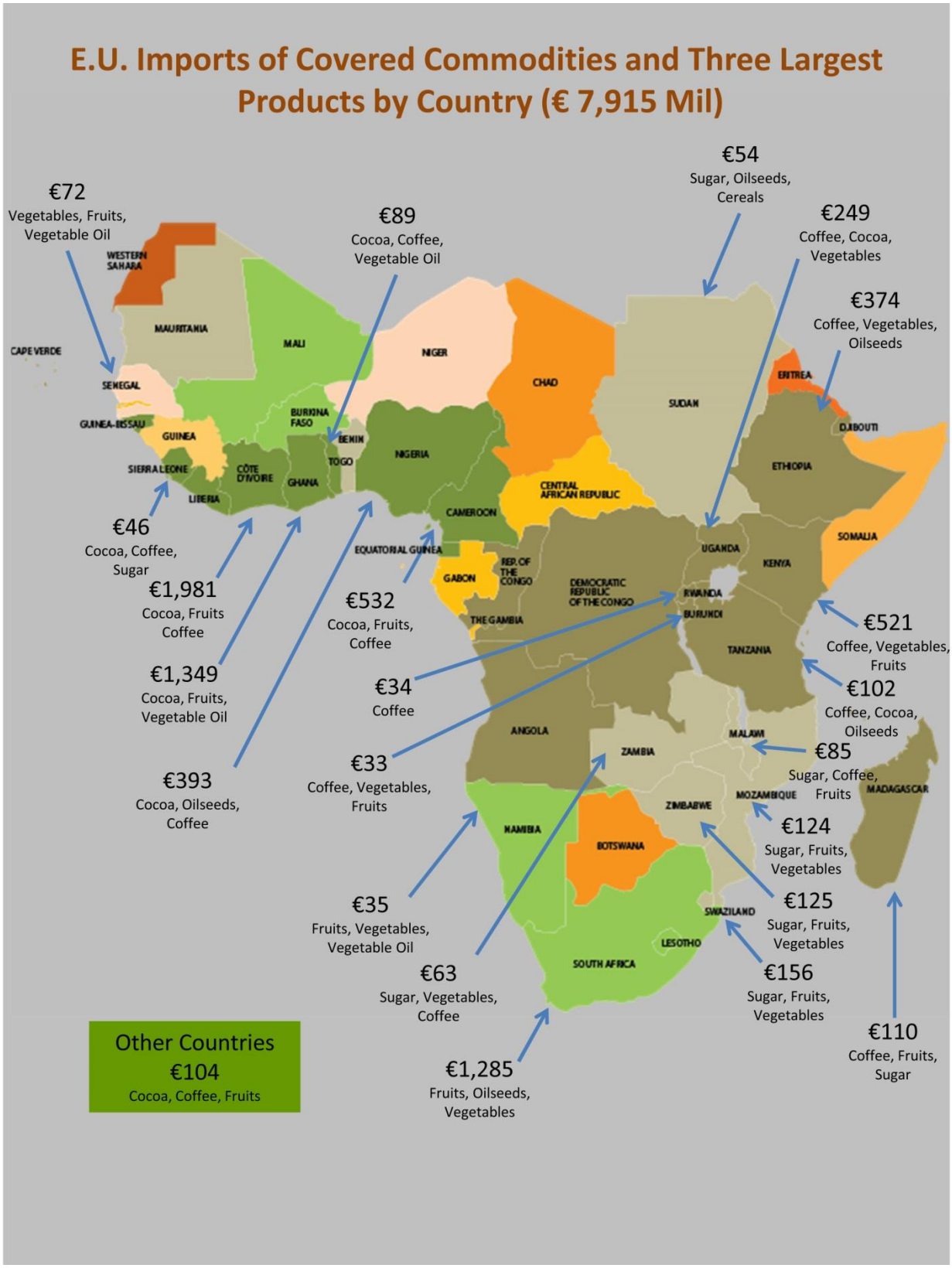




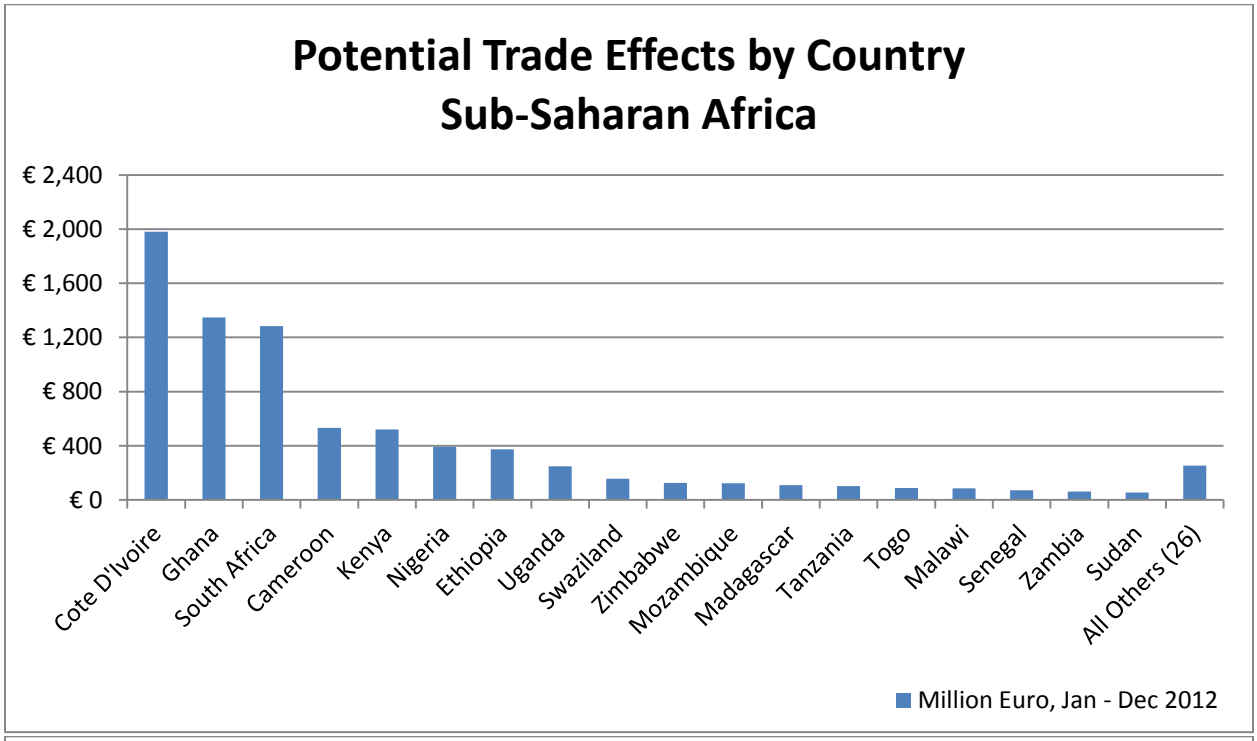
Southeast Asian exports of food and feed commodities to Europe are highly concentrated in two tariff classifications– crude vegetable oils, and coffee, tea and spices. Over half of the trade is in vegetable oils, with palm oil accounting for about 80 percent of this trade and coconut oil for most of the remainder. Indonesia, Malaysia, the Philippines and Thailand dominate this sector. Close to a quarter of the trade is in coffee, tea and spices, predominately coffee from Vietnam and Indonesia. Trade in fruits, nuts and animal feeds account for most of the trade outside the vegetable oil/coffee sector. The table below shows E.U. imports of these commodities from the world, from Southeast Asia and the percentage of imports from the world supplied by the region.

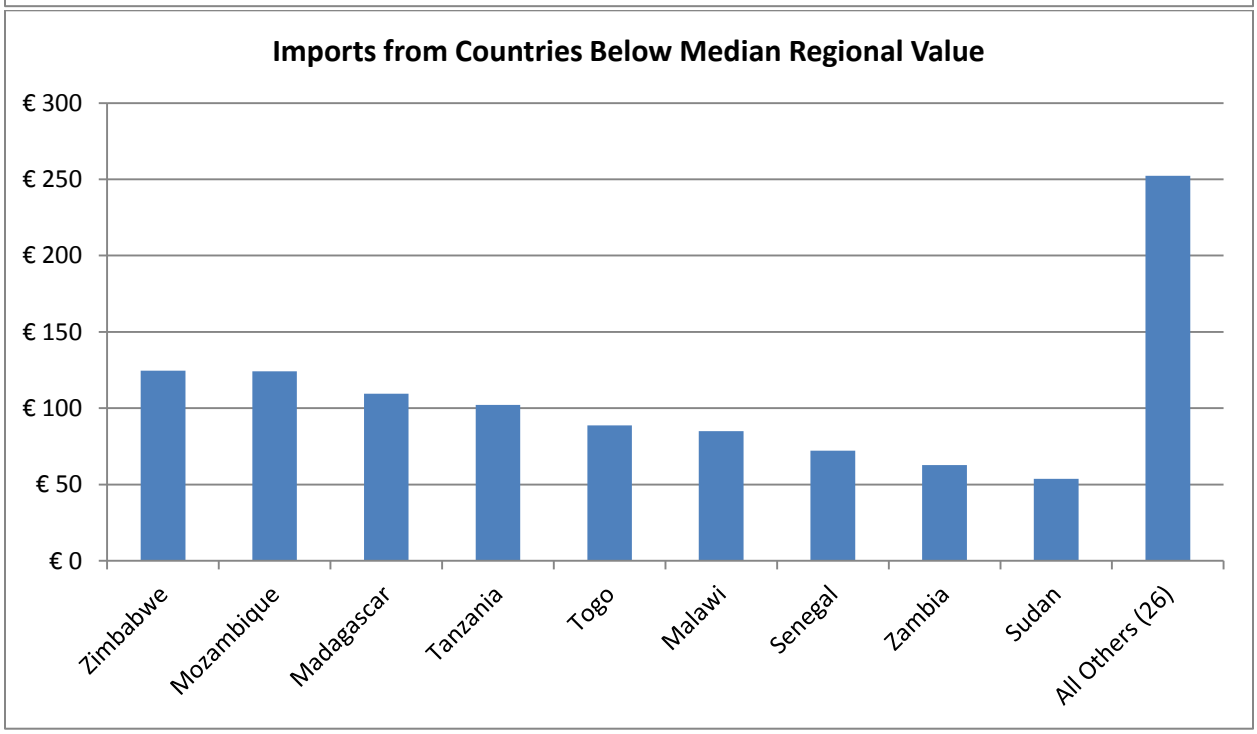
Commodity Group	Million Euro, Jan - Dec 2012		Percent
	E.U. Imports from World	From Southeast Asia	
Vegetable Oil	€ 8,222	€ 4,912	60%
Coffee, Tea and Spices	€ 9,470	€ 1,948	21%
Animal Feed Ingredients	€ 9,780	€ 482	5%
Fruit and Nuts	€ 13,795	€ 426	3%
Cereals	€ 4,613	€ 288	6%
Cocoa	€ 4,336	€ 205	5%
Sugar	€ 2,046	€ 81	4%
Vegetables	€ 3,525	€ 50	1%
Oilseeds and Groundnuts	€ 9,574	€ 41	0%
Total	€ 65,362	€ 8,432	13%

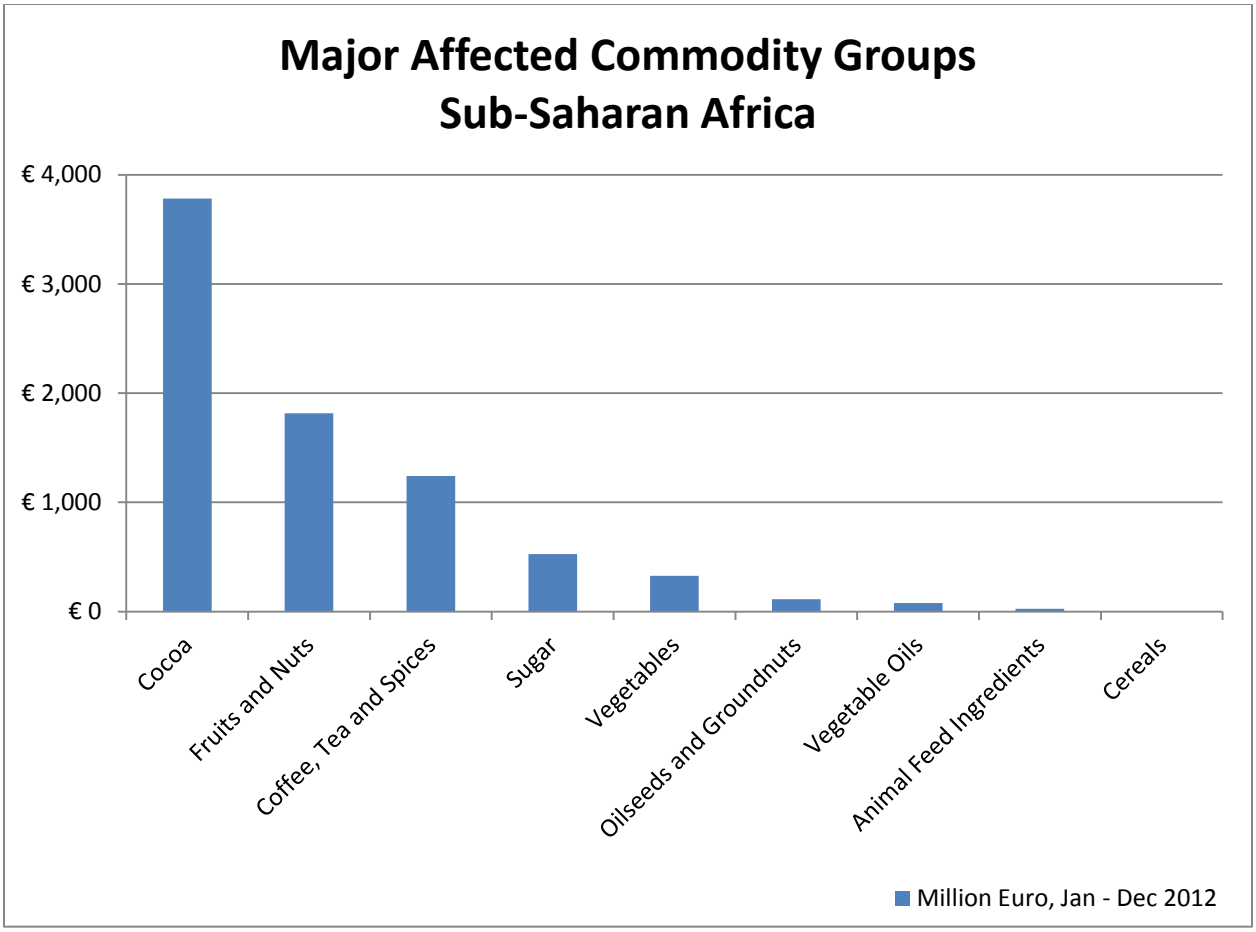
Results for Sub-Saharan Africa



Sub-Saharan Africa supplies the E.U. with €7.9 billion of commodities that may be affected by cut-off criteria in Regulation 1107/2009. The graphs below show the value of all covered commodities imported by the E.U. for each country in the region and the major commodity groups comprising these imports.



