

Rough Cut

Sustainability Issues
in the Coloured Gemstone Industry



Jamie Cross, Sanne van der Wal & Esther de Haan

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Global coloured gemstone industry suffers from poor working conditions

Coloured gemstones such as sapphire, ruby and emerald adorn countless pieces of jewellery. However, recent field research in Thailand and Madagascar, a company survey among leading international jewellers and a literature review by SOMO all demonstrate that the world behind these gemstones does not hold much sparkle.

The retail value of coloured gemstones is estimated at US\$ 10 - 15bn worldwide. Trade statistics indicate a value of nearly US\$ 4bn worldwide. However, as in many other commodity chains value and sustainability issues are distributed unevenly.

People tend to earn less every step down the coloured gemstone supply chain. Many stones originate in the poorest developing countries, like Tanzania, Madagascar and Zambia. Then they go to less poor developing countries like India, China and Thailand, where they are cut and polished. And eventually they are sold to wealthy consumers in the West.

Major labour problems occur at the beginning of the production process. Child labour, health hazards, fatal accidents, low income and employment insecurity: it is mainly the miners and gemstone processing workers who suffer from these effects. To date however there are no serious industry wide sustainability initiatives in place to address and attempt to mitigate the sustainability issues that plague this sector. Whereas the gold and diamond sectors, often involving the same jewellers as the coloured gemstone industry, show that industry wide efforts are possible. It is the authors' opinion that it is high time for the jewellery sector and other coloured stone stakeholders to start taking their responsibility.



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& Esther de Haan**

Amsterdam, February 2010

SOMO is an independent research organisation. In 1973, SOMO was founded to provide civil society organizations with knowledge on the structure and organisation of multinationals by conducting independent research. SOMO has built up considerable expertise in among others the following areas: corporate accountability, financial and trade regulation and the position of developing countries regarding the financial industry and trade agreements. Furthermore, SOMO has built up knowledge of many different business fields by conducting sector studies.

Colophon

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Contents

Contents	3
1. Background and overview	4
1.1 Background.....	4
1.2 Overview of report	4
2. Global trade in coloured gemstones	5
2.1 Definitions	5
2.2 Limitations to existing knowledge and research	5
2.3 Worldwide trade.....	6
2.4 Gemstone consuming countries	7
2.5 Gemstone producing countries.....	10
3. From mine to market: gemstones and the global value chain.....	15
3.1 The fragmented global industry	15
3.2 Global deposits of precious stones.....	17
3.3 Artisanal and small-scale mining	17
3.4 Profiles of gemstone producing countries in Africa	19
3.5 Large-scale mining in Africa’s coloured gemstone industry	21
3.6 The licit and illicit trade in rough, unprocessed gemstones	23
3.7 Gemstone processing and jewellery manufacturing.....	25
3.8 Profiles of gemstone processing and jewellery manufacturing countries.....	27
3.9 The retail trade in processed gemstones and jewellery products	30
4. Sustainability issues in the gemstone supply chain	33
4.1 Mining and the informal economy.....	33
4.2 Unregulated mining and trading	34
4.3 Gemstone trade links with terrorism, war economy and suppression	34
4.4 Child labour across the value chain.....	35
4.5 Working conditions in coloured gemstone mining	36
4.6 Working conditions in coloured gemstone processing	37
4.7 Environmental impacts	39
4.8 Economic impacts: creating a business friendly environment.....	39
5. Initiatives to improve the sustainability in the coloured gemstone supply chain.....	41
6. Appendices	43
6.1 List of all precious and semi-precious stones.....	43

1. Background and overview

1.1 Background

The coloured (non-diamond) gemstone industry is a strategic industry in many African and Asian countries. However, a closer look reveals that the production and processing of coloured gemstones comes with a range of serious economic (eg, smuggling, unfair trade), environmental (eg, deforestation, loss of biodiversity) and social (eg, serious health and safety issues, low and insecure income, child labour) issues. There is no indication that these issues are being dealt with adequately by business or governments, even when the countries producing and processing gemstones are actively seeking and encouraging solutions.

1.2 Overview of report

This report is intended to outline the social, environmental and economic issues present in the coloured gemstone supply chain. It offers an overview of the coloured gemstone trade, with a specific focus on mining in Africa and processing in Thailand. The report relies mostly on a review of existing literature and publicly available information. Field research was conducted in Thailand and Madagascar.

The report aims to:

- Outline the trade in coloured gemstones.
- Expand the focus of research on gemstones to include the social, environmental and economic issues involved in the production, trade and processing of coloured gemstones.
- Discuss the social, environmental and economic issues involved in the production and trade of coloured gemstones at different levels of the supply chain.

The report aims to raise awareness of the issues in this sector among a general public and civil society. While it is beyond the ambition of this research report to make specific recommendations how to address and mitigate the sustainability issues in this sector it also hopes to inspire positive action from the industry and its stakeholders.

2. Global trade in coloured gemstones

The global gemstone industry is divided into two distinct sectors: the diamond sector and the coloured gemstone sector. Although there is a lack of disaggregated data, the worldwide production of non-diamond gemstones is estimated to have exceeded US\$2 billion per year since the late 1990s.¹

2.1 Definitions

Gemstones have no single, precise definition.² Unlike diamonds, coloured gemstones are not a single commodity. Instead they are a category that includes dozens of different types of precious gemstones, with different sources and different values.

The definitions used in this report are based on the UN Standard International Trade Classification system, used for compiling international statistics on all merchandise entering international trade.³ Here gemstones are defined as: all precious and semi-precious stones (whether or not they have been worked or graded) excluding: all categories of diamonds; all precious stones composed of non mineral, organic materials (i.e. fossilised tree resins, pearls, ivory, corals, and lignite); and all precious stones made of synthetic or reconstructed materials. (For a complete alphabetical list, see Annex 1.)

2.2 Limitations to existing knowledge and research

Gemstones pass through a maze of miners, brokers, and wholesalers before they are polished, processed and introduced into the retail market. A lot of the upstream actors such as miners and brokers operate in the informal sector. As a consequence, the worldwide trade in gemstones remains 'difficult to track'⁴.

At every stage of their value chain non-diamond gemstones represent only one small segment of much larger trade flows. In their rough form, non-diamond gemstones represent only a fraction of the trade in mineral commodities produced and exported from African countries. Similarly, in their processed form, coloured gemstones represent only one speciality segment of the retail market for jewellery products.

This presents major difficulties in analysing economic data on global gemstone production and trade flows. The lack of clear definitions means that there are problems in sorting and disaggregating economic data on global gemstone production. Trade and production data commonly present aggregate figures that do not distinguish between diamonds and other precious stones as different categories. Blurring the analysis even further is the fact that there is also considerable illicit trading: rough coloured gemstones that leave countries of origin undeclared⁵.

¹ U.S. Geological Survey, Mineral Commodity Summaries, January 2000 and January 2007.

² M. MacFarlane et al., Towards an Ethical Jewellery Business: A Review of Key Issues (London: Natural Resources Institute and the University of Greenwich, 2003), p2

³ The commodity groupings of SITC reflect (a) the materials used in production, (b) the processing stage, (c) market practices and uses of the products, (d) the importance of the commodities in terms of world trade, and (e) technological changes.

⁴ See for instance: "Under the Table", Coloured Stone Magazine (Jan/Feb 2001)

⁵ See for instance: Sndgems company website, "Know Everything About Sapphire & Colored Gemstone Issues", <http://www.sndgems.com/sapphire-fair-trade-issues-community/Know_Everything_About_Sapphire_&_Colored_Gemstone_Issues.htm> (14-12-2009)

Existing research on this gemstone value chain is concentrated almost exclusively on the mining sector. There is very limited literature on traders and trade links between actors in the gem processing and jewellery industries (see table 1 below). There is a distinct paucity of literature from academic and civil society sources, and very little business, industry or market research. Where it does exist, research on gemstone trading, processing, and jewellery manufacturing is focused almost entirely on diamonds.

While some of the stages and trade routes in the gemstone value chain are the same, the actors involved and the structure of the diamond and non-diamond industries are very different. For instance, in contrast to diamond mining, coloured gemstones are mostly mined at relatively small, low-cost operations with few dominant producers⁶. The highly fragmented nature of the non-diamond gemstone industry, at almost every level of the value chain, makes it very difficult to identify significant actors.

Table 1: Existing documentary knowledge levels in the supply chain:

Production	Gems	Silver
Extraction	High	High
Trading	Low	Low
Processing	Low/medium	Low/medium
Trading	Low	Low
Production	Jewellery	
Manufacture	Low/medium	
Wholesale	Low/medium	
Retail	High	

Source: MacFarlane et al. (2003) Towards an Ethical Jewellery Business: A Review of Key Issues, London: Natural Resources Institute and the University of Greenwich, p97

2.3 Worldwide trade⁷

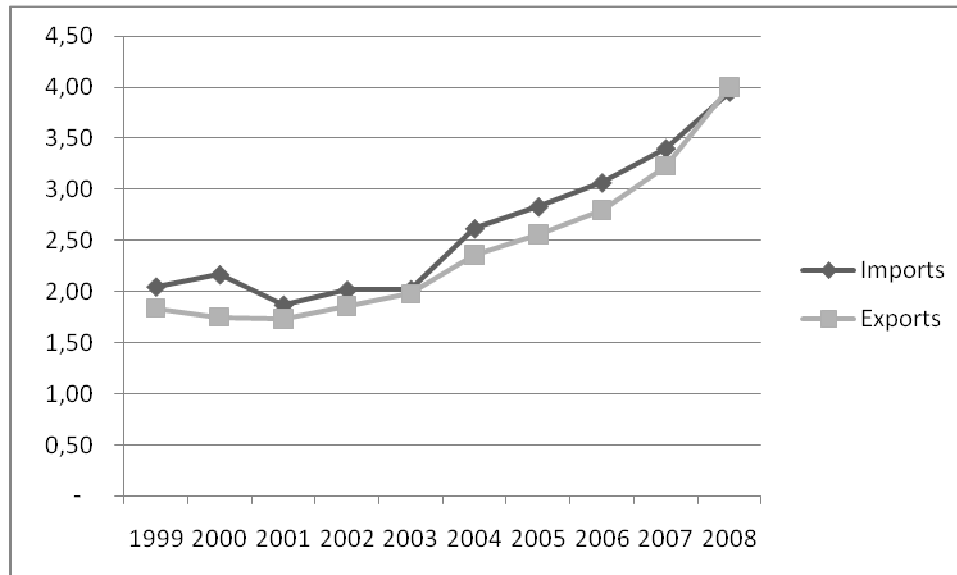
The worldwide trade in coloured gemstones amounted to roughly US\$4 billion in 2008. As can be seen in Chart 1 there has been considerable growth in the value of global trade since 2003 and sector analysts are predicting more expansion in the future⁸.

⁶ U.S. Geological Survey, Minerals Yearbook 2006, Gemstones, <<http://minerals.usgs.gov/minerals/pubs/commodity/gemstones/myb1-2006-gemst.pdf>> (14-12-2009)

⁷ Statistical data is compiled using the UN Commodity Trade Statistics Database (COMTRADE) which provides commodity trade data for all available countries and areas since 1962 (<http://comtrade.un.org/>)

⁸ UEA interact website, "Dubai coloured stones market shows strong growth potential", 15 October 2008, <http://www.uaeinteract.com/docs/Dubai_coloured_stones_market_shows_strong_growth_potential/32423.htm> (14-12-2009)

Chart 1: Worldwide imports and exports of coloured gemstones 1999-2008 (in US\$ billions)



Source: SOMO based on UN Comtrade

Trade is dominated by the USA, which accounts for around 25% of demand. Other leading importers include Switzerland (15%), Hong Kong⁹ (11%) and Thailand (9%). When looking at world exports the same countries are leading. In export by value Switzerland is the top exporter with a share of 15% of worldwide trade. Hong Kong accounts for 14%, Thailand for 13% and the USA captures 11% of world exports. The reason for this functional overlap is that there is considerable re-export of coloured gemstones in worldwide trade or in other words these countries are in fact the leading global *re-exporters* of coloured gemstones (see also chart 1). To illustrate: exports represent about half the value of US imports while Swiss exports are roughly equal to imports by value. Yet US domestic production of coloured gemstones was estimated to be only US\$12 million¹⁰, a fraction compared to the exports of this country that amounted to almost US\$460 million.¹¹ The value of Thai coloured gemstone exports is even 51% higher than their imports. This surplus is largely the result of value addition through gemstone processing (cutting).

2.4 Gemstone consuming countries

Global demand for coloured gemstones revolves around cut sapphire, emerald, tanzanite and ruby.¹² The global retail market value was estimated to be worth US\$10 billion-15 billion in 2007. Corundum

⁹ China (mainland) and China, Hong Kong Special Administrative Region constitute separate economies and separate custom zones. In this report Chinese gemstones trade figures mostly refer to Hong Kong unless stated otherwise.

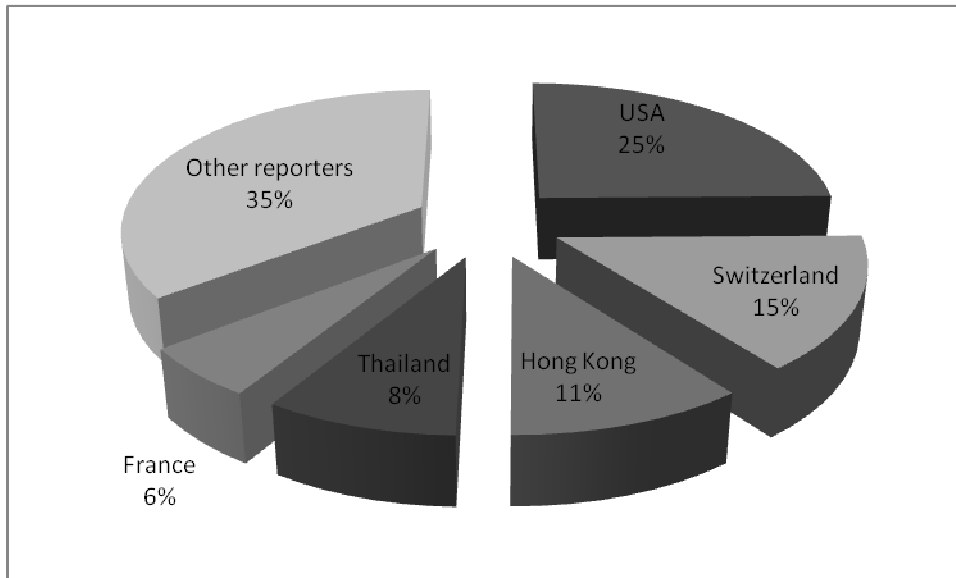
¹⁰ U.S. Geological Survey, Minerals Yearbook 2007, Gemstones, <<http://minerals.usgs.gov/minerals/pubs/commodity/gemstones/myb1-2007-gemst.pdf>

¹¹ While it was out of the scope of this research SOMO could not readily find an exact explanation for these high re-exports from Switzerland and the USA.

