

Promoting decent work in the chemical industry: Innovative initiatives



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INTERNATIONAL LABOUR ORGANIZATION

Sectoral Activities Department

**Promoting decent work in the chemical industry:
Innovative initiatives**

**Issues paper for discussion at the Global Dialogue Forum on Initiatives
to Promote Decent and Productive Work in the Chemical Industry**
(Geneva, 26–28 November 2013)

Geneva, 2013

INTERNATIONAL LABOUR OFFICE, GENEVA

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Executive summary

The chemical industry developed many innovative initiatives to promote decent work while increasing sustainability. Sustainability is a business imperative for the industry, and many companies now have a sustainability strategy and/or policy in place.

The global economic crisis has had a significant impact on employment in the chemical industry: many workers, across the board, have lost their jobs, and economic recovery is unlikely to lead to an immediate improvement in the employment situation. Large numbers of workers are either over- or underqualified. The economic slowdown, however, has given the chemical industry an opportunity to increase its competitive advantage through initiatives to make the industry more competitive, productive and profitable. Voluntary initiatives are enabling the industry to create a work culture where flexibility, productivity and individual quality of life are increasingly valued. Recruitment tools include internships and postdoctoral programmes, and the industry has introduced online recruitment tools to attract skilled young women and men, including strategic initiatives to improve their company brands among women and young workers, as well as consumers and users in the supply chain. Companies have also improved their human resources policies to meet workers' real needs for flexible work schedules and work-life balance. The chemical industry's green jobs initiatives are generating jobs and will increasingly do so.

The ILO's Global Jobs Pact is relevant to the chemical industry in many ways, not least through its emphasis on vocational education and training. In many countries, the industry is partnering with government and the social partners in innovative initiatives in vocational education and training. Some of these initiatives go beyond the national to the regional level, in order to enhance employability and mobility, such as the European Framework Agreement on Competence Profiles for Process Operators and First Line Supervisors in the Chemical Industry, the initiatives of the Cooperation Council for the Arab States of the Gulf (CCASG) in the Middle East, and the strategy being carried out by trade unions in six sub-Saharan African countries. Keeping the chemical industry competitive requires investing considerable resources in science, technology, engineering and mathematics in the long term, and governments play an important role in leading and monitoring such initiatives.

The improper use of chemicals can have adverse consequences for humans and the environment. In addition, new occupational risks are emerging because of technological innovation. The ILO Chemicals Convention, 1990 (No. 170), and multilateral environmental agreements (MEAs) have been adopted, and these are expected to continue to coordinate and guide work to improve the sound global management of chemicals. Other international and regional regulatory tools have been established, such as the European Union Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), and these can help to provide a consistent and coherent approach. The chemical industry's voluntary initiatives, including the Responsible Care (RC) initiative, can help to improve global mechanisms and systems of information sharing on chemicals and best practices on improving occupational safety and health (OSH), by ensuring compliance with the relevant laws and regulations. However, there have been challenges for these voluntary initiatives in operating a consistent and coherent system at the global level. It is important to encourage collaboration and coordination among voluntary initiatives, Convention No. 170 and MEAs, with particular emphasis on promoting the ratification and implementation of ILO OSH-related instruments, as well as the GHS.

One clear benefit of voluntary initiatives is that they have allowed the chemical industry a certain flexibility in addressing challenges in the sector. This flexibility also gives an advantage to small and medium-sized enterprises (SMEs): these initiatives can provide them with a good business case for investment. While voluntary initiatives are not all necessarily alike, because they have evolved in different regional and national contexts, they can, nevertheless, make valuable contributions to improving decent work in the industry by promoting fundamental rights at work and other workplace-related issues.

Social dialogue can serve as an effective tool to overcome the negative economic, social and political consequences of the continuing global financial crisis and to enhance trust among tripartite constituents to cope with existing and emerging challenges in the chemical industry. There must be an equitable balance between voluntary initiatives and global and national laws and regulations, and governments, employers' and workers' organizations all have a pivotal role to play.

