



EUROPEAN PARLIAMENT  
Directorate-General for External Policies of the Union

STUDY

Policy Department External Policies

# IMPLICATIONS OF REACH FOR THE DEVELOPING COUNTRIES

External Policies

MARCH 2006

EN



EUROPEAN PARLIAMENT

**DIRECTORATE-GENERAL FOR EXTERNAL POLICIES OF THE UNION**

**Policy Department External Policies**

# **IMPLICATIONS OF REACH FOR THE DEVELOPING COUNTRIES**

**POSSIBLE WAYS AND MEANS TO PRESERVE THEIR INTERESTS**

---

**External Policies**

**EP/ExPol/B/Study/2005/10**

**MARCH 2006  
EN**

This study was requested by the European Parliament's Committee on Development.

This paper is published in the following languages:

- Original: EN;
- FR.

Author: Dr Frank Ackerman,  
Global Development and Environmental Institute,  
Tufts University, Boston, USA

Responsible Official: Mr Reinhart PABST  
European Parliament  
Policy Department  
Plateau du Kirchberg  
office: SCH 06B046  
L-2929 Luxembourg  
Tel: +352-4300-22021  
Fax: +352-4300-24296  
E-mail: rpabst@europarl.eu.int

Manuscript completed in March 2006.

Paper copies can be obtained through:  
- E-mail: [poldep-relex@europarl.eu.int]  
- Site intranet: [<http://www.expo.ep.parl.union.eu/expo>]

Brussels, European Parliament, 2006.

The opinions expressed in this document are the sole responsibility of the author and do not necessarily represent the official position of the European Parliament.

Reproduction and translation for non-commercial purposes are authorised, provided the source is acknowledged and the publisher is given prior notice and sent a copy.



EUROPEAN PARLIAMENT

**DIRECTORATE-GENERAL FOR EXTERNAL POLICIES OF THE UNION**

**Policy Department External Policies**

# **IMPLICATIONS OF REACH FOR THE DEVELOPING COUNTRIES**

**POSSIBLE WAYS AND MEANS TO PRESERVE THEIR INTERESTS**

**Abstract:**

The study deals with the proposed regulatory framework for chemicals (REACH, COM (2003) 644 final of 29 Oct.2003), which causes considerable unease among developing countries on account of the burden that REACH may impose on them in terms of their market access to the EU.

The study explains the functioning of REACH and examines the socio-economic impact on the developing countries with special focus on the ACP States, in particular on South Africa, Mozambique, Jamaica, Ghana and Tanzania. It investigates possible changes in the patterns of competitiveness and trade flows. Particular emphasis is placed upon the role of multinationals compared to local producers. Furthermore the study highlights the macroeconomic impact of REACH as far as employment and government revenue are concerned. It also examines the cost and benefit of REACH for the ACP States.

Finally, technical assistance, capacity building, access to information and direct support for small and medium enterprises are examined.

---

**External Policies**

---

**EP/ExPol/B/Study/2005/10**

**MARCH 2006  
EN**

## Table of Contents

<b>Preface</b> .....	<b>vii</b>
<b>Executive Summary</b> .....	<b>viii</b>
<b>Introduction</b> .....	<b>1</b>
<b>1. Regulatory and institutional framework</b> .....	<b>3</b>
1.1. Functioning of the REACH system .....	3
1.2. Comparison with earlier legislation.....	4
1.3. Exemptions under REACH of special interest to the ACP countries.....	4
1.4. Requirements for substances in articles.....	5
1.5. Concerns about REACH and its impacts on ACP.....	5
<b>2. ACP development and trade: How much is subject to REACH?</b> .....	<b>7</b>
2.1. Background on ACP economies.....	7
2.2. Export categories and countries affected by REACH .....	7
2.3. Possible impacts on vegetable oils .....	13
2.4. Substances in articles.....	13
<b>3. Exporting enterprises: Multinationals versus local producers</b> .....	<b>15</b>
3.1. Aluminium .....	15
3.2. Gold .....	17
3.3. Ferroalloys.....	18
3.4. Acyclic Alcohols and Ammonia .....	19
3.5. Essential Oils.....	20
<b>4. Comparison with non-ACP exporters</b> .....	<b>23</b>
4.1. Comparisons: ACP, Chile, and Peru .....	25
4.2. Comparisons: South Africa, Brazil, China, and India .....	27
4.3. ACP trade preferences .....	28
<b>5. Macroeconomic importance of REACH exports</b> .....	<b>29</b>
5.1. Employment Impacts .....	30
5.2. Government Revenues.....	31
5.3. Macroeconomic impacts: what is at stake?.....	32
<b>6. Costs and benefits of REACH for ACP</b> .....	<b>33</b>
6.1. Interpreting the costs of REACH .....	33
6.2. Estimating the cost of REACH to ACP .....	34
6.3. Benefits of REACH: European estimates .....	36
6.4. Benefits of REACH for ACP .....	37
<b>7. Ways and means to preserve interests of developing countries</b> .....	<b>39</b>
7.1. Technical assistance and capacity building .....	39
7.2. Access to information for governments in developing countries.....	40
7.3. Support for SMEs .....	41
7.4. REACH and the GHS .....	41
7.5. One substance, one registration.....	41
<b>Bibliography</b> .....	<b>43</b>
<b>Endnotes</b> .....	<b>46</b>



## List of Tables

Table 2.1. REACH exports for selected ACP countries .....	8
Table 2.2. REACH mining exports.....	9
Table 2.3. REACH chemical exports.....	9
Table 2.4. Number of REACH export categories, by volume tier.....	10
Table 2.5. Major REACH exports by ACP country .....	11
Table 4.1. REACH exports.....	24
Table 4.2. Number of REACH export categories for selected non-ACP countries, by volume tier .....	24
Table 4.3. Major exporters of selected REACH products.....	25
Table 4.4 Major REACH Exports for South Africa, Brazil, China, and India.....	26
Table 5.1. Export dependence in ACP countries, 2004 .....	29
Table 5.2. EU exports, REACH exports, and global exports, 2004 .....	30
Table 5.3 REACH exports and estimated employment .....	31
Table 6.1 REACH registration and testing costs per substance .....	33
Table 6.2. Estimated cost of REACH for ACP .....	35

## List of Appendix Tables (not included in this printed version)

		Page(s)
<b>Appendix I</b>	Complete list and description of all ACP four-digit harmonized system (HS) trade categories potentially regulated by REACH	A2-A8
<b>Appendix II</b>	Number of four-digit HS REACH export categories, by volume tier, for all ACP countries	A9-A11
<b>Appendix III</b>	South African REACH chemical exports, eight-digit HS trade classification, EU export volume > 1,000 tonnes per year	A12-A13
<b>Appendix IV</b>	Harmonized system section 3301 (essential oils) eight-digit export details, major ACP exporting nations	A14-A16
<b>Appendix V</b>	Harmonized system four-digit REACH-affected trade details for all ACP nations	A17-A44
<b>Appendix VI</b>	Harmonized system four-digit REACH-affected trade details for nation groupings and selected non-ACP nations	A45-A85

**Note: Data for all appendices downloaded from Eurostat External Trade database.**

## **Preface**

The following is an assessment of the implications of REACH for developing countries and possible ways and means to preserve their interests. The study was commissioned by the European Parliament, Directorate-General for External Policies.

Main author: Dr. Frank Ackerman, Global Development and Environmental Institute, Tufts University, Boston, US

Project coordinator: Anne-Sofie Andersson, International Chemical Secretariat

Researchers: Rachel Massey, Brian Roach, Elizabeth Stanton and Raya Widenoja at the Global Development and Environmental Institute, Tufts University, Boston, US  
Julien Milanesi, William Parienté and Bernard Contamin at the Research Center on East African Countries, Université de Pau et des Pays de l'Adour, Pau, France  
Prof Patrick Bond and Euripides Euripidou at the University of KwaZulu-Natal School of Development Studies, Durban, South Africa  
Anne-Sofie Andersson and Per Rosander at the International Chemical Secretariat, Gothenburg, Sweden



## **Executive Summary**

This report examines the possible effects of the proposed new European chemicals policy, REACH, on developing countries in general and the African, Caribbean, and Pacific Group of States (ACP) in particular. The report finds that, for the most part, the effects of REACH on ACP countries will be manageable and will not interfere with existing trade patterns.

Although the effects on ACP countries are expected to be minor, there is scope for assistance to those countries to ensure that they reap the greatest possible benefits from the new regulation. Ideally, the implementation of REACH should go hand in hand with programs to assist developing countries in creating domestic systems for sound chemicals management. We offer a number of suggestions for ways in which the EU can ensure that ACP countries have sufficient information about REACH and are able to navigate the transition smoothly.

In this report we have introduced the category “REACH export” referring to all categories of export from ACP countries exported to EU that could potentially be affected by REACH.

### **1. Regulatory and institutional framework**

REACH is not introduced into a regulatory vacuum; rather, it replaces a complex set of existing regulations and directives. Testing and registration are actually less demanding than current rules for chemicals that have been brought to market since 1981.

From the perspective of the ACP countries, on-going negotiations on exemptions for minerals and other substances found in nature are of particular interest. Both the Council and the Parliament amendments to REACH expand the exemptions in these categories. The Council text exempts minerals, ores, and related mining and fuel products from the registration as long as they are not chemically modified. It also exempts “substances occurring in nature” other than those listed above, if they are not chemically modified, unless they meet the criteria for classification as dangerous. The Parliament text, while not identical, takes a similar approach.

### **2. ACP development and trade: How much is subject to REACH?**

The ACP consists of 79 developing countries that have a long-standing special relationship to Europe. South Africa, by far the largest industrial economy in ACP, is in many ways in a category by itself.

REACH is relevant to a subset of ACP's exports to EU. For ACP as a whole, "REACH exports" averaged €6.5 billion per year, or 1.4 percent of GDP in 2002 to 2004. There is, however, wide variation within ACP, so that some countries have virtually no REACH exports while others have relatively high proportions. South Africa alone represents almost two-thirds of REACH exports by value, and the effects of REACH on ACP are largely confined to a subset of 24 countries.

REACH exports are also concentrated in a few commodities, particularly gold, iron and steel, aluminium, platinum group metals, acyclic alcohols, cobalt, and nickel. While other products are also exported, by far the largest ACP trade flows affected by REACH are a few familiar metals. In the 24 ACP countries most affected by REACH, the top two export categories accounted for 63 percent or more -- in many cases, 90 percent or more -- of all REACH exports. Metals are the top REACH exports for 18 countries; essential oils are among the top exports in three countries.

ACP's leading exporter is its largest economy, South Africa, which has the largest mining sector in ACP. Most of South Africa's REACH exports consist of metals – particularly gold, platinum group metals, and iron and steel products. For both gold and platinum, the leading company is a subsidiary of the mining giant Anglo American, and a small number of companies produce virtually all of the nation's output. For iron and steel, the industry is again dominated by a handful of large firms.

A number of categories of ACP exports to the EU include articles that could potentially contain REACH-affected substances. The provisions of REACH could potentially create a small competitive advantage for EU-based importers of articles, compared with EU-based producers.

### **3. Exporting enterprises: multinationals versus local producers**

Major multinational corporations and the largest ACP companies are presumably able to comply with regulatory requirements under REACH, just as well as European firms. At the other extreme, small local firms in developing countries may face real difficulties in understanding and complying with European regulations such as REACH.

Metals, alcohols, and ammonia are generally produced and exported by multinational enterprises, at times working through joint ventures with local firms and national governments. In some countries, such as South Africa, Trinidad and Tobago, and Zimbabwe, large local firms are also involved in these industries. In gold-producing countries other than South Africa, small-scale gold mining exists alongside large commercial mines; government agencies are charged with buying gold from small-scale miners and exporting it, although black-market sales are also common. Essential oils are produced and exported by small local enterprises, which may need help in responding to REACH. South Africa has a combination of multinational corporations and very large national firms in its mining, metals, and chemicals industries. While most production and exports come from these very large firms, there are also a minority of smaller South African businesses that could find the requirements of REACH to be challenging.

In the industries we examined, only essential oils and, to a lesser extent, the smaller South African exporters support the notion that developing country exporters may need help in coping with REACH. Most of ACP's leading exports, including the great majority of South Africa's exports, come from large multinationals, joint ventures, and large ACP firms.

### **4. Comparison with non-ACP exporters**

ACP nations' exports represent less than a tenth of the total REACH-relevant imports to the EU; other developing nations account for four times as much. When expressed as a percentage of

GDP, however, exports of REACH-regulated products play a greater role in some ACP countries than in most other developing nations.

South Africa can be compared with other large, emerging industrial economies in the developing world, such as Brazil, China and India. While South Africa exported about €4.2 billion annually in REACH-affected products over 2002 to 2004, Brazil exported €1.8 billion, China €3.7 billion, and India €1.5 billion. Mining is more important in South Africa, while the chemical industry is more important in Brazil, China, and India. Although REACH exports are a much larger fraction of the economy in South Africa than in these other countries, REACH is unlikely to alter their competitive positions.

### **5. Macroeconomic impacts**

A total of seven ACP countries, including South Africa, have REACH exports that are greater than 2 percent of GDP. The value of REACH exports is largest as a proportion of GDP in Mozambique and Suriname.

Complete employment data are not available for REACH-affected sectors in all ACP nations. We estimate that there are about 315,000 workers in sectors affected by REACH in the ACP countries, more than two-thirds of them in South Africa. (In countries with small-scale gold mining, the numbers will be greater. There is little or no equivalent small-scale production in most other REACH export industries.) These jobs are not at risk due to REACH, since no great economic disruption will result from the regulation; Europe will continue importing the same products from ACP.

For government revenues, again, the best available data are from South Africa. In 2005, the South African public revenue from gold mining taxes and profits from government ownership in mines was 6 percent of industry profits. Mining taxes and profits likely comprise a larger share of revenues for other ACP countries. Some developing countries receive as much as 25 to 30 percent of their public revenues from the mining sector.

### **6. Costs and benefits of REACH for ACP**

The costs of REACH are primarily the costs of registration and testing for any exports that are subject to REACH, plus any economic disruption or losses caused by the regulations. The direct costs are, however, small enough, and the enterprises generally large enough, that there should be little if any economic disruption. The benefits include increased knowledge of chemical hazards and safety, improved protection of workers' health and the natural environment, and potentially reduced liability for future damages.

Based on data on the volume of exports, we estimate that the total cost of REACH to ACP countries will be about €50 million, or €4.6 million per year over the eleven-year phase-in period. South Africa's exports would bear more than half of this cost, about €30 million, or €2.8 million per year. The next largest costs, more than €2 million total or €200,000 per year would fall on Cuba, and Trinidad and Tobago. As a percentage of the value of REACH exports, the costs would be greatest for Liberia and Papua New Guinea.

Several European studies have estimated that REACH will provide substantial benefits, easily outweighing its costs. Some of the benefits may be particularly valuable to developing countries, in the form of protection for the health of workers in export industries. In industries that are increasingly moving to developing countries, such as textiles, regulations such as REACH will provide information and incentives for improved occupational health standards in the exporting nations. REACH may also provide financial savings by identifying emerging environmental hazards before widespread contamination occurs, thus avoiding costly future cleanups.

The purpose of REACH is to generate information, and to identify chemical hazards to human or environmental health before, rather than after, significant damage occurs. To the extent that REACH is successful in achieving this core goal, developing and developed countries alike will benefit. Among other benefits, REACH will create a crucial new resource for developing countries, in the form of a publicly accessible database of chemical hazards and properties. REACH will also facilitate developing countries' efforts to create domestic systems for sound chemicals management.

## **7. Ways and means to preserve developing country interests**

In this section, we look at the ways in which the EU can provide support to developing economies in general, and to the ACP economies in particular, as they begin the process of complying with REACH.

There may not be any need to make further modifications to the provisions of REACH in order to preserve developing countries' interests. REACH already has been modified in response to developing country concerns, in particular by exempting many minerals, a major area of ACP exports. It is equally important to ensure that REACH is not weakened excessively, as developing countries (and others) will benefit from the information about chemicals that will be generated under REACH.

One important way the EU can support the ACP economies in adapting to REACH requirements is to ensure that clear guidance and information are available at each step of the process. Clarification is needed about the extent of REACH requirements, the scope of authorisation, and the European Chemical Agency's responsibilities with regards to capacity building and technical assistance.

Further, a number of developing countries, including some ACP countries such as South Africa, have already made progress in implementing the Globally Harmonised System of Classification and Labelling of Chemicals (GHS). It is important that EU implement the GHS as soon as possible, to avoid creating problems for exporters in developing countries.

Compliance with REACH will be more challenging, and assistance may be necessary, in a minority of cases, such as essential oils, where SME producers and exporters are dealing with a range of products. The cost of such assistance will be limited, because there are so few export sectors where small enterprises are involved.

## Introduction

The European Union is in the final stages of developing its new legislative framework on chemicals, the Registration, Evaluation, and Authorisation of Chemicals, or REACH. In the extensive discussion of the expected impacts of REACH, questions have been raised about the effects of this new chemicals policy on developing countries. In particular, will it harm the economies of the group of African, Caribbean, and Pacific countries (ACP) that historically have been oriented toward exporting to Europe? Statements from ACP as a group, from individual countries, and from business interests in ACP countries demonstrate concerns about the effects of new European regulation on the economies of developing countries. In 2005, the European Parliament requested a study of these issues; this report responds to that request.

Our strategy in this study is to list all the categories of exports from ACP countries that could potentially be affected by REACH (which we refer to as “REACH exports”), and then to identify the countries where these exports are most important, and the enterprises involved in producing and exporting these goods. This approach makes it possible to assess the impacts, positive and negative, that could result from REACH. At one extreme, a major multinational company exporting a small number of products in huge volume should find the burdens of REACH to be comparatively light; at the other extreme, small local enterprises in developing countries, exporting a large number of products in small volumes, could find it more challenging to comply with REACH. Indeed, we have found examples of both extremes, although the multinationals account for a much larger share of REACH exports.

To define the concept of “REACH exports” in more detail: The categories of substances discussed in REACH do not correspond closely to the available trade data. To create an approximate match, we examined detailed lists of export categories. Specifically, we reviewed the hundreds of “four-digit” categories within the minerals, chemicals, precious metals, and base metals sections of the Harmonised System for trade data. In that data system, shorter numbers refer to broader categories, while longer numbers refer to narrower categories. For example, “inorganic chemicals” is a two digit category, “fluorides and complex fluorine salts” is a four digit category, and “dipotassium hexafluorozirconate” is an eight digit category.