¹² Fair Trade Organisation and Consultancy and Research for Environmental Management, Sustainability of Jewellery Sold in the Netherlands, 2005, p25 and UEA interact website, "Dubai coloured stones market shows strong growth potential", 15 October 2008, <http://www.uaeinteract.com/docs/Dubai_coloured_stones_market_shows_strong_growth_potential/32423.htm> (14-12-2009)

(rubies and sapphires) encompassed 35%, tanzanite 10-15% and emeralds 10-12% of coloured gem sales.¹³

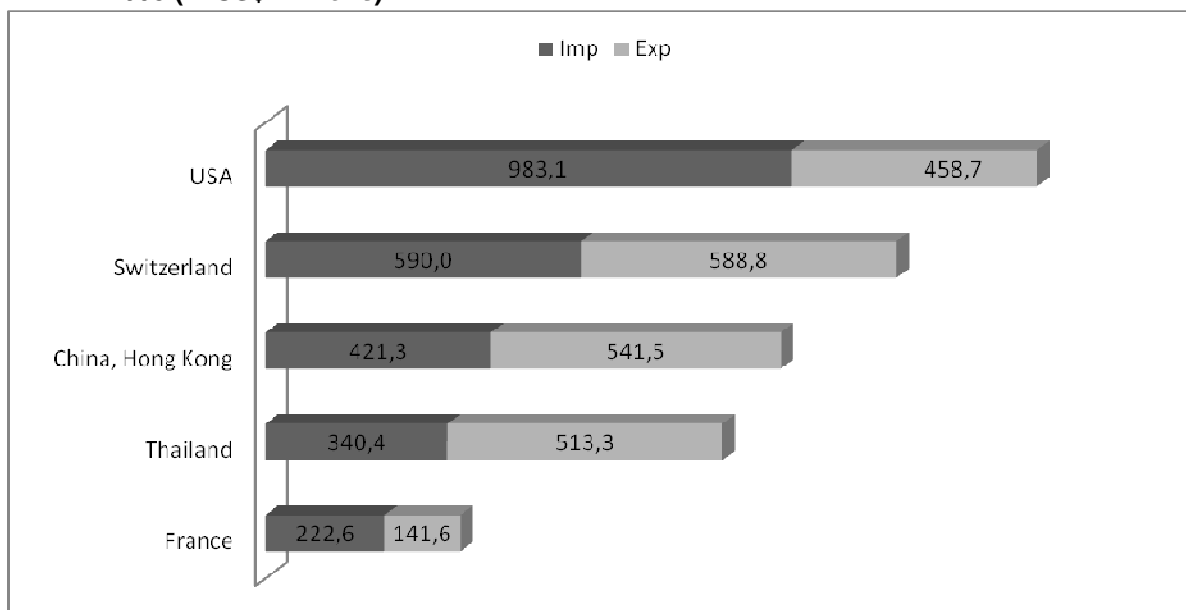
Chart 2: Value share of the world’s leading coloured gemstone importing countries in 2008



Source: SOMO based on UN Comtrade

As can be seen in chart 2 just three countries accounted for half of the global coloured gemstone imports by value. However, as already indicated above, all the leading countries also have substantial exports. Of these countries only the USA retains most of the stones it imports. In all the other countries the value of re-exports exceeded half of the value of original imports.

Chart 3: Imports and exports of the world’s leading coloured gemstone importing countries in 2008 (in US\$ millions)



Source: SOMO based on UN Comtrade

¹³ ICA website, "ICA Congress Panelists Discuss Forces Shaping Gem Industry", <<http://www.gemstone.org/press/uploads/press/ICAForgesShapingIndustry.doc>> (12-12-2009)

The popularity of coloured gemstones led to a rise in the value of US imports of emerald, rubies, sapphires, and other precious and semi-precious stones for domestic consumption between 2004 and 2005. In 2008 the US domestic market for natural, unset coloured gemstones was estimated to be worth about US\$1.15 billion, up from US\$770 million in 2000, and the United States is expected to continue to dominate global gemstone consumption over the coming decade.¹⁴

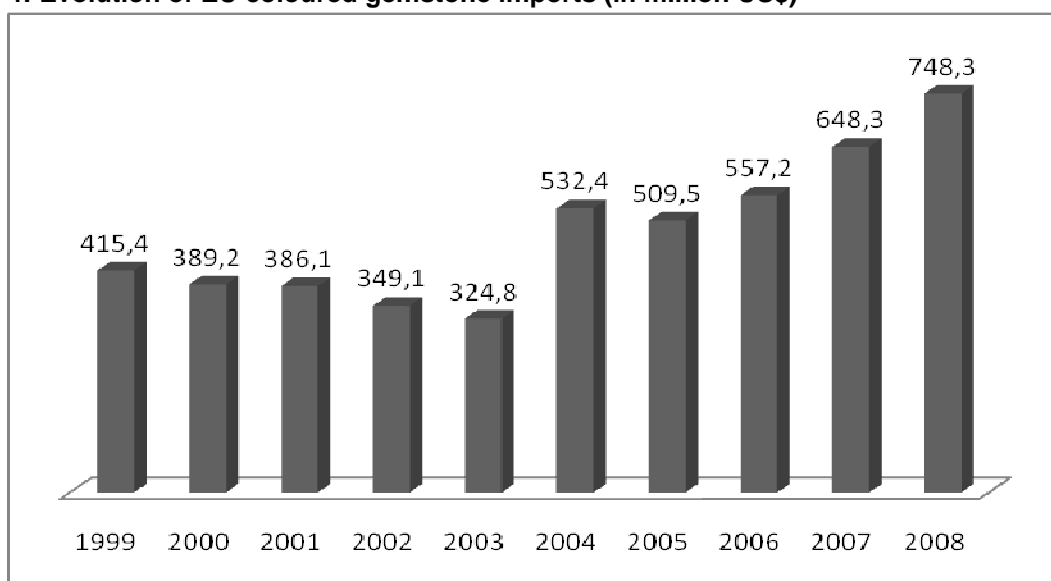
Table 2: price index for non-diamond gemstones (US wholesale prices in US\$ per carat 2007)

Amethyst	7-15
Blue sapphire	700-1,375
Blue topaz	5-10
Emerald	2,400-4,000
Green tourmaline	45-60
Pink tourmaline	60-125
Rhodolite garnet	18-30
Ruby	1,725-2,000
Tanzanite	300-450

Source: U.S. Geological Survey Minerals Yearbook 2007

The value of coloured gemstone imports into the EU amounted to roughly US\$750 million in 2008. As can be seen in chart 4 below, the evolution of imports by value can be divided in two periods over the last decade: one period from 1999-2003 in which there was decline in demand and a second period from 2004 onwards in which imports grew markedly.

Chart 4: Evolution of EU coloured gemstone imports (in million US\$)



Source: SOMO based on UN Comtrade

When looking at disaggregated import data, France, the United Kingdom, Germany and Italy alone account for 91% of all gemstone imports into the European Union (see Table 8). Top EU-importer France accounts for imports worth US\$223 million in 2008. New members of the European Union are growing markets for coloured gemstone products. Eastern European countries are experiencing new demand for jewellery and gemstone products. In Poland, for example, imports of gemstones increased

¹⁴ U.S. Geological Survey, Mineral Commodity Summaries, Gemstones, 2009, <<http://minerals.usgs.gov/minerals/pubs/commodity/gemstones/mcs-2009-gemst.pdf>> (01-12-2009)

nearly 350% between 2004 and 2005. Poland now imports more coloured stones than Greece, Portugal, or the Netherlands (see also Chart 3).¹⁵ It should be mentioned that, as can be seen as well in the figures in the beginning of this section (chart 3), the non-EU country Switzerland is actually the European non-diamond gemstone champion. Its imports, valued at roughly US\$590 million in 2008 are considerably higher than those of other European countries.

Table 3: EU imports of coloured gemstones in 2008 (in US\$ millions)

Country	Value	Share
France	222.6	30%
United Kingdom	195.8	26%
Italy	159.2	21%
Germany	106.3	14%
Belgium	20.9	3%
Austria	12.2	2%
Spain	8.8	1%
Greece	4.4	1%
Poland	3.5	0%
Netherlands	3.3	0%
Other EU countries	11.3	2%
Total EU	748.3	100%

Source: SOMO based on UN Comtrade

2.5 Gemstone producing countries

Virtually all coloured gemstones are mined in low-cost, widely dispersed artisanal and small-scale mines in remote or inaccessible and mineral-rich parts of the non-industrialised world or global south. Regions with major deposits of coloured gemstones include:¹⁶

Asia-Pacific	
Afghanistan	aquamarine, beryl, emerald, kunzite, lapis lazuli, ruby and tourmaline
Australia	beryl, opal and sapphire
Burma	beryl, jade, ruby, sapphire and topaz
Sri Lanka	beryl, ruby, sapphire and topaz

Central and South America	
Brazil	agate, amethyst, beryl, ruby, sapphire, topaz and tourmaline
Colombia	beryl, emerald and sapphire
Mexico	agate, opal and topaz

Africa	
Kenya	beryl, garnet and sapphire
Madagascar	beryl, rose quartz, sapphire and tourmaline
Tanzania	garnet, ruby, sapphire, tanzanite and tourmaline
Zambia	amethyst and beryl

¹⁵ See: "New Kids on the Bloc", Coloured Stone Magazine (March/April 2006)

¹⁶ U.S. Geological Survey, Minerals Yearbook 2005, <<http://minerals.usgs.gov/minerals/pubs/commodity/gemstones/gemstmyb05.pdf>>, p.30

This section will focus on African coloured gemstone production. The combined exports of all African countries amounted to roughly US\$152 million in 2007. This is substantial compared to the leading gemstone producing countries outside Africa (see table 9 below).

Table 4: Value of exports of the world's five leading gemstone producing countries in 2007 excluding African countries (in US\$ millions)

Country	Value
Sri Lanka	154.0
Colombia	126.4
Brazil	111.6
Australia	39.8
Mexico	1.2

Source: SOMO based on UN Comtrade

Calculating the trade in coloured gemstones from Africa is extremely difficult. Estimates suggest that the majority of all trade in gemstones from African countries is undocumented, and takes place in the informal, unregulated or illicit economy outside of State control. For example in 2001, Madagascar's annual coloured gemstone production was estimated to be worth US\$400 million¹⁷. Compared with the officially recorded 2001 exports of US\$9.4 million¹⁸ this means that virtually all of its gems are exported illegally. Similarly, a majority of Zambia's gemstones are reported to leave the country unofficially¹⁹.

The top five exporters of precious stones from Africa in 2007 were Tanzania, South Africa, Zambia, Madagascar and Kenya (see Table 5 below). These five countries together represent roughly 99% of total official African exports of coloured gemstones by value.²⁰ When calculated over a five-year period (2003-2007) the Top 3 changes slightly with Zambia taking over the leading position before Tanzania and South Africa (see Chart 5).

Table 5: Africa's five leading exporters of coloured gemstones in 2007 (in US\$ millions)

Top African Exporters	2007
Tanzania	44.7
South Africa	44.6
Zambia	37.6
Madagascar	16.9
Kenya	5.5
Other African countries	2.2
Total Africa	151.6

Source: SOMO based on UN Comtrade

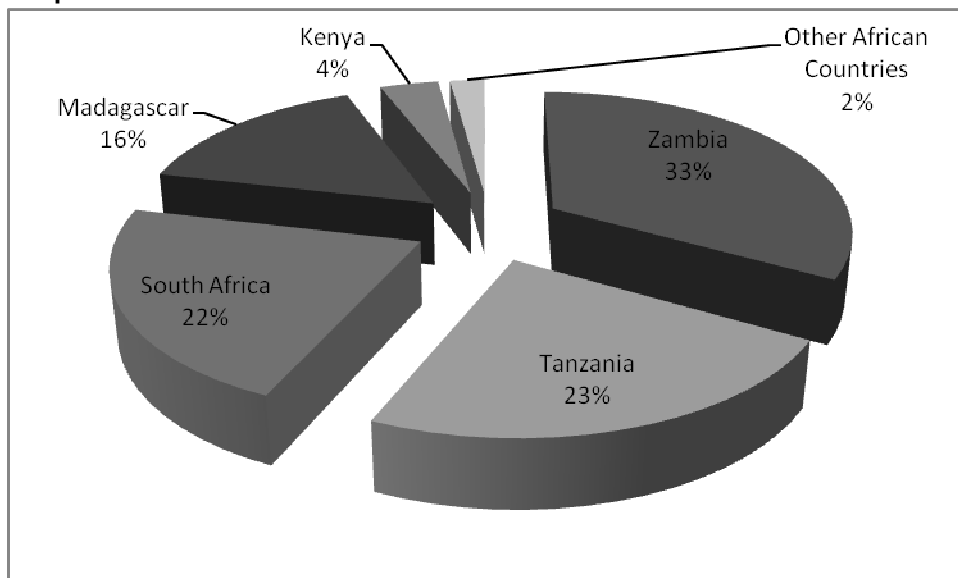
¹⁷ Mining, Minerals and Sustainable Development (MMSD), Breaking New Ground: Mining Minerals and Sustainable Development, 2002 < <http://www.iied.org/pubs/display.php?o=9084IIED> > (1 February 2010)

¹⁸ UN Comtrade

¹⁹ Mining, Minerals and Sustainable Development (MMSD), Breaking New Ground: Mining Minerals and Sustainable Development, 2002 < <http://www.iied.org/pubs/display.php?o=9084IIED> > (1 February 2010)

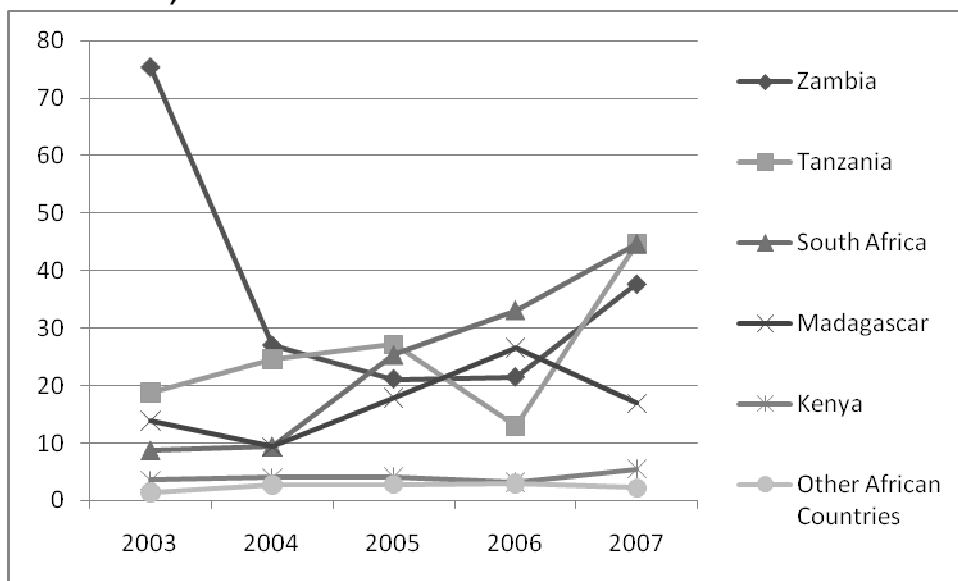
²⁰ Calculations by SOMO based on UNCTAD (UN Comtrade) data of 53 African Countries: Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Rep., Chad, Comoros, Congo, Côte d'Ivoire, Dem. Rep. of the Congo, Djibouti, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Togo, Tunisia, Uganda, United Rep. of Tanzania, Zambia and Zimbabwe

Chart 5: Africa's top 5 gemstone exporting countries (2003-2007 average) share of total African exports



Source: SOMO based on UN Comtrade

Chart 6: Exports from Africa's five top 5 gemstone producing countries, 2003-2007 (in US\$ millions US)



Source: SOMO based on UN Comtrade

The value of officially recorded exports for Madagascar, Tanzania and Zambia was rather volatile over a period of five years. Kenya's and the combined exports of African exporters not belonging to the top five remained stable albeit at a notably lower level than their competitors (see Chart 6). Zambia's exports were at a record high in 2003, only to fall dramatically to a 2005 low. South Africa's gemstone industry by contrast is booming. Exports of precious stones from South Africa have risen from US\$8.7 million in 2003 to almost 54.5 million in 2008 (not in graph). As a result of increased regional trade integration and the removal of trade tariffs, South Africa has now become a net importer of precious stones. Imports of precious stones rose from just US\$4.3 million in 2002 to 36.9 million in 2008. South Africa is now a major importer of precious stones from Tanzania, with imports increasing markedly

from US\$15 million to 22 million between 2004 and 2008. The other top African exporters hardly import gemstones for re-exports.