Abbreviations and acronyms

ABIQUIM	Brazilian Chemical Industry Association
ACC	American Chemistry Council
ACGIH	American Conference of Governmental Industrial Hygienists
ADNOC	Abu Dhabi National Oil Company
BAVC	German Federation of Chemical Employers' Associations
BRICS	Brazil, Russian Federation, India, China and South Africa
CCASG	Cooperation Council for the Arab States of the Gulf
Cefic	European Chemical Industry Council
CG/HCCS	Coordinating Group for the Harmonization of Chemical Classification Systems
CGIL	Italian General Confederation of Labour
CIEL	Center for International Environmental Law
CIS	Commonwealth of Independent States
CISL	Italian Confederation of Workers' Unions
CLP	Regulation on classification, labelling and packaging of substances and mixtures (European Union)
CSERGE	Centre for Social and Economic Research on the Environment
CSR	corporate social responsibility
DNELs	derived no-effect levels
ECOSOC	Economic and Social Council (United Nations)
ECEG	European Chemical Employers Group
ECHA	European Chemicals Agency
EIROnline	European Industrial Relations Observatory On-line
EMCEF	European Mine, Chemical and Energy Workers' Federation
Eurofound	European Foundation for the Improvement of Living and Working Conditions
FECC	European Association of Chemical Distributors
G20	Group of 20
GCC	Gulf Cooperation Council
GDP	gross domestic product
GFAs	global framework agreements
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
HSE	Health and Safety Executive (Government of the United Kingdom)
ICCA	International Council of Chemical Associations
ICCM	International Conference on Chemicals Management
ICEM	International Federation of Chemical, Energy, Mine and General Workers' Unions (now part of IndustriALL Global Union)
IG BCE	German Chemicals Industry Trade Union (IG Bergbau, Chemie, Energie)
ILO-OSH 2001	ILO guidelines on occupational safety and health management systems

IndustriALL	IndustriALL Global Union
IOE	International Organisation of Employers
IOMC	Inter-Organization Programme for the Sound Management of Chemicals
ILO	International Labour Organization
ISIC	International Standard Industrial Classification of All Economic Activities
ISO	International Organization for Standardization
ITUC	International Trade Union Confederation
KAT	King Abdullah University of Science and Technology
LRC	International Chemical Employers' Labour Relations Committee
MEAs	multilateral environmental agreements
MNE Declaration	Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (ILO)
nPB	n-propyl bromide
OECD	Organisation for Economic Co-operation and Development
OELs	occupational exposure limits
OSH	occupational safety and health
PERI	Political Economy Research Institute
RC	Responsible Care
RCMS	Responsible Care Management System
REACH	Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals (European Union)
SAICM	Strategic Approach to International Chemicals Management
<i>SASSMAQ</i>	<i>sistema de avaliação de saúde, segurança, meio ambiente e qualidade</i> (health, safety, environment and quality assessment system) (Brazil)
SMEs	small and medium-sized enterprises
STEM	science, technology, engineering and mathematics
TDG	transport of dangerous goods
TLVs	threshold limit values
UGL	General Union of Labour (Italy)
UIL	Italian Labour Union
UNCED	United Nations Conference on Environment and Development
UNCETDG/GHS	United Nations Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research

Introduction

This issues paper has been prepared by the ILO as a basis for discussion at the Global Dialogue Forum on Initiatives to Promote Decent and Productive Work in the Chemical Industry, to be held in Geneva from 26 to 28 November 2013.

At the 310th Session (March 2011) of the Governing Body of the International Labour Organization, it was proposed to hold a Global Dialogue Forum to:

... discuss initiatives to promote decent and productive work in the chemical industry. This Forum would examine initiatives to promote social dialogue for improving the performance of the chemical and pharmaceutical industries, in particular of small and medium-sized enterprises.

Taking on board the ILO's Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (MNE Declaration),¹ the discussion may assess how corporate social responsibility initiatives and relations with the emerging voluntary initiatives could be promoted at global and national levels in the chemical and pharmaceutical industries.²

At its 317th Session (March 2013), the Governing Body decided that the Forum would last three days and be held from 26 to 28 November 2013. The Office proposes that the Forum be composed of eight Employer and eight Worker representatives. All Governments would be invited to send representatives.³

Background

In 2011, the ILO organized the Tripartite Meeting on Promoting Social Dialogue on Restructuring and its Effects on Employment in the Chemical and Pharmaceutical Industries. The meeting discussed the employment effects of restructuring in the industries; vocational training and education; and social dialogue to promote an atmosphere conducive to better industrial relations during restructuring in the industries. The meeting unanimously adopted the Conclusions, which note that:

Social dialogue plays an essential role in making restructuring processes successful in the chemical and pharmaceutical industries. ... Good social dialogue practice in the context of restructuring also requires that the agenda and content of the process be clearly defined in consultation between employers, workers and their representatives. Dialogue, to be effective, must be in accordance with the national law and practice and the relevant ILO principles and standards. Good social dialogue practices which exist in some countries provide valuable models that could be documented and disseminated for the information of sectoral social partners in other countries. Among other aims, restructuring-related social dialogue should

¹ ILO: *Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (MNE Declaration)*, fourth ed. (Geneva, 2006), http://www.ilo.org/empent/Publications/WCMS_094386/lang--en/index.htm [accessed 30 July 2013].

² ILO: *Sectoral Activities Programme: Proposals for 2012–13*, GB.310/STM/1, 310th Session, Mar. 2011 (Geneva), paras 25–26, http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_151401.pdf [accessed 30 July 2013]. See also ILO: *Report of the Committee on Sectoral and Technical Meetings and Related Issues*, GB.310/14(Rev.), 310th Session, Geneva, Mar. 2011, para. 58, http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_153323.pdf [accessed 30 July 2013].

³ ILO: *Sectoral Activities Programme 2012–13*, GB.317/POL/4, 317th Session, Geneva, Mar. 2013, paras 15–17, http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_204759.pdf [accessed 30 July 2013].

seek to expand employment opportunities with decent work conditions and worker employability through greater investments in education, vocational training and lifelong learning for all workers, while at the same time seeking to increase the competitiveness of companies in the industries.⁴

The conclusions also note that “decent work, as defined by the ILO, is as relevant to SMEs as it is to any other company in the chemical and pharmaceutical industries. Social dialogue should be undertaken at appropriate levels and in all sizes of enterprises ...”.⁵ The Conclusions highlight the need to discuss initiatives to promote decent work in the chemical industry.

Context and outline of the paper

Following discussions at the previous sectoral tripartite meeting for the chemical industry, this paper focuses on specific initiatives to promote decent work in the industry, with some discussion on the laws and regulations that are important to do this.

This paper has five chapters. Chapter 1 discusses how sustainability contributes to promoting decent work in the chemical industry. Chapters 2–5 discuss employment trends, vocational education and training, sound management of chemicals, and industrial relations.

The structure of the paper is aligned with the MNE Declaration – a voluntary instrument to promote good practice by enterprises and encourage the positive contribution that enterprises can make to economic and social progress based on the observance and promotion of international labour standards. Adopted in 1977 and amended in 2000 and 2006, the MNE Declaration takes into account the objectives of the ILO Declaration on Fundamental Principles and Rights at Work and its Follow-up (1998). As a universal instrument, the MNE Declaration is relevant both to host countries, where companies are operating, and to home countries, where companies are headquartered. Home country governments should encourage good social practices among their multinational enterprises, and host countries should foster an environment that encourages multinational and other enterprises to undertake actions that promote decent work in accordance with international labour standards and in compliance with national laws and regulations. Both host and home country governments are invited to be prepared to have consultations with each other, whenever the need arises, on the initiative of either. The MNE Declaration provides specific guidance to governments and businesses in five areas: general policies; employment; training; conditions of work and life; and industrial relations. For the purposes of this paper, “conditions of work and life” include an emphasis on the sound management of chemicals, given the importance of this subject in the context of the chemical industry.

⁴ ILO: *Tripartite Meeting on Promoting Social Dialogue on Restructuring and its Effects on Employment in the Chemical and Pharmaceutical Industries*, Note on the proceedings (Geneva, 2012), http://www.ilo.org/sector/activities/sectoral-meetings/WCMS_175205/lang-en/index.htm [accessed 30 July 2013].