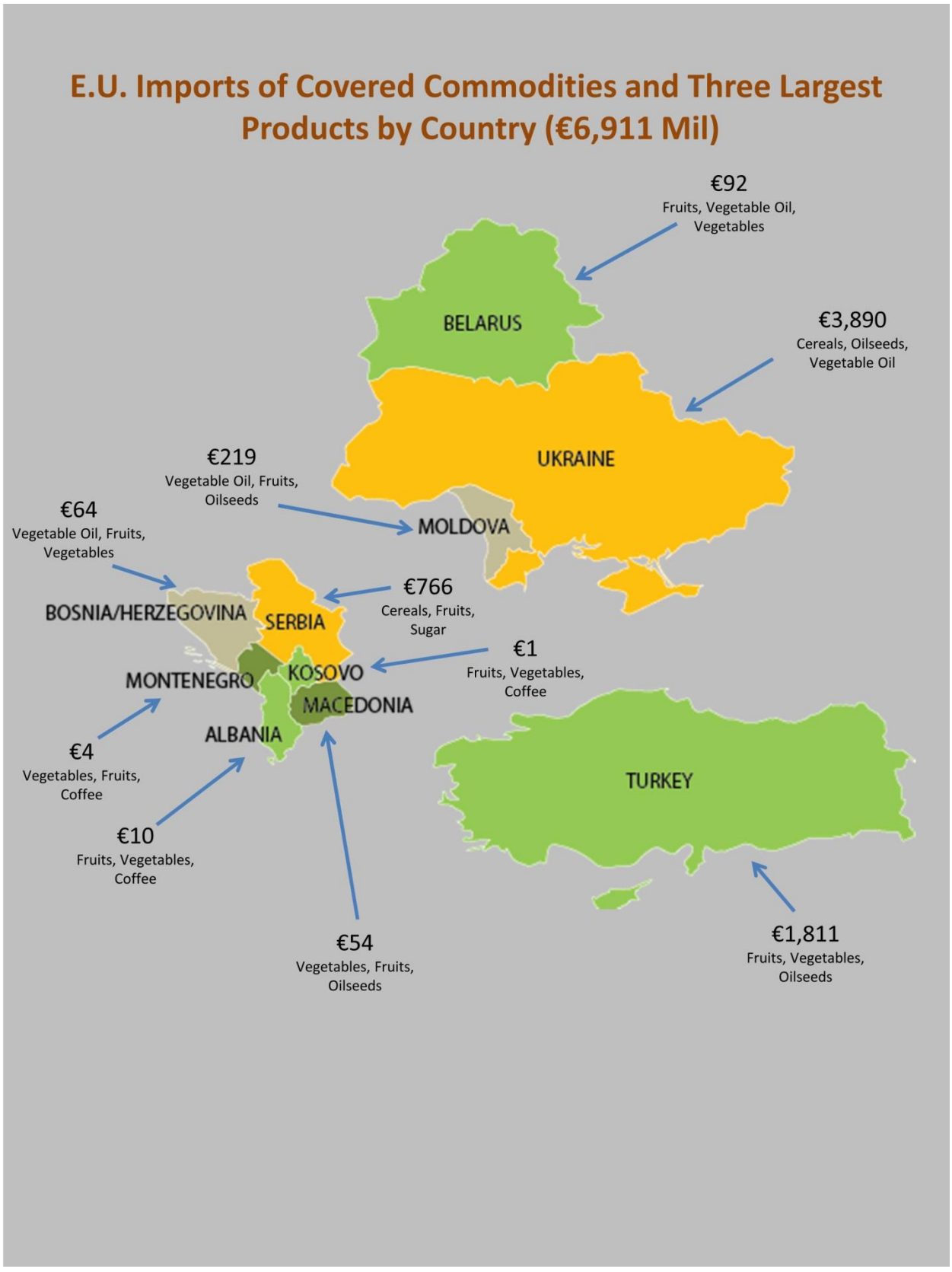




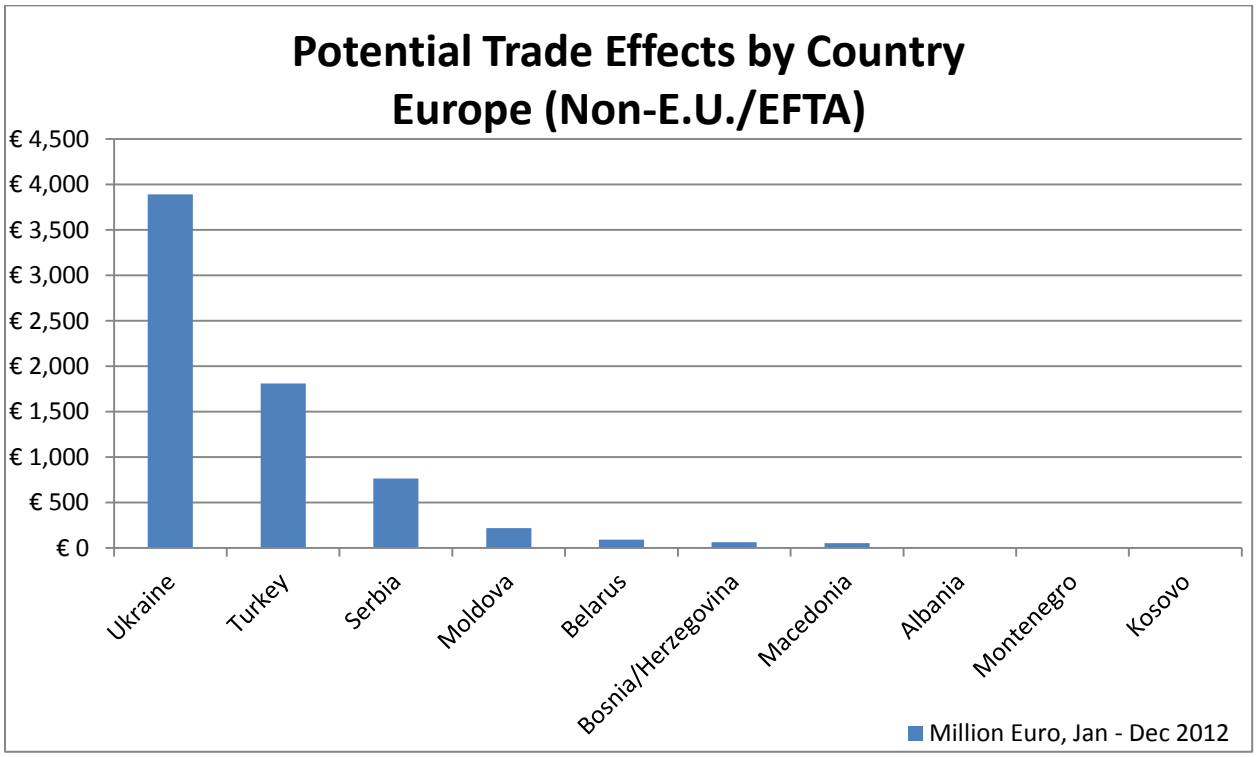
Sub-Saharan Africa supplies the vast majority of Europe's supplies of cocoa, with imports of over €1 billion from both Cote D'Ivoire and Ghana. ACP countries in the region provide approximately 27 percent of E.U. sugar imports, with five countries each supplying over €50 million of cane sugar and molasses to Europe. South Africa supplies over €1 billion of fruits and nuts to Europe. The region is also a significant source of coffee and tea for E.U. markets. The table below shows E.U. imports of these commodities from the world, from Sub-Saharan Africa and the percentage of imports from the world supplied by the region.

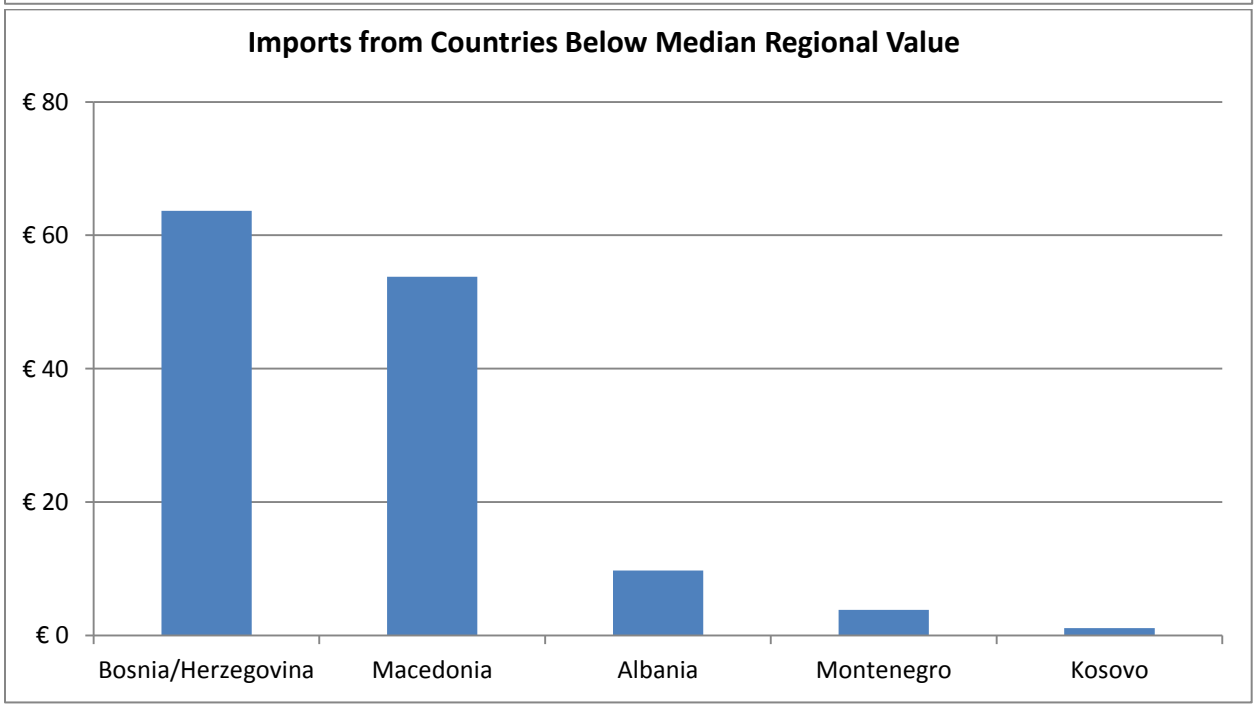
Commodity Group	Million Euro, Jan - Dec 2012		Percent
	E.U. Imports from World	From Sub-Saharan Africa	
Cocoa	€ 4,336	€ 3,782	87.2%
Sugar	€ 2,046	€ 525	25.7%
Fruit and Nuts	€ 13,795	€ 1,815	13.2%
Coffee, Tea and Spices	€ 9,470	€ 1,242	13.1%
Vegetables	€ 3,525	€ 326	9.3%
Oilseeds and Groundnuts	€ 9,574	€ 113	1.2%
Vegetable Oil	€ 8,222	€ 79	1.0%
Feed Ingredients	€ 9,780	€ 27	0.3%
Cereals	€ 4,613	€ 5	0.1%
Total	€ 65,362	€ 7,915	12.1%

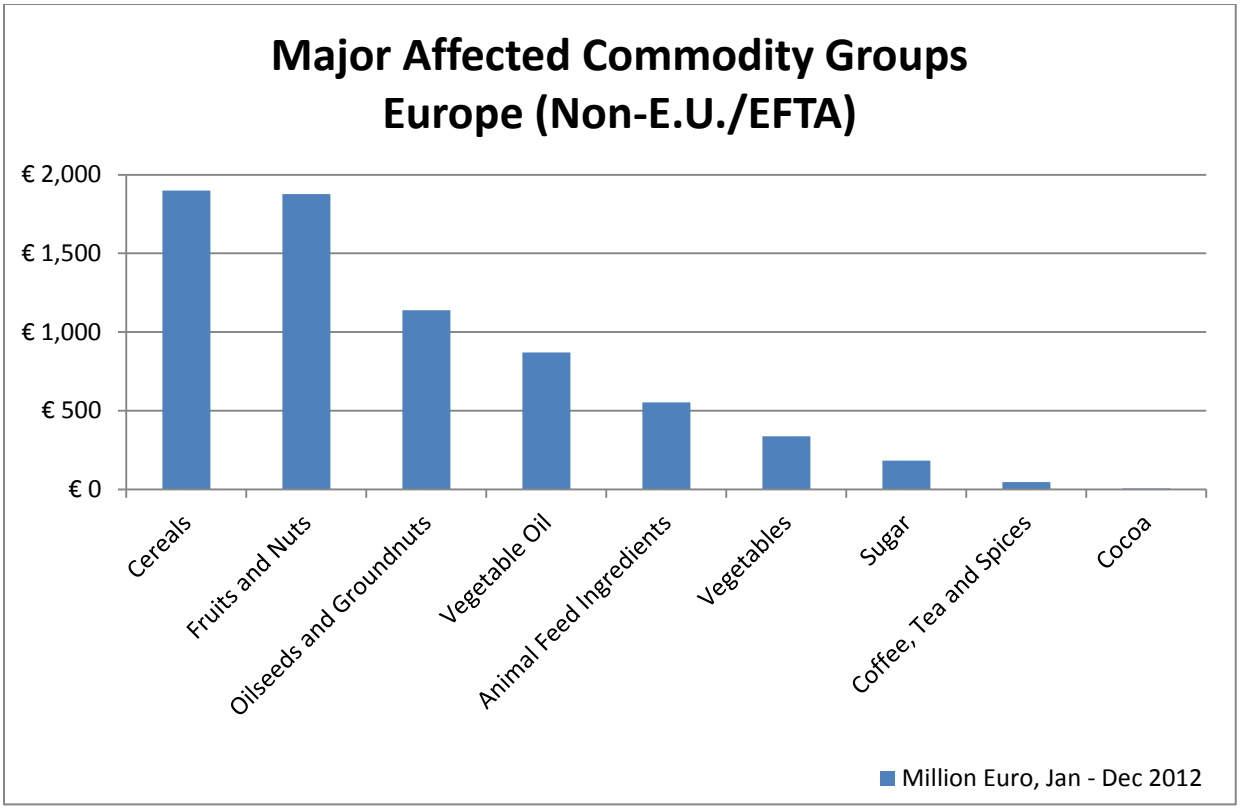
Results for Non-E.U./EFTA Europe



For purposes of this report, only European countries that are neither E.U. nor EFTA members have been included. These countries supply the E.U. with €6.9 billion of commodities that may be affected by cut-off criteria in Regulation 1107/2009. The graphs below show the value of all covered commodities imported by the E.U. for each country in the region and the major commodity groups comprising these imports.