We excluded only those, such as fuels, which we were certain would be exempt from REACH. The remaining list, of all those export categories that we judged to be certainly, probably, or even possibly subject to REACH, is shown in Appendix I; these are what we mean by “REACH exports.” We suspect that this list errs in the direction of over-inclusiveness; it is intended to present a worst case or upper-bound on REACH impacts. Using this list, we analyzed REACH exports by country and commodity, producing the calculations and analysis presented in this report, beginning in Section 2.

Throughout most of the report, “REACH exports” refers only to exports from ACP. However, in Section 4 we compare ACP's REACH exports to the rest of the world's exports of the same goods to Europe. There we also refer to “REACH exports” from other countries to the EU.



# 1. Regulatory and institutional framework

The development of REACH began in 1999 when environment ministers across the EU recognized that there was a need for a new regulatory framework on chemicals. The European Commission produced an initial consultation document, invited comments from a range of stakeholders, and produced a revised draft of the proposed legislation in 2003. The European Parliament completed a First Reading of the legislation in November 2005, and the European Council agreed on a Common Position a few weeks later.

Both the Parliament and the Council made several amendments to the proposed regulation. Since there are differences between the Parliament and Council versions, the proposal will go through a Second Reading, potentially in October 2006; REACH then could enter into force a few months later. In this study, where differences exist between the Council and the Parliament versions of the legislation, we draw on the Council text. The Council version is slightly more stringent in aspects of the regulation relevant for ACP exporters, so conclusions drawn from this version are a “worst case scenario” for exporters.

## 1.1. Functioning of the REACH system

REACH consists of several main parts: registration, evaluation, authorisation, and restriction. The requirements under REACH will apply to all EU producers as well as to importers of substances produced outside the EU. While all substances subject to REACH will require registration and evaluation, only a small minority are expected to require authorisation or restriction.

Registration will be required for substances produced in or imported into the EU in volumes above one tonne per producer per year (tpa), with the result that an estimated 30,000 substances will be affected. Only chemical substances will be registered, not preparations (mixtures) or articles (final products). The data required for registration depend on the volume of the substance, and are quite limited for substances under 10 tpa. The registration requirements for substances that are already on the market will be introduced gradually over a period of eleven years. Substances produced in high volumes and CMR (carcinogenic, mutagenic, or toxic to reproduction) substances will be registered within three years after the legislation enters into force, followed by other substances in descending volumes. Companies producing the same substance will have to share certain data in order to avoid duplication in testing, and to reduce the associated costs and administrative burdens. Registrations will be submitted to the new European Chemicals Agency, which will be located in Helsinki, Finland.

The Agency will evaluate test proposals from producers or importers of substances above 100 tpa. All substances suspected to present a risk to human health or to the environment can be further investigated. It is not yet decided whether further investigation is the responsibility of the Agency or the Member States.

Authorisation will be needed for the use of substances of very high concern (CMR, PBT\*, vPvB†, and other substances of equivalent concern). Producers, importers, or users, either on their own or together with others, can apply for an authorisation for one or more uses and for one or more substances at the same time. The final requirements for authorisation will be decided during the second reading of REACH.

## **1.2. Comparison with earlier legislation**

REACH is not being introduced into a regulatory vacuum; rather, it will replace a complex set of earlier regulations and directives. Earlier legislation distinguished between what are often called “existing” substances (those on the market before 1981) and “new” substances. For existing substances there is no obligation to deliver information about the properties of the substance (regulation 793/93). A few substances of potentially high risk to human health or the environment have been evaluated by the member states. In contrast, relatively strict requirements apply to chemicals placed on the market since 1981, and to chemicals categorized as “dangerous.” Under Directive 67/548/EEC, all substances placed on the market since 1981 have to be registered if produced in volumes above ten kilograms. Data requirements under this Directive increase with ascending volume, and are actually more extensive than the requirements under REACH. Both the Council and the Parliament versions of REACH continue to place stricter requirements on new than on existing substances in the one to ten tonnes volume tier.<sup>1</sup>

Directive 99/45/EC established rules for classification, packaging, and labelling of dangerous preparations, but imposed no other requirements for new preparations. Past legislation also required creation of a Safety Data Sheet for all substances classified as dangerous (Directive 2001/58/EC) and this requirement will continue under REACH. In addition, Directive 76/769/EEC set out restrictions for certain substances that also will be restricted under REACH.

## **1.3. Exemptions under REACH of special interest to the ACP countries**

Exports to EU from the ACP countries include minerals, ore and ore concentrates, metals, scrap, pesticides, other chemicals, and apparel. Some of these exports are partly or entirely exempted from REACH.

Polymers are exempt from the registration and evaluation requirements, although they may be subject to authorisation and restriction.<sup>2</sup> Active ingredients of pesticides and biocides, as well as pharmaceuticals, are also exempt from registration requirements as they are regulated under separate legislation.<sup>3</sup> Moreover, REACH does not regulate waste, although it does regulate substances produced from waste or during waste treatment.

Annex II of the proposed legislation lists several dozen additional substances that are exempted from the registration requirement; these include a range of food additives or components, vitamins, plant products, and other familiar, well-characterized substances. Annex III contains additional exemptions from registration, including incidental by-products resulting from exposure to environmental factors, storage, end-use conditions, or other circumstances; hydrates

---

\* Persistent, bioaccumulative and toxic.

† Very persistent and very bioaccumulative.



of a substance formed by contact with water; and basic elemental substances whose safety profile is well known, such as hydrogen and oxygen.

The Commission's proposed legislation exempted “minerals, ores, and substances occurring in nature if they are not chemically modified during their manufacturing,” unless they meet the criteria for classification as dangerous. It also exempted natural gas, crude oil, and coal.<sup>4</sup> Both the Council and the Parliament versions of REACH expand these exemptions, reducing the scope of the legislation. The Council text exempts minerals, ores, ore concentrates, natural gas, liquefied petroleum gas, natural gas condensate, process gases and components thereof, crude oil, coal and coke as long as they are not chemically modified, regardless of whether they are classified as dangerous. It also exempts “substances occurring in nature” other than those listed above, as long as they are not chemically modified, unless they meet the criteria for classification as dangerous.<sup>5</sup> The Parliament text differs only slightly on these questions.<sup>6</sup>

#### **1.4. Requirements for substances in articles**

REACH requires manufacturers and importers to provide information on substances contained in articles under certain circumstances. According to the Council text, producers and importers of articles must register a substance in an article if the substance is present in those articles in quantities greater than one tonne per producer or importer per year, and if the substance is intended to be released “under normal or reasonably foreseeable conditions of use.”<sup>7</sup>

In addition, the European Chemical Agency must be notified of a substance in an article if it is present in quantities greater than one tonne per producer or importer per year, if it is present at more than 0.1 percent of the weight of the article, and if it meets the criteria that would make it subject to authorisation. These provisions can be waived if the producer or importer shows that humans or the environment will not be exposed “during normal or reasonably foreseeable conditions of use including disposal.”<sup>8</sup>

Finally, the Agency can require producers or importers to submit a registration for a substance in an article not covered by the provisions above if the one-tonne threshold is met, and the Agency suspects that the substance will be released from the articles and poses a health or environmental risk. To date, no procedures have been established to control the content of substances in articles imported to the EU.

#### **1.5. Concerns about REACH and its impacts on ACP**

In June 2005, the ACP Council of Ministers adopted a resolution on the draft REACH legislation. The resolution notes that mining products play a significant role in the economies of nearly two-thirds of the ACP countries. The resolution supports the general goals of REACH, but expresses “deep concern” about the “potential negative impact of REACH on exports, particularly in commodities such as minerals and metals, from ACP to the EU.” It also suggests that REACH may also have “adverse effects on other production sectors such as the textile industry.” Furthermore, the Ministers state that they are “convinced” both “that REACH will be expensive to implement,” and that REACH will have a negative effect on small, medium-sized, and micro-enterprises, especially “emerging small-scale miners.” They express concern that the

costs imposed by REACH may “lead to disinvestment from ACP States,” potentially resulting in loss of employment for millions of people.<sup>9</sup>

Addressing these concerns, the ACP Ministers make several suggestions, including requests that the EU exempt ores, minerals, and alloys from the registration and authorisation requirements, exempt metals in massive form from the authorisation requirements, and reduce bureaucratic requirements and attendant costs for ACP countries.

According to both the Parliament and Council texts, minerals and ores are exempted from the registration, addressing the issue that had been the main concern of the ACP countries before the first reading of the REACH legislation. More recently, industry groups such as the Chamber of Mines of South Africa have expressed concerns about authorisation requirements for ores. They anticipate that many ores will require authorisation, since they contain impurities that are known to be of very high concern, such as arsenic in copper ore. Since the proportion of hazardous impurities varies widely, even between different batches of ore from the same mine, the industry is concerned that every batch of ore may require a separate authorisation. The result, they believe, would be a very burdensome and expensive regulatory system for the mining industry and its customers.

In fact, authorisation procedures under REACH have not yet been fully defined. Thus it is premature to estimate their cost impacts. This concern is addressed further in Section 6 of this report.

## **2. ACP development and trade: How much is subject to REACH?**

### **2.1. Background on ACP economies**

The ACP Group of States consists of 79 developing countries that have a long-standing special relationship to Europe. Many of them are ex-colonies that have traditionally received preferential access to European markets. ACP includes 48 countries in Africa (all of sub-Saharan Africa), 16 in the Caribbean, and 15 in the Pacific. Founded in 1975, ACP has elaborated its relationship with Europe through a series of agreements, most recently the Cotonou agreement of 2000.

As of 2003, ACP's population of 743 million people represented 12 percent of the world population, while its total GDP of €434 billion amounted to only 1.3 percent of world output. Almost half of ACP's GDP comes from just two countries, South Africa (35 percent) and Nigeria (12 percent). South Africa, by far the largest industrial economy in ACP, is in many ways in a category by itself. Much of our discussion will treat South Africa separately from the rest of ACP.

Although average incomes are low in most ACP nations, there is a wide range within the group. In 2004, ten ACP countries had GDP per capita over US\$ 10,000 (€ 8200) in purchasing power parity terms.<sup>10</sup> ACP countries are heavily dependent on trade, with the world in general and with Europe in particular. ACP exports to the world amount to roughly one-third of GDP.<sup>11</sup> ACP exports to the EU amounted to €44.8 billion, or just over 10 percent of ACP GDP, in 2003.<sup>12</sup> Seven ACP countries have exports to Europe of more than 20 percent of GDP.<sup>13</sup>

### **2.2. Export categories and countries affected by REACH**

REACH is only relevant to a fraction of ACP's exports to Europe. Some types of chemicals, minerals, and ores will be affected (in addition to the minor impact on substances in articles, discussed below). In the widely used Harmonised System for trade data, which classifies exports and imports into 23 major sections, REACH affects portions of sections V (mineral products), VI (chemicals), XIV (precious metals, stones, and jewellery), and XV (base metals). Possible effects on section III (vegetable oils) are discussed below.

We reviewed the list of four-digit export categories within these classifications, identifying all of those that are potentially affected by REACH. Our goal was to err on the side of inclusiveness: when in doubt, we included any borderline or ambiguous cases, excluding only those which we were certain would not be subject to registration under REACH (see the discussion about REACH coverage in section 1.) We identified 235 categories of “REACH exports” – that is, exports to the EU which are potentially subject to REACH, including all the uncertain ones (these export categories are listed in Appendix I). This is, by design, a worst case scenario; the true list of exports subject to REACH is likely a subset of our list. The value of shipments, in euros, is available for all of these categories; in addition, the volume of shipments, in tonnes, is available for most categories.

For ACP as a whole, REACH exports averaged 1.4 percent of GDP in 2002 to 2004. There is, however, wide variation within ACP, with some countries having virtually no REACH exports

and others having higher proportions. In eleven countries, REACH exports averaged one percent of GDP or more in 2002 to 2004, as shown in Table 2.1. In Mozambique and Suriname, REACH exports were more than ten percent of GDP.

In order to focus on the countries where REACH will have the greatest effect, we applied three criteria: we selected all countries where REACH exports exceeded one percent of GDP, or where the value of REACH exports exceeded €10 million, or where the volume of shipments of at least one detailed category of REACH exports exceeded 1000 tonnes. The 24 ACP countries that meet at least one of these criteria are shown in Table 2.1. These 24 countries account for more than 99 percent of all REACH exports from ACP.

<b>Table 2.1. REACH exports for selected ACP countries</b> (2002-2004 average)		
	<i>million euros</i>	<i>% of GDP</i>
Cameroon	75	0.6%
Comoros	3	1.0%
Congo	7	0.2%
Congo, Dem. Rep.	35	0.7%
Cote d'Ivoire	18	0.2%
Cuba	37	0.1%
Dominican Republic	91	0.6%
Equatorial Guinea	46	1.9%
Ghana	189	2.8%
Guinea	54	1.7%
Jamaica	273	3.7%
Liberia	1	0.4%
Madagascar	16	0.4%
Mozambique	561	12.4%
Namibia	10	0.3%
Papua New Guinea	1	0.03%
South Africa	4,238	3.0%
Sudan	48	0.3%
Suriname	104	11.4%
Tanzania	257	2.8%
Trinidad and Tobago	190	2.0%
Uganda	13	0.2%
Zambia	64	1.6%
Zimbabwe	100	1.3%

Although in some cases we examine ACP totals, our analysis focuses largely on these 24 countries. The other 55 ACP nations report a broad range of very small quantities of many different REACH exports. In those instances where small, non-industrial nations report small exports of industrial products, it seems likely that they are re-exporting goods produced elsewhere (if not simply making mistakes in data classification or data entry). Since these ambiguous data amount to much less than one percent of all REACH exports, we have not investigated them further or included them in our cost estimates.

There are several reasons why many ACP countries are so little affected by REACH. Some are primarily agricultural exporters; some island nations have service-based, often tourist-oriented, economies; and some countries depend on exports of products such as fuels which are exempt from REACH.

#### *Mining and chemicals exports*

Tables 2.2 and 2.3 show the principal categories of REACH exports, separately for South Africa and for all other ACP countries. Some €5.9 billion, more than 90 percent of the total, consists

of mining products, as shown in Table 2.2.<sup>14</sup> (“Chapter 81” includes cobalt, manganese, and other, less common metals.) In mining, both in South Africa and in the rest of ACP, the top six products represent 95 percent or more of all REACH exports. Gold, iron and steel, aluminium, platinum, cobalt, copper, manganese, and nickel together account for the overwhelming majority of REACH exports from ACP.

Chemical exports amount to almost €0.6 billion, as shown in Table 2.3. South Africa has a diverse range of chemical exports, discussed in Section 3. Chemical exports from other countries

are quite concentrated, with 90 percent in the top six products, and almost half consisting of acyclic alcohols, i.e. methanol and ethanol. (“Chapter 29” refers to organic chemicals.)

<b>Table 2.2. REACH mining exports</b> (2002-2004 average)			<b>Table 2.3. REACH chemical exports</b> (2002-2004 average)		
<b>South Africa</b>			<b>South Africa</b>		
	<i>€ million</i>			<i>€ million</i>	
Gold	1,993	51%	Acyclic hydrocarbons	29	9%
Iron, steel, ferroalloys	1,005	26%	Reaction initiators	22	7%
Platinum group metals	682	17%	Prepared binders	18	6%
Aluminium, aluminium oxide	59	2%	Hydrazine, hydroxylamine, and their inorganic salts	18	6%
Copper	35	1%	Salts of oxometallic or peroxometallic acids	15	5%
Manganese, manganese oxides	33	1%	Organic composite solvents	15	5%
Subtotal of above	3,807	97%	Subtotal of above	118	38%
<b>All REACH mining exports</b>	<b>3,929</b>	<b>100%</b>	<b>All REACH chemical exports</b>	<b>310</b>	<b>100%</b>
<b>All other ACP</b>			<b>All other ACP</b>		
	<i>€ million</i>			<i>€ million</i>	
Aluminium, aluminium oxide	1,041	53%	Acyclic alcohols	122	46%
Gold	538	27%	Chapter 29 confidential trade	61	23%
Iron, steel, ferroalloys	175	9%	Ammonia	20	8%
Chapter 81 confidential trade	50	3%	Essential oils	20	7%
Cobalt	48	2%	Heterocyclic compounds	12	4%
Nickel	26	1%	Colouring matter	4	1%
Subtotal of above	1,879	95%	Subtotal of above	238	90%
<b>All REACH mining exports</b>	<b>1,969</b>	<b>100%</b>	<b>All REACH chemical exports</b>	<b>265</b>	<b>100%</b>
<b>ACP total</b>			<b>ACP total</b>		
	<i>€ million</i>			<i>€ million</i>	
Gold	2,530	43%	Acyclic alcohols	132	23%
Iron, steel, ferroalloys	1,162	20%	Chapter 29 confidential trade	61	11%
Aluminium, aluminium oxide	1,103	19%	Acyclic hydrocarbons	30	5%
Platinum group metals	682	12%	Essential oils	26	4%
Cobalt	61	1%	Reaction initiators	23	4%
Copper	55	1%	Prepared binders	22	4%
Subtotal of above	5,593	95%	Subtotal of above	293	51%
<b>All REACH mining exports</b>	<b>5,898</b>	<b>100%</b>	<b>All REACH chemical exports</b>	<b>575</b>	<b>100%</b>

### *Volume of exports*

REACH will regulate chemicals and mineral products based on the volume of sales in Europe. Most ACP countries have very few REACH exports in the top volume tiers, for which REACH registration and testing requirements are the most demanding. Table 2.4 shows the number of four-digit categories of REACH exports, by country, in the four volume tiers regulated by REACH. This is not an exact count of the number of separate substances exported to EU, since

four-digit categories may contain multiple substances. In many cases, however, a country has only a single export within a four-digit category. The only countries with more than 20

**Table 2.4. Number of REACH export categories, by volume tier**  
(based on 2002-2004 average export volumes, tonnes per year)

	1,000+	100-1,000	10-100	1-10	Total (1+)
Cameroon	1	1	5	9	16
Comoros	0	0	1	1	2
Congo	1	2	3	3	9
Congo, Dem. Rep.	1	3	3	6	13
Cote d'Ivoire	0	2	7	16	25
Cuba	4	6	10	14	34
Dominican Republic	2	1	6	9	18
Equatorial Guinea	2	0	0	2	4
Ghana	1	1	7	3	12
Guinea	2	1	2	3	8
Jamaica	2	0	2	5	9
Liberia	1	0	1	4	6
Madagascar	0	2	1	5	8
Mozambique	1	1	4	7	13
Namibia	1	2	1	4	8
Papua New Guinea	1	0	0	0	1
South Africa	48	45	48	26	167
Sudan	0	0	0	1	1
Suriname	1	2	1	6	10
Tanzania	0	4	5	2	11
Trinidad and Tobago	7	3	6	5	21
Uganda	0	0	2	3	5
Zambia	4	2	2	1	9
Zimbabwe	3	1	2	8	14

categories above the 1 tonne threshold are South Africa, Cuba, Côte d'Ivoire, and Trinidad and Tobago. The only countries with more than two categories in the top tier, above 1000 tonnes per year, are South Africa, Cuba, Trinidad and Tobago, Zambia, and Zimbabwe. While Table 2.4 presents data on REACH export volumes for the 24 ACP nations selected using our criteria, Appendix II provides volume data for all ACP nations.