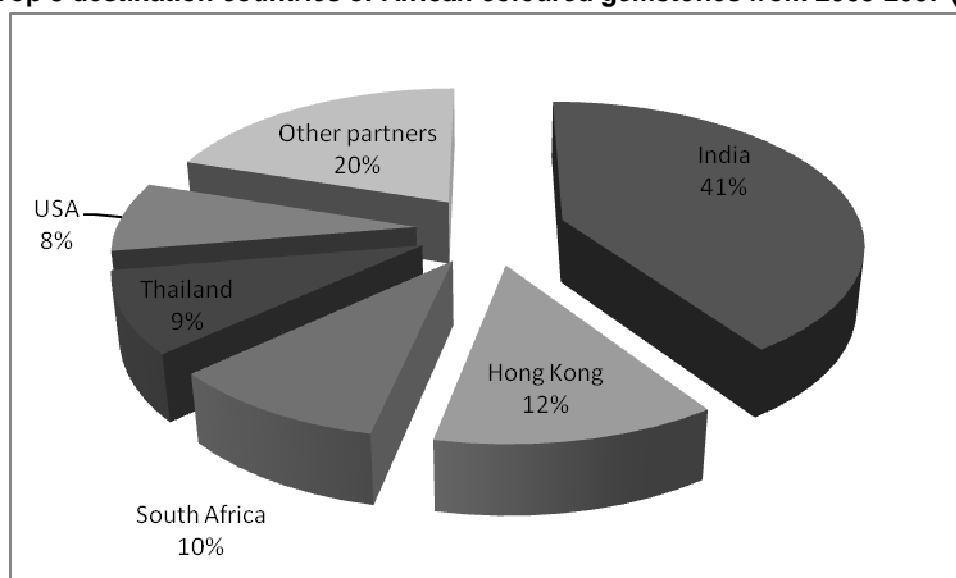
The top destination countries of African coloured gemstones in 2007 were India, South Africa, USA, Hong Kong and Thailand with India capturing the lion share (see Table 4). Five-year averages show a slightly different picture with Hong Kong and Thailand being more prominent than the USA and South Africa (see chart 7).

Table 6: Top 5 destination countries of African coloured gemstones in 2007 (\$ millions)

Top African Export Partners	2007
India	75.5
South Africa	21.0
USA	13.2
China, Hong Kong	13.1
Thailand	8.6
Other partners	20.3
Total Africa	151.6

Source: SOMO based on UN Comtrade

Chart 7: Top 5 destination countries of African coloured gemstones from 2003-2007 (average)



Source: SOMO based on UN Comtrade

Major trading partners for Africa's top five producers of non-diamond gemstones vary considerably on the country level. For example India remains the major destination for coloured gemstones from Kenya, South Africa and Zambia, while Madagascar's exports are largely destined for Thailand and Hong Kong. There have also been significant changes in the direction of trade and South Africa has emerged as an important partner, with almost half of Tanzania's coloured gemstone exports destined for South Africa.

In South and South East Asia, the major destinations for Africa's non-diamond gemstones are the processing and manufacturing centres of India, Thailand and Hong Kong. Non-diamond gemstones are shipped directly from African producing countries to Asian manufacturing countries, but there is also a considerable trade in rough stones between these non-producing countries. India, for example, imports large volumes of gemstones from Thailand and Hong Kong.

Fluctuations in the global market for coloured gemstones have a clear impact on African producers. Increased demand in the new consumer economies of China and India has important implications for the balance of trade and investment with African countries. The consequences of global insecurity can have immediate implications. Following 11 September 2001, demand for Tanzania's most heavily mined gemstone (*tanzanite*) in the US (which represents over 80% of the world market for the commodity) declined sharply; and prices plummeted by as much as 77% with an adverse effect on the Tanzanian economy.²¹

²¹ Government of Tanzania, Poverty Reduction Strategy Paper: Progress Report, August 2001, <<http://www.imf.org/external/np/prsp/2001/tza/01/081401.pdf>>, p. 56.

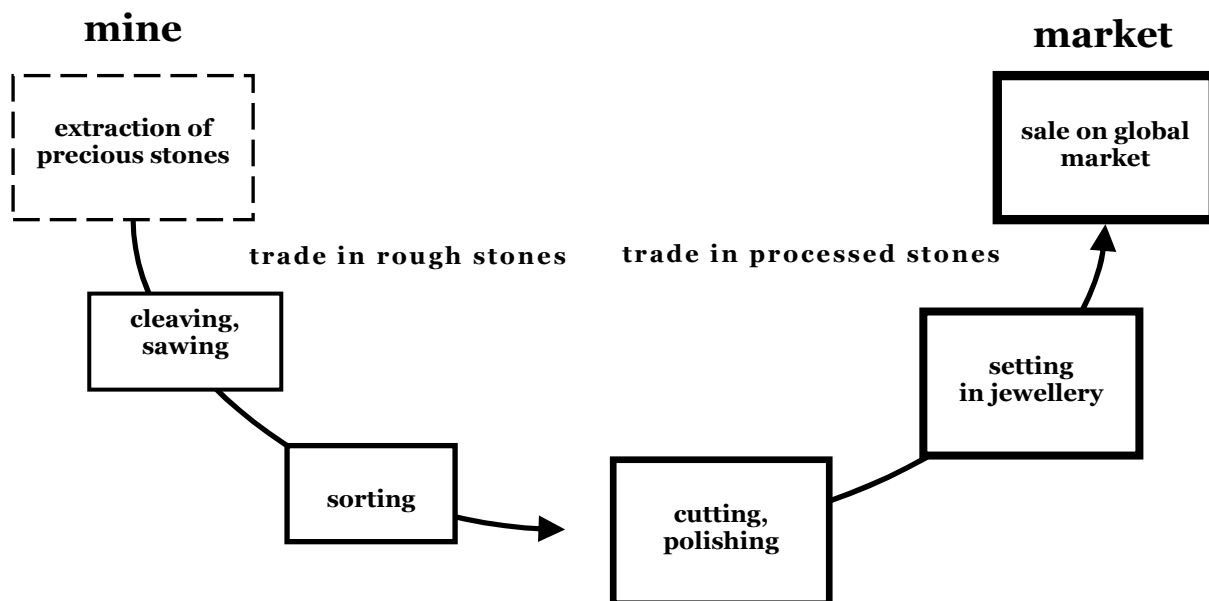
3. From mine to market: Gemstones and the global value chain

This chapter offers an overview of the processes, actors, activities and locations that connect the production of coloured gemstones in Africa to the global market.

3.1 The fragmented global industry

Trade relations in the coloured gemstone industry are very different from those in the diamond sector. Unlike the diamond industry, the coloured gemstone industry is highly fragmented at all levels - from exploration, to mining, to processing and distribution - with many small companies bound together in intricate trading relationships. Increased consolidation in the industry has seen the emergence of larger players who have integrated different sections of the value chain from source to supply. There are, however, no dominant trading companies and research suggests that no single operating entity controls more than 2% of the market, measured either in volume or value of shipments.²²

Diagram 1: From mine to market, outline of the coloured gemstone value chain

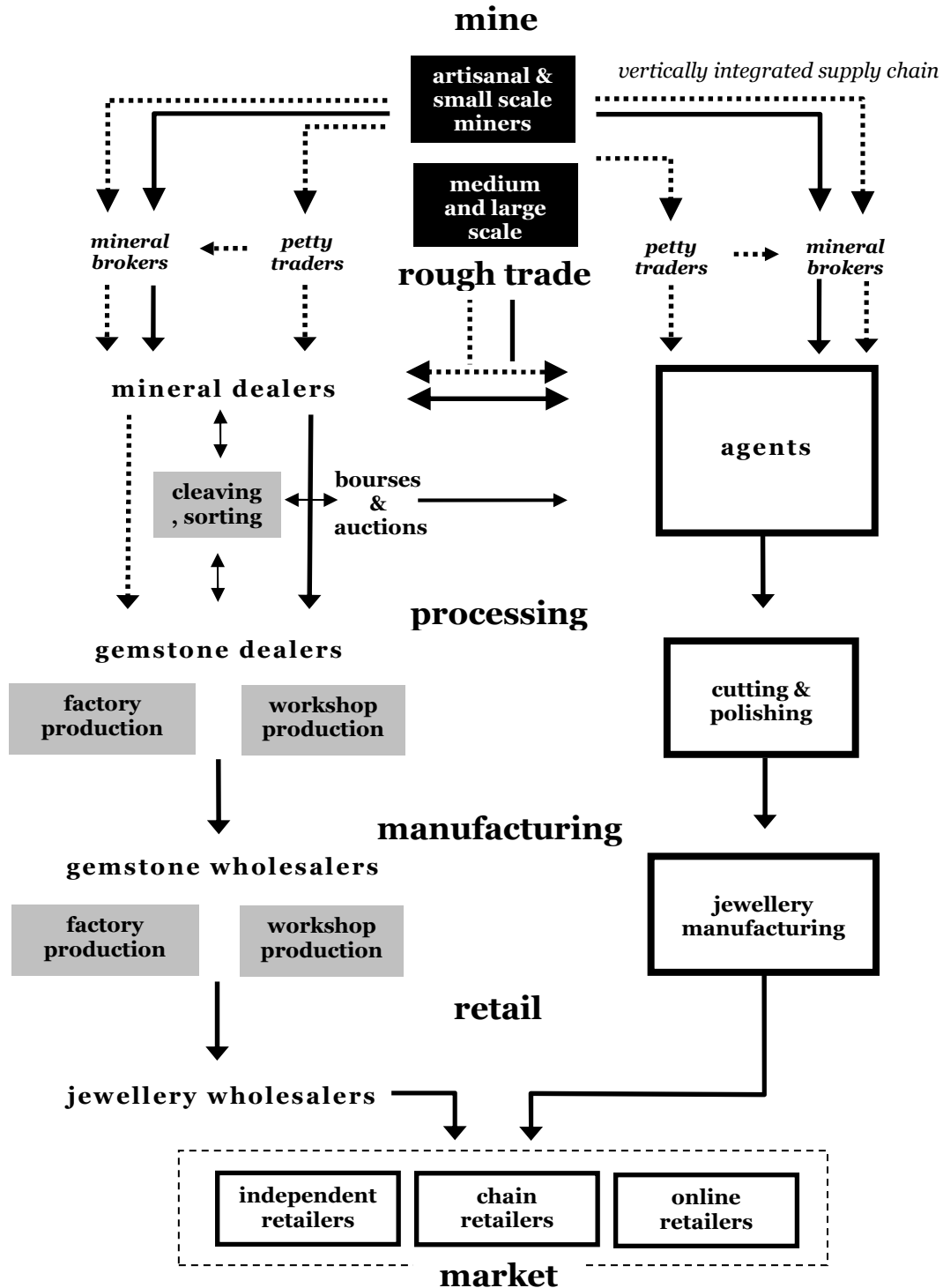


Between the point of extraction at sites of gemstone mining and the point of sale on the global retail market the gemstone value chain has four key stages: 1) cleaving/sawing, 2) sorting, 3) cutting/polishing and 4) manufacturing into jewellery product. A substantial portion of the value addition occurs downstream, in the jewellery manufacturing and retailing stages. The rough gem found by a prospector or miner will be sold and resold several times between different layers of intermediaries and traders before it reaches the customer. Value chain case studies suggest that the

²² R.H. Lopez, et al., Sapphire Shop: A Case Study from the Lubin School of Business, 2007, <http://digitalcommons.pace.edu/business_cases/6> (19-01-2010)

final retail product sells for essentially 11 times that of the rough stone.²³ Diagrams 1 and 2 outline the main production and trade movements of gemstones through the value chain.

Diagram 2: Non-diamond gemstone value chain, showing key actors



Note: Dotted lines indicate illicit, unregulated trade flows.

²³ Arthur Thomas, Gemstones handbook (UK: New Holland Publishers, 2008)

3.2 Global deposits of precious stones

Compared to most deposits of gold, copper and other base or ferroalloy metals, most deposits of coloured gemstones are relatively low yielding. As a result, gemstone deposits are commonly mined on a small scale. While the production of diamonds is dominated by large-scale, highly mechanised, mining operations and controlled by a small number of corporate giants, coloured gemstone production largely takes place in artisanal and small-scale mines, in relatively small, low-cost operations and has few if any dominant producers.

Gemstones are a non-renewable resource. As a consequence, the non-diamond gemstone industry is cyclical, registering high points in production as new deposits are discovered and declines as the extraction of precious stones slows. During the 20th century different countries have risen to prominence - Brazil in the 1950s and 1960s, Tanzania in the 1970s, Afghanistan in the 1980s, and Nigeria in the late 1990s - as new deposits are discovered and increased capital is invested in extraction. In 2004, production lulls were being reported for many gemstones.²⁴

3.3 Artisanal and small-scale mining

Artisanal and small-scale mining used to be estimated to account for somewhere between 90-100% of global gemstone production.²⁵ More recent estimates (see also Table 7) indicate that in African gem-producing countries such as Zambia, South Africa and Mozambique small-scale and artisanal miners are outnumbered by miners working for large-scale mining operations. While these figures also include mining of other types of minerals such as gold and silver, the share of coloured gemstone mining is likely to be significant in these estimates.

²⁴ National Gemstone website, The Gemstone Forecaster, In The News, Rough Times
<<http://www.preciousgemstones.com/gfwinter04.html>>

²⁵ M. MacFarlane et al., Towards an Ethical Jewellery Business: A Review of Key Issues (London: Natural Resources Institute and the University of Greenwich, 2003), p2.

Table 7: Workforce estimates in different forms of mineral mining and major coloured gemstone products in a number of African gemstone producing countries.

Location	Artisanal and small-scale mining			Large-scale mechanised mining	Major coloured gemstone products
	workforce	women	children		
Malawi	40,000	4,000		14,000	ruby, sapphire, aquamarine, garnet, amethyst, rose quartz
Mozambique	60,000	18,000		87,000	aquamarine, tourmaline, amethyst, emerald, morganite, rose quartz.
Namibia					aquamarine, topaz, garnet
South Africa	10,000	500		1,350,000	emerald and amethyst
United Republic of Tanzania	550,000	137,500	>3,000	365,000	tanzanite, emerald, ruby, alexandrite, sapphire, spinel, garnet, alexandrite, chrysoberyl.
Zambia	30,000	9,000		300,000	Emerald, amethyst, aquamarine
Zimbabwe	350,000	153,000		350,000	Emerald, aquamarine, chrysoberyl, alexandrite, tourmaline, beryl.