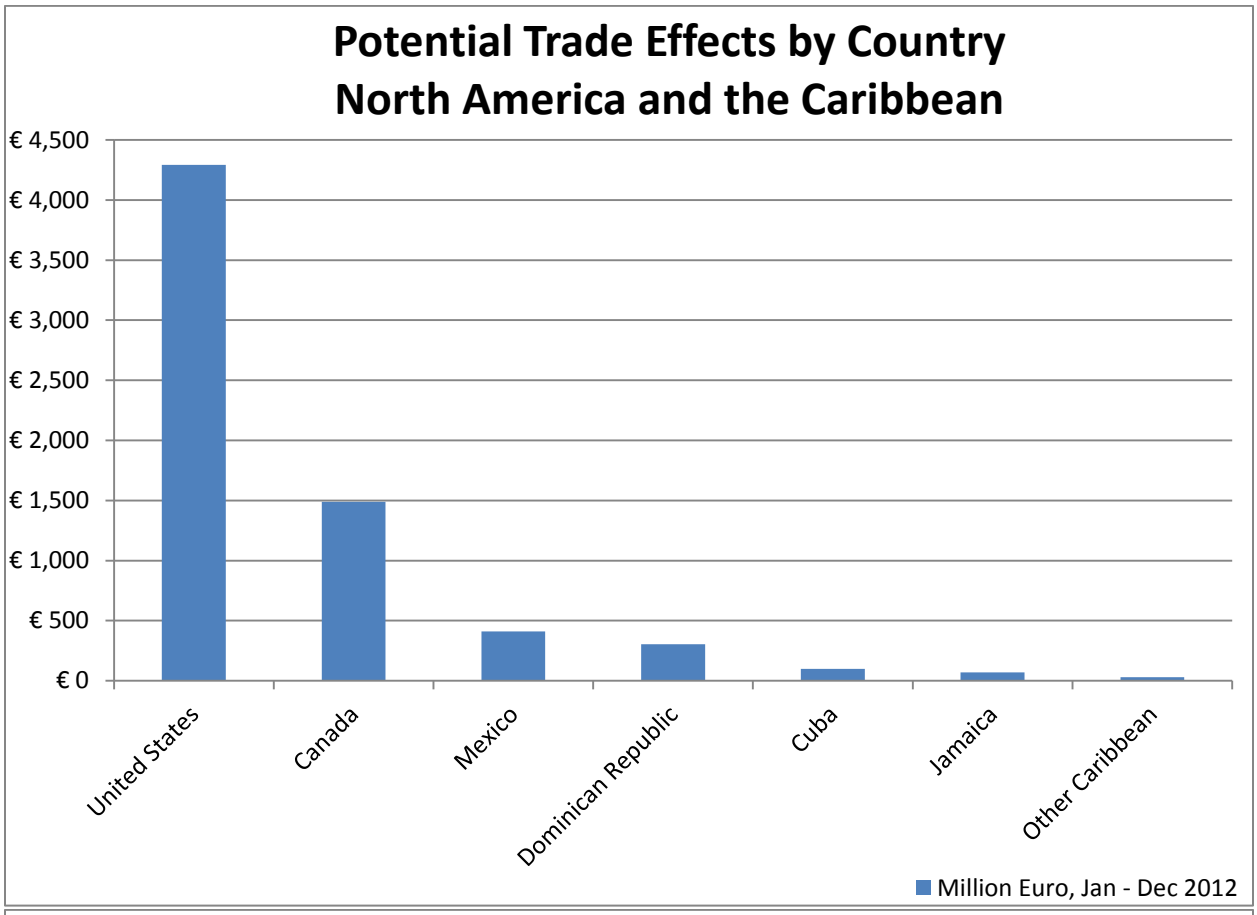


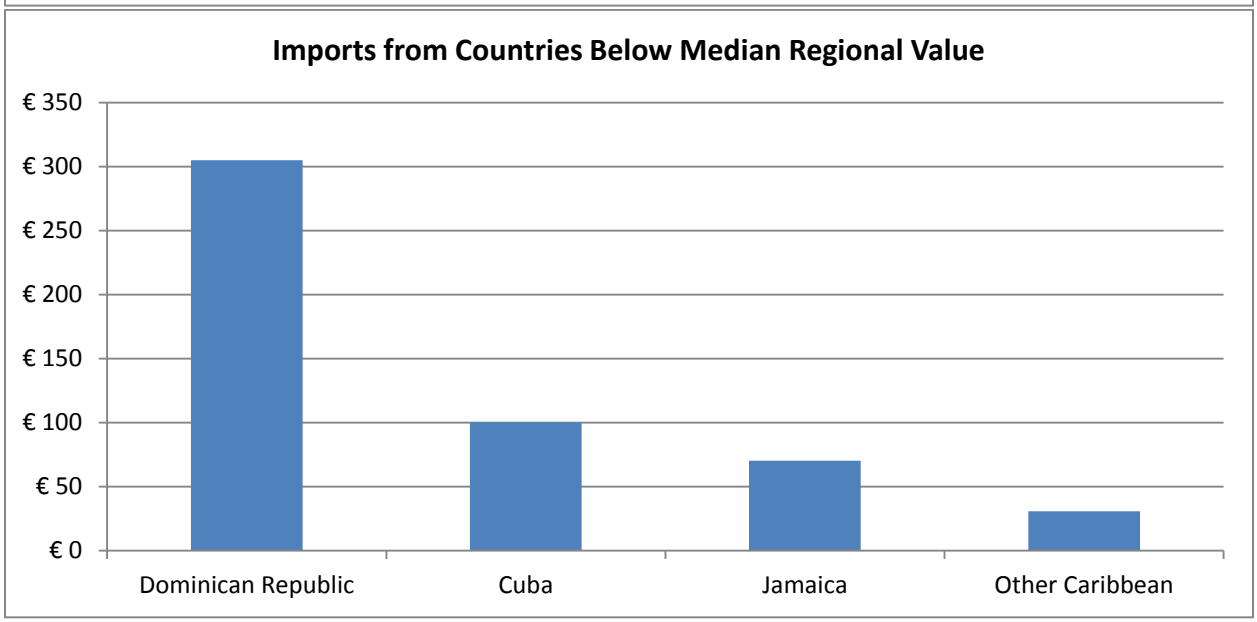
Over the past several decades Eastern Europe has become the major regional supplier of cereal grain imports by the E.U., with the Ukraine alone supplying over 35% of cereal imports. The Ukraine also now supplies over €900 million of soybeans and rapeseed to Europe. Other significant grain and oilseed suppliers in the region include Turkey, Serbia and Moldova. Turkey is the second largest leading supplier of imported fruits and nuts to the E.U. behind the United States. The table below shows E.U. imports of these commodities from the world, from non-E.U./EFTA countries in Europe and the percentage of imports from the world supplied by the region.

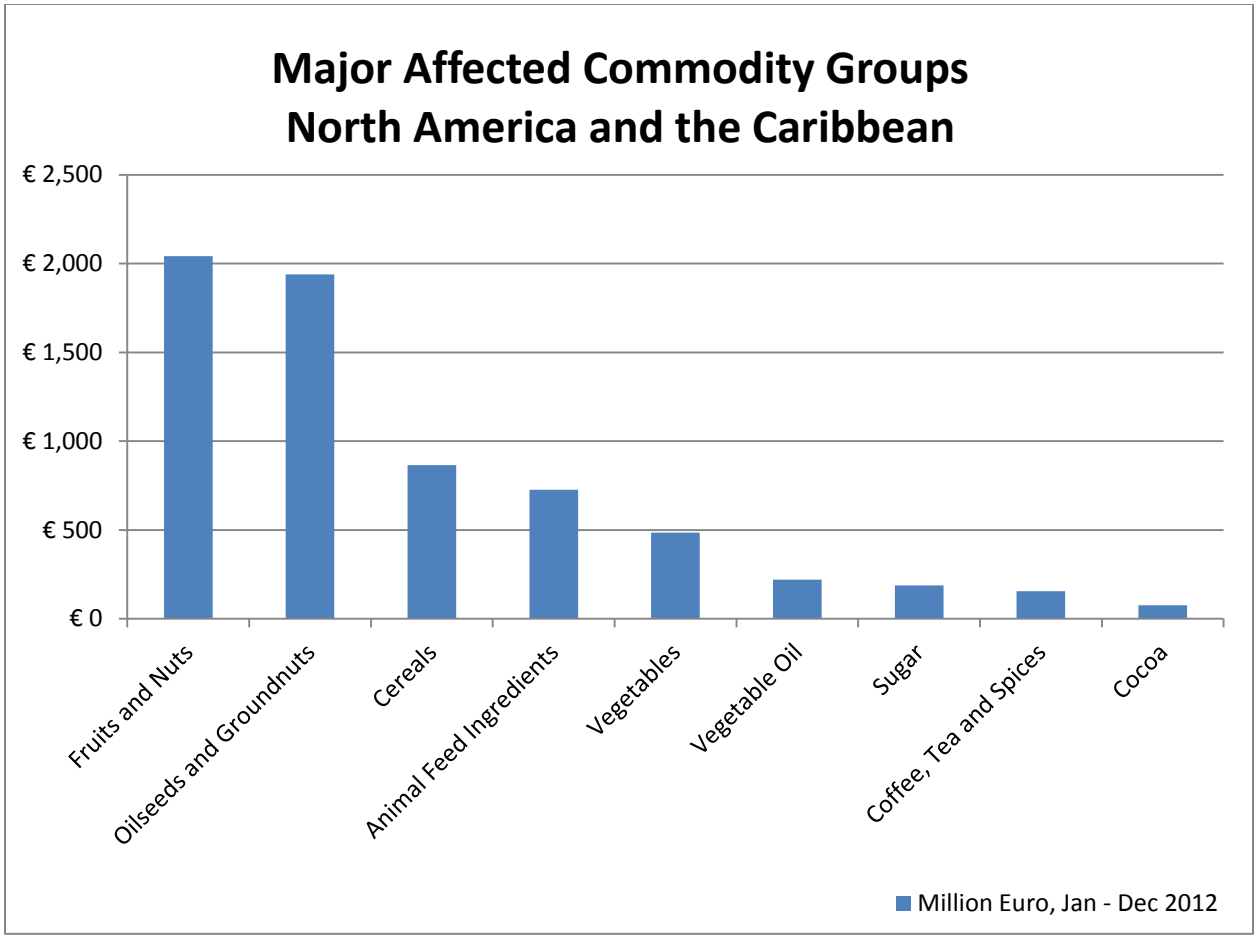
Commodity Group	Million Euro, Jan - Dec 2012		Percent
	E.U. Imports from World	From Europe (Non-E.U./EFTA)	
Cereals	€ 4,613	€ 1,900	41.2%
Fruit and Nuts	€ 13,795	€ 1,877	13.6%
Oilseeds and Groundnuts	€ 9,574	€ 1,138	11.9%
Vegetable Oil	€ 8,222	€ 870	10.6%
Feed Ingredients	€ 9,780	€ 553	5.7%
Vegetables	€ 3,525	€ 337	9.6%
Sugar	€ 2,046	€ 183	8.9%
Coffee, Tea and Spices	€ 9,470	€ 47	0.5%
Cocoa	€ 4,336	€ 6	0.1%
Total	€ 65,362	€ 6,911	10.6%

Results for North America and the Caribbean

The North America and Caribbean region supplies the E.U. with €6.7 billion of commodities that may be affected by cut-off criteria in Regulation 1107/2009. The graphs below show the value of all covered commodities imported by the E.U. for each country in the region and the major commodity groups comprising these imports.