All of the ACP countries that are affected by REACH are heavily dependent on one or two export categories. Among the top 24 countries, one or two categories account for at least 63 percent of the value of the country's REACH exports in every case, and at least 90 percent for 16 countries, as shown in Table 2.5.

ACP's leading mineral and metal products (as listed in Table 2.2) are the dominant REACH exports for 18 countries, including South Africa. Essential oils (volatile oils with the characteristic odour or flavour of the plants from which they are made, used in perfumes and flavourings) are leading exports from Comoros, Côte d'Ivoire, and Madagascar. Methanol, an acyclic alcohol, is the principal REACH export from Equatorial Guinea, a spin-off from the country's rapidly expanding oil industry. Most of Equatorial Guinea's exports go to North

America and Asia, however, rather than Europe; and most of the country's exports to Europe (and elsewhere) consist of petroleum. Trinidad and Tobago is also an oil-producing country, and petroleum is its top export to Europe. Trinidad and Tobago has an extensive industrial economy, built in part on its oil and gas production, and exports a range of manufactured goods. Its

**Table 2.5. Major REACH exports by ACP country**

	<i>major exports</i>	<i>% of REACH exports (2002-04 average)</i>
Cameroon	Aluminium	95%
Comoros	essential oils	98%
Congo	copper, cobalt	80% *
Congo, Dem. Rep.	cobalt, copper	90% *
Cuba	nickel, iron	82%
Cote d'Ivoire	essential oils, gold	92%
Dominican Republic	Ferroalloys	85%
Equatorial Guinea	acyclic alcohol	88%
Ghana	aluminium, gold	100%
Guinea	aluminium, gold	99%
Jamaica	Aluminium	100% *
Liberia	ferrous products, gold	94%
Madagascar	essential oils, gold	96%
Mozambique	Aluminium	100%
Namibia	zinc, copper	99%
Papua New Guinea	monocarboxylic acids	71%
South Africa	gold, platinum	63%
Sudan	Gold	100%
Suriname	aluminium, gold	98%
Tanzania	Gold	97%
Trinidad and Tobago	acyclic alcohol, ammonia	75% *
Uganda	Gold	92% *
Zambia	cobalt, copper	97% *
Zimbabwe	ferroalloys, nickel	86%

*\*percentage of identifiable trade, excluding a major category of confidential trade*

principal REACH exports are acyclic alcohols (ethanol and methanol) and ammonia. Papua New Guinea's principal REACH exports are monocarboxylic fatty acids mainly derived from palm oil, one of the country's main export products.

#### *South Africa<sup>15</sup>*

ACP's leading exporter is its largest economy, South Africa. Only one quarter of South Africa's total exports to the EU come under REACH guidelines. Coal and diamonds (the country's top exports to Europe), and many manufactured and agricultural exports are not affected. In REACH export sectors, South Africa is the fourth-largest supplier of iron and steel to the EU, has a diversified, growing chemical industry, and has the largest mining sector in ACP.<sup>16</sup> We identified more than 200 REACH export categories in South Africa, far more than in any other country.

South Africa's complex and diversified chemical industry employs roughly 200,000 people, accounting for €7 billion of value added, more than 4 percent of GDP.<sup>17</sup> Its growth has been driven by the demand for explosives in the mining industry, the abundance of cheap coal, and the political environment before 1994, which put a premium on national self-sufficiency (DTI, 2005, 20). The industry is dominated by three major companies, AECI, SASOL, and Dow Sentrachem. In the words of the South African Department of Trade and Industry (DTI), “a few large upstream producers who are responsible for between 60 percent and 70 percent of the chemical sector turnover dominate SA chemical sector...” (DTI, 2005, 20).

Most of South Africa's chemical production, however, is in product lines that are exempt from REACH: liquid fuels, plastics, polymers, rubber, and pharmaceuticals account for 71 percent of the industry.<sup>18</sup> Much of the production in the remainder of the industry is in high-volume, basic chemicals, according to the DTI (DTI, 2005, 20).

South Africa is a net importer of chemicals, largely due to its imports of pharmaceuticals and fine chemicals. At the same time, it is a significant exporter of other chemical products. Most of South Africa's chemical exports to Europe are basic industrial chemicals, with a smaller quantity of finished products such as cosmetics and inks. No single product or small group of products dominates the list, as seen in Table 2.3; rather, there are exports of moderate quantities of a variety of industrial chemicals. Only 21 percent of South Africa's chemical exports go to the EU; markets in Africa, Asia, and North America are more important to the industry.<sup>19</sup>

Most of South Africa's REACH exports consist of metals – particularly gold, platinum group metals, and iron and steel products. South Africa is the world's largest producer of both gold and platinum. In gold, South Africa has 40 percent of world reserves, and produced 14 percent of world output in 2004. In platinum, South Africa is even more dominant, with 88 percent of world reserves, and 58 percent of world output in 2004.<sup>20</sup> South Africa is also important, but not as dominant, in iron and steel. In 2005, the country produced roughly 40 million tonnes of iron ore (3 percent of world output), of which 25 million tonnes were exported as ore and 15 million tonnes were used locally.<sup>21</sup> South Africa is the 19th largest steel producer and the eighth largest net exporter in the world. In 2005, only 14 percent of South Africa's steel exports went to the EU, while 41 percent went to the Far East and 21 percent to other countries in Africa.<sup>22</sup>

The largest REACH export from South Africa's iron and steel industry is ferroalloys, an intermediate product consisting of iron alloyed with elements such as chromium, manganese, and silicon that add desirable properties for steelmaking. In 2004, South Africa produced 4.3 million tonnes of ferroalloys, almost a fifth of world production of 23 million tonnes, and second only to China's 8.6 million tonnes (Jorgenson 2004). Exports amounted to at least 3.4 million tonnes in 2004, or about 80 percent of production.<sup>23</sup>

Under REACH, alloys are treated as mixtures: when alloys are imported into Europe, each of the substances in the alloys must be registered. There are, however, only a limited number of substances used in alloys. Ferrochromium makes up 72 percent of South Africa's ferroalloy production, and ferromanganese and silicomanganese another 23 percent (Jorgenson 2004).



### **2.3. Possible impacts on vegetable oils**

It is uncertain whether or not one additional category of ACP exports to Europe will be regulated under REACH. Vegetable oils are classified as complex substances under the European Inventory of Existing Commercial Substances (EINECS), and therefore could be subject to REACH. The Parliament version of REACH exempts vegetable oils, and the Council version is ambiguous on this point but could be interpreted as exempting vegetable oils. Thus it appears likely that vegetable oils will be exempted, and they have not been included in the calculations earlier in this section.

If vegetable oils were regulated under REACH, the impact would again be concentrated on just a few countries and products. In 2004, ACP exports to the EU in section III (animal and vegetable fats and oils) totalled €248 million. Of this total, 82 percent came from two countries: Papua New Guinea exported €182 million of palm oil and coconut oil to Europe, and Senegal exported €21 million of groundnut (peanut) oil. The next largest section III exporters, with €3 million to €8 million each, were Côte d'Ivoire, Ghana, Vanuatu, Gambia, South Africa, and Sudan. No other ACP country exported more than €1.5 million.

If vegetable oils were covered by REACH, our estimate of ACP's total REACH exports would increase by about 4 percent, and Senegal, Gambia (a groundnut oil exporter) and Vanuatu (coconut oil) would join our list of the ACP countries most affected by REACH. Gambia and Vanuatu are very small economies where vegetable oil exports amount to 2 to 3 percent of GDP. If its vegetable oils were regulated, Papua New Guinea would become the third most heavily affected ACP country, measured by REACH exports as a percent of GDP.

### **2.4. Substances in articles**

REACH requires submission of data on substances in articles under certain circumstances, as explained in Section 1 of this report. A number of categories in the ACP-EU trade data include articles that could potentially contain REACH-affected substances. These include electrical equipment; textiles and clothing; articles made from metals, plastics, rubber, wood, and leather; optical, photographic, and cinematographic apparatus; articles of stone, plaster, cement, asbestos, and mica; and miscellaneous items such as footwear, mattresses, and furniture.

Concern has been expressed about the possible effects of REACH on the textiles industry. The resolution on REACH by the ACP Council of Ministers, described in Section 1 of this report, suggests that REACH may have an adverse effect on the textiles industry in ACP countries.<sup>24</sup> On the other hand, a study conducted within Europe drew attention to the potential vulnerability of the European textiles industry (Enviro Tex GmbH, 2005). This study emphasized the fact that the textiles industry uses a large number of low-volume specialty substances, which could pose difficulties for testing and registration. The study suggests that REACH may offer a competitive advantage to importers of textiles, since REACH will apply to the substances used in European production regardless of whether they are present in the finished product. In contrast, producers outside of Europe have the option to use any substance in production, provided that the substance is not incorporated into the finished product.

A number of toxic chemicals are used in textile production; some of these remain in the finished garment or other textile product.<sup>25</sup> Some chemicals are applied deliberately to textiles to impart certain qualities, such as colour or crease resistance. Other chemicals are added as “auxiliaries” in manufacturing, for example to protect fibres during weaving or to increase the affinity of textile fibres for dye. Residues of these auxiliaries may remain in finished textile products. Many of these chemicals are hazardous. For example, textiles can contain carcinogenic azo dyes, heavy metals, brominated flame retardants, and formaldehyde. Dyes used on cotton often must be “fixed” chemically after dyeing, to ensure that they adhere to the fibre (KEMI, 1997).

Exports of textiles from ACP countries to the EU are worth nearly €1.4 billion per year. Three countries account for more than two-thirds of this total. The top textile exporters among the ACP countries are Mauritius, with sales of €0.5 billion, South Africa, with nearly €0.3 billion, and Madagascar, with somewhat less than €0.2 billion. Textiles are only a small part of South Africa’s overall exports. In contrast, textiles and apparel account for about half of the total exports to the EU from Madagascar, and about a third from Mauritius.

Production of cotton textiles in Madagascar is largely coordinated by two large companies. Almost 85 percent of cotton production in the country is coordinated by Haysema, a company owned 62 percent by the government and 38 percent by a French cotton company. Haysema provides seeds, fertilizers, and insecticides to farmers, purchases cotton from them, and processes the cotton for export. The majority of producers supplying cotton to Haysema are smallholders with less than 5 hectares of land.<sup>26</sup> Most of the remainder of cotton is produced by the Cotona Group, a vertically integrated company that operates in all stages of production from cotton growing to garment manufacturing. Cotona operates the primary spinning mill in Madagascar and supplies fabrics to many garment manufacturers in the country, as well as operating its own manufacturing operations.<sup>27</sup> Thus, although small producers are involved in cotton production in Madagascar, large companies are responsible for exporting the finished products to Europe.

### **3. Exporting enterprises: Multinationals versus local producers**

In this section we examine the enterprises that produce and market some of the leading ACP exports that could be subject to REACH. In particular, we attempt to identify the role of multinationals and large companies, government enterprises, and small and medium-sized local enterprises based in ACP nations. Major multinational corporations are presumably able to cope with regulatory requirements under REACH, just as well as European firms; the same may also be true for the largest ACP-based companies. At the other extreme, small local firms in developing countries may face real difficulties in understanding and complying with European regulations such as REACH.

The exports and countries examined here are:

- Aluminium in Mozambique, Cameroon, Jamaica, and Suriname;
- Gold in Tanzania, Suriname, and Ghana;
- Ferroalloys in the Dominican Republic and Zimbabwe;
- Alcohols and ammonia in Trinidad and Tobago, and Equatorial Guinea;
- Essential oils in Madagascar and Comoros; and
- Mining, metals, and chemicals in South Africa.

Our findings in brief are as follows:

- Metals, alcohols, and ammonia are generally produced and exported by multinational enterprises, at times working through joint ventures with local firms and national governments. In Trinidad and Tobago, and in Zimbabwe, large local firms are also involved in these industries.
- In gold-producing countries other than South Africa, small-scale gold mining exists alongside large commercial mines; government agencies are charged with buying gold from small-scale miners and exporting it, although black-market sales are also common.
- Essential oils are produced and exported by small and medium sized enterprises (SME's), which may need help in responding to REACH.
- South Africa has a combination of multinational corporations and very large national firms in its mining, metals, and chemicals industries. While most production and exports come from these very large firms, there are also a minority of smaller South African businesses that could find the requirements of REACH to be challenging.

In the industries we examined, only essential oils and, to a lesser extent, the smaller South African exporters support the notion that developing country exporters may need help in coping with REACH. Most of ACP's leading exports, including the great majority of South Africa's exports, come from large multinationals, joint ventures, and large ACP firms. Small-scale gold mining does not lead to small-scale marketing; it is either handled by a national government agency, or is sold on the black market, neither of which involves any legitimate small exporters.

#### **3.1. Aluminium**

Among ACP countries other than South Africa, aluminium and aluminium oxides are by far the largest REACH exports. Of the twelve countries exporting these products, Mozambique,

Cameroon, Jamaica, and Suriname account for 99 percent of production (excluding that of South Africa). In all four countries, major multinational companies are the leading force in the industry, often operating through joint ventures with the national government and/or other local partners.

### *Mozambique*

Mozambique's export revenue came mostly from its fisheries until its economy changed dramatically with the inauguration of the Mozal smelter in 2000 (Southern African Regional Poverty Network 2004, 33). Mozal belongs to an international consortium whose lead owner is the Australian mining firm BHP Billiton (47 percent). Other owners are Mitsubishi (25 percent), the Industrial Development Corporation of South Africa (24 percent), and the government of Mozambique (4 percent). In 2003, the plant increased output by almost 50 percent to 407,000 tonnes,<sup>28</sup> and aluminium exports accounted for 58 percent of total Mozambican exports (Yager, 2003a,1). Aluminium can be exported to Europe using the special duty-free status of Mozambican goods. By 2002, nearly 90 percent of Germany's aluminium imports came from Mozal.<sup>29</sup>

### *Cameroon*

In 2004, Cameroon exported €91 million in unwrought aluminium to the EU. Alucam is the only aluminium operation in the country; the Alucam smelter and rolling mill are co-owned by the government of Cameroon (53 percent) and the Canadian multinational Alcan (47 percent) (Bermúdez-Lugo 2004). Alcan reported a major expansion in Cameroon operations in 2004, increasing plant capacity from 90,000 tonnes to 3.5 million tonnes a year.<sup>30</sup> Alcan is the world's second largest producer of unwrought aluminium, and also produces many other products. Its global revenues in 2003 totalled €22.9 billion.<sup>31</sup>

### *Jamaica*

Jamaica is one of the world's leading producers of bauxite (the ore from which aluminium oxide is produced) and of aluminium oxide, also known as alumina. In 2003, Jamaica produced 13.4 million tonnes and 3.8 million tonnes respectively of bauxite and alumina (Bermúdez-Lugo 2004, 8-9). The sector is dominated by three joint venture projects of international companies.

The Alcoa Minerals of Jamaica Aluminium Company (Jamalco), owned one-half by of Alcoa and one-half by the Jamaican government, owns and manages several bauxite mines, an alumina refinery, and port facilities in Jamaica; its capacity recently expanded to 2.65 million tonnes.<sup>32</sup> The West Indies Alumina Company (Windalco) alumina refinery, owned by a subsidiary of Glencore International (93 percent) and by the Jamaican government (7 percent), includes a smelter, several mines and its own port. Its production capacity is 1.26 million tonnes of alumina, and it employs 1200 workers.<sup>33</sup> The Alumina Partners of Jamaica (Alpart), owned by Glencore (65 percent) and Hydro Aluminium (35 percent), expanded its facilities in 2003 and exports through its own port. The refinery's capacity is 1.65 million tonnes of alumina and it employs 1300 workers. The Jamaican government profits from exports through its licensing arm in the Ministry of Mining and partial ownership of Windalco and Jamalco (Bermúdez-Lugo 2004, 8-9).

### *Suriname*

Alcoa has operated in Suriname since 1916, and is the main producer of aluminium both through its subsidiary Suralco and through a joint venture with BHP Billiton. The industry is expanding, with two large projects scheduled to be completed in 2005. Bauxite accounted for 70 percent of the Suriname's export earnings in 2003 and 15 percent of GDP (Fong-Sam 2003,5).

### **3.2. Gold**

Gold mining in ACP countries is conducted by two categories of producers: large multinationals, and artisanal and small-scale miners. The latter include men, woman and even children who operate with rudimentary tools for low profits, often using mercury at great cost to their health and the environment (Dreschler, 2001).<sup>34</sup> The gold they mine is usually sold either to black-market traders or government buyers, depending on the laws and effectiveness of government programs. The artisanal miners will not be directly affected by REACH as they do not export gold themselves, but sell it either to the government or on the black market. In every country we examined, however, a majority of gold production comes from large-scale mines.

### *Tanzania*

In 2004, Tanzania exported €311 million in gold to the EU, making it the largest ACP exporter after South Africa. Output was 48,000 kilograms in 2003 (Yager 2003b). The gold mining industry in Tanzania consists of many large mining companies and consortium projects, as well as about 500,000 artisanal miners.<sup>35</sup> The industry was deregulated in 1987, allowing both private companies and artisanal miners to operate legally. Exports of gold have increased since 2000, mainly due to new large-scale mining projects. Some of the largest gold-mining companies in the world operate in Tanzania, such as AngloGold Ashanti (a subsidiary of Anglo American, South Africa's largest gold producer), Barrick, and Resolute Mining, as well as other multinational gold companies (Yager 2003b). Large local companies that mined gold in Tanzania in the past have generally been bought out by even larger multinationals.