Source: Adapted from Hentschel, T., et al. (2002), *Global Report on Artisanal & Small-Scale Mining*, International Institute for Environment and Development, p21 and MMSD (2002), *Breaking New Ground: Mining Minerals and Sustainable Development*, Earthscan: London, p319

Artisanal and small-scale miners work largely in the 'informal sector', which makes it hard to establish precise figures on the numbers of people involved in it. In the 1990s estimates suggested that some 20 million people were directly or indirectly dependent on some form of artisanal and small-scale mining for their subsistence.²⁶ Between 1998 and 2003, artisanal and small-scale mining was estimated to have increased in 21 out of 35 developing countries.²⁷ Women make up an estimated 30% of the workforce in artisanal and small-scale mining worldwide.²⁸ On a country level this share varies considerably depending on the country and the mineral. Studies have shown women participate in all aspects of mining (except the handling of mechanised equipment) and are indirectly involved in the industry through ancillary activities such as the supply of food, drink, tools and equipment, as well as gemstone trading.

The terms artisanal and small-scale mining are used to describe different kinds of production. *Artisanal mining* is used to describe mainly manual and non-organised mining, which may involve only individuals or groups of individuals exploiting deposits with the simplest equipment'.²⁹ *Small-scale mining* is used to describe a more extensive and mechanised type of mining that implies some degree of organisation and management although operations may enjoy different levels of capital investment, use different types of technology and employ different numbers of employees.³⁰

²⁶ ILO, Social and labour issues in small-scale mines: Report for discussion at the Tripartite Meeting on Social and Labour Issues in Small-scale Mines (Geneva: ILO, 1999)

²⁷ M. MacFarlane et al., *Towards an Ethical Jewellery Business: A Review of Key Issues* (London: Natural Resources Institute and the University of Greenwich, 2003), p10.

²⁸ J.J. Hinton, M.M. Veiga & C. Beinhoff, "Women and Artisanal Mining: Gender Roles and the Road Ahead" in *The Socio-Economic Impacts of Artisanal and Small-Scale Mining in Developing Countries* Ed. G. Hilson, Pub. A.A. Balkema, Swets Publishers (Netherlands, 2003)

²⁹ M. Barry, *Regularising Informal Mining: A Summary of the Proceedings of the International Roundtable on Artisanal Mining, Industry and Energy Department Occasional Paper No.6.* (Washington: World Bank, 1996).

³⁰ T. Hentschel, F. Hruschka, & M. Priester, International Institute for Environment and Development, *Global Report on Artisanal & Small-Scale Mining*, January 2002 <iiedtest.merfa.co.uk/pubs/pdfs/G00723.pdf.>, p5.

Despite these differences artisanal and small-scale mining operations share the following characteristics:

- They are not registered, do not normally pay royalties to the state or taxes on profits, and commonly lack legal rights to exploit a particular deposit.
- They are likely to lack capital, have poor access to markets, to exploit small or marginal deposits, to work labour intensively with low rates of recovery, and to operate under primitive conditions of health and safety, and to have poor environmental practices.³¹
- Artisanal miners in particular – including those who stake a cultural claim to the territories on which they work and those who operate informally – are likely to be regarded as illegal by local and state authorities.
- They are often reluctant to disclose precise production figures, as they seek to discourage interest from larger or legal mining operators and as they seek to avoid interference from the state.

Analysts commonly conclude that a lack of basic business knowledge hinders the sustainable growth of small-scale mining operations, even if natural resources are promising and production is reasonable. As a consequence, strengthening the capacity of local business entrepreneurs has become a key strategic focus for international development donors. In Madagascar, the World Bank funding has supported a gemstone training institute aimed at strengthening indigenous capacity in the mining industry. These efforts are aimed at enabling countries like Madagascar to capture a greater share of the ‘international sapphire split’ - the profit in each stone that is shared among the digger, trader, cutter and wholesaler.³² Such efforts, however, fail to address the broader structural issues that lead to the increase of artisanal and small-scale mining and to the power imbalances between producers and traders down the value chain.

3.4 Profiles of gemstone producing countries in Africa³³

This section provides a brief profile of gemstone production in selected African countries.

Kenya

Gold is by far the most important of Kenya’s mineral deposits but the country also produces amethyst, iolite and aquamarine and is the main source of tsavorite (emerald green grossular garnet). Garnet deposits are located near Taita Taveta where the biggest single producer is the Scorpion Mine. There are major ruby mining operations around the Tsavo National Park and the bulk of Kenya's annual ruby exports are produced at the John Saul Mine. The region around Baringo is being worked by a variety of independent miners.

Madagascar

Madagascar's gemstone production boomed in the 1990s. Mining is centred around the towns of Ilakaka and Sakaraha and produces a variety of coloured stones. Major deposits at Ambatovita, Andilamena Antsirabe, Diego Suarez, Vangainrano, and Vatomandry are worked by a combination of

³¹ Mining, Minerals and Sustainable Development (MMSD), *Breaking New Ground: Mining Minerals and Sustainable Development*, 2002 < <http://www.iied.org/pubs/display.php?o=9084IIED> > (1 February 2010)

³² Xan Rice “Outlook: Fair cut of the gem bonanza” *Guardian Weekly* December 15, 2006.

³³ Information for this section is largely drawn from: Austin, G et al. 2005. *World Mining Report* in *Coloured Stone Magazine*. <http://www.tucsonshowguide.com/stories/nov05/mining.cfm#africa>

artisanal miners and small-scale miners, usually under the control of a single broker who attracts investors and finances the mining operations.

Malawi

Gemstone mining in Malawi is done mostly on artisanal basis. Major sites of activity include Mzimba, near the border with Zambia, which produces aquamarine and beryl, as well as garnet, amethyst, and rose quartz. The largest mining operation in the country is a ruby and sapphire mine at Chimwadzulu Hill. Chimwadzulu is the single biggest mine in Malawi and is responsible for the bulk of the country's gemstone exports. The mine is run by a private operator and its gemstone products are marketed in the United States as Nyala Ruby.

Mozambique

Exact production figures for gemstone mining in Mozambique are unavailable and official figures report less than 15 kilograms of production per year. Major gem-producing areas are located in Nampula and Zambezia provinces, which produce aquamarine, tourmaline, amethyst, emerald, morganite, and rose quartz. Unofficial estimates put the amount at hundreds of kilograms per year, mostly in aquamarine and tourmaline.

Nigeria

Non-diamond gemstone activity in Nigeria has focused on the Oyo, Saki and Kwara regions which have produced tourmaline and garnet, and the Kaduna and Bauchi regions which have produced aquamarine and sapphire. Although mining is active, production currently has little impact on the global market.

South Africa

South Africa produces little in the way of coloured gemstones. There are known deposits of emerald and amethyst, but the only gemstone material produced in any significant quantity is tiger's eye quartz, for which South Africa is one of the world's major suppliers.

Today South Africa is the largest net importer of gemstones in Africa. South Africa's membership of the Southern African Development Community (SADC), the South African Customs Union (SACU) and the Common Market for Eastern and Southern Africa (COMESA) has removed trade tariffs with regional producers, including Zambia, Tanzania, Kenya and Madagascar and changed the flow of precious stones. The South African government is encouraging investment in gemstone manufacturing operations.

United Republic of Tanzania

A variety of coloured gemstones are found in Tanzania but the country's gemstone industry is now dominated by tanzanite (blue zoisite).³⁴ Tanzanite was 'discovered' in 1967 and at the current rate of extraction the existing deposits are expected to expire in 12-15 years.³⁵ As of April 2005, there were 21 registered mining ventures in the country (see table 4). Six of the ventures were for gold mining, four for gemstone mining (including diamonds), and 11 for industrial minerals (including salt, limestone, and phosphate).³⁶

³⁴ S. Larenaudie, "Romancing a New Stone", Time 1 March 2007 <<http://www.time.com/time/magazine/article/0,9171,1594137-1,00.html>> (1 February 2010)

³⁵ K. Lyimo, "Tanzanite Running Out? Good Riddance, I say" The East African, 15 May 2007, <<http://allafrica.com/stories/200705150694.html>> (1 February 2010)

³⁶ P. Kafumu, "Golden Returns for Tanzania" Mining Magazine (August 2005).

The growth of the tanzanite industry has led to an increase in the scale of independent mining operations and increased competition between large mining companies and small-scale miners.³⁷ Most gemstones are exported uncut and the government of Tanzania is encouraging the growth of manufacturing and processing operations.

Zambia

The mining sector has been a prime mover of economic development in Zambia for over 70 years, with exports of mineral products (including copper, cobalt, and coal) contributing about 70% of total foreign exchange earnings. Today Zambia is one of the world's three largest producers of emeralds and has large quality reserves of tourmalines, aquamarines, amethysts, citrines and garnets. While emerald is the country's biggest gem export in value terms, amethyst is the biggest export by volume, accounting for an estimated 700 tonnes of material each year. Official export figures of approximately US\$37.6 million (2007) underestimate the true value of the trade.

Zambia has issued between 450 and 500 ten-year gemstone mining licenses and 345 of those are emerald mining licences. Emerald mining is centred around Kafubu, near the border with the Democratic Republic of Congo, Mapatizya, and Lundazi. The majority of miners in each region are artisanal or small-scale independent operators but the bulk of production is mined by a few large companies with mechanised, open pits. There are at least 10 large, fully mechanised gemstone mines with plots of up to 45 sq km.

Zimbabwe

The only major mining operation in Zimbabwe at present is the Sandawana emerald mine in Zvishavane. There are known deposits of aquamarine, chrysoberyl, alexandrite, tourmaline, and yellow, green, and pink beryl.

3.5 Large-scale mining in Africa's coloured gemstone industry

The question of how much global gemstone production is dominated by large corporate mining interests and how much takes place through small-scale artisanal mining operations is still not fully clear yet, as discussed in section 3.3. What seems clear, however, is that the relationship between large-scale mining companies and artisanal mining is symbiotic. Mining and exploration companies are sometimes attracted to new locations by the activity of artisanal miners. They have been known to 'use' artisanal and small-scale miners as unpaid 'geologists'; launching large explorations of mineral deposits wherever there is evidence of small-scale mining activity. Similarly, when large-scale private mining companies dominate key sites and major mineral deposits, they commonly attract large numbers of artisanal miners to the area. Small-scale miners often congregate around a larger-scale mine taking advantage of the opportunities for access to ground deposits and perhaps re-mining some of the larger company's waste.³⁸

These relationships between large mining companies and smaller-scale mining industries have been characterised by conflict rather than cooperation. Governments have been quick to ignore or 'clear out' artisanal and small-scale miners in favour of large companies, forcing independent miners into illegality while granting legal entitlements to corporate investors. In some cases, this is a visible

³⁷ Ibid.

³⁸ Mining, Minerals and Sustainable Development (MMSD), *Breaking New Ground: Mining Minerals and Sustainable Development*, 2002 < <http://www.iied.org/pubs/display.php?o=9084IIED> > (1 February 2010), p324.

legitimate process of state resettlement that offers compensation to those resettled and displaced. In others police intervention is required to enforce company entitlements is used.

However, while large mining companies publicly seek to stamp out the activities of artisanal and small-scale producers, privately they may also enjoy work and trade relations with an artisanal mining community. First, by incorporating artisanal miners into a temporary, flexible labour force at the site of large-scale mining operations. Second, by using independent artisanal producers to reach gemstones that lie outside territories to which they hold legal rights to mine.

In recent years, the attitude of larger multinational companies in the mining industry towards small-scale or independent operators is reported to have changed. Large mining companies increasingly see a business case for building relationships with artisanal and small-scale miners. In the short term, these relations can help avoid tension and potential conflict with local miners.³⁹

As in the global diamond industry, the structure of the coloured gemstone trade is changing and there are more alliances and collaborations between producers, manufacturers, and retailers. A brief scan of the major African exporting countries reveals a number of large corporate entities are involved in the extraction and processing of gemstones in these countries.

Large-scale mining companies commonly raise funds for gemstone exploration and extraction from private equity firms and financial houses. JP Morgan's Natural Resources fund, for example, is worth approx. US\$2.3 billion and invests in a range of mineral commodities, including gemstones.⁴⁰ Profiles of two major large-scale mining companies are given in the boxes below.

Gemfields Resources PLC⁴¹

Gemfields Resources is a public limited company engaged in importing, processing, selling, exploring for and mining precious and semi-precious stones. It operates in the United Kingdom, British Virgin Islands, Canada, India, Panama, Zambia, Madagascar and Mozambique.⁴² Gemfields is part of the Pallinghurst Resources Group just like Fabergé.⁴³

The Group has been actively involved in exploring opportunities in the gemstone-mining industry in Zambia since 1996. The company has assembled several significant interests in emerald properties, covering approximately 70% of the prospective area in the Ndola Rural Emerald Restricted Area ('NRERA'). Gemfields is looking to enhance profitability via downstream integration into gemstone cutting, polishing and distribution.

In the fiscal year ending in June 2009, the company registered a loss in earnings of US\$201 million, which it ascribes to a US\$249 million impairment charge against the value of its Kagem mine. Emerald sales amounted to US\$815,456.⁴⁴

³⁹ Mining, Minerals and Sustainable Development (MMSD), *Breaking New Ground: Mining Minerals and Sustainable Development*, 2002 < <http://www.iied.org/pubs/display.php?o=9084IIED> > (1 February 2010), p331.

⁴⁰ E. Morgan, "JP Morgan mines a rich seam" in *Financial Times*, 31 May 2007

⁴¹ www.gemfields.co.uk

⁴² Gemfields website, "Corporate structure", <<http://www.gemfields.co.uk/structure.htm>> 1 February 2010

⁴³ Pallinghurst Resources website, "Corporate Profile", <<http://www.pallinghurst.com/about/focus.html>> (1 February 2010)

⁴⁴ Gemfields Resources website, "Gemfields Resources PLC Report and Financial Statement Year Ended 30 June 2009" <<http://www.gemfields.co.uk/pdf/Annual%20Report%202009.pdf>> (1 February 2010)

Tanzanite One Ltd⁴⁵

Tanzania's tanzanite industry is dominated by a single private company, *Tanzanite One Ltd*. Tanzanite One Limited explores, mines, beneficiates (cuts, polishes, grades, certificates and packages), and markets rough and polished tanzanite and tanzanite jewellery.

Tanzanite One is the most high profile example of commercialisation in the African gemstone industry. The company owns the mining license for a significant portion of the Merelani Tanzanite Mining area. The company is estimated to control 35% of the country's total production – accounting for around 25% of all mining and purchasing a further 10% from small-scale miners and brokers.⁴⁶ Tanzanite One is the world's leading producer of tanzanite holding extensive mining and prospecting licences over a large portion of Tanzania's only known tanzanite producing area. Tanzanite One Mining has developed one of the world's most modern coloured gemstone mining operations. The vertically integrated business explores, mines, cuts, polishes, grades, certificates and packages, markets and sells tanzanite (both rough and polished) products.