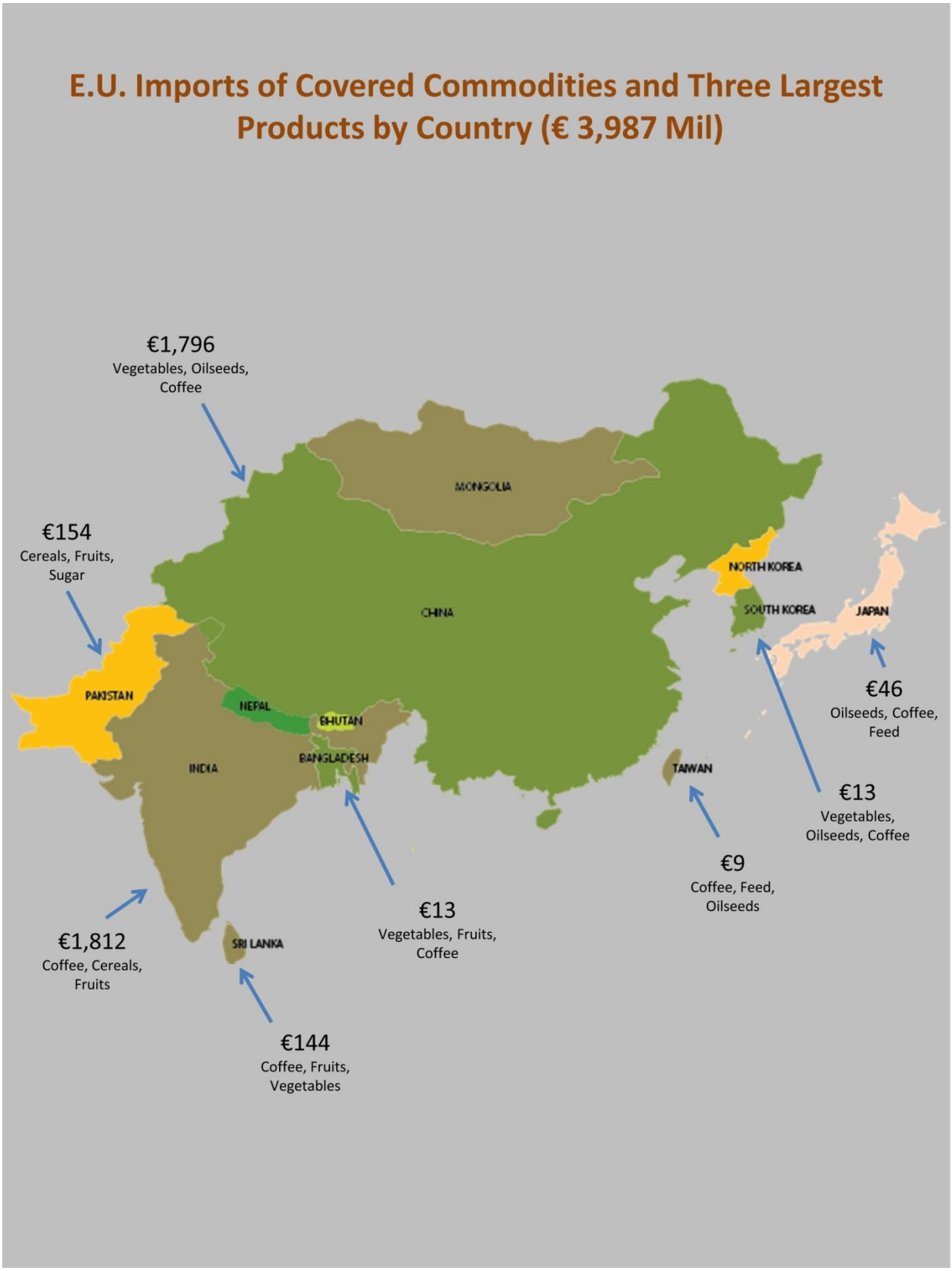




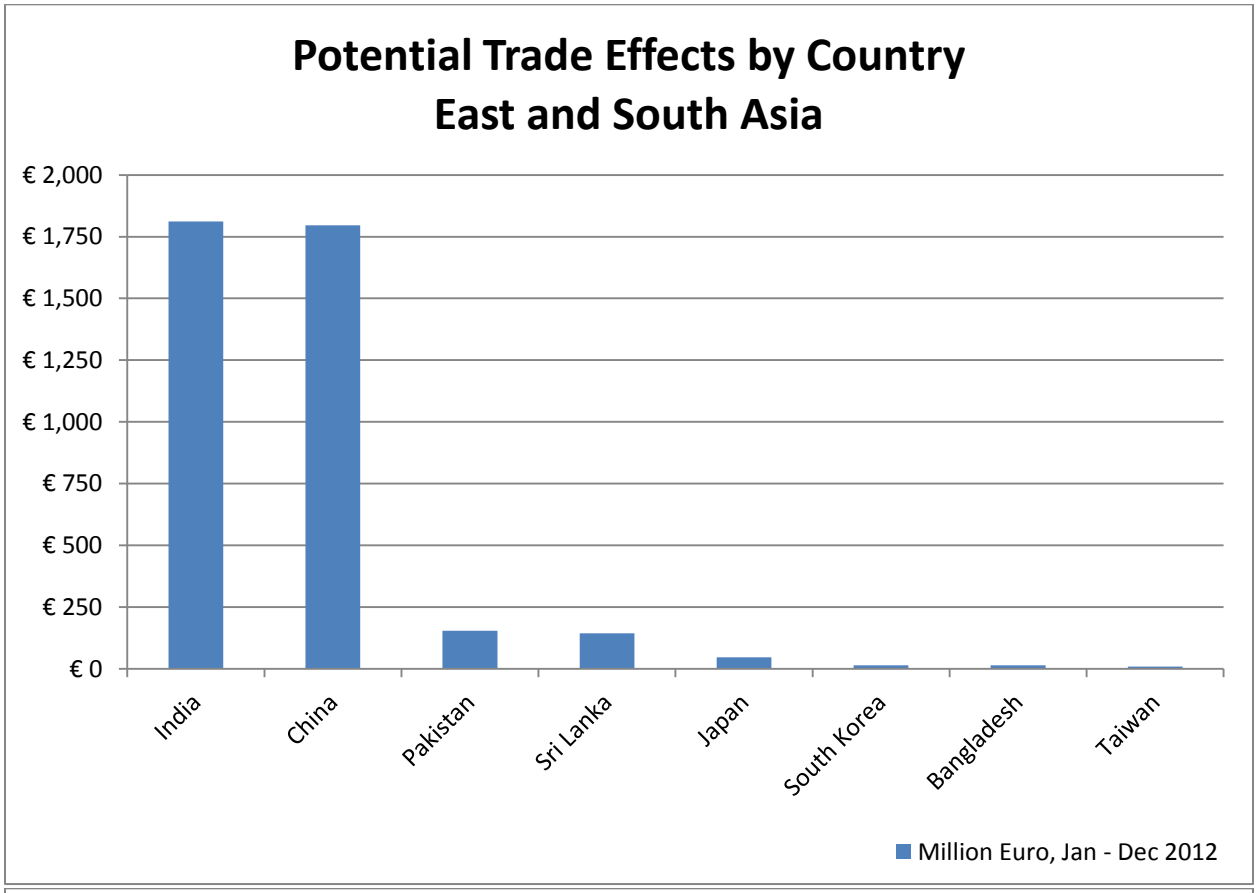
The North American and Caribbean region supplies appromixately 10% of E.U. imports of raw and semi-processed agricultural commodites, althought its position among regional suppliers has declined sharply over the last twenty years. Changes in E.U. agricultural and regulatory policies have led to declines in volumes of U.S. corn and soy imports, although this has been partially offset by increases in imports of tree nuts from the U.S. and and oilseeds from Canada. The table below shows E.U. imports of these commodities from the world, from North America and Caribbean countries and the percentage of imports from the world supplied by the region.

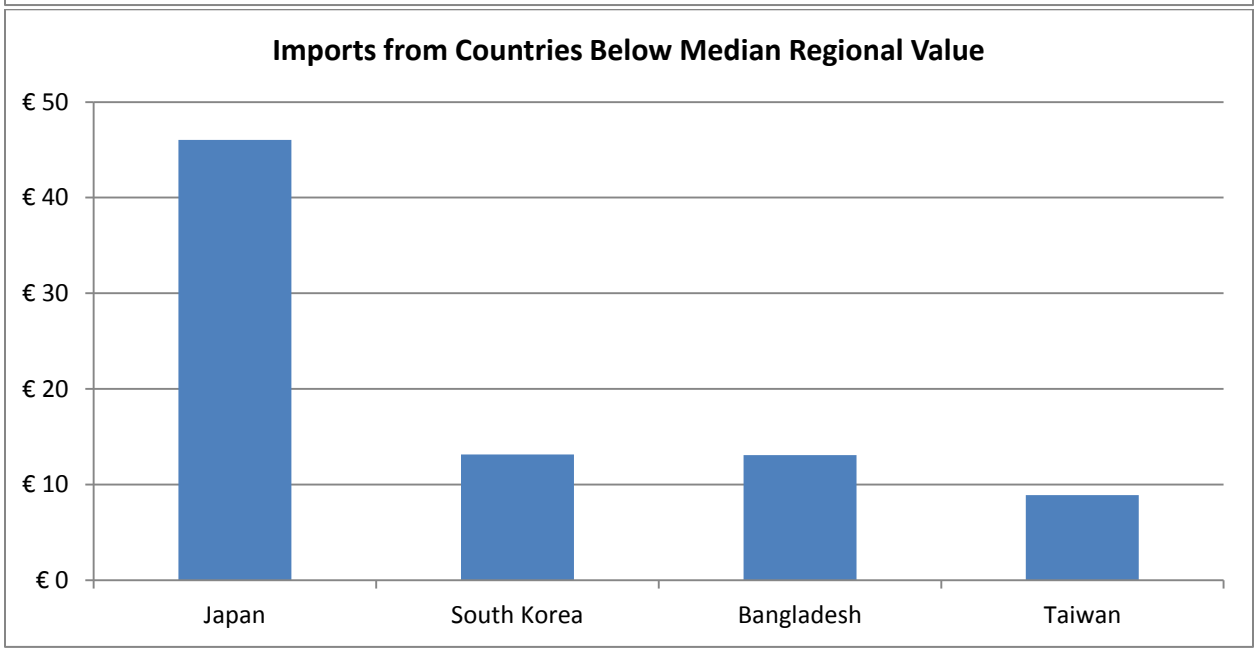
Commodity Group	Million Euro, Jan - Dec 2012		Percent
	E.U. Imports from World	From North America and Caribbean	
Fruit and Nuts	€ 13,795	€ 2,042	15%
Oilseeds and Groundnuts	€ 9,574	€ 1,939	20%
Cereals	€ 4,613	€ 865	19%
Feed Ingredients	€ 9,780	€ 726	7%
Vegetables	€ 3,525	€ 486	14%
Vegetable Oil	€ 8,222	€ 220	3%
Sugar	€ 2,046	€ 188	9%
Coffee, Tea and Spices	€ 9,470	€ 155	2%
Cocoa	€ 4,336	€ 77	2%
Total	€ 65,362	€ 6,697	10%

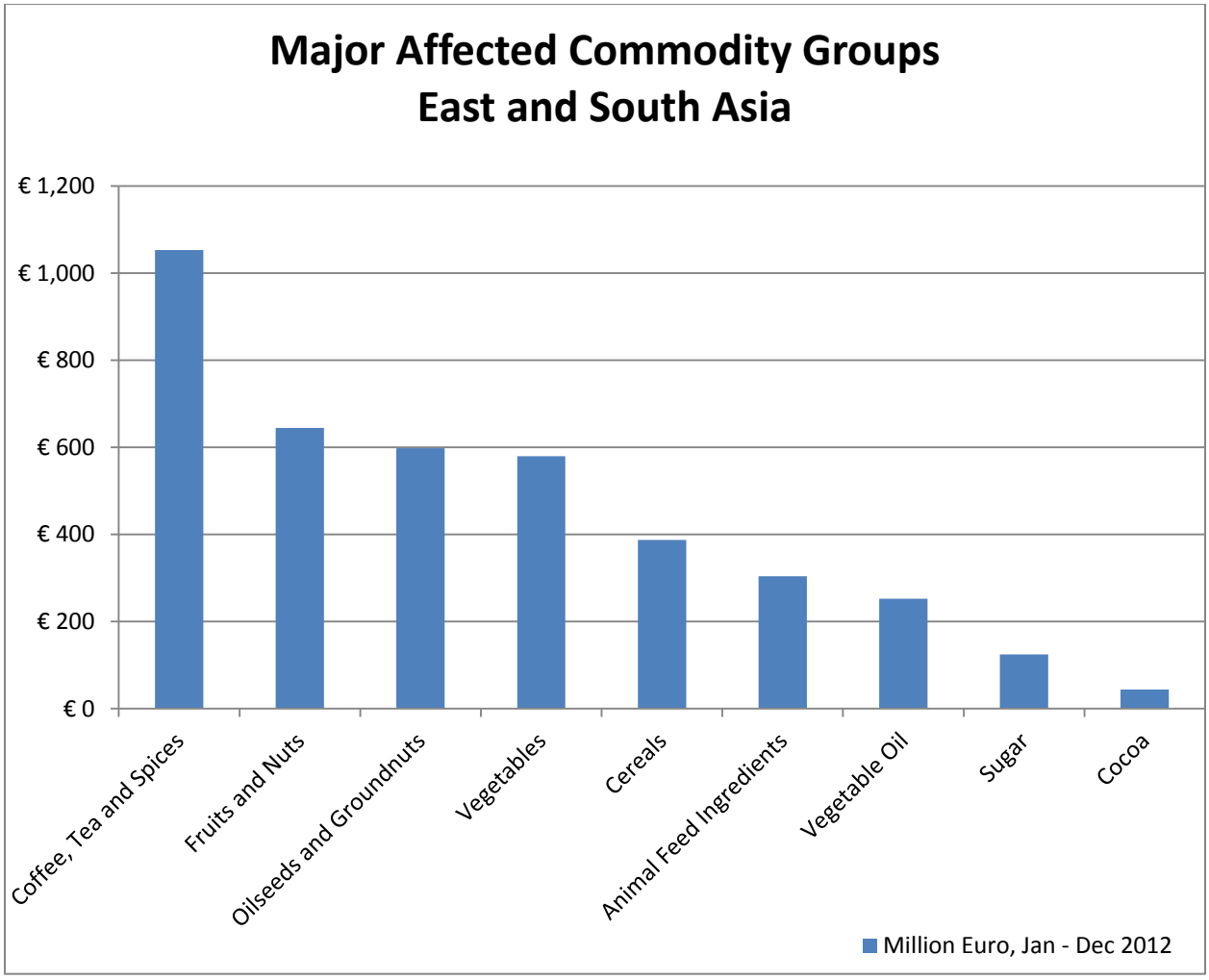
Results for East and South Asia



East and South Asia supply the E.U. with €4 billion of commodities that may be affected by cut-off criteria in Regulation 1107/2009. The graphs below show the value of all covered commodities imported by the E.U. for each country in the region and the major commodity groups comprising these imports.