By some estimates 25 percent of the gold produced comes from artisanal and small-scale miners. The government is obligated to buy gold produced by small-scale miners but a lack of infrastructure and resources has given rise to many middlemen and black-marketers (Dreschler, 2001). Partly to address this problem, the government of Tanzania has invested in the country's first gold refinery (owned 80 percent by the government and 20 percent by Italian investors), which will buy gold directly from small-scale miners at market prices.<sup>36</sup>

### *Suriname*

Suriname exported €74.5 million worth of gold to the EU in 2004. Only two large gold companies operate in Suriname, Canarc Resources Corporation (Benzdorp is the local company) and Cambior (Rosebel Gold Mines). Canarc is a Canadian company listed on the Toronto Stock Exchange whose major shareholders include Barrick Gold and Kinross Gold Corporation.<sup>37</sup> Cambior is the sixth largest Canadian gold producer; its Rosebel mine is expected to operate for ten years and produced 8,400 kilograms in its first year (Fong-Sam 2003).<sup>38</sup>

The rest of Suriname's gold mining is carried out by artisanal miners, the majority of whom operate on illegal claims. Suriname has been experiencing a gold rush that started in 1993

following the end of a civil war.<sup>39</sup> The government does have a purchasing program for gold that is the only authorized buyer from small-scale miners, but it only collects an estimated 25 percent of actual production (Heemskerk 2000, 21). Illegal sales of gold in connection with money laundering, often through jewellers, are common (Veiga 1997, 8).

### *Ghana*

Ghana was the second largest producer of gold in Africa after South Africa in 2003, although its gold industry has recently experienced a downturn (Coakley 2003a,1). In 2003, two companies accounted for 85 percent of Ghana's gold production, AngloGold Ashanti, and Gold Fields Ghana. Gold Fields Ghana is owned by the South African company, Gold Fields Ltd. (71 percent), the Canadian company IAMGold (19 percent), and the Ghanaian government (10 percent).<sup>40</sup> Gold Fields Ltd. is a South African company that describes itself as one of the world's largest un-hedged producers of gold, with global production of 120,000 kilograms yearly and listings on several European stock exchanges.<sup>41</sup>

The Newmont Mining Corporation, a U.S. company and the world's second largest gold mining company after Anglo American, also announced investments in two new Ghanaian mines in 2003 (Coakley 2003a). Other companies included the mid-tier Golden Star Resources (with its main assets in Ghana and production of 5,700 kilograms in 2005)<sup>42</sup> and Redback Mining, from Vancouver (with production of 3,500 kilograms per year).<sup>43</sup> In addition, there are about 100,000 artisanal miners of diamonds, gold, and other minerals, some of whom mine illegally. Small-scale miners sell their gold either on the black market or to the state agency in charge of marketing gold (even if they mine illegally), at "near market prices" (Hilson and Potter 2003, 250-254).

## **3.3. Ferroalloys**

### *Dominican Republic*

In 2003, all of the Dominican Republic output of the alloy ferronickel, 27,200 tonnes, was produced by Falcondo. The company is owned by Falconbridge Ltd. of Canada (85 percent), the government of the Dominican Republic (11 percent), and Redstone Resources Inc. (4 percent). The company mines, mills, and smelts its own nickel laterite ores in the Dominican Republic (Bermúdez-Lugo 2003, 6-7). Falconbridge is the fourth largest producer of refined nickel in the world, and a significant regional producer of ferronickel. Beyond copper and nickel, it also has zinc and aluminium investments and operates in 18 countries.<sup>44</sup>

### *Zimbabwe*

Zimbabwe exported €163 billion in ferrochrome in 2003, and chromium and ferroalloys accounted for 36 percent of the country's mineral production. The ferroalloy industry in Zimbabwe is dominated by two private companies (Coakley 2003b, 1-2).<sup>45</sup> One company, Zimbabwe Alloys, was bought from Anglo American in 2005 by a local consortium.<sup>46</sup> The other private company is a local firm called Zimbabwe Mining and Smelting Company (Zimasco), which is the world's fifth largest ferrochrome producer.<sup>47</sup> The industry also includes smaller operations controlled and marketed by the government-owned Zimbabwe Mining Development Corporation (Coakley 2003b, 1-2).

### 3.4. Acyclic Alcohols and Ammonia

The leading exports of industrial chemicals from ACP countries other than South Africa are acyclic alcohols (ethanol and methanol) from Trinidad and Tobago, and Equatorial Guinea, and ammonia from Trinidad and Tobago.

#### *Trinidad and Tobago*

Trinidad and Tobago has a significant chemical industry, with ten ammonia and seven methanol plants.<sup>48</sup> The country also recently added a plant producing ethanol.<sup>49</sup> Both methanol and ammonia are downstream products of natural gas production from Trinidad and Tobago's energy sector.

Several large international companies, and some medium-sized international and regional companies are involved in the production of ammonia, as well as the government of Trinidad and Tobago. One of the most recently built plants, commissioned in 2004, is a joint project of German and U.S. companies as well as CL Financial Ltd. of Trinidad and Tobago (Bermúdez-Lugo 2003). CL Financial is a diversified regional conglomerate spanning several industries, with operations in 26 countries.<sup>50</sup> Another contract signed in 2005 for the construction of the largest ammonia/urea plant in the Western Hemisphere was from a joint venture between the government and private investors, mainly from the island's insurance industry, calling themselves Trinidad Energy Investments Limited (TEIL).<sup>51</sup> Also in 2005, Terra Industries, a U.S. chemical company, announced it would partner with CF Industries, a U.S. fertilizer producer, and ANSA McAl Limited to construct a large ammonia manufacturing facility.<sup>52,53</sup> ANSA McAl is a diversified regional conglomerate with before tax profits of €60 million in 2004.<sup>54</sup> The remaining multinational involved in ammonia production is Yara International, a subsidiary of the Norwegian energy company, Norsk Hydro. It owns and operates one plant and also operates two other plants belonging to the Trinidad Nitrogen Co. (Tringen), of which it owns 49 percent. An entity controlled by the national government, owns the remaining 51 percent of Tringen.

Trinidad and Tobago also exports both methanol and ethanol. The methanol industry is highly consolidated, consisting of two companies with seven plants. Methanol Holdings Trinidad Limited (MHTL), owned in majority by CL Financial and 43 percent by a German investment firm, Consolidated Energy Limited (CEL), owns six plants, the newest of which cost about €400 million and will double the company's output.<sup>55</sup> Methanex, a Canadian company with methanol production facilities in three countries and listings on the Toronto Stock Exchange as well as the NASDAQ, owns the remaining two plants, with a combined production of 2.5 million tonnes.<sup>56,57</sup> A subsidiary of CL Financial opened the island's first ethanol manufacturing facility in 2005 and planned to produce 250 to 450 million litres per year.<sup>58</sup>

#### *Equatorial Guinea*

Equatorial Guinea is economically dependent on the production and export of petroleum products. Methanol, as a by-product of oil and natural gas production, began in 2001. Methanol output comes entirely from the Atlantic Methanol Production Co., which is owned by the Marathon Oil Corporation (45 percent), Noble Energy (45 percent), and Equatorial Guinea's

government (10 percent) (Mobbs 2004). Marathon Oil and Noble Energy are both U.S. oil companies, based in Houston, Texas.

### **3.5. Essential Oils**

Essential oils are products of plants giving the odours and tastes characteristic of the particular plant, such as cinnamon and lavender. They are usually produced through steam distillation or the pressing of the rinds of a plant. Six ACP countries exported an annual average of more than 50 tonnes of essential oils to EU in 2002-2004; data on exports of essential oils from these six countries are presented in Appendix IV. We looked in further detail at the industry in Madagascar, the largest essential oils exporter to the EU after South Africa, and its neighbour, Comoros, for which 98 percent of its REACH exports to the EU consisted of essential oils in the same period.

Plants for essential oils are often grown by small scale farmers, who sell their products to companies with distillation and packaging facilities.<sup>59</sup> In the ACP countries we examined, the sector appears to consist entirely of small to medium farmers and manufacturers. Following the discussion of the industry in Madagascar and Comoros, we briefly examine the importers of essential oils and the likely impacts of REACH in this sector.

#### *Madagascar*

Madagascar, the ACP's largest essential oils exporter after South Africa, sent an average of €6 million of essential oils to the EU in 2002 to 2004. Vanilla is one of Madagascar's most important and well-known exports, but essential oils from many other plants that grow well in Madagascar are also being established as export products, for example, ylang ylang, clove, palmarosa, geranium, niaouli, and helichryse.<sup>60</sup> Growing consumer interest in essential oils and in organic products has spurred production. Currently 80 to 90 percent of the oils are produced for export, and are exported "raw" due to the lack of manufacturing infrastructure.<sup>61</sup> The government of Madagascar does not provide support for essential oils or other organic products.

The international aid community, including agencies such as GTZ, USAID, and UNIDO, has been active for more than a decade, with several major aid projects aimed at developing the industry, particularly the organic production of essential oils, in an effort to raise rural incomes. GTZ started one of the first projects, called Protrade, in 1994, offering marketing and production advice aimed at securing entrance for growers to the EU organic market.<sup>62</sup> In 2005, USAID started a program called "Business And Market Expansion" or Bamex, to support and encourage the production of essential oils and other Malagasy products.<sup>63,64</sup> The Bamex site lists about 20 small to medium-sized companies that produce essential oils or related substances.<sup>65</sup> Pronabio, a professional producers and traders association in agribusiness, is also working on developing the essential oils market and certifying organic products, with approximately 20 members involved in the production or export of essential oils.<sup>66,67,68</sup>

#### *Comoros*



In Comoros, also known as the Perfume Isles, exports of essential oils account for 98 percent of REACH exports. The group of islands exports 80 percent of the world's supply of ylang-ylang essence, a main ingredient in many perfumes. The essential oil of vanilla is another important export. As in Madagascar, distilleries use their own crops but also buy from smaller farmers, since producing for the export market requires quality controls of the distilled products and registration processes that most small farmers cannot afford on their own.<sup>69</sup> Distillation of vanilla and ylang-ylang was formerly carried out mainly by French companies, but as unprofitable plantations have been closed, farmers have begun to set up their own small distilleries.<sup>70</sup>

Comoros is among the poorest nations in Africa. The country has few natural resources, and its chief exports, vanilla, essential oils, cloves, and copra, are subject to large price fluctuations.<sup>71</sup> Necessary infrastructure for development is lacking – many villages are not connected to roads and the ports are rudimentary.<sup>72</sup>

#### *Who will bear the costs for importing essential oils?*

The importers and suppliers to the EU will bear the costs of meeting REACH requirements for essential oils imported in quantities of more than 1 tonne. It has been suggested that the ability to comply with REACH could become a decisive determinant in importers selection of suppliers (Jones 2005, 20). The European Federation of Essential Oils, which represents importers to the EU and producers in the EU, has emphasized that their 150 members are mainly SME's and would have difficulty complying with REACH. They have suggested exempting essential oils from REACH along with the other substances exempted in Annex III<sup>73</sup>.

Even if essential oils are not exempted, however, the overall costs of REACH compliance will be low. As Appendix IV shows, there are only a limited number of essential oils exported from ACP to the EU in quantities affected by REACH.

In fact, a 2005 paper on the subject estimated that 170 essential oils (57 percent of all the essential oils sold in the EU) are produced in amounts less than one tonne and are not subject to REACH. Another 120 essential oils (40 percent) are below 100 tonnes and will need to be registered within eleven years. Only ten essential oils fall in the range requiring registration within six years. The report also points out that safety and toxicity information is available for many of the best-known products (Jones 2005, 19). This suggests that suppliers in ACP countries, who supply only a subset of the essential oils on the European market, would be able to comply with REACH, if international aid programs are available to provide technical and financial assistance.

### **3.6. South Africa**

Finally, the exporting enterprises of South Africa are in a class by themselves. Some of these exporters have already appeared in this section, as foreign investors in gold production in other African countries. In general, both the mining and metals industries and the chemicals industry are dominated by small numbers of very large South African and multinational companies; there are, however, some smaller producers that play a secondary role in the country's REACH exports.

### *Mining and metals*

South Africa is the world's leading producer of gold, with four major companies producing more than 28,000 kilograms annually.<sup>74</sup> Mergers and consolidations have recently reduced the number of companies in the industry so that now six companies produce 99 percent of the country's output, led by AngloGold Ashanti, which is partially (32 percent) owned by the British multinational mining company Anglo American. According to South Africa's Chamber of Mines the other five large-scale gold producers are Harmony, a publicly-traded South African company that also has operations in Australia and Papua New Guinea; Driefontein Consolidated, Kloof Division, and Beatrix, which are all owned by Gold Fields Ltd.; and the South Deep Joint Venture, a joint venture between Placer Dome (50 percent) and Western Areas (50 percent).<sup>75,76,77</sup> Barrick Gold Corporation, one of the largest gold mining multinationals in the world, purchased a controlling share in Placer Dome in January 2006.<sup>78,79</sup>

In platinum group metals, where South Africa's position in the world market is even more dominant than in gold, there are three big companies – Anglo Platinum, Impala Platinum, and Lonmin Platinum – which accounted for about 93 percent of production in 2002 (Coakley 2002, 26). Anglo Platinum, owned in part by Anglo American (45 percent), is the world's largest producer, and Impala Platinum (Implats) is the world's third-largest producer. Implats also owns 27 percent of Lonmin Platinum, the remaining large producer, as well as shares in some smaller start-ups.<sup>80</sup>

South Africa's iron and steel industry is based on its extensive reserves of iron ore, with an annual output of 40 million tonnes. One company, Kumba Resources (partially owned by Anglo American), produces three-quarters of the total, from two huge mines. One of its mines has a rail link of more than 800 kilometres to a dedicated deepwater port.<sup>81</sup>

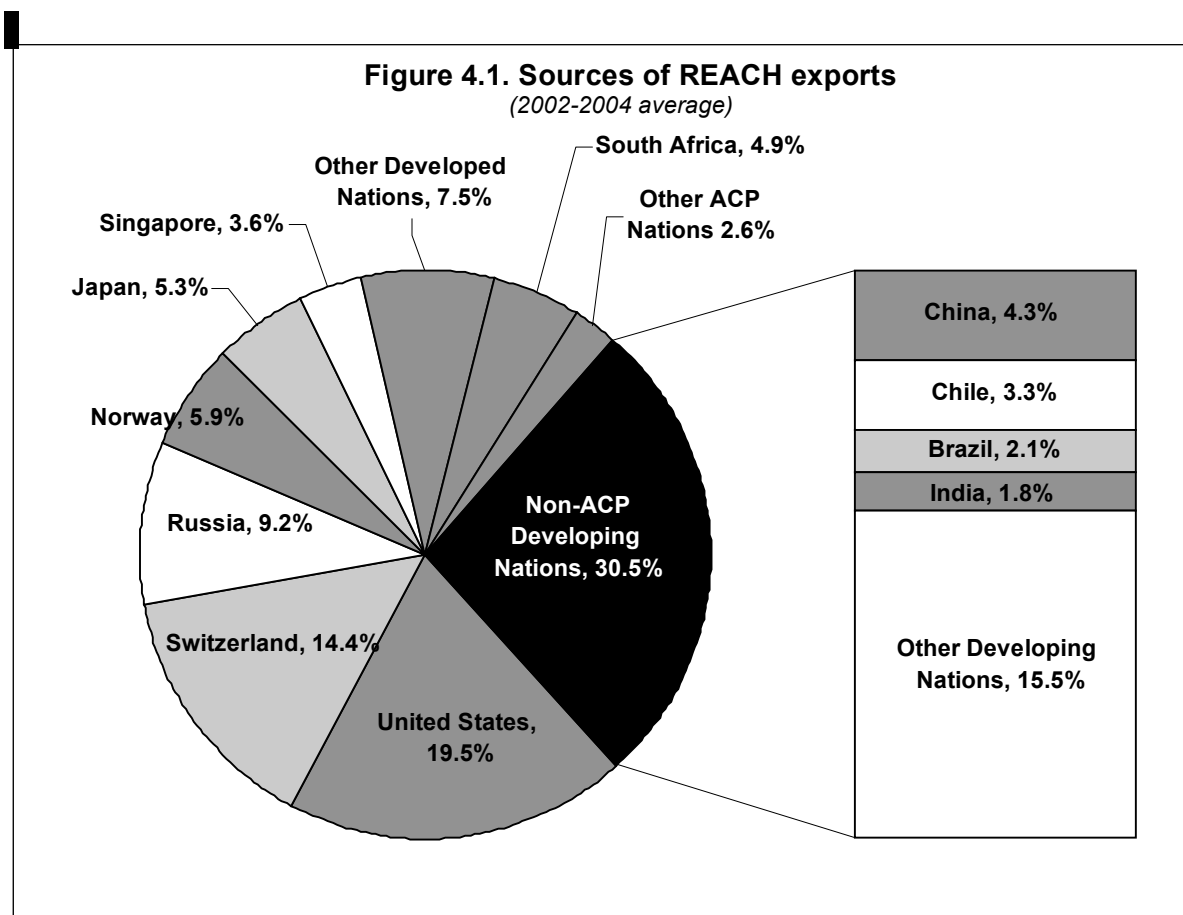
While the majority of the iron is exported as ore, and 15 million tonnes are used locally, South Africa also exports ferroalloys on a large-scale. South Africa is second only to China in production of ferroalloys, with output of more than four million tonnes and exports of more than three million tonnes annually; industry sources report that there are seven companies producing ferroalloys in South Africa.<sup>82</sup> There are six carbon steel producers in South Africa, including both a subsidiary of Mittal Steel, the world's largest steel company, and a subsidiary of Anglo American.<sup>83</sup>

### *Chemicals*

South Africa's chemical industry is dominated by three large companies: AECI, SASOL, and Dow Sentrachem. AECI is a large South African company, with annual turnover of more than €1 billion. SASOL is an even larger South African company, with turnover of more than €9 billion, which is listed on the New York Stock Exchange. The third company, Dow Sentrachem, is a wholly-owned subsidiary of Dow Chemical.<sup>84</sup> Other major international players active in the market include Hoechst, Bayer, Shell Chemicals, BASF, and Rohm and Haas. Several other companies involved in the production (much for local use) of specialty or high performance chemicals are all large regional companies, or subsidiaries of a larger international or trade groups. One of the main marketers of speciality chemicals is Chemical Services (Chemserve), which comprises the 19 speciality chemical subsidiaries and joint ventures of the AECI group.<sup>85</sup>

## 4. Comparison with non-ACP exporters

In this section we compare the impact of REACH on ACP nations and on other exporters to the EU. Import data for 2002 to 2004 for all trade products that potentially may be regulated by REACH were available for a total of 211 countries and territories, including the 79 ACP nations. More than half of all REACH exports come from the top five industrial countries: the United States, Switzerland, Russia, Norway, and Japan (see Figure 4.1). South Africa is number six, and is the largest developing country exporter of REACH-regulated products, followed by China, Chile, Brazil, and India.<sup>86</sup>



ACP exports represent only 7.5 percent of total REACH exports; other developing nations accounted for four times as much, and industrial countries for even more. From the point of view of some ACP countries, however, REACH products account for a significant share of GDP. As shown in Table 4.1, REACH exports represent more than 10 percent of GDP in Mozambique and Suriname, and more than 2 percent in five others. But among the largest non-ACP developing nations, REACH exports never represent more than 4 percent of GDP, and exceed 2 percent only in Chile and Peru. (Several ex-Soviet countries have REACH exports between 1 percent and 5 percent of GDP, representing a combination of mining and industrial exports; these seem less directly comparable to most of ACP.)<sup>87</sup>

<b>Table 4.1. REACH exports</b> (2002-2004 average)		
<b>ACP Nations</b>		
	<i>% of GDP</i>	<i>million €</i>
Mozambique	12.4%	561
Suriname	11.4%	104
Jamaica	3.7%	273
South Africa	3.0%	4,238
Tanzania	2.8%	257
Ghana	2.8%	189
Trinidad and Tobago	2.0%	190
Zimbabwe	1.2%	100
<b>Non-ACP Developing Nations</b>		
	<i>% of GDP</i>	<i>million €</i>
Chile	4.0%	2,827
Peru	2.2%	1,238
Turkey	0.6%	1,372
Malaysia	0.5%	508
Brazil	0.4%	1,770
Venezuela	0.4%	345
China	0.3%	3,702
India	0.3%	1,524

The greater dependence of ACP countries on REACH exports could simply reflect the location of major mineral resources. Alternatively, it could be a result of historical trade patterns dating back to the colonial or early postcolonial era; or it could be due to current trade preferences for ACP members. Trade preferences are discussed later in this section.