The Tanzanite One Group is a public limited company, listed on the London Stock Exchange, with subsidiaries located in South Africa, Tanzania and various offshore territories. For the fiscal year ending 31 December 2008, Tanzanite One Ltd's revenues amounted to US\$26.9 million which was 37% lower than the 42.6 million the year before, which the company claims to be the result of the financial crisis. Over the same year the company suffered a net loss of US\$9.5 million.⁴⁷ Gemfields (see boxed text directly above) has a 10% minority share in Tanzanite One.⁴⁸

3.6 The licit and illicit trade in rough, unprocessed gemstones

The primary market in coloured gemstones sees manufacturers buy stones directly from producers. However, cutters and polishers without direct access to mines rely on a secondary market where rough gemstones are traded between intermediaries.

The informal organisation of artisanal and small-scale gemstone mining operations in Africa's non-diamond gemstone industry has created an environment conducive to private, unregulated business and has primarily benefited intermediary traders. Intermediary traders buy gemstones directly from mines or directly from workers at the expense of the mine owner. In inaccessible or rural locations with a lack of market information and price indices, artisanal and small-scale producers are at a considerable disadvantage. They are unable to accurately value products and they have no access to the markets for their products except through intermediaries. As a consequence, artisanal and small-scale miners typically sell gemstones at very low cost to traders who can sell them at considerable profit.

⁴⁵ www.tanzaniteone.com

⁴⁶ K. Lyimo, "Tanzanite Running Out? Good Riddance, I say" *The East African*, 15 May 2007, <<http://allafrica.com/stories/200705150694.html>> (1 February 2010)

⁴⁷ Tanzanite one, 2008 Financial Year results, <http://www.tanzaniteone.com/announcements/T12008FY_Results20090504.pdf> (1 February 2010)

⁴⁸ Pallinghurst Resources website, "Corporate Profile", <<http://www.pallinghurst.com/about/focus.html>> (1 February 2010)

Illegal gem exports from Madagascar

Different sources report that it is hard to get accurate figures on the role that sapphire mining plays in the Malagasy economy and that what data is available is contradictory. Part of this comes from the illegal trade of sapphires from Madagascar.⁴⁹

For example, in Madagascar diggers or washers unearth the stones which are usually sold to a person that sells it on the local market or sells it on to someone that transports it to a nearby market. There the Malagasy traders buy the stones they sell on to foreign businessmen that operate in Madagascar, often from places like their hotel rooms. The foreign traders are required by law to apply for visas for the stones and declare their value upon which they have to pay a government tax of 2% on exported rough stones (not on stones that are processed in Madagascar). A portion of the stones, especially the more valuable ones, is exported from Madagascar illegally.⁵⁰

The trade in non-processed diamond gemstones remains largely clandestine and is characterised by a low degree of trust between miners, traders, the government and other stakeholders.⁵¹ Gemstone prices fluctuate with market demand and availability and competition between traders can inflate prices. Gemstone buyers use different strategies to acquire the commodity as cheaply as possible. Common strategies include offering credit services to miners in order to 'pre-book' their output or enhance the business relationship.

Traders in gemstone products can be divided into three categories: *petty traders*, *mineral brokers* and *dealers*. *Petty traders* are local operators who link artisanal and small-scale miners to mineral brokers or dealers for a small fee. *Mineral brokers* buy a range of mineral commodities at mine sites and sell them on in local or regional capital cities. *Mineral dealers* buy and sell consignments of rough stones and trade them internationally. While a small proportion of brokers or dealers do hold legal permits to trade in gemstones, the majority have no licenses and operate 'illegally'. Mineral dealers may act independently or as agents who sell directly to clients in the cutting, polishing or jewellery manufacturing industries. Sites of artisanal and small-scale mining attract both African and non-African buyers. Research from gemstone producing countries suggests a high number of traders from India, Israel and the US and increasing numbers from South Africa.⁵² The number of operators in each category varies depending on the type and volume of the mineral commodity, the season of production and the quality of stones produced.

Efforts to institutionalise the trade in gemstones through a state regulated trading or marketing system have proven unsuccessful. Since the 1980s, the government of Zambia has made several efforts to centralise and control the trade in gemstones. These efforts have been characterised by failure as artisanal and small-scale miners bypassed state trading agents and sold their best stones at higher prices to dealers operating illegally. Research indicates that the majority of gemstones produced by artisanal and small-scale miners in Africa are exported illegally.

'Lapidarians' (people involved in the cutting and polishing of gemstones) commonly purchase consignments of coloured gemstones wholesale from mineral dealers. Their suppliers are locked into

⁴⁹ L. Tilghman et al., *Artisanal Sapphire Mining in Madagascar: Environmental and Social Impacts*, 2007, <http://www.uvm.edu/envnr/gemecology/assets/Tilghman_et_al_Madagascar_2005.pdf> (07-12-2009)

⁵⁰ The university of Vermont, *Madagascar's Sapphires*, 2007, <<http://www.uvm.edu/envnr/gemecology/madagascar.html>> (07 December 2009)

⁵¹ B. Dreschler, *International Institute for Environment and Development (IIED): Mining, Minerals and Sustainable Development, Small-scale Mining and Sustainable Development within the SADC Region*,

<[iiedtest.merfa.co.uk/pubs/pdfs/G00735.pdf](http://www.iiedtest.merfa.co.uk/pubs/pdfs/G00735.pdf)> (07 December 2009)

⁵² Ibid.

the trading networks in gemstone producing countries and deal in a wide range of gemstones products. Dealers and wholesalers of non-diamond gemstones advertise widely on the internet. So today, for example, rough emeralds mined in Zambia can be bought online through the internet trade portal *ecplaza.com*.⁵³ The complexity of these networks and the number of actors involved - including business entrepreneurs from India, China, the US, Western Europe, and the Arab Emirates - mean that it is enormously difficult to gain a clear picture of the trade in rough, unprocessed gemstones.

Global trading exchanges – or *bourses* - for loose, cut and uncut gemstones remain important for these international trade flows. The Diamond and Precious Stones Bourse in Idar Oberstein (Hunsrueck, South-West Germany) remains the largest private commodity exchange for non-diamond gemstones. The bourse opened in 1974, and rough stones continue to be cleaved (given a basic cut) and sorted here before being exported for cutting and polishing. Important centres for the global trade in gemstones are emerging in the Arabian Gulf, where the high volume of imports and exports through the United Arab Emirates has established Dubai as a new hub for the gemstone industry.⁵⁴

Trade fairs and auctions for the gemstone industry attract producers, importers and exporters from around the world. Major annual events include, for example, InterGem held in Idar-Oberstein, Germany and the AGTA trade fair organised by the American Gem Trade Association across the USA.

The relationships between artisanal or small-scale miners and their buyers and dealers are almost entirely undocumented. There is practically no record of who these actors are, what their links are to the communities involved in production or to the larger companies involved in large-scale mining operations in the wider gemstone industry. In major producing countries, industry associations play an important role in mediating relationships between traders. Recent research suggests that these industry associations are likely to be pivotal to the introduction of any ethical initiatives in the sector in relation to gathering support and ensuring that local understanding is embedded in the initiative.⁵⁵

3.7 Gemstone processing and jewellery manufacturing

Processing and manufacturing in the gemstone industry is dominated by two major processes 1) cutting and polishing gemstones; and 2) setting of gemstones in jewellery products. The gemstone cutting, polishing and jewellery manufacturing industry is characterised by extensive systems of subcontracting, wherein workshops and smaller or medium-sized factories provide services to larger manufacturers and jewellery retailers. Gemstones themselves are only one raw material amongst a range of components required in this production process. Jewellery products, for example, require a range of peripheral materials (gold or silver posts, chains and hinges) as well as the gemstone.

New technologies play a very important role in the gemstone processing industry, with the widespread adoption of laser based techniques for processing, decoration and fitting, and computer aided design for modelling and prototype development. However, the mass production of jewellery products is normally restricted to established manufacturers equipped with more sophisticated and automated production equipment. Modern gemstones are commonly artificially treated to enhance their

⁵³ EC plaza website, "Rough Zambian Emeralds", < http://www.ecplaza.net/tradeleads/seller/3810045/rough_zambian.html> (12 June 2007)

⁵⁴ See for example: Trade Arabia website, "Dubai 'now a gemstones capital'", <<http://www.tradearabia.com/news/newsdetails.asp?Sn=RET&artid=123260>> (1 February 2010)

⁵⁵ M. MacFarlane et al., *Towards an Ethical Jewellery Business: A Review of Key Issues* (London: Natural Resources Institute and the University of Greenwich, 2003), p71.

appearance and there is a constant battle between gem traders and testing laboratories to hide and detect new treatments.⁵⁶ Some common treatments include:

- Heating, Irradiation, Diffusion, Dying and Bleaching to lighten, fasten, darken or change the colour of gems.
- Impregnating gems with colourless oils, wax or resins, to make imperfections less visible and improve a gemstone's clarity and appearance.
- Injecting colourless plastic or glass into gems in order to hide cracks or fractures and improve the gemstones' appearance and durability.
- Laser-drilling, which removes dark inclusions from diamonds, improving the clarity of the stone.

The global gemstone cutting, polishing and jewellery manufacturing industry is dominated by the economies of India, Hong Kong and Thailand. For India and Thailand particularly, the gem and jewellery industry represents an important part of the economy investor and government policies are focused on providing support and meeting the demands of this industry. India has enjoyed a world leader position in the gems processing segment but its contribution to jewellery manufacturing is still small. There is increased competition from Hong Kong and Thailand.

Mapping the links between producing countries and processing countries is very difficult. Non-diamond gemstones may be bought at source by agents acting on behalf of gemstone or jewellery manufacturing companies, or they may be bought from independent gemstone wholesalers. Some dealers add value by offering specifics in certification and gemmological analysis. There is a gradual trend towards the integration of value chains in the coloured gemstone industry, as larger companies seek to incorporate processing, manufacturing and marketing activities into their operations and extract greater profits from the value chain. A high profile global player in this sector is the Swarovski Group that specialises in the manufacturing and marketing of crystal accessories and jewellery. The Swarovski Group, which owns the 'Signity' brand (www.signity.com), is a world leader in the sale and distribution of precision-cut gemstones and synthetic stones.⁵⁷

Just as jewellery manufactures have begun to invest in gemstone cutting, polishing, retail and distribution, mining companies have begun to invest in processing and manufacturing. One recent high profile example has been the purchase by Pallinghurst Resources, a private equity group which pursues strategic partnerships and investments in the natural resources sector among which coloured gemstones (see company profiles of Gemfields and Tanzanite One in section 3.5), of Fabergé, a luxury jewellery brand. In 2006, Pallinghurst bought the Fabergé brand from Unilever, the consumer products manufacturer, and plans to reinstate it as 'the world's leading supplier of branded gemstones'. The company's business will extend from sourcing rough stones through to polished and branded gemstones, which will be sold wholesale to jewellery makers.

⁵⁶ Khulsey website, "Gemstone Enhancements, Heat Treatment, Irradiation, etc.", <http://www.khulsey.com/jewelry/gemstone_enhancement.html> (1 February 2010)

⁵⁷ See Swarovski website www.swarovski.com

3.8 Profiles of gemstone processing and jewellery manufacturing countries

India

India's gemstone industries are undergoing major changes, as manufacturers introduce new technologies in order to mass-produce standard quality cut and polished stones.⁵⁸ Unsorted gemstones constitute only a fraction of India's total imports, meaning that they are largely sorted and cleaved (cut) before they reach India for bruiting (polishing).

The manufacturing industry in the gemstone sector is still characterised by numerous small, fragmented and unorganised players engaged in small-scale craft based production. However, there is increased investment in large manufacturing units, producing international quality output and deploying new manufacturing technologies.⁵⁹

In 2008 India imported some US\$190 million in non-diamond gemstones, with trade dominated by imports from Thailand (22%), Hong Kong (19%) and the USA (12%). Non-diamond gemstones from all African countries represent US\$43 million (23%).

The Gems and Jewellery Export Promotion Council (GJEPC) operating under the supervision of the Ministry of Commerce, Government of India, and consisting of elected representatives from the industry has played a crucial role in achieving and sustaining export growth by promoting the industry in both domestic and international markets.

China and Hong Kong

China's jewellery export grew 24.99% year on year to US\$4.96 billion during the January-November period of 2005. During this period, China exported noble metal jewellery worth US\$1.826 billion, diamonds worth US\$1.278 billion and pearls and gemstone worth US\$128 million. Among all Chinese export-processing regions, Southern Guangdong Province contributed 55.43% (US\$2.75 billion) of China's total jewellery export. The province has become the largest jewellery and gemstone producing area in the country. The growing capacity of China's jewellery processing industry allowed Hong Kong's jewellery enterprises to seize the opportunity which resulted in a massive transfer of jewellery manufacturing activities from Hong Kong to mainland China.⁶⁰

The Hong Kong jewellery industry can be broadly classified into two sectors: jewellery made of precious metal and imitation jewellery. The former is a lot larger in terms of establishment, employment and export value. Hong Kong is the leading exporter of imitation jewellery and with exports amounting to US\$4.8 billion the fourth largest exporter of precious jewellery in the world. In terms of value almost 90% of Hong Kong's total exports of jewellery are of precious metal.⁶¹

Jewellery manufacturing processes with less stringent quality requirements are increasingly being shifted to the Chinese mainland, mainly Shenzhen and Panyu. The more delicate, higher value-added processes remain in Hong Kong. With increased investment by Hong Kong manufacturers on the

⁵⁸ R. Russell. "A Region Rich in History, Gemstones in Loupe" the magazine of the Gemological Institute of America, 16 (2). (2007)

⁵⁹ Diplomatist website, "Gems & Jewellery, The Sparkle of Success", <http://www.diplomatist.com/dipo3rd05/story_06.htm> (1 February 2010)

⁶⁰ Labour Action China, A short history of the problem of silicosis in gemstone producing industries and the legal loopholes in the implementation of the occupational diseases law, 2007, <www.jewelrystory.net/eng/problem_of_silicosis.doc>

⁶¹ HKTDC website, "Hong Kong Industry Profiles", 9 February 2009, <http://tinyurl.com/yerzwrq> (1 February 2010)

mainland and improved crafting skills of mainland workers, re-exports of jewellery from China have increased briskly in recent years.⁶²

When focussing on coloured gemstones trade only it is clear as well that Chinese mainland trade is much smaller than that of Hong Kong. In 2008 Chinese mainland and Hong Kong imports amounted to US\$134.5 and US\$421.3 million respectively. The difference in the value of exports is even greater: Hong Kong exports amounted to US\$514.5 million whereas those from the Chinese mainland represented US\$12 million. For the Chinese mainland the most important sourcing countries were Thailand (33%), South Africa and Burma (19%). For Hong Kong China they were the USA (19%), Thailand (18%) and India (17%).

Thailand

Thailand has emerged as a major international hub for the production, processing and trade of diamonds and coloured gemstones. The country has positioned itself as a regional hub for diamond and precious stone cutting, capitalising on its low labour costs, skilled craftsmen and its proximity to gemstone producing countries in South East Asia. Thailand's gemstone cutting and polishing industry extends from mass manufacturing facilities inside purpose built export processing zones to subcontracted, home-based activities. Because gemstone processing is labour intensive and requires only simple and inexpensive machinery, small-scale processing, with its lower cost of production, is more competitive than factory processing. Therefore the industry increasingly relies on small-scale producers that work in their own houses or in small workshops.