⁵ *ibid.*

1. The chemical industry and innovative initiatives in the industry

1. World chemicals sales in 2011 were €2,744 billion (about \$3,600 billion). The chemical industry underpins virtually all sectors of the economy. In the European Union, the large industrial customers for chemicals are rubber and plastics, construction, pulp and paper, and the automotive industry. Nearly two-thirds of chemicals are supplied to European Union industrial sectors, including construction. More than one third of chemicals are supplied to other branches of the European Union economy, including agriculture, health and social work, services and other business activities.¹
2. According to the United Nations Environment Programme (UNEP), global chemical output (produced and shipped) was valued at \$171 billion in 1970. By 2010, it had grown to \$4.12 trillion. While annual global chemical sales increased in 2000–09, the share of the Organisation for Economic Co-operation and Development (OECD) decreased from 77 to 63 per cent and the share of the BRICS countries² increased from 13 to 28 per cent. It is forecast that global chemical sales will grow at about 3 per cent per year to 2050.³
3. This paper outlines innovative initiatives taken by actors in the chemical industry to promote decent work together with sustainability. Sustainable development is defined as consisting of three pillars: social, environmental and economic.⁴ Decent work is an important component of sustainable development. In the words of the ILO:

Decent work sums up the aspirations of people in their working lives. It involves opportunities for work that is productive and delivers a fair income, security in the workplace and social protection for families, better prospects for personal development and social integration, freedom for people to express their concerns, organize and participate in the decisions that affect their lives, and equality of opportunity and treatment for all women and men.⁵

4. International labour standards are a path to decent work as they are first and foremost about the development of people as human beings. In the 1944 Declaration of Philadelphia, the international community recognized that “labour is not a commodity”.⁶ Work is part of everyone’s daily life and is crucial to a person’s dignity, well-being and development as a human being. Economic development should include the creation of jobs and working conditions in which people can work in freedom, safety and dignity. In short, economic development is not undertaken for its own sake, but to improve the lives of human beings;

¹ The European Chemical Industry Council (Cefic): *Facts and figures 2012: The European chemicals industry in a worldwide perspective* (Brussels, 2012).

² The five BRICS countries are Brazil, Russian Federation, India, China and South Africa.

³ OECD: *OECD Environmental Outlook to 2050: The consequences of inaction* (Paris, 2012).

⁴ United Nations Conference on Environment and Development (UNCED): Agenda 21, Rio de Janeiro, Brazil, 3–14 June 1992.

⁵ ILO: *Decent work*, <http://www.ilo.org/global/topics/decent-work/lang--en/index.htm> [accessed 30 July 2013].

⁶ ILO: *ILO Constitution*, http://www.ilo.org/dyn/normlex/en/f?p=1000:62:0::NO:62:P62_LIST_ENTRIE_ID:2453907:NO#A1 [accessed 30 July 2013].

the international labour standards are there to ensure that the focus remains on improving human life and dignity.

5. Some of the ILO Conventions, Recommendations and Declarations are relevant to promoting decent work in the chemical industry. Vocational guidance and training standards include the Paid Educational Leave Convention, 1974 (No. 140); the Human Resources Development Convention, 1975 (No. 142), and Recommendation, 2004 (No. 195). Occupational safety and health and protection against specific risk standards include the Occupational Safety and Health Convention, 1981 (No. 155), the Protocol of 2002 to the Occupational Safety and Health Convention, 1981, and Recommendation, 1981 (No. 164); the Occupational Health Services Convention, 1985 (No. 161), and Recommendation, 1985 (No. 171); the Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187), and Recommendation, 2006 (No. 197); the List of Occupational Diseases Recommendation, 2002 (No. 194); the Occupational Cancer Convention, 1974 (No. 139), and Recommendation, 1974 (No. 147); the Working Environment (Air Pollution, Noise and Vibration) Convention, 1977 (No. 148), and Recommendation, 1977 (No. 156); the Chemicals Convention, 1990 (No. 170); and Recommendation, 1990 (No. 177); the Prevention of Major Industrial Accidents Convention, 1993 (No. 174); and Recommendation, 1993 (No. 181). There are also the ILO Declaration on Fundamental Principles and Rights at Work and its Follow-up (1998)⁷ and the Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (MNE Declaration).⁸
6. While it is certain that environmental degradation and climate change will increasingly require enterprises and labour markets to react and adjust, the goal of environmentally sustainable economies will not be attained without the active contribution of the world of work. The environment and social development must no longer be treated as separate pillars of sustainable development, but rather as closely interrelated dimensions. Such an integrated approach turns the drive towards environmental sustainability into a significant avenue for development, with more and better jobs, social inclusion and poverty reduction.⁹
7. A reader survey carried out by *ICIS Chemical Business* and the bio-based technology developer Genomatica in 2012 showed that 54 per cent of the more than 700 chemical companies that responded indicated that they now have a sustainability strategy and/or policy in place. With respect to practical engagement with sustainable practices:

... the key initiative over the past five years has been to improve manufacturing processes, especially with respect to reducing energy and waste. This was mentioned by no less than 75 per cent of the respondents. Other leading initiatives include the reduction/elimination of toxic chemicals (mentioned by 47 per cent) and increased use of bio-based and renewable content in products (44 per cent).¹⁰

⁷ ILO: *ILO Declaration on Fundamental Principles and Rights at Work and its Follow-up*, <http://www.ilo.org/declaration/thedeclaration/textdeclaration/lang--en/index.htm> [accessed 30 July 2013].

⁸ ILO: *Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (MNE Declaration)*, fourth ed. (Geneva, 2006), http://www.ilo.org/empent/Publications/WCMS_094386/lang--en/index.htm [accessed 30 July 2013].

⁹ ILO: *Sustainable development, decent work and green jobs*, Report V, International Labour Conference, 102nd Session, Geneva, 2013.

¹⁰ J. Baker: "Green concepts take firm root", Special report: Sustainability survey, in *ICIS Chemical Business* (Sutton, Surrey), 21–27 Jan. 2013, pp. 27–30.

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8. Improving health and safety performance had become more important since the previous survey in 2009: it was cited as important by 63 per cent of respondents in 2012, compared to only 20 per cent in 2009.
 9. The chemical industry thus views sustainability as a business imperative that steers business strategy. Embedding sustainability in daily operations, and refocusing product portfolios and innovation on solutions that meet the needs of human development are vital to growth and long-term viability. Through innovative sustainable initiatives, the industry improves efficiency of resources and reduces carbon dioxide emissions and energy consumption.
 10. The Brazilian petrochemical company Braskem ensures that sugar cane used in the production process is grown in a sustainable and socially responsible manner. DuPont has declared goals that call for the company to double the amount of research and development investment in programmes that have direct, quantifiable environmental benefits for its customers and consumers to \$640 million, and to increase annual revenue by at least \$2 billion from products that reduce greenhouse gas emissions by 2015. Eastman Chemical aims to have two-thirds of new product revenue coming from sustainably advantaged products by 2015. By 2020, BASF is expecting sales of approximately €30 billion from innovations launched in the past ten years, many of which will be sustainable-solution businesses, with expected earnings before interest, taxes, depreciation and amortization of €7 billion.¹¹
 11. Sustainability also benefits workers in the chemical industry by providing them with jobs. The global chemical industry has created nearly 20 million jobs and has the potential to create more (this will be discussed in Chapter 2). Sustainable development has also contributed to increased wages for workers, which in turn promotes decent work in the industry. Between 1999 and 2008, it has been reported that 66 out of 72 ILO member States showed an increase in real wages.¹²
 12. In the context of the chemical industry, innovative initiatives are either compulsory (such as laws and regulations) or voluntary (such as corporate social responsibility (CSR), or codes of practice). Both of these are discussed further in Chapters 4 and 5.

¹¹ R. Coons: “Sustainability: Solving global challenges”, in *IHS Chemical Week* (Englewood, Colorado), 1 Apr. 2013.

¹² ILO: *Restructuring, employment and social dialogue in the chemical and pharmaceutical industries*, Report for discussion at the Tripartite Meeting on Promoting Social Dialogue on Restructuring and its Effects on Employment in the Chemical and Pharmaceutical Industries, 24–27 Oct. 2011 (Geneva), http://www.ilo.org/sector/Resources/publications/WCMS_164943/lang--en/index.htm [accessed 30 July 2013].