Another important difference between ACP countries and the largest non-ACP countries is the degree to which REACH exports are concentrated in just a few items. Section 2 of this report demonstrated that, with the exception of South Africa, ACP countries export fewer than 35 REACH-affected substances each (see Table 2.4). In contrast, the largest non-ACP developing countries export as many as 183 REACH substances (see Table 4.2). In addition, non-ACP countries have far more REACH exports in the higher volume categories.

We next consider the extent of direct trade competition between ACP and other exporters. For six major products, Table 4.3 shows the 10 largest exporters to the EU. For five of the six products listed in the table, ACP supplies between 10 percent and 40 percent of total EU imports; in the case of copper, ACP's share is less than 2 percent. (South Africa is number 11 on the list of countries supplying copper to the EU; Zambia, the next ACP supplier, is number 24.) Although the ACP countries are major suppliers of these products to the EU, they clearly face competition from both developing and industrial nations.

Does REACH affect ACP and non-ACP developing countries differently? As suggested in Table 4.1, a principal difference is that REACH affects a bigger fraction of the economy in several ACP countries. The closest comparison may be with Chile and Peru, the non-ACP countries with the on which REACH has the largest impacts.

<b>Table 4.2. Number of REACH export categories for selected non-ACP countries, by volume tier</b>					
<i>(based on 2002-2004 average export volumes, tonnes per year)</i>					
	<i>1,000+</i>	<i>100-1,000</i>	<i>10-100</i>	<i>1-10</i>	<i>All 1+</i>
Brazil	56	41	37	18	152
Chile	14	14	22	29	79
China	108	41	24	10	183
India	69	46	33	15	163
Peru	9	15	12	14	50

**Table 4.3. Major suppliers of selected REACH exports**  
(2002-2004 average, in million euros; *ACP nations in bold italics*)

<b>Gold</b>		<b>Iron, steel, ferroalloys</b>		<b>Aluminium</b>	
Switzerland	2,456	Russia	1,174	Norway	2,324
<b><i>South Africa</i></b>	<b><i>1,993</i></b>	<b><i>South Africa</i></b>	<b><i>990</i></b>	Russia	1,460
Peru	832	Norway	667	<b><i>Mozambique</i></b>	<b><i>560</i></b>
Russia	572	Ukraine	581	Iceland	365
Australia	444	Brazil	503	Brazil	358
Hong Kong	401	Turkey	371	Switzerland	285
Uzbekistan	351	China	347	<b><i>Jamaica</i></b>	<b><i>250</i></b>
Canada	274	India	313	United States	235
<b><i>Tanzania</i></b>	<b><i>249</i></b>	Romania	279	Romania	193
Chile	241	South Korea	263	Canada	181
<b><i>Other ACP</i></b>	<b><i>289</i></b>	<b><i>Other ACP</i></b>	<b><i>173</i></b>	<b><i>Other ACP</i></b>	<b><i>292</i></b>
Other developing	467	Other developing	2125	Other developing	1036
Other industrial	416	Other industrial	905	Other industrial	282
WORLD	8,985	WORLD	8,691	WORLD	7,822
<b>Platinum group metals</b>		<b>Acyclic alcohols</b>		<b>Copper</b>	
<b><i>South Africa</i></b>	<b><i>682</i></b>	Russia	175	Chile	2,174
United States	379	Chile	147	Russia	733
Russia	228	Saudi Arabia	145	Bulgaria	325
Switzerland	223	United States	129	Peru	187
Canada	46	Norway	107	Kazakhstan	108
Norway	38	Libya	105	Switzerland	90
Japan	28	<b><i>Trinidad&amp;Tobago</i></b>	<b><i>81</i></b>	United States	84
South Korea	13	Japan	47	Norway	78
Colombia	10	<b><i>Equatorial Guinea</i></b>	<b><i>41</i></b>	Australia	53
China	5	Malaysia	27	Japan	39
<b><i>Other ACP</i></b>	<b><i>0.3</i></b>	<b><i>Other ACP</i></b>	<b><i>10</i></b>	<b><i>ACP total</i></b>	<b><i>57</i></b>
Other developing	7	Other developing	186	Other developing	236
Other industrial	8	Other industrial	74	Other industrial	17
WORLD	1,666	WORLD	1,273	WORLD	4,157

#### 4.1. Comparisons: ACP, Chile, and Peru

Chile has a much higher per capita income than Peru, and most ACP countries. With an emerging industrial sector, Chile exports numerous products to Europe. Chile and Peru are similar to each other, and to many ACP countries, in having two mineral exports that account for almost all of their REACH exports. Specifically, copper makes up 77 percent of Chile's REACH exports, and gold 9 percent. For Peru the proportions were roughly reversed, with gold representing 67 percent and copper 15 percent of REACH exports. (The sums of copper and gold together, 86 percent for Chile and 82 percent for Peru, are quite similar to the figures for ACP countries in Table 2.3.) In copper, Chile alone accounts for half of EU imports, and Peru is a distant fourth place, as shown in Table 4.4. In gold, Peru is second only to South Africa among producing nations, and Chile is eighth.<sup>88</sup>

**Table 4.4 Major REACH Exports for South Africa, Brazil, China, and India**  
(2002-2004 average)

<b>South Africa</b>		
	<i>€ millions</i>	<i>% of total</i>
Gold	1993	47%
Iron, steel, ferroalloys	1005	24%
Platinum group metals	682	16%
Industrial chemicals	201	5%
Aluminium	59	1%
Other	299	7%
<b>Total</b>	<b>4239</b>	<b>100%</b>
<b>Brazil</b>		
	<i>€ millions</i>	<i>% of total</i>
Gold	71	4%
Iron, steel, ferroalloys	688	39%
Platinum group metals	0	0%
Industrial chemicals	394	22%
Aluminium	354	20%
Other	262	15%
<b>Total</b>	<b>1770</b>	<b>100%</b>
<b>China</b>		
	<i>€ millions</i>	<i>% of total</i>
Gold	1	0%
Iron, steel, ferroalloys	386	10%
Platinum group metals	5	0%
Industrial chemicals	2,003	54%
Aluminium	69	2%
Other	1,238	34%
<b>Total</b>	<b>3702</b>	<b>100%</b>
<b>India</b>		
	<i>€ millions</i>	<i>% of total</i>
Gold	0	0%
Iron, steel, ferroalloys	360	24%
Platinum group metals	1	0%
Industrial chemicals	807	53%
Aluminium	3	0%
Other	354	23%
<b>Total</b>	<b>1524</b>	<b>100%</b>

As in the ACP mining countries, Chile and Peru have a few very large mining enterprises, some of them joint ventures of multinational companies and major local companies, and some of them government enterprises. Chile, the world's leading copper producer, accounted for more than 35 percent of global copper production, or 4.2 million tonnes, in 2003 – most of it produced by the state-owned company Codelco.<sup>89</sup> Large private mining companies make up the rest of the sector. Anglo American owns four mines and a smelter in Chile, as well as 44 percent of another mine owned jointly with Falconbridge and a Japanese consortium.<sup>90</sup> Antofagasta, a very large Chilean company, has majority ownership in three mines.<sup>91</sup> BHP Billiton is the majority owner of one of the largest copper mines in the world, with a consortium of Chilean and Japanese investors, and also owns two additional mines.

Chile is also a major gold producer, although its output is essentially a by-product of copper mining. The multinational mining companies Barrick, Placer Dome, Newmont, Bema Gold Corporation, Meridian Gold and Kinross Gold all play important roles in Chile's gold industry.<sup>92</sup>

Peru is a leading producer of copper and Latin America's largest exporter of gold. As in several ACP countries, it has a minority of small-scale miners operating alongside a few major enterprises. The gold sector is dominated by two mines making up 68 percent of total output in 2003. The first mine is jointly owned by Newmont (51 percent) and a Peruvian company (44 percent); the second is owned by Barrick. Of the remaining total production, medium-sized producers account for 19 percent, and artisanal and small-scale

miners about 14 percent. One of the medium producers is Andean American, a Canadian gold mining company.<sup>93</sup>

The copper industry is structured similarly, with two mines producing about 70 percent of Peru's national total. The first is owned by Southern Copper Corporation, a leading multinational mining company. The second is owned jointly by BHP Billiton, Teck-Cominco (a large Canadian company), and Mitsubishi. Phelps Dodge Corporation and Doe Run Peru, large U.S. companies, along with Anglo American, were other major copper producers. Medium and small-scale miners supplied about 5 percent of the total.<sup>94</sup>

#### **4.2. Comparisons: South Africa, Brazil, China, and India**

South Africa's more diverse economy can be compared to other large, emerging industrial economies in the developing world, such as Brazil, China, and India. South Africa's GDP per capita is slightly higher than Brazil's and much higher than that of China or India. But with much larger populations, both Brazil and India have GDP roughly three times as large – and China nine times as large – as that of South Africa. Still, South Africa exports more REACH-affected products to the EU than any of these countries. While South Africa exported about €4.2 million annually in REACH products from 2002 to 2004, Brazil exported €1.8 million, China €3.7 million, and India €1.5 million. REACH exports are also a much larger fraction of the economy in South Africa (3.0 percent) than in Brazil (0.4 percent), China (0.3 percent), or India (0.3 percent), as shown in Table 4.1.

Table 4.4 compares the major REACH exports for South Africa, Brazil, China, and India. Industrial chemicals represent only 5 percent of REACH exports for South Africa, compared to 22 percent for Brazil, 54 percent in China, and 53 percent for India. The monetary value of South Africa's industrial chemical exports to Europe is roughly half that of Brazil, one-quarter that of India, and only one-tenth that of China. Thus impacts of REACH on the chemical industry are more important for Brazil, India, and especially China, than for South Africa.

Where South Africa's chemical industry is dominated by a handful of large domestic corporations, Brazil's industry is a diverse array of multinationals and competitive local companies. In the leading industrial state of São Paulo, nine large companies play a particularly important role, each reaching sales of more than €400 million.<sup>95</sup> Brazil's Chemical Industry Association is composed of 160 companies, at least 30 of which are multinationals like Bayer and DuPont, primarily engaged in organic (basic petrochemical products) and inorganic (fertilizers, chlorine, and industrial gases) chemical production. The industry sales reached an estimated €56 billion in 2005, half of it in industrial chemicals.<sup>96</sup>

In India, the chemical industry is one of the country's oldest industries and has contributed significantly to industrial and economic growth since independence in 1947. In particular, India's agrochemical and petrochemical industries are some of the fastest growing sectors of the economy. The country has recently emerged as one of the largest and cheapest producers of pharmaceuticals, accounting for nearly 8.5 percent of global production by volume. Forty-five multinational companies such as Novartis and Herdilla Chemicals have created local operating bases, generally through acquisitions of domestic companies that have demonstrated their profitability on the global market.<sup>97</sup>

Conversely, mining plays a much larger role in the economy of South Africa, compared to Brazil, India, or China. The greater magnitude of REACH exports in South Africa reflects above all the country's unparalleled position in mining.

### **4.3. ACP trade preferences**

A final factor in the comparison of ACP and other developing countries is the role of trade preferences. The trade relationship between the ACP nations and the EU is currently governed by the ACP-EU Partnership Agreement signed in Cotonou on 23 June 2000.<sup>98</sup> The Cotonou Agreement allows for the continuation of non-reciprocal trade tariff preferences, set forth in the Lomé Conventions, until 31 December 2007. By this date, the ACP nations either individually or in groups are scheduled to negotiate reciprocal Economic Partnership Agreements with the EU compatible with the World Trade Organisation rules. The eventual goal is equal tariffs and access to markets, although the process generally will be asymmetric, with the EU taking the lead in removing any remaining trade barriers. The Cotonou Agreement also continues the availability of aid to the ACP nations through the European Development Fund.

Yet the importance of these provisions could easily be exaggerated, especially outside of agriculture. On average, the tariff reduction benefit that ACP countries receive has been estimated at less than one percent (Brenton, 2003). Many ACP countries are already exempt from European tariffs. The Everything But Arms trade policy, adopted by the EU in 2001, extends duty and quota free access to all products originating in the least developed countries, except arms and ammunition.<sup>99</sup> The eligible countries include 39 ACP members and 9 others; many, though not all, of the ACP countries most affected by REACH are in this group.

In view of the apparently limited benefits of current EU trade preferences for ACP members, at least outside agriculture, it seems unlikely that there will be major changes in their position vis-à-vis other developing countries as a result of REACH.



## 5. Macroeconomic importance of REACH exports

In this section, we look at the macroeconomic significance of REACH exports in ACP countries. While REACH exports represent a significant share of the economies of several countries, we do not anticipate that these exports will be jeopardized by REACH.

The value of REACH exports is largest, as a proportion of GDP, in Mozambique and Suriname (see Table 5.1). A total of seven countries, including South Africa, have REACH exports that are greater than 2 percent of GDP. For the 24 ACP countries in Table 5.1 as a whole, REACH exports are 1.9 percent of GDP; for the countries other than South Africa, the ratio is only 1.4 percent.<sup>100</sup>

	GDP, billions of euros	REACH exports / GDP	All exports to EU / GDP
Cameroon	12.8	0.7%	12.9%
Comoros	0.3	0.8%	2.7%
Congo	3.5	0.2%	18.6%
Congo, Dem. Rep.	5.2	0.5%	5.0%
Cote d'Ivoire	12.5	0.02%	17.6%
Cuba	27.3	0.05%	1.1%
Dominican Republic	15.7	0.9%	2.8%
Equatorial Guinea	3.6	1.2%	23.5%
Ghana	7.1	0.9%	14.5%
Guinea	3.2	1.0%	11.6%
Jamaica	7.0	4.0%	6.7%
Liberia	0.4	0.4%	14.8%
Madagascar	3.5	0.9%	15.4%
Mozambique	4.9	15.0%	17.2%
Namibia	3.7	0.5%	24.4%
Papua New Guinea	2.9	0.06%	12.9%
Sudan	17.4	0.2%	0.9%
Suriname	0.9	14.5%	18.5%
Tanzania	9.1	3.5%	7.4%
Trinidad and Tobago	9.7	1.8%	4.8%
Uganda	5.5	0.3%	4.8%
Zambia	4.4	2.4%	4.1%
Zimbabwe	4.6	2.5%	9.7%
<b>subtotal without South Africa</b>	<b>165.0</b>	<b>1.4%</b>	<b>6.9%</b>
South Africa	171.5	2.3%	9.1%
<b>Total</b>	<b>336.5</b>	<b>1.9%</b>	<b>8.6%</b>

Total trade with the EU is much more important than REACH exports alone (as shown in the last column of Table 5.1): it represents more than 8 percent of GDP for the 24 countries as a whole, or almost 7 percent excluding South Africa. It is almost a quarter of GDP for Equatorial Guinea and Namibia.

Comparison of the last two columns of Table 5.1 reveals the share of exports to the EU that are affected by REACH. For some countries, such as Jamaica, Mozambique, Suriname, and Zambia, the majority of their exports to the EU are potentially covered by REACH. For other countries, such as Cameroon, Equatorial Guinea, Ghana, Madagascar, and Papua New Guinea, almost all of their trade with the EU is in products that would be unaffected by REACH.