Thailand's gemstone and jewellery industry has been a powerful export earner for the country ranking seventh in the country's top exports⁶³ the largest markets are the United States, Israel, Belgium and Japan. Today, however, Thai based manufacturers face competition from lower labour costs in India. In order to remain competitive, the Thai industry has placed a focus on upgrading its production processes through improved technology. Thailand's Department of Export Promotion has been proactively showcasing Thailand's gems and jewellery industry. Thai companies are increasing their marketing efforts to establish Thai brand names in the world market. In order to reduce costs, Thai companies are looking to source competitively priced gemstones and raw materials from Africa to process and re-export, while the Board of Investment (BOI) is lobbying for the removal of duties on necessary import materials.⁶⁴

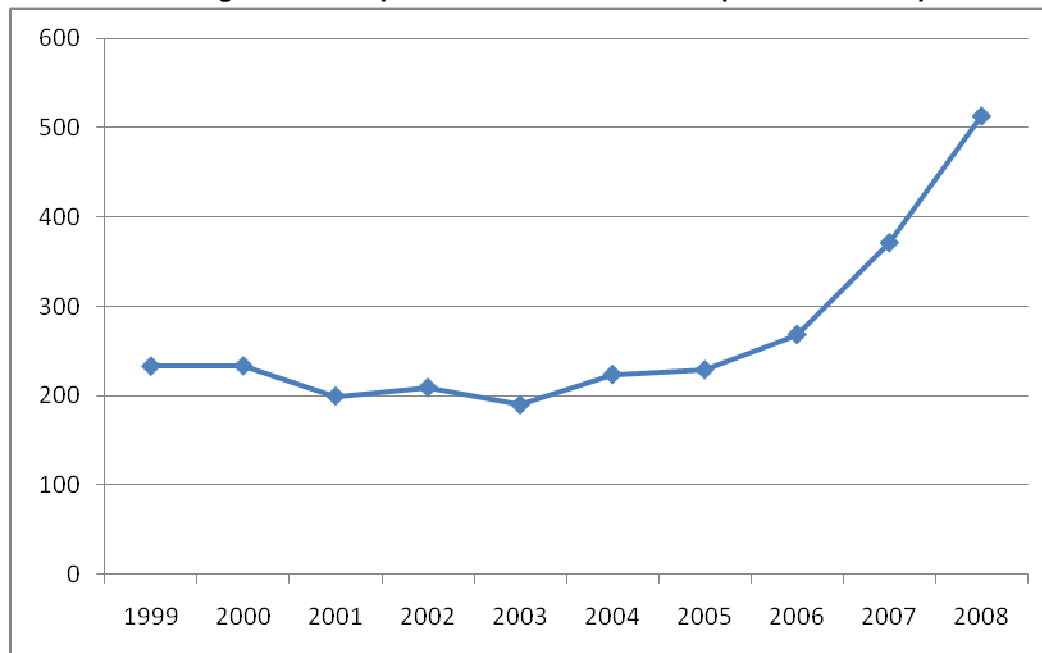
The Chantaburi Province is the Thai epicentre of gemstone processing. Historically it was the country's principle gemstone mining area. After mining ceased to be profitable and Thailand had to import rough stones from among others Burma, Madagascar and Sri Lanka it relied on processing instead. However, since a number of years the industry is on a serious decline with an estimated 80%⁶⁵ of the cutting factories being shut and workers going back home to their native provinces. As a result Chantaburi is more and more a centre from which unprocessed gems are sent for processing into areas in the country where wages are (even) lower, especially in the country's Northeast (Isan) Region, and subsequently collected for redistribution.

⁶² Report on Hong Kong Jewellery Fair, 2006, <<http://tiny.cc/BYaYy> > (1 February 2010)

⁶³ Gem & Jewellery Export Promotion Council, Bangkok Gems and Jewelry Fair 2009, Market Report <<http://tinyurl.com/yfn8mu6>> (1 February 2010)

⁶⁴ Thailand.com website, "Industry Outlook, Gems and Jewelry", <http://www.thailand.com/exports/html/industry_iogem.htm> (1 February 2010)

⁶⁵ "Diamond and Gemstone Industry in the Doldrums", The Financial Times Limited (Thai Press Reports), 18 February 2009

Chart 8: Thai coloured gemstone exports over the last decade (in US\$ millions)

Source: Chart SOMO based on UN Comtrade

As can be seen from the chart 8 above Thai non-diamond gemstone export levels more or less stagnated over a period of eight years to increase sharply over the last two years. At the same time however industry sources indicate that prices for gemstones are historically low. This is the result of a number of factors. An important factor is a loss in confidence in the quality of gemstones from Thailand. In 1999 new ways of heating gemstones to produce colour were introduced, improving the value of gemstones. However, thereafter not all gemstone suppliers disclosed their products were coloured unnaturally. This in turn had a negative impact on the credibility of the industry. Another important factor is the US ban (economic sanctions) on direct and indirect imports from Burma that became effective in September 2008. Burma secures an estimated 90% of the world's ruby supply. These rubies are a crucial supply for Thailand which further processes the stones for re-export. Also the global economic recession that started earlier in the USA is taking its toll. Indications are that exports are down by 40% in the first quarter of 2009.⁶⁶ Imports of coloured gemstones amounted to US\$340 million in 2008. Hong Kong, India and the USA were the most important countries of origin.

New African manufacturers

Increasingly, the governments of gemstone producing countries in Africa are looking to capture increased value from the gemstone supply chain, by encouraging producers to process and manufacture stones in-country rather than exporting them. International financial institutions and development lending agencies identify Africa's gemstone industry as a vital export sector. The IMF, the World Bank and the WTO advocate policy reforms aimed at removing the constraints to investment in the gemstone industry, improving the infrastructure for private business, regulating the illicit or illegal trade in stones, and capturing greater value from the supply chain by encouraging manufacturing and processing activities. These strategies identify the increased exploitation of gemstone deposits as a driver of development in rural Africa, encouraging the construction of roads, telecommunications and a social infrastructure such as schools and health clinics.

⁶⁶ "Polishing away a big blemish", The Nation (Thailand), 9 May 2009

In Tanzania, for example, the government has established a dedicated Export Processing Zone in *Arusha* that it plans to develop into a large mining, cutting, jewellery manufacturing, and trading centre.⁶⁷ The Government of Kenya is actively promoting the country as an investment destination for gemstone manufacturing, and marketing its Export Processing Zone scheme to the global gem and jewellery industry.⁶⁸

Value addition in Madagascar

African countries with major deposits of diamonds and non-diamond gemstones are seeking to 'graduate' from being primary producers to developing extensive gemstone industries thereby aspiring to capture more value. For example in Madagascar the World Bank has financed an extensive project geared towards sustainable development through strengthening of governance and transparency in the management of mineral resources. One of the activities in this project is the launching of a training programme in cutting and polishing of gemstones⁶⁹ with the goal of adding more value in Madagascar. This is especially necessary seeing that the taxes on the export of gemstones are quite low. In 2008 the government of Madagascar put a ban on the export of rough gemstones and only allowed the export of cut gemstones, which led to a fast decline in the mining and export of coloured gemstones. In July 2009 the ban was lifted.

3.9 The retail trade in processed gemstones and jewellery products

When they reach the retail market, most gemstones have already been *set* or *strung* into jewellery products, ranging from rings to watches. The retail and wholesale jewellery sector in the US and Europe is very fragmented and highly competitive.

In the US, speciality retailers account for some 50% of the retail jewellery sector but chain stores are capturing an increasing market share. The business of smaller US retailers has steadily declined as they struggle to compete against mass merchants such as Wal-Mart, Target and Costco. Wal-Mart, for example, has risen to become the leading jewellery retailer in terms of sales turnover in the US.⁷⁰ Other major companies include Zale, Tiffany and Sterling Jewellers.

In Europe the sector remains dominated by small independent retailers but gemstone products are increasingly available in non-specialist jewellery outlets and there has been a rapid growth of business among mass merchandisers. The jewellery sector in the Netherlands offers a standard that also applies to other European countries. A Dutch retailer may purchase gemstones direct from wholesale agents, direct from Dutch or foreign producers, or direct from specific agents representing branded jewellery lines.⁷¹ 89% of entrepreneurs operate independently and only 9% are franchises that are part of a larger retail chain.

⁶⁷ National Gemstone website, The Gemstone Forecaster, In The News, Rough Times
<<http://www.preciousgemstones.com/gfwinter04.html>>

⁶⁸ Export Processing Zones Authority Kenya, Gemstones and Jewellery in Kenya. (Nairobi, 2005)

⁶⁹ World Bank, Project appraisal document on a proposed credit in the amount of 23.2 SDR (US\$32 million equivalent) to the republic of Madagascar for a mineral resources governance project, 17 April 2003, <http://www-wds.worldbank.org/external/default/WDSContentServer/WDSContentServer/IB/2003/05/13/000094946_03042604005061/Rendered/PDF/multi0page.pdf> (3 November 2009)

⁷⁰ Allbusiness website, "Wal-Mart Has Risen to Number One in Jewellery Retailing, yet the Prime Target Market for Jewellery...", <<http://www.allbusiness.com/marketing-advertising/market-research-analysis/5534609-1.html>> (3 November 2009)

⁷¹ Fair Trade Organisation and Consultancy and Research for Environmental Management, Sustainability of Jewellery Sold in the Netherlands, 2005, p33.

In the UK, business directories list more than 3500 registered wholesalers who import gemstone jewellery products and supply the retail market. An increasing number of online trading portals, like Polygon.net, offer retailers direct links to the wholesale suppliers of gemstones and gemstone jewellery products.⁷² The UK's jewellery retail market ranges from a large number of high end speciality retail jewellery stores (7000-8000), like Goldsmiths, to low end catalogue showroom operators and discount jewellery retailers (120), like Asda/Wal-Mart. Only three other speciality retailers of fine jewellery have more than 50 outlets.⁷³

Today, independent speciality retailers face increased competition from mass market outlets, shopping channels, internet and mail order firms, and bargain discounters. Research suggests that, today, e-commerce accounts for a quarter of all diamond and non-diamond retail trade.⁷⁴ Due to low overheads, online stores offer better savings on signature brands than the retail outlets.

Fashion houses are building on their brand identities to enter the jewellery market. In the US, Europe and South East Asia, jewellery products are increasingly marketed in combination with other branded 'personal lifestyle' products such as clothes, fashion accessories, watches, sunglasses and perfumes. Companies at high and low ends of the market (Calvin Klein, Diesel, Esprit, Mexx, Jones Apparel, Wal-Mart, Target) increasingly produce and market their own jewellery lines, which incorporate diamond and non-diamond gemstones into jewellery products.⁷⁵ New market segments have also emerged. Increased consumer demand has led to the emergence of ethical gemstone products and jewellery, with new specialist retailers serving this market niche (see also Chapter 5).⁷⁶

Cookson Group PLC⁷⁷

The Cookson Group is a major manufacturer and trader of ceramic, electronic and precious metal products. The Group's Precious Metals division is a leading supplier of fabricated precious metals (primarily gold, silver and platinum) to the jewellery industry in the US, UK, France and Spain. Products include alloy materials, semi-finished jewellery components and finished jewellery. In 2008, the Precious Metals Division generated a revenue of US\$506.3 million and net profits of US\$ 7.2 million⁷⁸. The company works in close collaboration with buyers and designers, and produces new products with world-renowned jeweller Tiffany & Co. Under the operating name Cookson Precious Metals the group operates the UK's largest online wholesale supply shop for the jewellery trade.⁷⁹ In the Netherlands the Group operates through its subsidiary Cookson-Drijfthout BV.

Signet Group PLC⁸⁰

Signet is the largest speciality retail jeweller in the US and the UK. Total group revenues amounted to US\$3.3 billion and net profits to US\$230 million in 2009. The US operations generate 76% of total group sales.⁸¹

⁷² See Polygon website: www.polygon.net.

⁷³ See Inventis website, "Signet operating review" <http://www.investis.com/signet/html_report/html/page16.html> Google cache only (1 February 2010)

⁷⁴ R.H. Lopez, et al., Sapphire Shop: A Case Study from the Lubin School of Business, 2007, <http://digitalcommons.pace.edu/business_cases/6> (19-01-2010) p4.

⁷⁵ Fair Trade Organisation and Consultancy and Research for Environmental Management, Sustainability of Jewellery Sold in the Netherlands, 2005, p37.

⁷⁶ M. Doulton, "Can you apply new rules to old gems?" Financial Times, 2 March 2007

⁷⁷ www.cooksongroup.co.uk

⁷⁸ Cookson Group website, Cookson Group plc Annual Report 2008, <http://www.cooksongroup.co.uk/cookson/uploads/results/press/CooksonGroupplc_annual08.pdf> (1 February 2010)

⁷⁹ See: <http://www.cooksongold.com/category/Gemstones/>

⁸⁰ www.signetgroupplc.com

⁸¹ Signet group corporate factsheet, <<http://ww1.investorrelations.co.uk/sj/uploads/investorpack/SignetGroupFactSheetrevisedfor100112.pdf>> (1 February 2010)

In the US, Signet controls 8.8% of the speciality jewellery market. The company's US division owns Kay Jewellers ('Kay'), which trades in malls and outdoor shopping centres, and Jared The Galleria Of Jewellery ('Jared'), which operates in off-mall destination superstores. Kay's is the largest speciality retail jewellery brand in the US and accounts for 41% of the Group's sales.

In the UK, the company controls approximately 12% of the retail market. It trades as H. Samuel (13% of total group sales) and Ernest Jones (11% of group sales)⁸² which are both positioned at the upper end of the middle market. H. Samuel is the largest chain of speciality retail jewellers in the UK and its stores are located in virtually every medium and large retail centre. Ernest Jones, the UK's second largest speciality retail jewellery chain, is represented in most large retail centres.⁸³

Home Retail Group⁸⁴

The Home Retail Group is the UK's leading home and general merchandise retailer with sales of US\$9.6 billion in 2008-2009.⁸⁵ The Group owns Argos, the UK's leading retail outlets with about 670 locations throughout the country. The chain is a mass market leader in the sales of consumer electronics, electrical appliances, toys, and jewellery.

Gems TV Holdings Limited⁸⁶

The Gems TV Holdings Group LTD runs a vertically integrated jewellery retail business: sourcing for low end cut coloured gemstones (beryl, topaz and quartz), in Madagascar, Sri Lanka, India, Brazil and East Africa; processing them at gemstone and jewellery manufacturing facilities in Chanthaburi, Thailand; and selling them directly to customers via television and internet home shopping subsidiaries in the USA, Japan, the UK and Germany. Gems TV Holdings Limited is listing on the Singapore Stock Exchange (GEMS SP).⁸⁷

In 2009 Gems TV reported revenues of US\$162 million down from 236 million the year before. The company also reported net losses of almost US\$60 million, which doubled the losses of the previous year.⁸⁸

⁸² Signet group corporate factsheet, <<http://ww1.investorrelations.co.uk/sj/uploads/investorpack/SignetGroupFactSheetrevisedfor100112.pdf>> (1 February 2010)

⁸³ <http://www.signetjewellers.com/pages/202/Overview.stm>

⁸⁴ www.homeretailgroup.com

⁸⁵ Home Retail Group website, Home Retail Group news, "Full-Year Results", <<http://www.homeretailgroup.com/home/media/hrg/corpnews/2009/2009-04-29/>> (1 February 2010)

⁸⁶ www.gemstv.com

⁸⁷ "Gem of an initial offering", The Business Times, Singapore, 6 November 2006.