2. Employment trends

2.1. Recent employment trends

13. Five years after the onset of the global financial crisis, the global economy is not yet growing at a pace that will create enough decent employment opportunities to restore pre-crisis employment levels. The World Bank has recently given increased recognition to the centrality of jobs and inclusive economic growth.¹ In many parts of the world, the crisis has resulted in rising unemployment, uncertainty and negative impacts on large numbers of workers and enterprises. This led to the adoption of the Global Jobs Pact in June 2009, which was subsequently endorsed by the G20 (Group of 20 Finance Ministers and Central Bank Governors) as part of their policy framework to confront the crisis. The principles contained in the Global Jobs Pact are relevant to the chemical industry, including supporting “job creation and help people into work”.²
14. The global economic crisis has resulted in job losses in the industry. According to the *International Yearbook of Industrial Statistics 2013*, published by the United Nations Industrial Development Organization (UNIDO), the basic chemical industry sector in 26 member States (out of 55, where reliable data are available) lost nearly 50,000 jobs between 2009 and 2010.³ Most of these countries are in Europe (see table 1). The cuts have affected all types of workers, including chemical engineers, chemists, managers, production workers and scientists.⁴

Table 1. Number of employees in the basic chemical sector, selected countries, 2007–10

Country	2007	2008	2009	2010	Change between 2009 and 2010 (latest year for which data are available)
Albania	3 921	3 742	3 492	3 530	38
Australia	–	–	9 100	10 000	900
Austria	–	6 367	6 347	–	-20
Azerbaijan	7 699	7 206	6 829	7 130	301
Belarus	56 968	56 069	56 695	63 243	6 548
Belgium	–	24 931	24 906	–	-25
Botswana	1 025	1 577	894	1 231	337
Brazil	222 293	264 744	220 438	213 238	-7 200

¹ World Bank: *World Development Report 2013: Jobs* (Washington, DC, 2012).

² ILO: *Recovering from the crisis: A Global Jobs Pact*, adopted by the International Labour Conference, 98th Session, Geneva, 2009, Part III, para. 11, <http://www.ilo.org/jobspect/lang-en/index.htm> [accessed 30 July 2013].

³ UNIDO: *International Yearbook of Industrial Statistics 2013* (Cheltenham, Gloucester, Edward Elgar, 2013).

⁴ S. Rovner: “Tepid recovery curtails hiring”, in *Chemical and Engineering News (C&EN)* (Vol. 90, Issue 45, 5 Nov. 2012), (Washington, DC), pp. 45–49.

Country	2007	2008	2009	2010	Change between 2009 and 2010 (latest year for which data are available)
Bulgaria	–	4 735	3 879	3 767	-112
Canada	–	31 000	28 000	–	-3 000
China	2 212 000	2 423 000	2 385 000	2 514 000	129 000
Colombia	7 687	7 819	7 213	8 165	952
Croatia	–	4 359	4 544	4 114	-430
Cyprus	–	777	776	832	56
Denmark	–	4 003	3 836	–	-167
Estonia	–	900	900	1 300	400
Finland	–	14 646	8 136	–	-6 510
France	–	66 400	68 500	–	2 100
Georgia	3 015	3 082	3 017	3 198	181
Germany	–	170 800	176 200	–	5 400
Hungary	–	8 260	8 045	–	-215
India	–	231 100	232 400	–	1 300
Iran, Islamic Republic of	30 215	43 787	50 962	–	7 175
Ireland	–	4 141	1 614	–	-2 527
Israel	–	4 300	4 800	–	500
Italy	–	41 300	39 700	–	-1 600
Japan	–	119 000	120 000	118 000	-2 000
Jordan	3 641	3 493	3 889	3 773	-116
Kuwait	2 865	3 307	3 731	3 867	136
Kyrgyzstan	1 704	1 489	1 179	996	-183
Latvia	575	699	661	798	137
Lithuania	4 175	4 231	3 955	3 548	-407
Malaysia	–	–	36 400	40 200	3 800
Mexico	–	35 700	36 600	36 700	100
Morocco	8 143	9 061	11 002	10 786	-216
Netherlands	–	23 799	26 463	–	2 664
New Zealand	3 010	2 990	3 070	–	80
Oman	1 423	1 653	1 998	2 106	108
Poland	–	32 200	31 100	–	-1 100
Portugal	–	4 579	4 152	–	-427
Qatar	4 949	5 256	5 479	5 118	-361
Romania	35 975	23 771	21 536	21 134	-402
Russian Federation	304 000	289 000	269 000	255 000	-14 000
Singapore	7 128	7 094	7 081	6 910	-171
Slovakia	–	6 648	6 438	–	-210
South Africa	21 100	20 700	19 900	–	–
Spain	–	32 500	28 900	–	-3 600