**Table 5.2. EU exports, REACH exports, and total exports, 2004**

	Total exports (millions of euros)	REACH exports as percent of total	All EU exports as percent of total
Cameroon	2,963	3.1	55.5
Comoros	47	4.9	17.0
Congo	2,939	0.2	22.2
Congo, Dem. Rep.	1,279	2.0	20.5
Cote d'Ivoire	5,274	0.1	41.6
Cuba	4,341	0.3	6.9
Dominican Republic	7,462	1.8	6.0
Equatorial Guinea	4,197	1.0	20.2
Ghana	2,686	2.4	38.5
Guinea	652	4.7	56.2
Jamaica	2,875	9.8	16.2
Liberia	138	1.0	38.8
Madagascar	1,051	3.1	51.4
Mozambique	1,451	50.6	57.9
Namibia	1,728	1.2	52.5
Papua New Guinea	2,351	0.1	15.7
Sudan	2,835	1.2	5.7
Suriname	710	18.3	23.2
Tanzania	1,623	19.6	41.7
Trinidad and Tobago	6,078	2.8	7.7
Uganda	751	2.1	34.9
Zambia	877	11.9	20.3
Zimbabwe	1,376	8.5	32.6
<b>Subtotal without South Africa</b>	<b>55,685</b>	<b>4.3</b>	<b>23.9</b>
South Africa	45,509	8.7	34.3
<b>Total</b>	<b>94,038</b>	<b>6.3</b>	<b>30.7</b>

Another way to estimate the macroeconomic impacts is to consider what proportion of each nation's global trade is potentially affected by REACH. For the same 24 ACP countries, Table 5.2 shows the percentage of global exports that go to the EU and the percentage of global exports that are potentially affected by REACH. Mozambique stands out, with REACH exports amounting to half its global total. Other countries where REACH exports are more than 8 percent of the global total are Jamaica, South Africa, Suriname, Tanzania, Zambia, and Zimbabwe. For all nations in the table, REACH exports are 6.3 percent of global exports.

### 5.1. Employment Impacts

Adequate employment data are not available to determine the total number of people employed in REACH-affected sectors for all ACP nations. We can produce a rough estimate of employment by assuming that employment-to-sales ratios throughout REACH-affected industries are the same as those in the gold and platinum industries in South Africa, for which relatively complete data are available. These two sectors are themselves a

substantial fraction of the REACH-affected industries in ACP as a whole, and may provide a reasonable basis for extrapolation to minerals and mining employment in other countries, with the one important exception of small-scale gold mining.

Under this assumption, there are roughly 313,000 workers employed in producing REACH exports in the ACP countries (see Table 5.3).<sup>101</sup> That is about 0.1 percent of the ACP countries' total labour force.<sup>102</sup> Of these, 130,000 employees, or somewhat more than 40 percent, are in South Africa's gold and platinum mining industries.<sup>103</sup>

**Table 5.3 REACH exports and estimated employment**  
(average 2002-2004)

	<i>million euros</i>	<i>estimated employees</i>
Cameroon	75	3,700
Comoros	3	150
Congo	7	350
Congo, Dem. Rep.	35	1,700
Cote d'Ivoire	18	900
Cuba	37	1,800
Dominican Republic	91	4,400
Equatorial Guinea	46	2,200
Ghana	189	9,200
Guinea	54	2,600
Jamaica	273	13,300
Liberia	1	50
Madagascar	16	750
Mozambique	561	27,300
Namibia	10	500
Papua New Guinea	1	50
Sudan	48	2,300
Suriname	104	5,100
Tanzania	257	12,500
Trinidad and Tobago	190	9,200
Uganda	13	650
Zambia	64	3,100
Zimbabwe	100	4,900
<b>subtotal without South Africa</b>	<b>2,194</b>	<b>106,700</b>
South Africa	4,238	206,200
<b>Total</b>	<b>6,432</b>	<b>312,900</b>

Using this extrapolation, we estimate that South Africa has the largest number of workers producing REACH exports, just over 200,000. The same assumption would imply that Mozambique, Jamaica, and Tanzania each have more than 10,000 workers producing REACH exports.

For small-scale gold mining, a very labour-intensive industry which is important in Tanzania and several other countries, the extrapolation from South African employment patterns is not appropriate; the true numbers of workers is certainly higher than the figures shown in Table 5.3. For example, Tanzania exports 83 percent of its gold to the EU.<sup>104</sup> If the gold exported to the EU comes proportionately from large and small-scale miners, it would be reasonable to assume that over 400,000 artisanal miners in Tanzania would be producing REACH exports. It is, however, the exporters of gold to the EU, and not the artisanal miners, that will need to register their product under REACH.

There is no comparable small-scale mining of other REACH exports; in the industries we examined, artisan mining appears to be restricted to gold.

## 5.2. Government Revenues

The minerals, mining, and chemicals industries that produce REACH exports are important sources of government revenue. In those countries that are most dependent on a few mining industries, the share of government revenue is naturally greatest. As

a World Bank report has noted, a number of developing countries receive as much as 25 to 30 percent of their government revenue from their mining sector.<sup>105</sup> Suriname is an example: the aluminium industry provides about 30 percent of total government revenues.<sup>106</sup> In other countries, the contribution of mining is smaller but still significant: for example, Ghana's mining industry provides about 10 percent of public revenues (Coakley, 2003a).

Again, data availability is most extensive in South Africa. Although mining is an important activity in South Africa, its more diverse and developed economy means that the government is less narrowly dependent on a few extractive industries. In 2004, South African state revenues from mining as a whole were 3.4 billion rand (€450 million), about 1 percent of total government revenues. In 2005, South African public revenue from gold mining was 138 million rand (€18.4 million), or 6 percent of the gold industry's profits.<sup>107</sup>

A report on African mining by researchers at the University of Cape Town found similar results. The share of all government revenue contributed by South Africa's gold and uranium mining industry fell to 1.1 percent in the 1990s; it had been 10 percent or more in previous decades, before a decline and reorganisation of the industry. The same report also estimated that in 1998 an additional 1.8 billion rand (€240 million) of government revenue from income and value-added taxes were the result of income from gold mining.<sup>108</sup>

### **5.3. Macroeconomic impacts: what is at stake?**

Mining is unquestionably important to many ACP countries, including South Africa. According to the Chamber of Mines of South Africa, the mineral industry as a whole accounted for 6.2 percent of GDP and 8.8 percent of employment in South Africa in 2003.<sup>109</sup> These numbers are naturally much larger than our estimates for REACH exports, as they include products that are exempt from REACH such as coal, diamonds, and uranium, as well as all mineral exports to North and South America, Asia, and other countries in Africa.

REACH exports are very important to several ACP countries, and production of these exports is responsible for more than 300,000 jobs, and some fraction of government revenues – naturally a greater fraction in countries more dependent on mining and other export industries. But the calculation of these impacts only answers a counterfactual question of little importance for public policy: How much would be lost if REACH exports vanished and were not replaced by any other exports or domestic industries?

No such disastrous impact is foreseeable. With or without REACH, Europe will continue to import the products that ACP exports. The very large multinational and ACP-based firms that produce most of these exports have the resources to comply with REACH, hiring European consultants when needed (just as many European firms will).

It is also important to keep in mind that most products exported from the ACP are not affected by REACH. Although metals and minerals account for about half of South Africa's exports, we find that less than 9 percent of the country's exports will be affected by REACH.

In addition, the great majority of the exports potentially affected by REACH – 88 percent in South Africa and 85 percent in ACP as a whole – consist of a small number of metals: gold, platinum group metals, ferroalloys, and aluminium. Costs to register this short list of major products will have minimal effects on the large-scale industries that produce and export them. The next section explores the costs, and the benefits, of REACH in more detail.

## 6. Costs and benefits of REACH for ACP

In this section we estimate the costs of REACH for ACP countries, and briefly review the available literature on the benefits of REACH. The principal categories of costs are the costs of registration and testing for any exports that are subject to REACH, plus any economic disruption or losses caused by the regulation. The direct costs are, however, small enough, and the producing and exporting enterprises are in most cases large enough, that there should be little if any economic disruption. The benefits include increased knowledge of chemical hazards and safety, improved protection of workers' health and the natural environment, and potentially reduced liability for future damages.

### 6.1. Interpreting the costs of REACH

Numerous studies have been conducted on the costs of implementing REACH. A summary of 36 studies, published in 2004, found that the estimated total cost of REACH is between €2.4 billion and €3.9 billion over an eleven-year implementation period. The European Commission's own impact assessment estimate was at the low end of the range.<sup>110</sup> One of the 36 studies was performed by two of the authors of this report for the Nordic Council of Ministers; our estimate was €3.5 billion (Ackerman and Massey, 2004). A handful of business-sponsored studies have come up with vastly higher estimates. A critique of the best-known of these studies, by Arthur D. Little, is presented in an appendix to our Nordic Council of Ministers study.

**Table 6.1 REACH registration and testing costs per substance**

Volume tier	(euros)	
	Individual registration	Consortium cost per firm
1 - 10 tonnes	14,600	17,000
10 - 100 tonnes	162,700	91,000
100 - 1000 tonnes	282,100	154,500
>1000 tonnes	323,200	185,500

Source: KPMG, "REACH - further work on impact assessment," April 2005, executive summary, p. 7

Since important features of REACH have been changed in the process of debate and amendment, the costs of compliance have changed as well. Changes since 2003 have been in the direction of lowering requirements and costs, implying that earlier studies of costs may now represent overestimates. A relatively recent (July 2005) analysis by KPMG, commissioned by CEFIC, UNICE and the European Commission, presents estimates of the registration and testing costs per substance,

as shown in Table 6.1, ranging from less than €15,000 for the lowest volume tier, up to €323,000 for an individual registration or €185,000 if two companies share the cost, in the top volume tier (KPMG, 2005,7). KPMG assumes only minimal use of QSARs (quantitative structure-activity relationships), i.e. analytical models designed to reduce animal testing; greater use of such models would reduce costs. Other steps, such as sharing costs among more than two companies, could reduce costs even further. Use of already published information, when it is available, will also lower testing costs below the levels shown in table. Thus the true costs of compliance could be lower than the KPMG estimates.

In earlier sections of this report, we have seen that most of the ACP exports subject to REACH, measured by value, are mining and mineral products, encompassing a small number of materials sold in huge volume. Even if all of the major mineral products need to be registered in the top volume tier, only a small number of registrations will be involved – and some of them are for well-studied substances, where testing costs may be lower because substantial information about chemical properties and hazards is already available. Moreover, nearly all of the mining is done

by very large companies, either multinational corporations or some of the largest national companies. The leading exception is small-scale gold production in several countries, which (if it travels through legitimate channels) is sold to marketing agencies created by the national government. Thus for ACP mining and mineral exports, if they are not already exempt as unprocessed ores, the cost of REACH is that some very large companies and government marketing agencies may have to supply information on a small number of substances. In the iron and steel industry, where ferroalloys are important, there are just a few substances used in alloys, so that just a few registrations would be required.

A very different picture is presented in recent statements by mining and metals industry representatives, who have raised the spectre of impossibly burdensome authorisation requirements for ores containing small but variable quantities of hazardous impurities. Since the details of authorisation procedures remain undecided, it is difficult to evaluate these claims about authorisation costs. We have not encountered other stakeholders, outside of industry, who anticipate that REACH will require thousands of separate authorisations for variable batches of ore imported by European smelters. A system that did require a new authorisation for every slight variation in ore content would clearly be undesirable, both for EU importers and for ACP exporters. We have assumed that such an undesirable system will not be adopted. Authorisation will only target metals, metal compounds, or other substances appearing in ores or minerals, if these substances are shown to impose the most severe risks to humans and the environment. These risks have been the longstanding focus of EU chemicals policy. The aim of authorisation is to address the use of substances of very high concern, since neither workers protection legislation nor the IPPC Directive requires the provision of information on these substances. However, regarding the concerns of the mineral industry, we recommend that the ongoing Reach Implementation Plans (RIPs) consider the possibility of allowing a single authorisation for an ore with a range of impurities of very high concern, instead of requiring a separate authorisation for each batch, as the industry fears.

This study does not estimate the costs of authorisation. For a number of reasons, such an exercise would be futile: it is not possible to say in advance which substances will be subject to an authorisation, which alternatives are available, or which socio-economic benefits will be considered. Furthermore, the fees for authorisation have not yet been determined. The number of affected substances will be small, since authorisation applies only to substances of very high concern; therefore we anticipate that the costs will be small in comparison to the costs of registration and testing. The next section develops an estimate of registration and testing costs.

## **6.2. Estimating the cost of REACH to ACP**

We can produce a rough estimate of the costs of REACH for ACP exporters by applying the KPMG costs per substance in Table 6.1 to the export volume data in Table 2.4. This would be the cost of REACH, under the KPMG cost assumptions, if each of the export categories in the latter table were a single substance produced by a single firm. The volume figures in Table 2.4, however, are for four-digit export categories, which might (or might not) contain more than one substance. In the case of South Africa's chemical industry, the area of greatest diversity in ACP's REACH exports (see Appendix III), we repeated the calculation with more detailed eight-digit export data. Spot checks of other countries and sectors suggested that the assumption of one substance per four-digit category is generally reasonable.

The results of our calculation (applying the KPMG consortium costs except for the lowest volume tier, where the individual registration cost is lower) are shown in Table 6.2.<sup>111</sup> The estimated total cost is about €50 million, or €4.6 million per year over the eleven-year phase-in period. South Africa's exports would bear more than half of this cost, about €30 million, or €2.8 million per year. The next largest costs, more than €2 million total or €200,000 per year would fall on Cuba, and Trinidad and Tobago.

As a percentage of the value of REACH exports, the estimated costs would be greatest for Liberia and Papua New Guinea. In Liberia, the principal estimated costs are for exports of ferrous products, where much of the information required for registration is presumably already available, and opportunities for consortium formation should be extensive (implying lower costs than our estimate). In Papua New Guinea, the only important REACH export is a chemical by-product of the much larger palm oil industry; as mentioned in Section 2, Papua New Guinea is a major exporter of vegetable oils, which are not covered by REACH. Although the percentages are greater than for other countries, the annual costs estimated for Liberia and Papua New Guinea are quite small, €30,000 and €17,000 respectively; if a few countries require assistance with costs of this magnitude, it will not be a large aggregate expense.

	<i>11-year total compliance cost (€1000)</i>	<i>Annual compliance cost (€1000)</i>	<i>Annual cost as a percentage of REACH exports</i>
Cameroon	941	86	0.1%
Comoros	106	10	0.4%
Congo	811	74	1.1%
Congo, Dem. Rep.	1,010	92	0.3%
Cote d'Ivoire	1,180	107	0.6%
Cuba	2,783	253	0.7%
Dominican Republic	1,203	109	0.1%
Equatorial Guinea	400	36	0.01%
Ghana	1,035	94	0.05%
Guinea	751	68	0.1%
Jamaica	626	57	0.02%
Liberia	335	30	4.6%
Madagascar	473	43	0.3%
Mozambique	806	73	0.01%
Namibia	659	60	0.6%
Papua New Guinea	186	17	1.9%
South Africa	30,629	2,784	0.1%
Sudan	15	1	0.00%
Suriname	688	63	0.1%
Tanzania	1,102	100	0.04%
Trinidad and Tobago	2,396	218	0.1%
Uganda	226	21	0.2%
Zambia	1,248	113	0.2%
Zimbabwe	1,010	92	0.1%
<b>TOTAL</b>	<b>50,616</b>	<b>4,601</b>	<b>0.07%</b>

Figures in Table 6.2 are hypothetical, based on the numerous assumptions described above. The true costs may differ, and could be lower for several reasons, such as more extensive exemptions from REACH (recall that our data are based on worst case assumptions), formation of consortia with more than two members, and use of already published information on the properties of chemical substances. On the other hand, costs could be higher if consortium formation is frequently impossible, or if the number of individual substances is greater than we have estimated.

The annual costs estimated in Table 6.2 amount to less than one tenth of one percent of the value of REACH exports for the 24 countries as a whole. This is only an average; costs will be lower for industries and countries exporting a few products in very large volume, and higher for those exporting multiple products in smaller volumes. Yet even in the sector with the broadest range of REACH exports, South Africa's chemical industry, REACH compliance may not pose a major challenge. A recent South African government report, analyzing in some detail the prospects for expansion of the chemical industry, does not list European regulation as one of the important obstacles; it does, however, express South Africa's commitment to meeting developed country environmental standards as its chemical industry grows (DTE 2005).

Average annual costs on the order of one tenth of one percent of the value of exports are small enough to cast doubt on most of the arguments about the incentives or disincentives created by REACH. In theory, any increase in costs could discourage production and investment, or lead industry to seek other markets where costs are lower. Thus a purely abstract discussion could suggest that REACH might decrease output of REACH exports, and/or lead exporters to seek non-European markets. In the abstract, the exemption for unprocessed ores sounds like an incentive for export of unprocessed rather than processed minerals, apparently discouraging investment in processing industries in ACP countries. In practice, these theoretical possibilities turn out to be far too small to matter. In the real world, prices of energy, materials, and equipment, and the availability of infrastructure and skilled labor, are much larger influences on production and investment decisions. Businesses routinely experience and cope with cost changes of much more than one tenth of one percent. No sensible enterprise changes its plans about where to locate its facilities, or decides to abandon a market as large as the EU, in response to the tiny percentage changes in costs that will result from REACH.

### **6.3. Benefits of REACH: European estimates**

Several studies have tried to estimate the benefits of REACH. While varying widely in methodology, most have found that partial estimates of the benefits of REACH range into the billions of euros, often tens of billions of euros, over the ten to 30 years after it is adopted. Many of the categories of benefits will apply, to some degree, to ACP countries as well, although we are not aware of any benefit studies focused on ACP in particular.

In 2003, the European Commission offered a rough estimate suggesting that one example of the benefits from REACH over 30 years would be on the order of €50 billion. This estimate was based on a conservative estimate that 1 percent of all disease is attributable to chemical exposures, and that 10 percent of these effects could be addressed by REACH (EU Commission 2003).



Another study, commissioned by the European Commission and carried out by RPA, looked in particular at expected occupational health effects of implementing REACH (RPA 2003). The study estimated the present value of the occupational health benefits of REACH at €18 billion to €54 billion. This estimate does not include the costs to employers of reduced productivity from workers' illnesses, direct costs to workers of purchasing medicines, and other costs.

A recent report estimated the monetary value within Europe of a subset of the occupational health benefits expected from REACH. The report looked at a set of skin and respiratory diseases that are commonly associated with toxic chemical exposures in the work environment. The report concludes that REACH benefits for occupational skin and non-malignant respiratory diseases only, in the first ten years, will be between €0.66 billion and €6.2 billion; or in the first 30 years, between €21.2 billion and €160.7 billion (Pickvance et al. 2005).

A study carried out by DHI Water and Environment for DG Environment estimated benefits from REACH using information on water treatment costs, costs of mistakes in chemicals management from the past, and health care costs. This study estimated benefits of €0.15 billion to €2.5 billion in the year 2017 and long-term benefits between €2.9 billion and €50 billion in the succeeding 25 years (Pedersen, 2005).