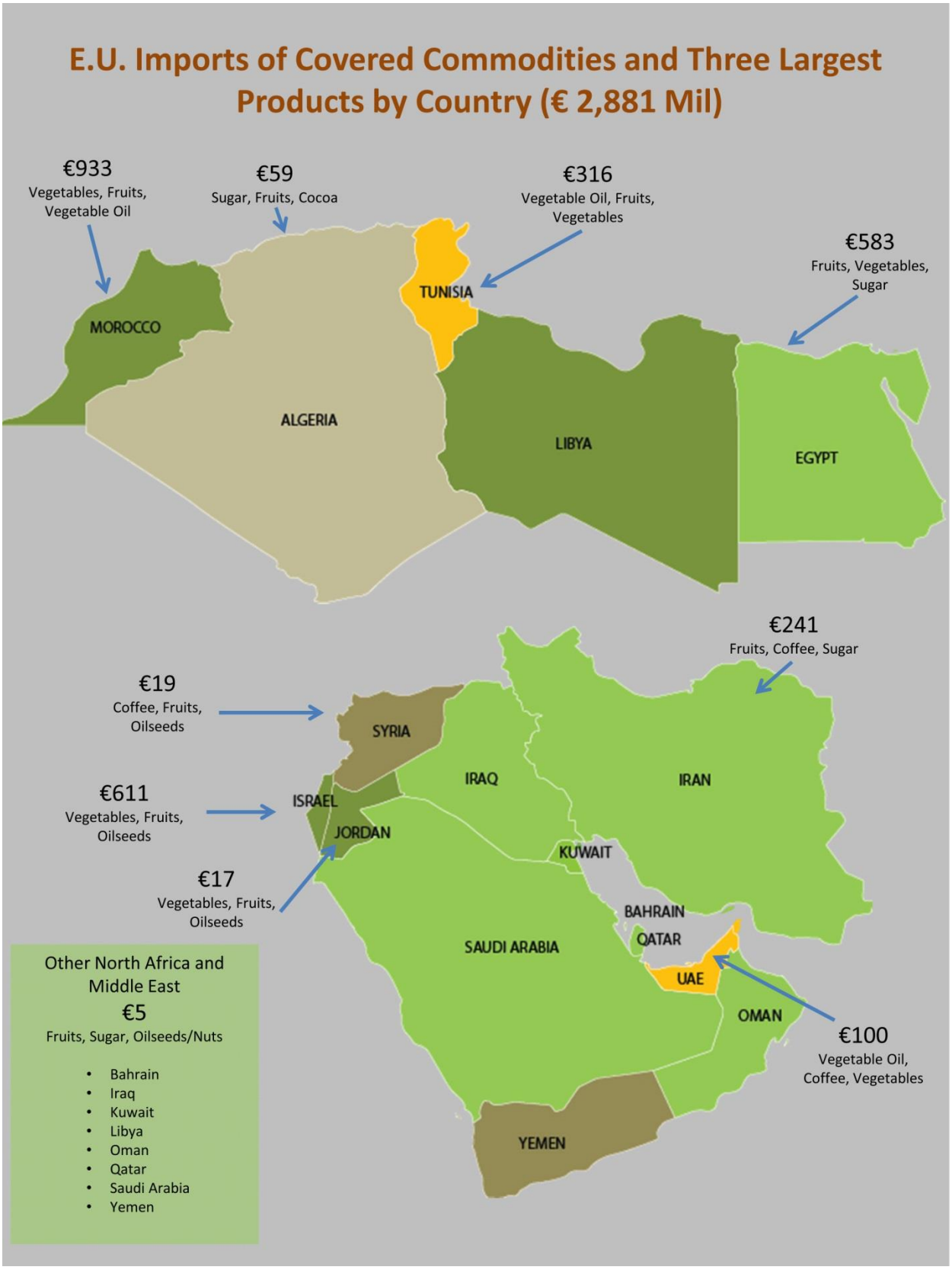




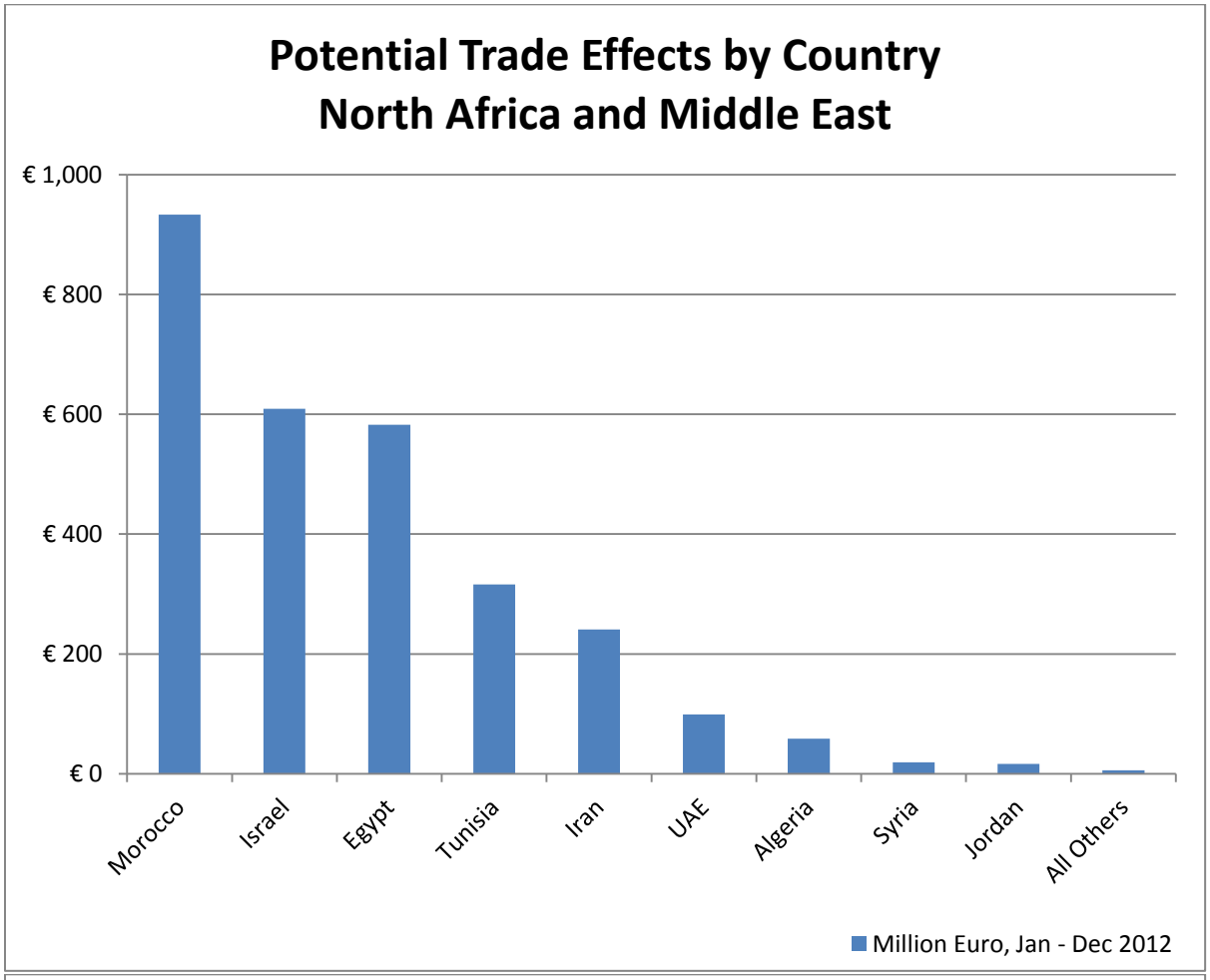
India and China account for ninety percent of E.U. imports from East and South Asia, with coffee, tea and spices, fruit and nuts, oilseeds and groundnuts and vegetables accounting for over seventy percent of the region's commodity supplies to the E.U. Nearly all of the remaining E.U. imports from the region are from Pakistan, Sri Lanka and Japan. The table below shows E.U. imports of these commodities from the world, from East and South Asia and the percentage of imports from the world supplied by the region.

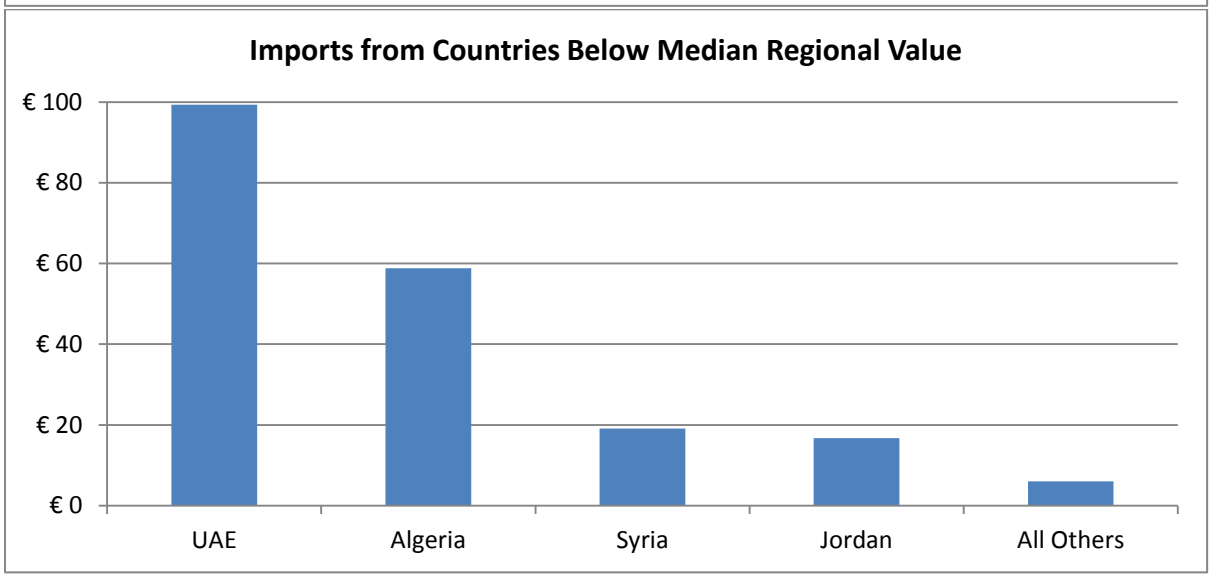
Commodity Group	Million Euro, Jan - Dec 2012		Percent
	E.U. Imports from World	From East and South Asia	
Coffee, Tea and Spices	€ 9,470	€ 1,053	11%
Fruit and Nuts	€ 13,795	€ 644	5%
Oilseeds and Groundnuts	€ 9,574	€ 598	6%
Vegetables	€ 3,525	€ 580	16%
Cereals	€ 4,613	€ 387	8%
Animal Feed Ingredients	€ 9,780	€ 304	3%
Vegetable Oil	€ 8,222	€ 252	3%
Sugar	€ 2,046	€ 125	6%
Cocoa	€ 4,336	€ 44	1%
Total	€ 65,362	€ 3,987	6%

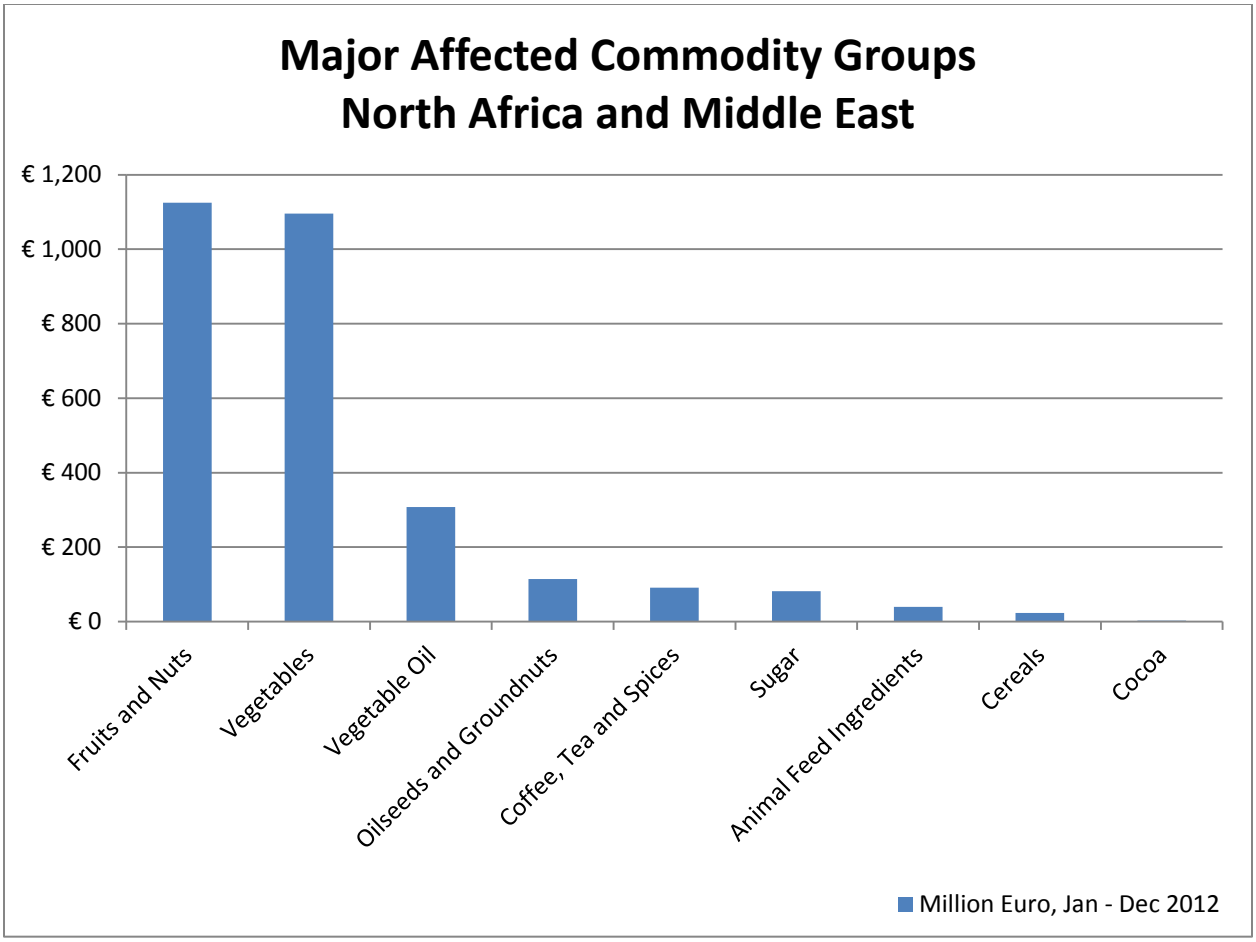
Results for North Africa and Middle East



North Africa and the Middle East supply the E.U. with €2.9 billion of commodities that may be affected by cut-off criteria in Regulation 1107/2009. The graphs below show the value of all covered commodities imported by the E.U. for each country in the region and the major commodity groups comprising these imports.