⁸⁸ GemsTV website, Investor Relations, "Financial Highlights", <<http://www.gems.tv/investor.html>> (1 February 2010)

4. Sustainability issues in the gemstone supply chain

4.1 Mining and the informal economy

Most analysts report that population pressures lead to an increase in artisanal and small-scale mining, but these assessments ignore the interplay between different sectors of the economy. The relationship between gemstone production in the informal economy and the formal or urban sectors of the economy remain poorly understood.

Increased artisanal and small-scale mining is linked directly to the rise and fall of other sectors of the economy. The decline of the heavy-metal industry in Zambia's copper-belt, for example, promoted massive de-industrialisation and de-urbanisation that has been reflected in the growth of that country's artisanal and small-scale mining industry.⁸⁹

Artisanal and small-scale mining are often seasonal activities that take place within the agricultural cycle and supplement other sources of income.⁹⁰ In Malawi, for instance, subsistence farmers mine gemstones in the dry season when there is less agricultural work.⁹¹ Changes in artisanal and small-scale mining industries are intricately related to broader transformations in the rural and urban economies of African countries. Artisanal and small-scale mining offers an alternative and sometimes temporary source of livelihood for families and communities who have been forced out of other formal and informal industries. Zimbabwe's economic recession has led to an increase in the number of people compelled to take up mining activities, for example.

Social, political and economic transformations at national and regional levels as a result of neo-liberal economic reforms, job losses in other sectors, natural calamities or conflict seems to increase the growth of artisanal and small-scale mining. For example, the ILO has described how structural adjustment programmes, low commodity prices or drought on private and public sector employment, trading, farming and inflation has led many people, especially women who relied on subsistence agriculture, to seek new, alternative or additional sources of paid employment.⁹²

There is considerable debate about the contribution of small-scale mining to sustainable development and sustainable livelihoods. For many people, particularly those involved in gold and semi-precious minerals like emeralds and diamonds, small-scale mining represents a possible 'fast track to wealth'. At the same time, small-scale mining in rural communities can have a domino effect on the local economy, generating significant local purchasing power and leading to a demand for locally produced goods and services (food, tools, equipment, housing, infrastructure).⁹³ Even in the case of illegal artisanal mining or the smuggling out of the products, the income returns to the mining region – be it

⁸⁹ J. Ferguson, *Expectations of Modernity: Myths and Meanings of Urban Life on the Zambian Copper-Belt*. (London: University of California Press, 1999).

⁹⁰ T. Hentschel, F. Hruschka, & M. Priester, International Institute for Environment and Development, *Global Report on Artisanal & Small-Scale Mining*, January 2002 <[iiedtest.merfa.co.uk/pubs/pdfs/G00723.pdf](http://www.iiedtest.merfa.co.uk/pubs/pdfs/G00723.pdf)>, p15

⁹¹ Mining, Minerals and Sustainable Development (MMSD), *Breaking New Ground: Mining Minerals and Sustainable Development*, 2002 <<http://www.iied.org/pubs/display.php?o=9084IIED>> (1 February 2010), p315.

⁹² ILO in T. Hentschel, F. Hruschka, & M. Priester, International Institute for Environment and Development, *Global Report on Artisanal & Small-Scale Mining*, January 2002 <[iiedtest.merfa.co.uk/pubs/pdfs/G00723.pdf](http://www.iiedtest.merfa.co.uk/pubs/pdfs/G00723.pdf)>, p22.

⁹³ T. Hentschel, F. Hruschka, & M. Priester, International Institute for Environment and Development, *Global Report on Artisanal & Small-Scale Mining*, January 2002 <[iiedtest.merfa.co.uk/pubs/pdfs/G00723.pdf](http://www.iiedtest.merfa.co.uk/pubs/pdfs/G00723.pdf)>, p17.

as cash or goods.⁹⁴ Discoveries of gemstone deposits can also provoke sudden and rapid immigration by small-scale miners and entrepreneurs.

4.2 Unregulated mining and trading

Artisanal and small-scale mining is characterised by the lack of regulation by state governments. The informal nature of the artisanal and small-scale mining sector implies that businesses operate beyond government supervision, and without state support. While artisanal and small-scale miners may hold legal titles to the land that they work it has been estimated at least 50% of small-scale miners work on land to which they do not have a legal claim.⁹⁵ In these circumstances, informality easily becomes illegality

Civil society groups continue to emphasise that increased government supervision of the sector is important for the policing and enforcement of environmental standards, health and safety regulations, and for labour relations.⁹⁶ There are also fiscal and political incentives for governments to formalise the gemstone sector, and regularise the informal or illicit trafficking of gemstones. The World Bank Poverty Reduction Strategy Paper for Zambia for example announced plans to re-introduce a national Gemstone Exchange, as a strategy to promote transparency and accountability in the industry and create a forum for the producers and the buyers of rough and processed gemstones.⁹⁷

4.3 Gemstone trade links with terrorism, war economy and suppression

There is a wide body of research material that documents the links between the global trade in diamonds and the war economy.⁹⁸ Like other precious minerals that have a high price on the global market, non-diamond gemstones provide an important resource to governments and counter-government organisations for financing the purchase of arms and ammunitions. In contrast to diamonds, the link between precious stones (emeralds, rubies, sapphires) and war economies is poorly documented. There are, however, sources indicating that the coloured gemstone trade can be linked to support terrorism and suppression in a number of countries, including Tanzania, Ethiopia, Burma (see also boxed text), Sri Lanka, Afghanistan and Pakistan.⁹⁹ In any case while the specific locations and global networks may differ the social and political issues remain very much the same.

It is important to note that public interest in the links between gemstones and the war economy can have a range of impacts on African producers. In 2001, US media reports linked the sale of tanzanite to al-Qaeda fundraising and led to a ban on the gemstone in the U.S.¹⁰⁰ However, the subsequent rise

⁹⁴ bid.

⁹⁵ ILO, Social and labour issues in small-scale mines: Report for discussion at the Tripartite Meeting on Social and Labour Issues in Small-scale Mines (Geneva: ILO, 1999)

⁹⁶ M. MacFarlane et al., Towards an Ethical Jewellery Business: A Review of Key Issues (London: Natural Resources Institute and the University of Greenwich, 2003), p8.

⁹⁷ World Bank, Poverty Reduction Strategy Paper for Zambia, <<http://www.imf.org/external/np/prsp/2002/zmb/01/033102.pdf>> (1 February 2010)

⁹⁸ For a vast array of published materials documenting the links between extractive industries, poverty and conflict see: <http://www.fataltransactions.org/>

⁹⁹ A. Usman, (CASM Asia), Conflict gems: mining marketing and terror funding, <<http://www.slideshare.net/EPetrilli/dr-ali-conflict-gems-brasilgia-presentation>> (1 February 2010)

¹⁰⁰ This ban was later removed by the U.S. State Department: M. Firestone, "Special Report: Tanzania", Business Traveller, 1 January 2007

in the demand for tanzanite is linked to among other things ethical concerns among US consumers over blood diamonds and increased interest in diamond alternatives.¹⁰¹

Burma: Mining, money, and misery

Burma's gem industry is dominated by the military junta (SPDC). Income from gemstone mining and trade is hence directly supporting the infamous and fierce oppression of the Burmese people by this junta. Moreover, Burmese officials are indicating increasing reliance on gemstone trade for income. The SPDC has direct stakes in many mines. The conditions at the mines are reportedly deplorable: rampant land confiscation, extortion, forced labour, child labour, environmental pollution, and unsafe working conditions for miners. HIV/Aids, drug-resistant malaria, and tuberculosis are also increasingly common in mining areas. Next to mines the junta also has ownership interest in many of the country's top gemstone businesses including state-run companies such as the Myanmar Gems Enterprise and Myanmar Pearl Enterprise.¹⁰²

4.4 Child labour across the value chain

Child labour has, historically, been an issue across the gemstone value chain but there is little contemporary research that explores the current status of children in the industry. Child labour in artisanal and small-scale mining industries is regarded as particularly problematic, because of the increased risk of children being exploited by adults, the special vulnerability of children to physical hazards and because of their exclusion through work from education.¹⁰³

In the past there was a high reported incidence of child labour throughout the value chain, from gemstone mining to manufacturing. The existence of substantial numbers of child workers in the Thai and Indian gemstone manufacturing industry is well documented. Increased international demand for gemstones led to the growth of the industry, and a rise in the employment of children less than 14 years old. Estimates from India in 1997 suggested that there were around 20,000 children among the 200,000 gem workers in Jaipur, Rajasthan, of which 85-95% are Muslim, and the remaining 5-15% are Hindu. In Trichy, Tamil Nadu, where the remaining 5% of gem polishing takes place, there are 10,000 children out of the total workforce of 60,000.¹⁰⁴ However, studies on the incidence of child labour in these industries (including gem polishing) are now outdated and disaggregated data is difficult to obtain. Some of the most recent reports on the incidence of child labour in this sector include those from the ILO on Tanzania (see boxed text) and Human Rights Watch on Burma.¹⁰⁵

¹⁰¹ S. Larenaudie, "Romancing a New Stone", Time 1 March 2007 <<http://www.time.com/time/magazine/article/0,9171,1594137-1,00.html>> (1 February 2010)

¹⁰² Human Rights Watch website, "Burma's Gem Trade and Human Rights Abuses", <<http://www.hrw.org/legacy/english/docs/2008/01/11/burma17729.htm>> (1 February 2010)

¹⁰³ ILO, Precious Lives: Child Labour and International Labour Rights Violations in the Diamond and Gemstone Industry, 1997

¹⁰⁴ ILO, Precious Lives: Child Labour and International Labour Rights Violations in the Diamond and Gemstone Industry, 1997

¹⁰⁵ UNHCR website, "Burma's Gem Trade and Human Rights Abuses", <<http://www.unhcr.org/refworld/docid/4896c48d1e.html>> (1 February 2010)

Child labour in Tanzanian gemstone mining

The ILO published a report in 2007 on girls in mining, part of which was gemstone mining in Tanzania, interviewing 150 girls and 50 boys (10-18 years old). Working on small or marginal deposits, where mechanical means are non viable, children are sought as they can slip through small holes and tunnels. The work is unskilled and badly paid which encourages recruitment of children. In the mining of gemstones girls are doing wet and dry panning for stones, transport rubble from the pits, sort mineralised rocks and stone crushing, jobs which are considered hazardous. Also girls are working in gemstones brokering. Children need to work to add to the family incomes and the girls interviewed claimed to spend the earned money on food and shelter, not on personal items such as clothing. Some of the children mentioned they felt coerced into work by parents or guardians¹⁰⁶.

4.5 Working conditions in coloured gemstone mining

Working conditions in coloured gemstone mining and processing can be very difficult (also see boxed texts below). Mining for instance can be dangerous with risks of getting injured or even killed. In artisanal or small-scale mining there often is a lack of adequate safety measures to prevent accidents in improvised mining sites. Accidents may result from collapsing mine tunnels and there is the risk of falling, suffocating, getting stuck or drowning. Income from artisanal or small-scale mining is unreliable: for days miners might find nothing at all or stones of little value. If they are lucky, however, they occasionally might find a high value stone. While the possibility of a big find is what lures people into mining gemstones in the first place, but on the contrary many seem worse off at the end of their work period.¹⁰⁷

Deplorable living conditions in artisanal mining sites in Madagascar

Ilakaka is the main sapphire trading hub in Madagascar, with the main traders coming from Thailand. Nearby in Sakahara, with newer mining sites, Sri Lankans are dominating the trade. Sapphire mining relies on artisanal mining. Individual miners dig small pits on the lands whose mining rights are owned by large mining groups. The miners might have an arrangement with the owners of the mining rights or they might not. The mining of gemstones is a highly risky trade, as the shafts are deep and there are hardly any health and safety measures – not even for example wood to strut the sides – as the miners do not have money for these measures. Children are working in the shafts as their small size makes it possible for them to go into very small and deep holes. When the shafts are deep there is little air and the miners use very primitive methods to blow a bit of air into the shafts. As there are many miners and comparatively little money that goes around for the artisanal miners the living conditions are deplorable.¹⁰⁸

Other negative social impacts include poor public health (eg, cholera outbreaks, diarrhea) in mining environments and mining towns from lack of proper sanitation and hygiene (no running water, people defecating in open spaces or near rivers, no garbage collection or sewage treatment, etc.), the spread of malaria and other tropical diseases as a result of stagnant water in abandoned mining pits¹⁰⁹, the prevalence of sexually transmitted infections and HIV/Aids in mining boomtowns, crimes ranging from

¹⁰⁶ ILO, Bureau for Gender Equality and IPEC, Girls in Mining. Research Findings from Ghana, Niger, Peru, and United Republic of Tanzania, 2007 < <http://tiny.cc/FjCl5>> (1 February 2010)

¹⁰⁷ See for example: L. Tilghman et al., Artisanal Sapphire Mining in Madagascar: Environmental and Social Impacts, 2007, <http://www.uvm.edu/envnr/gemecology/assets/Tilghman_et_al_Madagascar_2005.pdf> (7 December 2009)

¹⁰⁸ Trade union FISEMA and the Friedrich Ebert Stiftung, Madagascar, 2007, interview by Esther de Haan, SOMO.

¹⁰⁹ See for example: Gems and the environment website, "Sri Lanka's Gemstones", <<http://www.uvm.edu/envnr/gemecology/srilanka.html>> (1 February 2010)

violent murder¹¹⁰ to petty theft among miners but also by criminals attracted by the 'wild west' atmosphere that can be associated with gemstone mining boomtowns, in Madagascar for instance.¹¹¹

Harsh working conditions in artisanal tanzanite mining¹¹²

Tanzanite mining is a US\$300 million-a-year industry. Thousands of people from all over Tanzania rush to the Merelani Hills each year in search of the rare gem. However, most find an endless cycle of poverty instead. Tanzanite mines are licensed by the government. Most miners are independent and use ropes to lower themselves into shafts that are dug by hand and are actually nothing more than holes, that can be up to 300 metres deep. With few or no safety measures the mines are dangerous places to work. Collapsing mines, floods and dynamite accidents have caused hundreds of deaths in the past 20 years. For instance in 1988, about 50 miners died, in 1998 floods killed over 100 diggers and in June 2002, 39 tanzanite miners suffocated to death after inhaling carbon monoxide produced by a dynamite explosion in the mine shaft. In March 2008 an estimated 75 miners went missing and were feared dead following torrential midnight rains that flooded several mining pits operated by private proprietors.

4.6 Working conditions in coloured gemstone processing

The workplace problems that lapidarians experience are of a different nature. Health problems for gemstone cutters include bad eyesight, back pains and dust-lung disease (see boxed texts). Other health and safety issues include hazardous electrical installations, repetitive work, poor ventilation and lighting and unsafe machines which all contribute to high levels of industrial illness and disease.

Wages/income can be very low and unreliable for people who process coloured gemstones (also see boxed texts). Many workers that cut them or make them into jewellery still work in factories. While work in gemstone factories comes with the same problems (eg, low income, occupational health and safety problems) as home based gemstone cutting there are differences as well. One example is union hostility which remains despite some unions having been successful in organising workers in a number of workshops and factories. Pressure from the subcontracting of work has also served to stop wages from increasing.