#### **6.4. Benefits of REACH for ACP**

Regulation of hazardous chemicals should not be viewed as a rich country's luxury imposed on low income countries; some of the greatest beneficiaries of REACH could be businesses and workers in developing countries. Businesses will gain access to crucial information about the effects of their products, and the materials and substances they use; this will help them to identify and adopt safer alternatives, when appropriate, and to avoid future liability for damages. Workers will benefit because many chemicals pose greater hazards to the employees who handle them on a daily basis than to the consumers of finished products. This could be particularly important in industries that are increasingly concentrated in developing countries. For example, textile production has shifted steadily toward developing countries over a period of decades; thus, chemical exposures associated with textile production now occur primarily in developing countries. If REACH generates important health and environmental safety information about a chemical used in textile production, the new information will allow developing countries to adopt occupational exposure standards that ensure worker safety and avoid unnecessary occupational illness.

The problem of chemical exposures in developing countries is particularly severe, and exacerbates other hazards associated with poverty. A World Bank report (2002) reviewed the existing scientific literature on the relationship between poverty and exposure to toxics in developing countries. The report concludes that toxics are a significant and growing threat to health among the poor in developing countries. Resulting in part from toxic exposures, chronic diseases are emerging as an increasingly important source of illness in developing countries. According to World Health Organisation estimates, the burden from chronic disease in developing countries is expected to exceed the burden from infectious disease by 2020 (Goldman and Tran 2002).

If REACH identifies emerging environmental hazards, it may produce large financial savings by avoiding future costs. In Europe, a study has estimated that the cleanup costs for PCBs alone are much greater than the entire cost of REACH to taxpayers and industry (Von Bahr and Janson 2004). The financial costs associated with toxic chemical pollution and exposures in the developing world are also substantial, although they are poorly monitored and tracked.

REACH will also facilitate developing countries' efforts to create domestic systems for sound chemicals management. Many developing countries have only rudimentary systems for chemicals management, or have no legislation and administrative capacity on chemicals at all. Some developing countries are currently in the process of drafting new legislation on chemicals, or revamping existing legislation on chemicals. Some are also in the process of developing new administrative capacity on chemicals. This may include developing registration systems for chemicals and developing systems for information transfer about chemicals, including safety data sheets and labelling requirements. The process of creating a regulatory structure for chemicals can also include placing responsibilities on industry for providing information about their products or, in some other way, taking responsibility for ensuring the safety of their product. The regulatory structure may also include regulations about exposure, including occupational exposures.

It is important for developing countries to draw on the infrastructure that already exists for chemicals information management in industrialized countries, in order not to reinvent the wheel. Similarly, although it is important for developing countries to develop their own laboratory capacity for testing new chemicals, they should not lose time testing chemicals that have already been tested elsewhere. Much of this information and information management infrastructure already exists. Under REACH, it will be more extensive, more consistent, better organized, and readily available to anyone who needs it, in developing countries or elsewhere.

## 7. Ways and means to preserve interests of developing countries

In this section, we look at the ways in which the EU can provide support to developing economies in general and to the ACP economies in particular, as they begin the process of complying with REACH.

I There may not be any need to make further modifications of the scope of REACH in order to preserve the interests of developing countries. REACH has already been modified in response to developing country concerns, in particular by eliminating many minerals, a major area of ACP exports. This study has shown that no significant economic disruption will be caused by REACH. Most of ACPs leading exports come from large multinationals, joint ventures, and large ACP firms that are presumed to be able to cope with the regulatory requirements under REACH. There are, however, some small-scale producers exporting to EU (e.g. in essential oils) that probably will need assistance.

We have identified ways to preserve the developing countries interests, such as clarifying agency support to developing countries; providing accurate information about the scope and requirements of REACH; providing support to affected SMEs; rapidly implementing the Globally Harmonised System of Classification and Labelling of Chemicals (GHS) in EU; and increasing obligations to share data among registering companies.

### 7.1. Technical assistance and capacity building

#### *European Chemicals Agency*

REACH creates a European Chemicals Agency, which will be responsible for providing scientific and technical advice to member states and the institutions of the European Community. The Agency's responsibilities include "facilitating the efficient registration of imported substances," "establishing and maintaining databases with information on all registered substances," making non-confidential information available over the internet or through other means, and providing technical guidance (especially to help SMEs in developing chemical safety reports).

One task of the European Chemicals Agency will be, at the Commission's request, to provide technical and scientific support for steps to improve international co-operation on scientific and technical issues relating to the safety of substances, as well as active participation in technical assistance and capacity building activities on sound management of chemicals in developing countries.<sup>112</sup> The Parliament text of REACH uses slightly stronger wording on this point, strengthening the commitment to provide support to developing countries.<sup>113</sup>

Neither the Commission proposal nor the texts adopted by Parliament and Council specifies the type of technical assistance or capacity building that will be provided to developing countries. In addition, both the Council and in particular the Parliament extended the responsibilities the Agency beyond what was described in the Commission proposal. Additional financial support for the Agency was not, however, suggested. A clarification of the Agency's responsibilities with

regards to capacity building and technical assistance would help to preserve the interests of developing countries.

#### *Other institutions*

A number of institutions within EU can facilitate transition to compliance with REACH, whether by disseminating information on its regulation, helping individual companies to comply, providing data to other countries, or providing targeted development assistance related to chemicals management.

Other EU institutions that could help ACP countries to comply with REACH include the Directorates General for Environment, Enterprise, and Development. DG Environment and DG Enterprise are responsible for the development of REACH, and have extended knowledge of this and other related legislation. Both directorates have contacts with stakeholders and are involved in the development of the guidance documents. DG Development is responsible for pursuing development cooperation programs with developing countries.

Another potentially helpful institution is UNITAR, the United Nations Institute for Training and Research. UNITAR carries out a wide range of training programs associated with social and economic development goals, including training programs associated with the GHS. UNITAR has also been involved in education on chemical risk management. Other institutions that could provide similar assistance include the United Nations Environment Programme (UNEP) and the World Health Organisation (WHO).

Finally, individual member states may also have a role to play in assisting developing countries. Many EU member states have significant overseas development programs, some of which include substantial work to bolster the development of sound chemicals management systems in developing countries.

## **7.2. Access to information for governments in developing countries**

A clarification of the scope of REACH is needed and will reassure exporters. It is unclear for example if a bar of iron is an article or should be seen as a metal. One important form of support that the EU can provide is to ensure that accurate information about REACH requirements and the scope of authorisation is available to developing country governments and industry representatives. For example, the mining industry in South Africa as mentioned is concerned that several authorisations will be needed for each ore because of natural variations in the content of hazardous impurities.

As we discussed in Section 6, one of REACH's major benefits for developing countries is the new information that REACH will make available to these countries. Developing countries can use this information to underpin their own domestic systems of chemicals regulation and management. It would be reasonable to include a provision that enable developing countries to request information on the use, function, or application of a chemical under particular circumstances, for example, if a country suspects that uncontrolled use of a dangerous substance is occurring. Information on allowable uses in the EU would help a country to identify potentially problematic exposures within its own borders.

### **7.3. Support for SMEs**

Most of ACP's leading exports come from large multinationals, joint ventures, and large ACP firms that are presumably able to comply with the regulatory requirements under REACH. Moreover, many of the leading exports are widely used metals and basic chemicals, whose properties are relatively well-known. Compliance with REACH will be more challenging, and assistance may be necessary, in a minority of cases, such as essential oils, where SME producers and exporters are dealing with a range of products.

Importers of essential oils, often small companies themselves, will have to obtain information about the substances they are bringing into Europe. Evidence suggests that at least some essential oils have potentially harmful effects, but it seems unlikely that the full range of their properties is already known (Marquardt et al, 2005). Assistance with the details of registration and testing will be important in this case, and in any other cases where SMEs are involved in REACH exports. The fact that most ACP REACH exports come from large enterprises is good news in this respect: it implies that the actual areas of SME activity are relatively small, and thus the costs of the necessary assistance will be likewise limited. It should not be expensive for the European Chemicals Agency to ensure the availability of technical assistance to SMEs involved in ACP's exports to EU, because such assistance will apply to only a small minority of ACP REACH exports.

### **7.4. REACH and the GHS**

At the 2002 UN World Summit on Sustainable Development in Johannesburg, the global community agreed that the Globally Harmonised System of Classification and Labelling of Chemicals (GHS) should be implemented world-wide, with a target date of 2008. A draft proposal for European legislation to implement the GHS is currently under preparation. After a transition period, the new legislation will replace the current provisions on classification and labelling of chemicals, as set out in Council Directive 67/548/EEC and Directive 1999/45/EC as amended.<sup>114</sup>

A number of developing countries, including ACP countries such as South Africa, have already made progress in implementing the GHS. It is important that the EU implement the GHS as soon as possible and with a short transition period, to avoid creating problems for exporters from developing countries. If ACP countries are using the GHS and the EU has not adopted it, companies exporting to Europe will have to classify their product twice, creating an extra burden for those companies.

### **7.5. One substance, one registration**

Questions have been raised about whether the proposal for “one substance, one registration” (OSOR), introduced by the UK and Hungary in 2004, will help or hurt developing countries' interests. In general, the answer is that the advantages and disadvantages of OSOR for developing countries, and ACP countries in particular, will be about the same as the advantages and disadvantages of this initiative within the EU. The important feature of OSOR for our

purposes – and the only feature we are commenting on – is the requirement for registrants to share all non-confidential data on registered substances; previous REACH proposals allowed registrants to choose whether or not to share data. OSOR, and subsequent proposals requiring data sharing, are expected to reduce registration costs.

The UK Ministry of Environment estimated that the savings could be as high as 24 percent of the total costs of REACH implementation (RPA 2004). In addition, OSOR would reduce obstacles faced by SMEs and by developing country firms in gaining access to data. OSOR is intended to prevent situations in which large companies might see a strategic advantage in refusing to cooperate with smaller firms (UK DEFRA 2004). The current Council text combines elements of the original Commission proposal and the OSOR proposal. Thus, the advantages of the OSOR proposal are most closely matched by the Council text, as compared with the Parliament and the Commission versions. The text could be further strengthened by increasing the scope of the requirement for data sharing, in line with the original OSOR proposal.

## Bibliography

- Ackerman, Frank and Rachel Massey. 2004. *The True Costs of REACH*. Study for the Nordic Council of Ministers: <http://www.ase.tufts.edu/gdae/Pubs/rp/TrueCostsREACH.pdf>
- Bermúdez-Lugo, Omayra. 2004. The Mineral Industries of Cameroon and Cape Verde. In *U.S. Geological Survey Minerals Yearbook 2004*.  
<http://minerals.usgs.gov/minerals/pubs/country/2004/cmcmvmyb04.pdf>
- Bermúdez-Lugo, Omayra. 2003. The Mineral Industries of the Islands of the Caribbean Aruba, the Bahamas, Barbados, Cuba, Dominican Republic, Jamaica, Trinidad and Tobago, and Other Islands. In *U.S. Geological Survey Minerals Yearbook 2003*:  
<http://minerals.usgs.gov/minerals/pubs/country/2003/caribbeanmyb03.pdf>
- Brenton, Paul. 2003. “Integrating the Least Developed Countries into the World Trading System: The Current Impact of EU Preferences under Everything But Arms,” World Bank Policy Research Working Paper No. 3018
- Chamber of Mines of South Africa, Economics Advisory Unit. 2005. *The Potential Impact of the European Union's Draft Legislation, REACH, on the Social and Economic Development of Sub-Saharan Africa*.
- Coakley, George J. 2002. The Mineral Industry of South Africa. In *U.S. Geological Survey Minerals Yearbook 2002*:  
<http://minerals.usgs.gov/minerals/pubs/country/2002/sfmyb02.pdf>
- Coakley, George J. 2003a. The Mineral Industry of Ghana. In *U.S. Geological Survey Minerals Yearbook 2003*: <http://minerals.usgs.gov/minerals/pubs/country/2003/ghmyb03.pdf>
- Coakley, George J. 2003b. The Mineral Industry of Zimbabwe. In *U.S. Geological Survey Minerals Yearbook 2003*:  
<http://minerals.usgs.gov/minerals/pubs/country/2003/zimyb03.pdf>
- Dreschler, Bernd. 2001. “Small-scale Mining and Sustainable Development within the SADC Region.” *Minerals and Sustainable Development Project Report*. No. 84, International Institute for Environment and Development (IIED). Commissioned by the World Business Council for Sustainable Development (WBCSD):  
[http://www.iiied.org/mmsd/mmsd\\_pdfs/asm\\_southern\\_africa.pdf](http://www.iiied.org/mmsd/mmsd_pdfs/asm_southern_africa.pdf)
- European Commission, DG Enterprise and Industry. 2003. Extended Impact Assessment of REACH SEC 1171/3
- Enviro Tex GmbH. 2005. “Final Report: Analysis of the Potential Impacts of REACH on European Textile Supply Chains.” Report for the European Commission.

- Fong-Sam, Yolanda. 2003. The Mineral Industries Of French Guiana, Guyana, And Suriname. In *U.S. Geological Survey Minerals Yearbook 2003*:  
<http://minerals.usgs.gov/minerals/pubs/country/2003/gfgynsmyb03.pdf>
- Goldman, Lynn and Nga Tran. *Toxics and Poverty: The Impact of Toxic Substances on the Poor in Developing Countries*. Washington DC: World Bank
- Heemskerk, Marieke. 2000. Driving Forces of Small-Scale Gold Mining Among The Ndjuka Maroons: A Cross-Scale Socioeconomic Analysis Of Participation In Gold Mining In Suriname,” PhD diss. University Of Florida:  
<http://www.heemskerk.sr.org/pdf/DissComplete.pdf>
- Hilson, Gavin and Clive Potter. 2003. Why Is Illegal Gold Mining Activity so Ubiquitous in Rural Ghana?. *African Development Review* vol.15 no. 2-3: 249-64
- Jones, Andrew. 2005. *The Potential Impact of REACH on Exports of Biotrade Products to the European Union*. UNCTAD Biotrade Initiative -Biotrade Facilitation Programme:  
<http://www.biotrade.org/BTFP/BTFP-docs/reach-unctad-discussionpaper.pdf>
- Jorgenson, John D., et al. 2004. *Ferroalloys 2004*. United States Geological Survey:  
<http://minerals.usgs.gov/minerals/pubs/commodity/ferroalloys/feallmyb04.pdf>
- KemI: Swedish National Chemicals Inspectorate (KemI). 1997. *Chemicals in Textiles: Report of a Government Commission* (No. 5/97). Stockholm: Swedish National Chemicals Inspectorate.
- KPMG Business Advisory Services. 2005. *REACH - Further Work on Impact Assessment, A Case Study Approach, Final Report*:  
[http://europa.eu.int/comm/enterprise/reach/docs/reach/kpmg\\_final\\_report.pdf](http://europa.eu.int/comm/enterprise/reach/docs/reach/kpmg_final_report.pdf).
- Marquardt et al. 2005. *SPORT report EFFA Sub-project report*, Prepared for the SPORT partnership between the European Commission, Member States and Industry (Cefic, UNICE, UEAPME and DUCC)
- Mobbs, Philip M. 2004. The Mineral Industry of Equatorial Guinea. In *U.S. Geological Survey Minerals Yearbook 2004*:  
<http://minerals.usgs.gov/minerals/pubs/country/2004/ekmyb04.pdf>.
- Pedersen, F. et al. 2005. “The Impact of REACH on the Environment and Human Health,” Report by DHI Water and Environment for the European Commission, DG Environment.
- Pickvance, Simon et al. 2005. *The Impact of REACH on Occupational Health, with a Focus on Skin and Respiratory Diseases*. University of Sheffield, UK: Report prepared for the European Trade Union Institute for Research, Education and Health and Safety.



- RPA Inc. 2003. *Assessment of the Impact of the New Chemicals Policy on Occupational Health* Report prepared for the European Commission Environment Directorate-General.
- RPA Inc. 2004. *REACH – One Substance, One Registration*. London, UK: Report Commissioned by the Department for the Environment, Food and Rural Affairs.
- South Africa Department of Trade and Industry (DTI). 2005. *Sector Development Strategy: Chemicals*. Version 3.6: <http://www.dti.gov.za/chemicals/csp.pdf>
- Southern African Regional Poverty Network.. November 2004. *Mozambique - Diagnostic Trade Integration Study*, Vol. 1: <http://www.sarpn.org.za/>
- UK Department for the Environment, Food and Rural Affairs (DEFRA). 2004. *New European Chemicals Strategy – UK Partial Regulatory Impact Assessment*. Final Report.
- Veiga, Marcello M. 1997. *Artisanal Gold Mining Activities in Suriname: Report*. United Nations Industrial Development Organization:  
[http://www.unites.uqam.ca/gmf/intranet/gmp/files/doc/marcello\\_veiga/](http://www.unites.uqam.ca/gmf/intranet/gmp/files/doc/marcello_veiga/)
- Von Bahr, Jenny and Johanna Jason. 2004. *Cost of Late Action – the Case of PCB*. Copenhagen: Nordic Council of Ministers
- Yager, Thomas R. 2003a. The Mineral Industry of Mozambique. In *U.S. Geological Survey Minerals Yearbook 2003*:  
<http://minerals.usgs.gov/minerals/pubs/country/2003/mzmyb03.pdf>
- Yager, Thomas R. 2003b. The Mineral Industry of Tanzania. In *U.S. Geological Survey Minerals Yearbook 2003*:  
<http://minerals.usgs.gov/minerals/pubs/country/2003/tzmyb03.pdf>

## Endnotes

All the websites referenced in these notes were visited by the authors between January and March 2006.

---

<sup>1</sup> See Council, Annex 1c, and Parliament text, Annex 1BA.

<sup>2</sup> Commission text, Reasons and Objectives, section 1.2: Registration.

<sup>3</sup> Commission text, Chapter 2, Article 8.

<sup>4</sup> Commission text, Annex III, points 8 and 9.

<sup>5</sup> Council text, Annex III, point 8 and 8a.

<sup>6</sup> Parliament text, Annex III, points 8, 8a, and 9.

<sup>7</sup> The Council of the European Union, draft text of REACH, December 19, 2005.

<sup>8</sup> The Council of the European Union, draft text of REACH, December 19, 2005.

<sup>9</sup> ACP Council of Ministers, "Resolutions and Declarations of the 81st Session of the ACP Council of Ministers," June 2005.

<sup>10</sup> Antigua and Barbuda, Bahamas, Barbados, Botswana, Equatorial Guinea, Mauritius, Seychelles, South Africa, St. Kitts and Nevis, and Trinidad and Tobago.