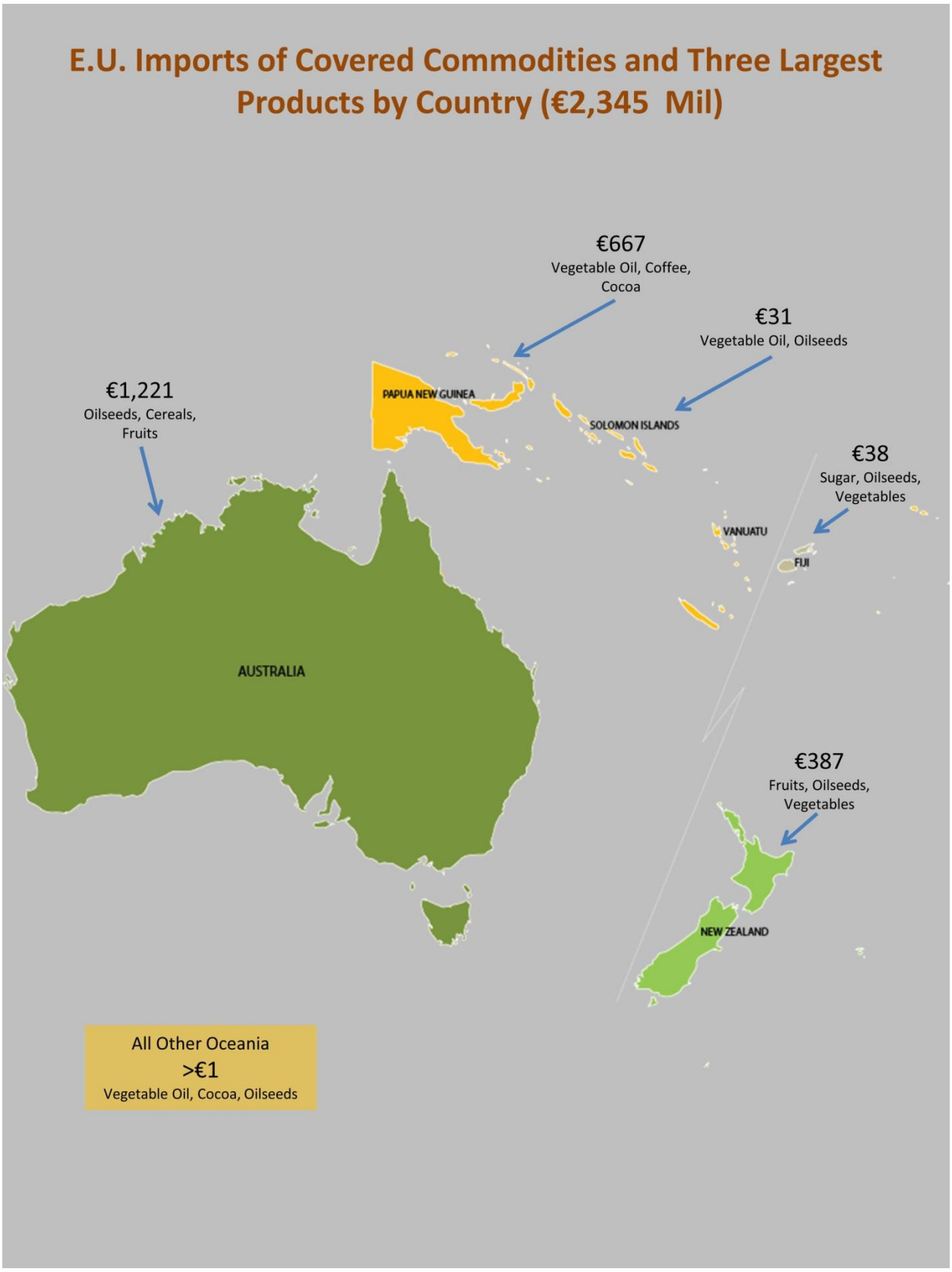




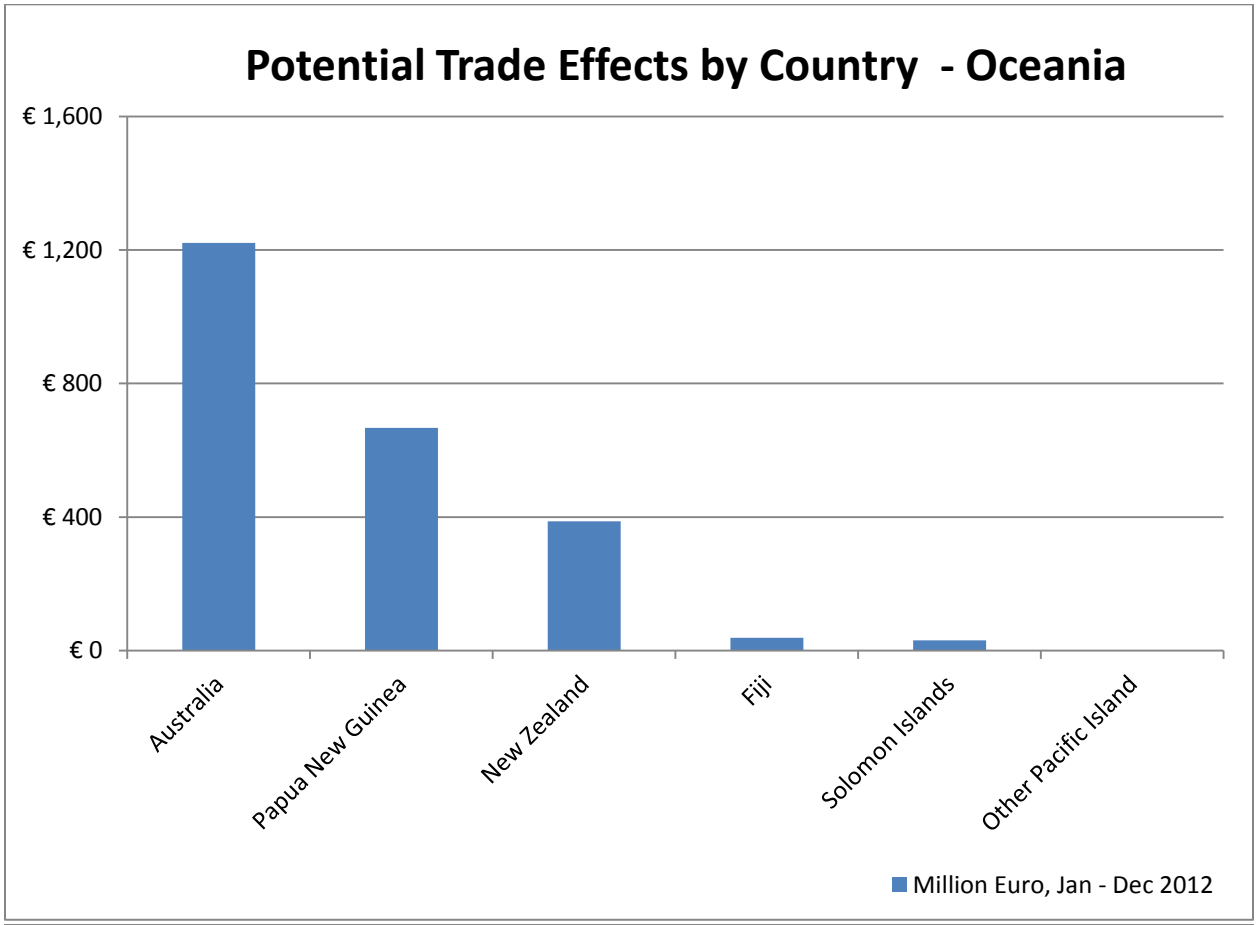
The North African and Middle East region is the primary supplier of vegetables imported by the E.U., with Morocco, Israel and Egypt the leading sources. These three countries, along with Iran, supply 90% of E.U. imports of fruts and nuts from the region. Sixty percent of the E.U. supply of vegetable oils from the region are sourced from Tunisia. The table below shows E.U. imports of these commodities from the world, from North Africa and the Middle East and the percentage of imports from the world supplied by the region.

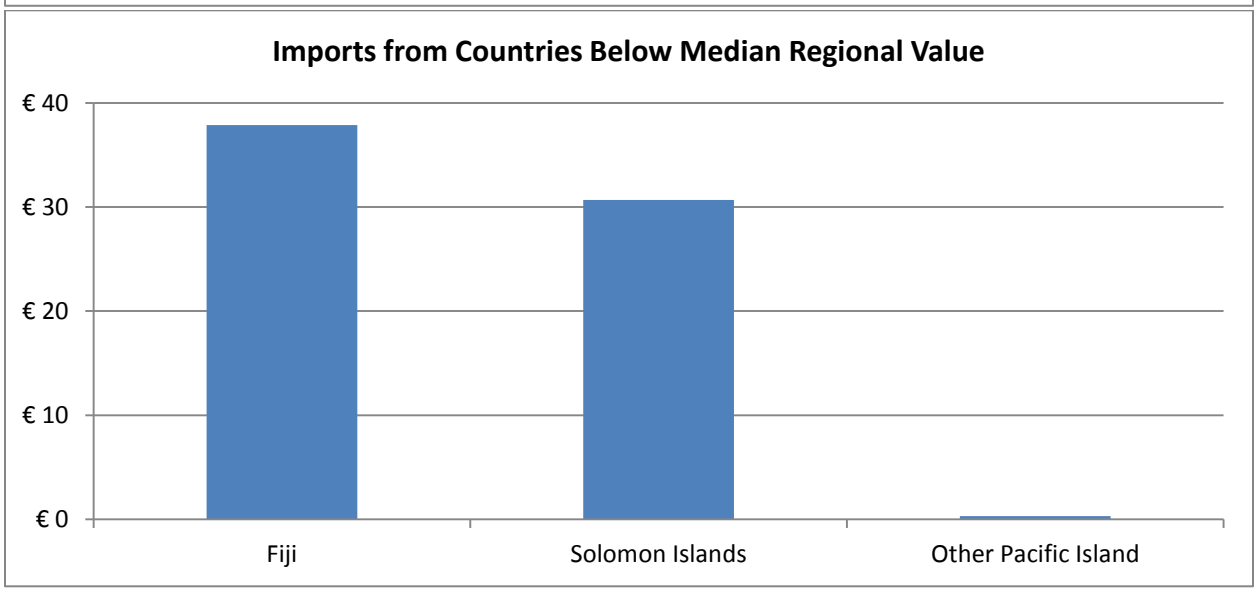
Commodity Group	Million Euro, Jan - Dec 2012		Percent
	E.U. Imports from World	From North Africa and Middle East	
Fruit and Nuts	€ 13,795	€ 1,125	8.2%
Vegetables	€ 3,525	€ 1,096	31.1%
Vegetable Oil	€ 8,222	€ 308	3.7%
Oilseeds and Groundnuts	€ 9,574	€ 114	1.2%
Coffee, Tea and Spices	€ 9,470	€ 91	1.0%
Sugar	€ 2,046	€ 82	4.0%
Feed Ingredients	€ 9,780	€ 40	0.4%
Cereals	€ 4,613	€ 23	0.5%
Cocoa	€ 4,336	€ 2	0.0%
Total	€ 65,362	€ 2,881	4.4%

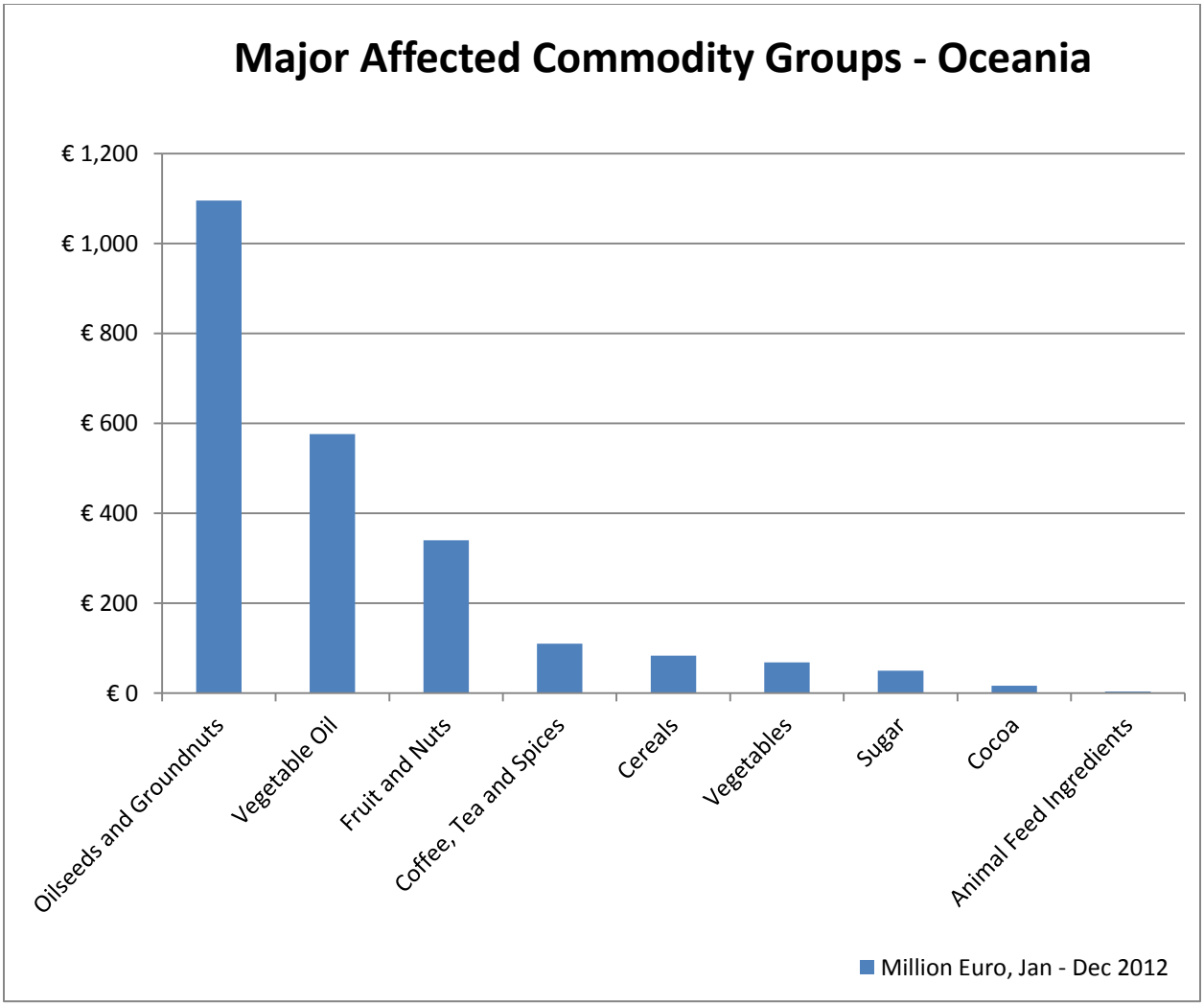
Results for Oceania



The Oceanic region supplies the E.U. with €2.3 billion of commodities that may be affected by cut-off criteria in Regulation 1107/2009. The graphs below show the value of all covered commodities imported by the E.U. for each country in the region and the major commodity groups comprising these imports.