¹¹⁰ See for example: BBC News website, "Madagascar's sapphire rush" 17 November 2007, <http://news.bbc.co.uk/2/hi/programmes/from_our_own_correspondent/7098213.stm> (1 February 2010)

¹¹¹ See for example: L. Tilghman et al., Artisanal Sapphire Mining in Madagascar: Environmental and Social Impacts, 2007, <http://www.uvm.edu/envnr/gemecology/assets/Tilghman_et_al_Madagascar_2005.pdf> (7 December 2009)

¹¹² "Tanzanite mining ban partially lifted", The Guardian, 5 April 2008 <<http://www.ippmedia.com/ipp/guardian/2008/04/05/111764.html>> (1 February 2010) & "Tanzania government suspends mining in NE after 75 miners go missing", International Herald Tribune, 30 March 2008, <<http://www.iht.com/articles/ap/2008/03/30/africa/AF-GEN-Tanzania-Miners.php>> (1 February 2010)

Proliferation of dust-lung disease in Hong Kong

The rapid growth of the jewellery and gemstone processing industry in Hong Kong has led to a sharp increase in the number of silicosis cases in the province. Silicosis, the so-called 'dust-lung disease', is an incurable occupational ailment which afflicts workers through the inhalation of an airborne crystalline silica dust, a workplace toxin that progressively debilitates lung capacity. Over the past few years, silicosis has become especially rampant in China because of the 'inspection vacuum' in hazardous industries in the early years of capitalist industrialisation in the coastal developed regions.

Source: Labour Action China¹¹³

Working conditions in coloured gemstone cutting in Thailand

Field research done for this report by the Thai Labour Campaign in 2009 investigated working conditions in the Thai gemstone cutting industry. While the research covered both Northeastern areas (Chiang Mai & Kanchanaburi) and Chantaburi, the traditional centre of coloured gemstone processing, the research had a strong focus on the North Eastern (Isan) region of the country which currently is an important hub of national gemstone processing.

To a large extent the problematic issues they found relate to the informal nature of this industry. Gemstone cutters have no job security, no contracts, no benefits such as pensions, no bonuses, no paid overtime, no paid holidays and medical insurance nor do they receive any support from brokers or other actors downstream for their work related expenses such as investments in machinery and private protective equipment (ppe).

Most lapidarians do not use PPE such as goggles/mask or gloves. Back pains and deteriorating eyesight were the most serious occupational health problems reported. Minor injuries such as small cuts were also reported. However, it is possible that less acute or serious occupational health problems might go unnoticed due to a lack of medical screening.

Most of the gemstone processing is based on the piece rate system: lapidarians are paid a certain amount per stone. Hence income depends on the amount of gemstones they process, which on its own is often not enough to cover family needs. In contrast to other regions visited all workers interviewed in Isan therefore supplement it with income or resources from other activities, mostly farming. Some lapidarians do cutting work in workshops during the day and do other gemstone cutting work in the evening at home to increase earnings. The piece rate depends on the region, kind of job (difficulty and the value of the stone, polishing or cutting, etc) but tends to be much lower now than a few years back. This is caused by a more structural decline in the industry and puts prices under pressure.

The piece rates in the Isan region are lower than in Chantaburi. Rates for preparing stones for cutting and polishing range from about 0.1 to 0.8 baht (US\$0.003 – 0.024) and cutting rates from about 0.5 to 3.2 per piece (US\$0.015 – 0.010). The average piece rate for cutting was about 1.3 baht per piece (US\$0.04). Average daily income was approximately 285 baht (US\$8.68) for 8 to 10 hours of work but income varied widely from 75 to 800 baht (US\$2.28 - 24.35) a day. For reference, the average of the minimum wage levels in the areas under study was about 157 (US\$4.78) baht a day.

Source: field research done by the Thai Labour Campaign for SOMO, 2009

¹¹³ Labour Action China, A short history of the problem of silicosis in gemstone producing industries and the legal loopholes in the implementation of the occupational diseases law, 2007, <www.jewelrystcampaign.net/eng/problem_of_silicosis.doc>

Testimonials of Thai gemstone workers

Ms. Boonchuen (50) cuts coloured gemstones in her home in Mahasarakham (Isan)

'I have worked as sapphire cutter since I was 16 years old. I now work together with my husband. He used to work in a gemstone processing factory but he had to stop working there because he had problems with his eyesight. He is under social welfare scheme but not me and I have troubles with my eyes as well. It is getting more and more difficult to earn enough for family needs. In the past, just one of us would earn 5000 baht/week. Nowadays together we earn just about 2000 baht. While living expenses, for instance our electricity and water bills and the education of our two children are very high. This year is the worst year we have had so far. However, we cannot stop cutting stones because it is the only skill we have. We have to keep changing trading agent to keep having supply.'

Mr. Kongkaew (46) cuts coloured gemstones in a small factory in Chantaburi

"I learned how to cut stones in Chantaburi where I have been working since 1985. I work from 8.30a.m. to 5p.m. with my employer and 8 other workers at a small factory. I am earning around 800 baht per day. 500 baht from the factory work and another 300 baht per day from cutting stones at my own place where I work most evenings from 7 or 8 PM till midnight and on holidays.

My biggest expense is for my child's education in Bangkok, which is around 8000 baht a month. The rest of my living expenses here are about 5000 baht/month. In the past I used to get over a thousand baht a day which enabled me to save some money. My current income is just enough to cover living cost, there is nothing left to save.'

4.7 Environmental impacts

The environmental impacts of artisanal and small-scale gemstone mining have been widely documented. Soil erosion and sedimentation of nearby watercourses caused by inadequate control of surface spoil and waste rock heaps can be a big problem because it can kill fish and other biological assets. Another serious issue is deforestation. Trees are felled to access soil for mining and to harvest timber for mineshaft reinforcement and equipment building. Agricultural land is sacrificed for mining activities and the landscape is scarred. Gemstone mining can also indirectly contribute to deforestation and negatively impact the environment: depletion of wildlife because of hunting; increased firewood consumption in gemstone settlements; stressed water supplies and subsidence because of heavy water usage for mining related activities; and air pollution because of oil powered pumps, drills and other machinery which also contribute to global warming.¹¹⁴

4.8 Economic impacts: creating a business friendly environment

As a labour intensive export industry, gemstone manufacturers consistently prove to be perfect investors in offshore economic zones. From Asia to Africa, free trade or export processing zones are increasingly attractive locations for low waged, labour intensive gemstone processing and jewellery manufacturing operations.

As a consequence of increased pressure to create a 'climate for private investment' in Africa the governments of gemstone producing countries have introduced a range of policies designed to

¹¹⁴ See for example: Gems and the environment website, "For Environmentalists", <<http://www.uvm.edu/envnr/gemecology/environmentalists.html>> (1 February 2010)

encourage investment in mining and mining related industries. Urged on by international development financing institutions, the policy priorities of African governments have increasingly focused on removing the 'constraints to a good business environment' and offering an attractive regulatory environment to investors. Incentives include favourable tax regimes that offer exemptions from duties on imports, exports and profits; subsidised utilities and infrastructure; and guarantees of freedoms from state intervention and labour laws.

In Zambia, for instance, the government has focused specifically on coordinating export promotion and private sector development programmes to promote the growth of the competitive gemstone sector.¹¹⁵ In Madagascar, planning and policy priorities include: the elimination of all existing impediments for mining production and the improvement of laws and regulations in the mining sector.¹¹⁶ As already mentioned in section 3.8 Kenya and Tanzania also seek to attract FDI by installing EPZs. While attracting business investment through for example EPZs can generate important jobs and income these benefits can come at a cost for instance when labour rights are not respected and companies do not pay taxes and move out of the country again when they *do* have to pay taxes.

¹¹⁵ WTO, Integrated Framework for Technical Assistance to Least Developed Countries: Zambia Diagnostic Trade Integration Study, 2005 <<http://www.integratedframework.org/files/Zambia-DTIS.pdf>> and, "Zambia Ready to Polish up its Gemstone Industry" Business Africa, 24 May 2005. <http://www.businessin africa.net/features/mining/443110.htm>

¹¹⁶ IMF, Republic of Madagascar: Poverty Reduction Strategy Paper, February 2007, <<http://www.imf.org/external/pubs/ft/scr/2007/cr0759.pdf>> (1 February 2010)

5. Initiatives to improve sustainability in the coloured gemstone supply chain

Corporate Social Responsibility (CSR) is still in its infancy stage in the coloured gemstone industry. There are some industry initiatives but there are currently no operational sector-wide initiatives or standard systems that aim to address sustainability issues throughout the coloured gemstone supply chain. An example of a recent CSR activity in this sector is the proposal for a Jewellery Ethical Trade System (ethical certification of mining and trade of gemstones) by the International Coloured Gemstone Association (ICA).¹¹⁷ Another is the continuing multi-stakeholder dialogue on fair trade standards for jewellery that started with the Madison Dialogue meeting at the World Bank in Washington DC in October 2007. While it is a generic jewellery initiative it seems to focus on coloured gemstones issues as well.¹¹⁸

Indeed there are a number of CSR jeweller initiatives that focus on diamonds (Kimberly process, Diamond Development Initiative), precious metals – especially gold and silver (Oro Verde), jewellery in general (Responsible Jewellery Council, Sustainable Jewellery Industry, several projects funded by the World Jewellery Confederation Education Foundation (WJCEF)) or mining in general (The Initiative for Responsible Mining Assurance (IRMA)). However, by definition but also in practice none of these initiatives *specifically* focuses on addressing sustainability issues in the coloured gemstone supply chain.

On the other hand there are a number of individual companies, jewellers mostly, that claim that they sell fair-trade or ethical coloured gemstones. While the claims of some of these parties may seem unfounded there are also a number of more ambitious companies of which Columbia Gem House (USA) is probably the best known. This company sets a number of social and other standards that supplying companies need to comply with and for which they need to sign a written declaration. Nevertheless, not a single company seems after close scrutiny to be able to claim that their standards (if any) are independently verified through third party audits on the ground. Arguably this is the hallmark of any credible sustainability (eg, fair-trade) standard system. Moreover these ‘fair-trade’ jewellery products of gemstone retailers are often not the largest coloured gemstone or jewellers worldwide or even nationally. Or in other words, their policies are likely to apply only to a small share of coloured gemstones sourced worldwide.

To be able to outline *mainstream* strategies to promote CSR/sustainability in this supply chain we conducted an international survey on CSR policies of leading jewellers in the USA, UK and the Netherlands. The sample included Signet Group (a market leader in the US and UK) and GemsTV (UK’s leading coloured gemstone online jewellery), Tiffany and Wal-Mart (leading US jewellers) and Siebel and Bijenkorf (leading Dutch jewellers). The survey questions were about *any* policy affecting the environmental, social and economic impact of production throughout the coloured gemstone

¹¹⁷ J.C. Michelou, Presentation at the 9th annual CASM Conference Maputo-Mozambique 2009, Coloured Gemstones from Mines to Market Proposal for Ethical Trade and Mining, <http://www.artisanalmining.org/userfiles/file/9th%20ACC/CASMSept9AM_Session4_FairTrade_JCMichelouCA.pdf> (1 February 2010)

¹¹⁸ Fair Jewellery website, “Manufacturing Standards”, <<http://www.fairjewelry.org/madison-dialogue-manufacturing-committee>> (1 February 2010)

supply chain of private label brands, (other) brands and no-brand coloured gemstone jewellery that these companies sell.

The results were very meagre: not a single company returned the completed survey. Except for one Dutch company there were no responses at all. Nevertheless, the companies were contacted several times by phone and email to find the person responsible for CSR and coloured gemstones and to urge them to respond after having sent them the survey. We searched public sources such as the media or company websites but could not find any evidence either of specific coloured gemstone CSR practices or policies by these companies. Hence it is very clear that they are not very transparent publicly about what they are doing or not doing. This makes it plausible to conclude that they are not doing anything substantial in this area. Again these findings clearly indicate that this sector still has a long way to go in tackling the serious sustainability issues plaguing this particular section of the jewellery industry. Whereas the gold and diamond sectors, often involving the same jewellers as the coloured gemstone industry, show that industry wide efforts are possible. It is the authors' opinion that it is high time for the jewellery sector and other coloured stone stakeholders to start taking their responsibility.

6. Appendices

6.1 List of all precious and semi-precious stones

Alphabetical index of all 116 precious and semi-precious stones as used by UN Statistics Division and classified under code 667.31 (SITC Rev.3) and 7103.1 (HS 2002)¹¹⁹: Precious or semi-precious stones, un-worked or simply sawn or roughly shaped, whether or not graded, not strung, mounted or set. See the ICA website for pictures of some of these gemstones¹²⁰

Adularia	Emerald	Obsidian
Agate	Euclase	Oligoclase (feldspar)
Agate		Olivine
Alexandrite	Falcon's-eye (quartz)	Onyx
Almandine	Feldspar (felspar)	Opal matrix
Amazon stone,	Fire-opal	Opal
Amazonite	Fluorite	Orthoclase
Amethyst	Fluorspar	
Amphiboles		Padparadschah
Andalusite	Garnet	Peridot (olivine)
Andradite	Greenstone	Plasma (green quartz)
Aquamarine	Grossular	Pleonast (black spinel)
Augite		Prase
Aventurine feldspar	Haematite	Pyrites
Aventurine quartz	Heliotrope	Pyrope (garnet)
Azurite malachite	Hessonite	
Azurite	Hiddenite	Quartz
	Hornblende	
Beryl	Hyacinth (zircon)	Rhodolite (garnet)
Bloodstone		Rhodonite (natural
Blue John (fluorite)	Iolite (cordierite)	manganese silicate)
Bonamite		Rock-crystal (quartz)
	Jade	Ruby
Cairngorm	Jadeite	
Cat's-eye (chrysoberyl)	Jasper	Sapphire
Cat's-eye (quartz)		Sard (cornelian)
Cat's-eye (tourmaline)	Kunzite (spodumene)	Sardonyx
Ceylonite	Kyanite	Serpentine
Chalcedony		Spessartite (garnet)
Chessylite	Labradorite	Sphene
Chiastolite	Lapis lazuli	Spinel
Chloromelanite		Spodumene
Chrysoberyl	Malachite	Sun-stone
Chrysocolla	Marcasite	
Chrysolite	Melanite (garnet)	Tiger's-eye (quartz)
Chrysoprase	Microlite	Titanite (sphene)

¹¹⁹ Older classification systems (SITC, Rev.1 and SITC,Rev.2) are used in trade data from 1960. New classification systems (HS-2002 and HS-1996) contain more detailed information on more clearly defined commodities, but have only been used to record trade data since 1996. For details of the UN classificatory system, see: <http://unstats.un.org/unsd/cr/>

¹²⁰ <https://www.ssi-id.de/gemstone.org/gem-library/ica-stock-photos/sets/index.html>

Rough Cut
Sustainability Issues in the Coloured Gemstone Industry

Cinnamonstone	Moonstone	Topaz
Citrine	Morganite (beryl)	Topazolite (garnet)
Cordierite	Morion	Tourmaline
Cornelian	Moss agate (quartz)	Turquoise
Corundum	Moss opal	
Cymophane		Variscite
	Nephrite (amphibole)	Vesuvianite (idocrase)
Demantoid		
Dichroite		Zircon
		Zoisite (Tanzanite)