<sup>11</sup> Based on IMF data, 2002-2004, with incomplete coverage for exports (but most large ACP economies included). The ratio is only slightly lower for South Africa, with exports equal to about 27 percent of GDP.

<sup>12</sup> Eurostat data on EU-ACP trade, complete coverage. The ratio for South Africa is virtually the same as for the rest of ACP.

<sup>13</sup> Botswana, Equatorial Guinea, Guyana, Namibia, Mauritania, Mauritius, and Seychelles. Based on 2004 data.

<sup>14</sup> We have categorized metal oxides, such as aluminium oxide and titanium oxide, as mining products, even though they are reported as inorganic chemicals.

<sup>15</sup> An exchange rate of 7.5 rand = 1 euro is used throughout this report, unless otherwise noted.

<sup>16</sup> "EU Bilateral Trade and Trade with the World: South Africa," DG Trade, June 2005.

<sup>17</sup> 2002-04 average, calculated from GDP data from Statistics South Africa, <http://www.statssa.gov.za>.

<sup>18</sup> Liquid fuels, i.e. the conversion of coal to oil, alone accounts for 31 percent of the industry. (DTI 2005, 14)

<sup>19</sup> Total for all section VI exports (not just REACH exports), 2002-04 average. Calculated from DTI data at <http://www.thedti.gov.za/econdb/raportt/RgSC04.html> and [...RgSC20.html](http://www.thedti.gov.za/econdb/raportt/RgSC20.html).

<sup>20</sup> Directorate of Mineral Economics, "South Africa's Mineral Industry 2004-2005," Department of Minerals and Energy, Republic of South Africa.

<sup>21</sup> South Africa Iron and Steel Institute (SAISI), <http://www.saisi.co.za/index.php?inc=overview>

<sup>22</sup> SAISI, <http://www.saisi.co.za/index.php?inc=tradingpartners>

<sup>23</sup> Directorate of Mineral Economics, "South Africa's Mineral Industry 2004-2005," page 5.

<sup>24</sup> ACP Council of Ministers, "Resolutions and Declarations of the 81<sup>st</sup> Session of the ACP Council of Ministers," June 2005.

<sup>25</sup> Unless otherwise noted, information in this section is drawn from Swedish National Chemicals Inspectorate (KemI), *Chemicals in Textiles: Report of a Government Commission* (No. 5/97) (Stockholm: Swedish National Chemicals Inspectorate, July 1997).

<sup>26</sup> <http://www.cottonboard.org/index.asp?Cat=6&sub=&cid=378>

<sup>27</sup> <http://www.cottonboard.org/index.asp?Cat=6&sub=&cid=378>

<sup>28</sup> Deutsche Bank press release, July 30, 2002: [http://www.deutsche-bank.de/presse/en/index.html?contentOverload=http://www.deutsche-bank.de/presse/en/releases\\_799.shtml](http://www.deutsche-bank.de/presse/en/index.html?contentOverload=http://www.deutsche-bank.de/presse/en/releases_799.shtml)

<sup>29</sup> German-Foreign-Policy.com news release, January 4, 2006: <http://www.german-foreign-policy.com/en/fulltext/55963/>

<sup>30</sup> CNW Telbec, Press Release: "Alcan, Cameroon Ink Plan to Upgrade Alucam Primary Smelter," October 26, 2005. <http://www.aluminium.org/Template.cfm?Section=Home&template=/ContentManagement/ContentDisplay.cfm&ContentID=9174>

<sup>31</sup> Alcan Inc site. See: <http://www.alcan.com/web/publishing.nsf/content/About+Alcan+Home>

<sup>32</sup> ALCOA site. See: <http://www.alcoa.com/jamaica/en/home.asp>

<sup>33</sup> Glencore International AG. See: <http://www.glencore.com/pages/aluminium.htm#>

- 
- <sup>34</sup> “Fact Sheet, Sustainable development of small-scale mining, GEUS,” Geological Survey of Denmark and Greenland (December 16, 2004): <http://www.geus.dk/cgi-bin/udskriv-uk.pl?udfil=geus-general/fact-sheets,fs-small-scale-mining-uk.htm>
- <sup>35</sup> “Tanzania: Women in the Mining Sector, the Current Situation.” *Findings* No. 189, World Bank/IBRD (August 2001): <http://www.worldbank.org/afr/findings/english/find189.pdf>
- <sup>36</sup> Patrick Kisembo, “Tanzania embarks on value addition to gold exports,” *The Guardian*, February 12, 2006: <http://www.ippmedia.com/ipp/guardian/2005/12/02/55188.html>
- <sup>37</sup> Canarc site. See: <http://www.canarc.net/>
- <sup>38</sup> Cambior Company Profile. Available at: <http://www.cambior.com/>
- <sup>39</sup> “Mercury use in the Artisanal Gold Mining Sector in Suriname” UNEP Chemicals, August 2002. Online at <http://www.chem.unep.ch/mercury/Report/rev-draft-comments/suriname.htm>
- <sup>40</sup> Gold Fields Ltd of South Africa site. See: <http://www.goldfields.co.za/>
- <sup>41</sup> Gold Fields site. See: <http://www.goldfields.co.za/>
- <sup>42</sup> Golden Star Resources site. See: <http://www.gsr.com/>
- <sup>43</sup> Red Back Mining site. See: <http://www.redbackmining.com/s/Home.asp>
- <sup>44</sup> Falconbride Company site. See: [http://www.falconbridge.com/about\\_us/corporate\\_profile.htm](http://www.falconbridge.com/about_us/corporate_profile.htm) and [http://www.falconbridge.com/our\\_business/nickel/overview.htm](http://www.falconbridge.com/our_business/nickel/overview.htm)
- <sup>45</sup> The Financial Gazette (South Africa), “Zimasco reopens three furnaces,” May 28, 2004. <http://www.fingaz.co.zw/fingaz/2004/May/May28/5526.shtml>
- <sup>46</sup> Press Release, “Zimbabwe Alloys Limited,” Anglo American plc, June 1, 2005. At: <http://www.angloamerican.co.uk/>
- <sup>47</sup> The Financial Gazette (South Africa), May 28, 2004.
- <sup>48</sup> Ministry of Energy and Energy Industries of Trinidad & Tobago. “Downstream Gas Based Industries,” (2004). <http://www.energy.gov.tt/applicationloader.asp?app=articles&id=807>
- <sup>49</sup> Alexander’s Gas and Oil Connections, “Trinidad Bulk Traders launches into ethanol production,” Newsletter Latin America, Vol. 10, No. 22, November 24, 2005: <http://www.gasandoil.com/goc/company/cnl54770.htm>
- <sup>50</sup> CL Financial plc site. See: <http://www.clfinancial.com/Company.asp?CAT=12>.
- <sup>51</sup> The Trinidad Guardian, “Owning the oil plantation,” Nov 3, 2005. <http://www.guardian.co.tt/archives/2005-11-04/bussguardian2.html>. Also *The Trinidad Guardian*, “New US\$650m ammonia/urea plant coming,” October 27, 2005. <http://www.guardian.co.tt/archives/2005-10-26/business1.html>
- <sup>52</sup> CF Industries, Company Profile. See: <http://www.cfindustries.com/other/profile.htm>
- <sup>53</sup> Terra News release, “Terra, others study Trinidad ammonia/UAN plant project,” April 14, 2005. [http://www.terraindustries.com/latest/corp\\_activities/05-04/trinidad\\_study.pdf](http://www.terraindustries.com/latest/corp_activities/05-04/trinidad_study.pdf)
- <sup>54</sup> ANSA McAL press release, April 19, 2005. See: [http://www.ansamcal.com/index.php?option=com\\_content&task=view&id=56&Itemid=66](http://www.ansamcal.com/index.php?option=com_content&task=view&id=56&Itemid=66)
- <sup>55</sup> MHTL company site: <http://www.ttmethanol.com/background.html>
- <sup>56</sup> Methanex company webpage, Methanex in Trinidad. [http://www.methanex.com/ourcompany/locations\\_trinidad.html](http://www.methanex.com/ourcompany/locations_trinidad.html) and Company Profile <http://www.methanex.com/ourcompany/profile.html>.
- <sup>57</sup> Ministry of Energy and Energy Industries of Trinidad & Tobago. “Industry Focus - Petrochemicals,” (2004). <http://www.energy.gov.tt/applicationloader.asp?app=articles&id=808>.
- <sup>58</sup> Alexander’s Gas and Oil Connections, November 24, 2005.
- <sup>59</sup> FAO Corporate Document Repository, “Opportunities for Developing Countries in the Production and Export of Organic Horticultural Products,” *World Markets for Organic Fruit and Vegetables* FAO (2001). [http://www.fao.org/documents/show\\_cdr.asp?url\\_file=/DOCREP/004/Y1669E/y1669e01.htm](http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/004/Y1669E/y1669e01.htm)
- <sup>60</sup> Information from the Madagascar Consulate in South Africa on essential oils production. See: <http://www.madagascarconsulate.org.za/oils.html>; and FAO, “Opportunities for Developing Countries in the Production and Export of Organic Horticultural Products.”
- <sup>61</sup> Madagascar Consulate in South Africa. <http://www.madagascarconsulate.org.za/oils.html>
- <sup>62</sup> FAO, “Opportunities for Developing Countries in the Production and Export of Organic Horticultural Products.”
- <sup>63</sup> FAO, “Opportunities for Developing Countries in the Production and Export of Organic Horticultural Products.”
- <sup>64</sup> Bamex Press Release, June 27, 2005. [http://www.madagascarnatural.com/madagascar\\_press%20.pdf](http://www.madagascarnatural.com/madagascar_press%20.pdf)
- <sup>65</sup> List of essential oil and spice producers in Bamex <http://www.madagascarnatural.com/producers.htm>
- <sup>66</sup> Madagascar Consulate in South Africa <http://www.madagascarconsulate.org.za/oils.html>
- <sup>67</sup> Pronabio website. <http://www.pronabio.org/anglais/pronabio.html>.

- 
- <sup>68</sup> Pronabio member list. See: <http://www.pronabio.org/anglais/membres.php?limit=0>.
- <sup>69</sup> Sarah Grainger, "Comoros seeks sweet smell of success," BBC, September 14, 2005. <http://news.bbc.co.uk/go/em/fr/-/1/hi/world/africa/3652780.stm>.
- <sup>70</sup> Mongabay.com Country Studies, "Comoros History-Economy – Industry and Infrastructure." [http://www.mongabay.com/reference/country\\_studies/comoros/all.html](http://www.mongabay.com/reference/country_studies/comoros/all.html)
- <sup>71</sup> Country Profile: Comoros, BBC, February 15, 2006. [http://news.bbc.co.uk/1/hi/world/africa/country\\_profiles/1070727.stm](http://news.bbc.co.uk/1/hi/world/africa/country_profiles/1070727.stm)
- <sup>72</sup> US Department of State, Bureau of African Affairs, "Background Notes: Comoros," (January 2006). <http://www.state.gov/r/pa/ei/bgn/5236.htm>
- <sup>73</sup> EFEO Position, "Concerning the EU proposal for a new regulation on chemicals (REACH)." April 25th, 2005: <http://www.biotech.org/BTFP/BTFP-docs/reach-efeo-positionpaper.PDF>
- <sup>74</sup> Mbendi Profile: South Africa – Mining: Gold Mining-Overview (2004)
- <sup>75</sup> Chamber of Mines of South Africa (2005) Progressive Analysis of Working Results, January-December 2005.
- <sup>76</sup> Harmony website, <http://www.harmony.co.za/>.
- <sup>77</sup> Gold Fields website, <http://www.goldfields.co.za/>.
- <sup>78</sup> Placer Dome website, <http://www.placerdome.com>.
- <sup>79</sup> Barrick website, <http://www.barrick.com>.
- <sup>80</sup> Mbendi Profile: South Africa – Mining: Gold Mining-Overview (2004)
- <sup>81</sup> <http://www.kumbaresources.com/>, "Overview."
- <sup>82</sup> Andrew Ianham, "Furnace rebuild adds flexibility," *Mining Weekly Online*, October 14, 2005, <http://www.miningweekly.co.za/min/features/furnaces/?show=75113>
- <sup>83</sup> South Africa Iron and Steel Institute, <http://www.saisi.co.za/index.php?inc=tradingpartners>
- <sup>84</sup> Dow location and company information. See: <http://www.dow.com/facilities/africa/south.htm>
- <sup>85</sup> Chemserve, "Annual Review" at [www.chemserve.co.za](http://www.chemserve.co.za).
- <sup>86</sup> In Figure 4.1 and Table 4.2, we have classified the non-EU countries of the former Soviet Union (other than Russia) as developing countries, and have classified Singapore as an industrial country.
- <sup>87</sup> Belarus, Kazakhstan, Ukraine, and Uzbekistan, as well as Bulgaria and Romania, have REACH exports between 1 percent and 5 percent of GDP, with the highest percentages in Bulgaria (4.9 percent) and Uzbekistan (4.7 percent). Another country with noticeable REACH exports is Libya (1.4 percent of GDP), based on oil and gas byproducts such as acyclic alcohols.
- <sup>88</sup> This assumes that Switzerland and Hong Kong are exporting gold produced elsewhere, not producing it themselves
- <sup>89</sup> Mbendi Profile, Chile-Copper 2004: <http://www.mbendi.co.za/indy/ning/cppr/sa/cl/p0005.htm>
- <sup>90</sup> Anglo American site. See: <http://www.angloamerican.co.uk/>
- <sup>91</sup> Antofagasta site. See [http://www.antofagasta.co.uk/interior/about/f\\_geo.html](http://www.antofagasta.co.uk/interior/about/f_geo.html)
- <sup>92</sup> Mbendi Profile, Chile –Gold 2004. See: <http://www.mbendi.co.za/indy/ning/gold/sa/cl/p0005.htm>
- <sup>93</sup> Andean American site. See: <http://www.andeanamerican.com/>
- <sup>94</sup> Gurmendi (USGS 2003) and information from company websites.
- <sup>95</sup> Government of Brazil. See: <http://www.investmentos.sp.gov.br/idiomas/english/setores/quimica.htm>
- <sup>96</sup> ABIQUIM site. See: <http://www.abiquim.org.br/english/content.asp?princ=bci&pag=outlook>.
- <sup>97</sup> See: <http://www.icmaindia.com/cmi/asp/sectorhighlights.asp>
- <sup>98</sup> DG Trade. See [http://europa.eu.int/comm/trade/issues/bilateral/regions/acp/lprel\\_en.htm](http://europa.eu.int/comm/trade/issues/bilateral/regions/acp/lprel_en.htm).
- <sup>99</sup> DG Trade. See: [http://europa.eu.int/comm/trade/issues/global/gsp/eba4\\_sum.htm](http://europa.eu.int/comm/trade/issues/global/gsp/eba4_sum.htm)
- <sup>100</sup> Due to time and data availability constraints, Tables 5.1 and 5.2 refer only to 2004, while other tables present 2002-04 averages.
- <sup>101</sup> The ratio of employees to sales in South Africa's gold and platinum industries taken together is approximately 50 employees to every 1 million euros. Data taken from "South Africa's Mineral Industry 2004-2005," Directorate: Mineral Economics, Department: Minerals and Energy, Republic of South Africa, [http://www.dme.gov.za/publications/pdf/annual\\_reports/sami\\_2005.pdf](http://www.dme.gov.za/publications/pdf/annual_reports/sami_2005.pdf).
- <sup>102</sup> Data from World Bank's World Development Indicators database (2003 data).
- <sup>103</sup> The figures for South Africa's gold and platinum mining employment are based on actual data from South Africa's Directorate of Mineral Economics, while the estimated number of employees for other countries and industries are extrapolated.
- <sup>104</sup> Mbendi profile, <http://www.mbendi.co.za/indy/ning/gold/af/ta/p0005.htm>.

---

<sup>105</sup> “Treasure or Trouble? Mining in Developing Countries,” World Bank and International Finance Corporation (2002): [www.natural-resources.org/minerals/CD/docs/twb/treasure\\_trouble.pdf](http://www.natural-resources.org/minerals/CD/docs/twb/treasure_trouble.pdf).

<sup>106</sup> Pitou van Dijk, Geske Dijkstra, Niek de Jong, Dougal Martin, and Rob Vos, “The Suriname Economy: Experiences of the 1990s and Challenges Ahead,” Center for Latin American Research and Documentation, (2000): [www.cedla.uva.nl/60\\_publications/PDF\\_files\\_publications/vandijck\\_SURcuaderno.pdf](http://www.cedla.uva.nl/60_publications/PDF_files_publications/vandijck_SURcuaderno.pdf).

<sup>107</sup> Summary of Quarterly Statements of Working Results, 2005, Chamber of Mines of South Africa, <http://www.bullion.org.za/MiningEconomics&Stats/Eco%20Pdf%27s/Quarterly%20pdf/Archives/2005/qsum05q4.pdf>.

<sup>108</sup> Steven Malherbe, *A Perspective on the South African Mining Industry in the 21<sup>st</sup> Century*, August 2000.

<sup>109</sup> Economics Advisory Unit, Chamber of Mines of South Africa, “The Potential Impact of the European Union’s Draft Legislation, REACH, on the Social and Economic Development of Sub-Saharan Africa,” June 2005, page 16.

<sup>110</sup> “The impact of REACH: Overview of 36 studies on the impact of the new EU chemicals policy (REACH) on society and business,” Workshop REACH Impact Assessment, 25th - 27th October 2004, The Hague, The Netherlands, [www.eu2004-reach.nl/downloads/Comprehensive\\_Overview-v2.pdf](http://www.eu2004-reach.nl/downloads/Comprehensive_Overview-v2.pdf).

<sup>111</sup> Our list of REACH exports includes cosmetics and perfumes, which are subject to much reduced regulatory requirements under REACH because they are separately regulated under the Cosmetics Directive. For this reason, we set the compliance cost for cosmetics and perfumes to the KPMG cost for the lowest volume tier, regardless of the actual volume of the exports. Since there are relatively few such categories among ACP’s REACH exports, this had only a minor impact on the calculation.

<sup>112</sup> Article 73(2)(i).

<sup>113</sup> Article 73(49)(ge).

<sup>114</sup> EU Commission, DG Enterprise and Industry, “IMPLEMENTING THE GLOBALLY HARMONISED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS).” “ See: [http://europa.eu.int/comm/enterprise/reach/ghs\\_en.htm](http://europa.eu.int/comm/enterprise/reach/ghs_en.htm)