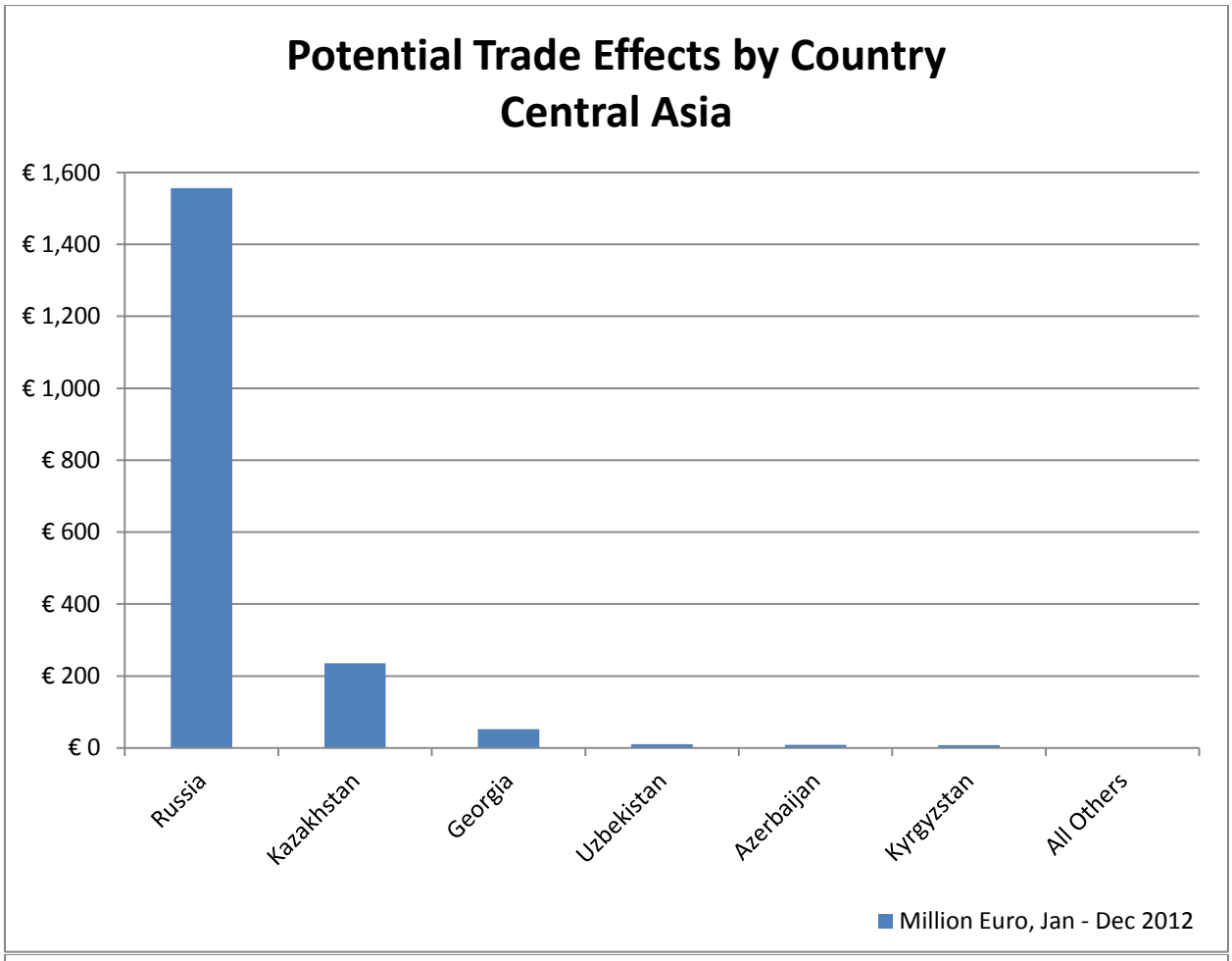


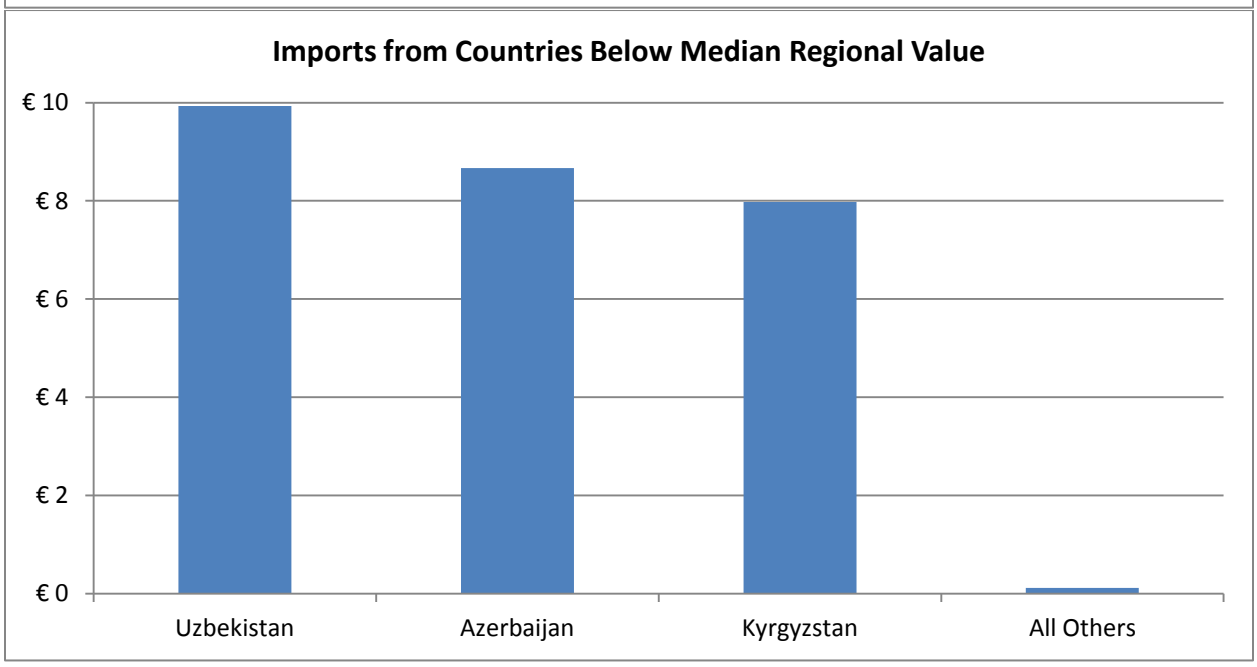
Australia, Papua New Guinea and New Zealand provide nearly all of the E.U. imports of covered commodities from Oceania. Australia supplies the bulk of the E.U. imports of oilseeds, groundnuts and cereals from the region. Papua New Guinea is responsible for nearly all of the exports of vegetable oils, and New Zealand is a major supplier of both fruits and vegetables. The table below shows E.U. imports of these commodities from the world, from Oceania and the percentage of imports from the world supplied by the region.

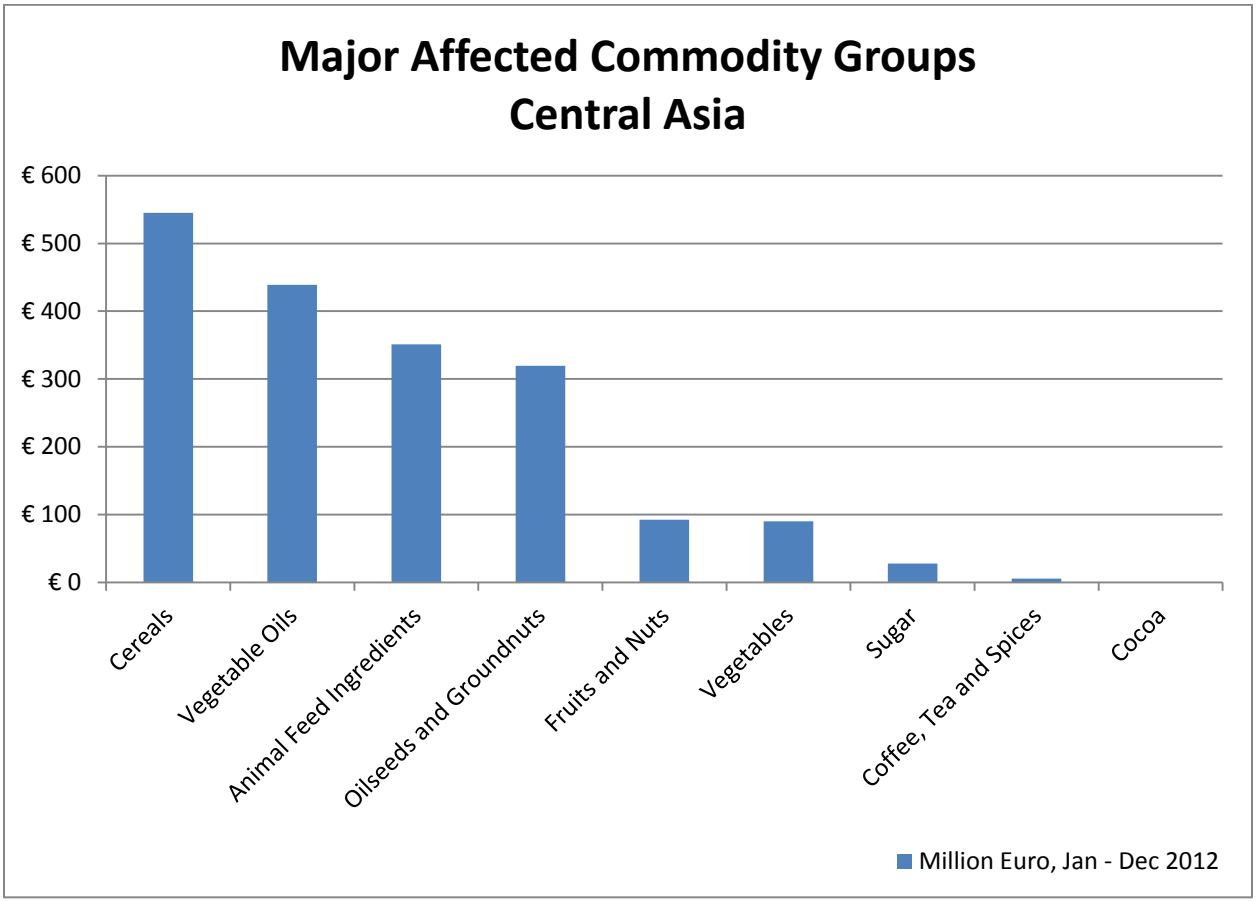
Commodity Group	Million Euro, Jan - Dec 2012		Percent
	E.U. Imports from World	From Oceania	
Oilseeds and Groundnuts	€ 9,574	€ 1,096	11.4%
Vegetable Oil	€ 8,222	€ 576	7.0%
Fruit and Nuts	€ 13,795	€ 340	2.5%
Coffee, Tea and Spices	€ 9,470	€ 110	1.2%
Cereals	€ 4,613	€ 83	1.8%
Sugar	€ 2,046	€ 50	2.5%
Cocoa	€ 4,336	€ 17	0.4%
Feed Ingredients	€ 9,780	€ 4	0.0%
Total	€ 65,362	€ 2,345	3.6%

Results for Central Asia

Central Asia supplies the E.U. with €1.9 billion of commodities that may be affected by cut-off criteria in Regulation 1107/2009. The graphs below show the value of all covered commodities imported by the E.U. for each country in the region and the major commodity groups comprising these imports.







The E.U. supply of commodities from Central Asia is dominated by Russia which supplies over 80% of the region's supply. The bulk of E.U. imports from Russia are vegetable oils, cereals, animal feeds and oilseeds. Kazakhstan is also an important cereal and oilseed supplier, and Georgia is a large fruit supplier to the E.U. The table below shows E.U. imports of these commodities from the world, from Central Asia and the percentage of imports from the world supplied by the region.

Commodity Group	Million Euro, Jan - Dec 2012		Percent
	E.U. Imports from World	From Central Asia	
Cereals	€ 4,613	€ 545	11.8%
Vegetable Oil	€ 8,222	€ 439	5.3%
Animal Feed Ingredients	€ 9,780	€ 351	3.6%
Oilseeds and Groundnuts	€ 9,574	€ 319	3.3%
Fruit and Nuts	€ 13,795	€ 92	0.7%
Vegetables	€ 3,525	€ 90	2.5%
Sugar	€ 2,046	€ 27	1.3%
Coffee, Tea and Spices	€ 9,470	€ 6	0.1%
Cocoa	€ 4,336	€ 0	0.0%
Total	€ 65,362	€ 1,870	2.9%

Appendix 1 – List of Active Substances Potentially Subject to Regulation

Active substances potentially subject to Regulation 1107/2009 based on endocrine disruptor categorization were drawn from two sources:

Table 1 below lists active substances identified as potential endocrine disruptors based on a 2013 evaluation by the UK Food and Environment Research Agency (FERA - reference 4). It includes substances deemed more or less likely to pose a risk of endocrine disruption and substances for which further information is required. The table has been edited from its original version to remove substances which were not deemed to pose a risk or require further information.

Table 2 lists additional active substances identified as potential endocrine disruptors based on a Summary Impact Assessment of the regulation conducted by the UK Health and Safety Directorate/ Chemicals Regulation Directorate in 2009 (HSE-CRD - reference 3). The table has been edited from its original version to remove substances already identified in Table 1.

Table 1 – FERA 2013

		Further information required	More likely to pose a risk	Less likely to pose a risk
Fungicides				
	Bupirimate	No	No	Yes
	Carbendazim	Yes	No	No
	Cymoxanil	Yes	No	No
	Fluazinam	Yes	No	No
	Fosetyl aluminium	Yes	No	No
	Hymexazol	Yes	No	No
	Iprodione	No	No	Yes
	Mancozeb	No	Yes	No
	Mandipropamid	Yes	No	No
	Myclobutanil	No	No	Yes
	Prochloraz	No	No	Yes
	Prothioconazole	Yes	No	No
	Silthiofam	Yes	No	No
	Tebuconazole	No	No	Yes
	Thiophanate-methyl	No	No	Yes
	Thiram	Yes	No	No

		Further information required	More likely to pose a risk	Less likely to pose a risk
Herbicides	2,4-D	Yes	No	No
	Chlorpropham	Yes	No	No
	Dimethenamid-P	Yes	No	No
	Ethofumesate	Yes	No	No
	Fluazifop-p-butyl	Yes	No	No
	Glufosinate- ammonium	Yes	No	No
	Ioxynil	No	Yes	No
	Lenacil	Yes	No	No
	Linuron	No	Yes	No
	Metribuzin	No	No	Yes
	Pinoxaden	Yes	No	No
	Propyzamide	No	No	Yes
	S-metolachlor	Yes	No	No
	Tepraloxydim	Yes	No	No
	Terbuthylazine	Yes	No	No
Insecticides	Abamectin	No	Yes	No
	Beta-cyfluthrin	Yes	No	No
	Chlorpyrifos	Yes	No	No
	Clothianidin	Yes	No	No
	Lambda-cyhalothrin	Yes	No	No
	Spinosad	Yes	No	No
	Spiromesifen	No	No	Yes
	Spirotetremat	Yes	No	No
	Thiacloprid	No	Yes	No

Table 2 – DEFRA HSE-CRD 2009

Insecticides	Bifenthrin	Deltamethrin	Dimethoate
Fungicides	Bitertanol	Fluquinconazole	Penconazole
	Cyproconazole	Flusilazole	Propiconazole
	Difenoconazole	Fuberidazole	Tetraconazole
	Epoxiconazole	Maneb	Thiram
	Fenbuconazole	Metconazole	Triademenol
	Folpet	Metiram	Triticonazole
Herbicides	Amitrole	Fluometuron	Tralkoxydim
	Carbetamide	Molinate	
	Chlorotoluron	Picloram	
Soil Sterilant	Metam		

Appendix II – 4-Digit Harmonized Tariff System Codes Included in Study

HTS Chapter	Description
Chapter 7	**Edible vegetables and certain roots and tubers**
07.01	Potatoes, fresh or chilled.
07.02	Tomatoes, fresh or chilled.
07.03	Onions, shallots, garlic, leeks and other alliaceous vegetables, fresh or chilled.
07.04	Cabbages, cauliflowers, kohlrabi, kale and similar edible brassicas, fresh or chilled.
07.05	Lettuce (Lactuca sativa) and chicory (Cichorium spp.), fresh or chilled.
07.06	Carrots, turnips, salad beetroot, salsify, celeriac, radishes and similar edible roots, fresh or chilled.
07.07	Cucumbers and gherkins, fresh or chilled.
07.08	Leguminous vegetables, shelled or unshelled, fresh or chilled.
07.09	Other vegetables, fresh or chilled.
07.10	Vegetables (uncooked or cooked by steaming or boiling in water), frozen.
07.12	Dried vegetables, whole, cut, sliced, broken or in powder, but not further prepared.
07.13	Dried leguminous vegetables, shelled, whether or not skinned or split.
07.14	Manioc, arrowroot, salep, Jerusalem artichokes, sweet potatoes and similar roots and tubers with high starch or inulin content, fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets; sago pith.
Chapter 8	**Edible fruit and nuts; peel of citrus fruit or melons**
08.01	Coconuts, Brazil nuts and cashew nuts, fresh or dried, whether or not shelled or peeled**.**
08.02	Other nuts, fresh or dried, whether or not shelled or peeled.
08.03	Bananas, including plantains, fresh or dried.
08.04	Dates, figs, pineapples, avocados, guavas, mangoes and mangosteens, fresh or dried.
08.05	Citrus fruit, fresh or dried.
08.06	Grapes, fresh or dried.
08.07	Melons (including watermelons) and papaws (papayas), fresh.
08.08	Apples, pears and quinces, fresh.
08.09	Apricots, cherries, peaches (including nectarines), plums and sloes, fresh.
08.10	Other fruit, fresh.
08.11	Fruit and nuts, uncooked or cooked by steaming or boiling in water, frozen, whether or not containing added sugar or other sweetening matter.
08.13	Fruit, dried, other than that of headings 08.01 to 08.06; mixtures of nuts or dried fruits of this Chapter.
08.14	Peel of citrus fruit or melons (including watermelons), fresh, frozen, dried or provisionally preserved in brine, in sulphur water or in other preservative solutions.
Chapter 9	**Coffee, tea, mate and spices**
09.01	Coffee, whether or not roasted or decaffeinated; coffee husks and skins; coffee substitutes containing coffee in any proportion.
09.02	Tea, whether or not flavoured.
09.03	Mate.
09.04	Pepper of the genus Piper; dried or crushed or ground fruits of the genus Capsicum or of the genus Pimenta.
09.05	Vanilla.

09.06	Cinnamon and cinnamon-tree flowers.
09.07	Cloves (whole fruit, cloves and stems).
09.08	Nutmeg, mace and cardamoms.
09.09	Seeds of anise, badian, fennel, coriander, cumin or caraway; juniper berries.
09.10	Ginger, saffron, turmeric (curcuma), thyme, bay leaves, curry and other spices.

Chapter 10	**Cereals**
10.01	Wheat and meslin.
10.02	Rye.
10.03	Barley.
10.04	Oats.
10.05	Maize (corn).
10.06	Rice.
10.07	Grain sorghum.
10.08	Buckwheat, millet and canary seeds; other cereals.

Chapter 12	**Oil seeds and oleaous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder**
12.01	Soya beans, whether or not broken.
12.02	Ground-nuts, not roasted or otherwise cooked, whether or not shelled or broken.
12.03	Copra.
12.04	Linseed, whether or not broken.
12.05	Rape or colza seeds, whether or not broken.
12.06	Sunflower seeds, whether or not broken.
12.07	Other oil seeds and oleaginous fruits, whether or not broken.
12.08	Flours and meals of oil seeds or oleaginous fruits, other than those of mustard.
12.09	Seeds, fruit and spores, of a kind used for sowing.
12.10	Hop cones, fresh or dried, whether or not ground, powdered or in the form of pellets; lupulin.
12.12	Locust beans, seaweeds and other algae, sugar beet and sugar cane, fresh, chilled, frozen or dried, whether or not ground; fruit stones and kernels and other vegetable products (including unroasted chicory roots of the variety Cichorium intybus sativum of a kind used primarily for human consumption, not elsewhere specified or included.
12.13	Cereal straw and husks, unprepared, whether or not chopped, ground, pressed or in the form of pellets.
12.14	Swedes, mangolds, fodder roots, hay, lucerne (alfalfa), clover, sainfoin, forage kale, lupines, vetches and similar forage products, whether or not in the form of pellets.

Chapter 15	**Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes**
15.07	Soya-bean oil and its fractions, whether or not refined, but not chemically modified.
15.08	Ground-nut oil and its fractions, whether or not refined, but not chemically modified.
15.09	Olive oil and its fractions, whether or not refined, but not chemically modified.
15.10	Other oils and their fractions, obtained solely, from olives, whether or not refined, but not chemically modified, including blends of these oils or fractions with oils or fractions of heading 15.09
15.11	Palm oil and its fractions, whether or not refined, but not chemically modified.
15.12	Sunflower-seed, safflower or cotton-seed oil and fractions thereof, whether or not refined, but not chemically modified.
15.13	Coconut (copra), palm kernel or babassu oil and fractions thereof, whether or not refined, but not chemically modified.

15.14	Rape, colza or mustard oil and fractions thereof, whether or not refined, but not chemically modified.
15.15	Other fixed vegetable fats and oils (including jojoba oil) and their fractions, whether or not refined, but not chemically modified.
15.16	Animal or vegetable fats and oils and their fractions, partly or wholly hydrogenated, inter-esterified, re-esterified or elaidinised, whether or not refined, but not further prepared.
15.21	Vegetable waxes (other than triglycerides), beeswax, other insect waxes and spermaceti, whether or not refined or coloured.

Chapter 17	**Sugars and sugar confectionery**
17.01	Cane or beet sugar and chemically pure sucrose, in solid form.
17.03	Molasses resulting from the extraction or refining of sugar.

Chapter 18	**Cocoa and cocoa preparations**
18.01	Cocoa beans, whole or broken, raw or roasted.
18.02	Cocoa shells, husks, skins and other cocoa waste.
18.03	Cocoa paste, whether or not defatted.
18.04	Cocoa butter, fat and oil.
18.05	Cocoa powder, not containing added sugar or other sweetening matter.

Chapter 23	**Residues and waste from the food industries; prepared animal fodder**
23.02	Bran, sharps and other residues, whether or not in the form of pellets, derived from the sifting, milling or other working of cereals or of leguminous plants.
23.03	Residues of starch manufacture and similar residues, beet-pulp, bagasse and other waste of sugar manufacture, brewing or distilling dregs and waste, whether or not in the form of pellets.
23.04	Oil-cake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of soyabean oil.
23.05	Oil-cake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of ground-nut oil.
23.06	Oil-cake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of vegetable fats or oils, other than those of heading 23.04 or 23.05.
23.08	Vegetable materials and vegetable waste, vegetable residues and by-products, whether or not in the form of pellets, of a kind used in animal feeding, not elsewhere specified or included.
23.09	Preparations of a kind used in animal feeding.

APPENDIX III– Study Author

Kyd Brenner is an independent consultant providing international trade policy counseling and trade analysis to clients in the global food and agriculture industries. From 2001 – 2012 Brenner was a Partner in DTB Associates LLP and remains affiliated with the firm as a Senior Consultant. From 1975 – 2000 he held a variety of executive positions with the Corn Refiners Association representing the $10 billion U.S. corn processing industry in domestic and international policy matters.

Mr. Brenner has participated in the development of U.S. legislation and regulation that facilitated development of major food and feed markets, including the market for the country's largest volume food additive. He has extensive experience in U.S.-E.U. agricultural trade relations and served on the Agricultural Technical Advisory Committees for Trade in Grain, Feeds and Oilseeds and Sweeteners on behalf of the Secretary of Agriculture and U.S. Trade Representative.

He has served on the U.S. delegation to the FAO/WHO Codex Alimentarius Commission and many of its committees since 1991. His areas of expertise include international food and feed safety and standards, trade in products of modern biotechnology and the interface between science and trade policy.

Mr. Brenner provides services to clients engaged in: primary crop and animal production; commodity handling and export; biofuels production; food and feed ingredient processing; and supply of food additives, crop protection materials and veterinary drugs.

Representative projects have included:

- Counseling clients on priorities and strategies in the Uruguay and Doha GATT/WTO negotiations, and other multi-lateral negotiations including NAFTA, TPP and TTIP, and other U.S. bi-lateral FTA negotiations since 1985
- Representation on Sanitary and Phytosanitary Standard issues including MRLs for food/feed additives, contaminants and veterinary medicines, and international guidelines on risk assessment and management established by the Codex Alimentarius Commission
- Resolution of bi-lateral disputes including SPS and customs classification issues
- Comparative tariff, trade data and regulatory analysis to assist clients in raw material sourcing and plant siting decisions

ENDNOTES

[1] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:309:0001:0050:EN:PDF. Data extracted December 15 – 23, 2013.
[2] European Commission DG Environment, Brussels, 13 February 2013, ED-AD-HOC-6/2013/01, The Community Strategy for Endocrine Disrupters
[3] http://www.pesticides.gov.uk/Resources/CRD/Migrated-Resources/Documents/O/Outcomes_paper_-_summary_impact_assessment_(Jan_09).pdf
[4] Agronomic and economic impact assessment for possible human health and ecotoxicology criteria for endocrine disrupting substances." The Food and Environment Research Agency, Sand Hutton, York UK. June 2013
[5] World Customs Organization HS Nomenclature 2012.
http://www.wcoomd.org/en/topics/nomenclature/instrument-and-tools/hs_nomenclature_2012.aspx
[6] HTS Chapters included are: 07 - Edible vegetables and certain roots and tubers; 08 - Edible fruit and nuts; peel of citrus fruit or melons; 09 - Coffee, tea, maté and spices; 10 – Cereals; 12 - Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder; 15 - Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes; 17- Sugars and sugar confectionery; 18 - Cocoa and cocoa preparations; 23 - Residues and waste from the food industries; prepared animal fodder.
[7] For example, the Codex MRL database contains MRLs on a product identified as "Calamondin". Trade databases do not contain a product with this identification, but do contain data for the class of fruit (citrus fruits) associated with the botantical identify of Calamondin.
[8] http://epp.eurostat.ec.europa.eu/newxtweb/setupdimselection.do. Extractions after these dates may show modestly different totals due to the continual update system for Eurostat databases.
[9] e.g., pp 7 – 8 in Fungicides, Bactericides and Biologicals for Deciduous Tree Fruit, Nut, Strawberry and Vine Crops, University of California Davis, 2012 at http://plantpathology.ucdavis.edu/files/146650.pdf
[10] Reference 4, p. 34
[11] Minor rounding errors are generated by aggregating Eurostat trade data from the level of individual countries and commodities to global and regional levels. The rounding error at a global level is 0.0015%
[12] WTO Agreement on Agriculture HTS chapters, excluding tobacco and fiber.

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