Country	2007	2008	2009	2010	Change between 2009 and 2010 (latest year for which data are available)
Sri Lanka	2 040	1 531	1 828	2 291	463
Sweden	–	10 598	9 625	–	-973
The former Yugoslav Republic of Macedonia	358	326	293	325	32
Ukraine	80 109	78 737	62 622	60 411	-2 211
Viet Nam	27 800	32 400	35 900	36 800	900

Source: UNIDO: *International Yearbook of Industrial Statistics 2013* (Cheltenham, Gloucester, Edward Elgar, 2013).

15. Some chemical companies are now increasing new production lines, which may result in more workers being hired. In 2012, Dow and Akso Akrilik Kimya Sanayii formed a carbon fibre joint venture that could add 1,000 jobs in Turkey. GlaxoSmithKline is about to create approximately 1,000 new pharmaceutical jobs in the United Kingdom. Novo Nordisk plans to expand its United States pharmaceutical workforce by about 600, and generic drug maker Mylan will add more than 500 jobs in Ireland.⁵
16. Economic recovery, however, is unlikely to lead immediately to an improvement in the employment situation. The global economic crisis has widened the pre-existing skills mismatch – the discrepancy between the qualifications and skills that individuals possess and those needed by the labour market. The degree of skills mismatch, which was already increasing before the crisis, has been aggravated by labour market difficulties resulting from the unfavourable economic cycle.⁶ Many workers are either over- or underqualified. According to PricewaterhouseCoopers, about one third of life science companies have reviewed their approach to research and development in the past three years, and, between 2009 and 2012, the pharmaceutical industry laid off 150,000 workers. Some 72 per cent of pharmaceutical executives now intend to increase their research and development capacity, but half of them indicate that hiring has become more difficult than before.⁷

2.2. Industry initiatives to increase employability

2.2.1. Recruiting initiatives

17. Internships in the chemical industry increase the chances for new graduates to find a permanent job. Exposure to business and environmental practices and to OSH gives them an edge. Many companies use their internship programmes as extended interviews and as a

⁵ S. Rovner: “Tepid recovery curtails hiring”, in *Chemical and Engineering News (C&EN)* (Vol. 90, Issue 45, 5 Nov. 2012), (Washington, DC), pp. 45–49.

⁶ European Commission: *Employment and social developments in Europe 2012* (Brussels, 2012).

⁷ A. Thayer: “Pharma firms see a lack of needed skills”, in *Chemical and Engineering News (C&EN)* (Vol. 91, Issue 6, 11 Feb. 2013), (Washington, DC) p. 7.

way of assessing available talent. Some firms dedicate efforts to grooming tomorrow's employees prior to their graduation.⁸

18. Finding postdoctoral positions in the chemical industry is becoming more difficult, as competition for these jobs is fierce, particularly at SMEs. Some SMEs are paying more attention to postdoctoral programmes to recruit talented workers. Wolfe Laboratories, a contract research organization based in the United States, is recruiting to fill a postdoctoral position that will involve collaboration with Merck and will focus on understanding the pharmaceutical and physic-chemical properties of formulations and their impact on in vivo performance. In addition, the company is looking to fill another new position which will extend its collaboration in antibody drug conjugate research with a university. The programme will allow the company to extend its scientific capabilities in a way that meets the needs of its customers, which are developing a broad range of compounds, including small molecules, biologics and targeted therapeutics.⁹

2.2.2. Elevating corporate brand recognition

19. Chemical firms see building a strong brand as an important recruitment tool. Because young people are brand conscious, many companies are using social media to increase their brand recognition among young people. BASF has established strategic global initiatives to strengthen and develop its employer brand: an example of such an initiative is BASF's Generations@Work – a project simulation that enables young people to become familiar with performance, flexibility and productivity.¹⁰ L'Oréal uses Internet online games: one of these - e-Strat Challenge - allows students to manage a simulated beauty products organization. Games such as these are designed for marketing students and are giving L'Oréal a reputation as a recruiter in fast-growing emerging markets such as Brazil. Online games attract more than 50,000 students every year.¹¹

2.3. Improving working conditions to retain skilled workers

20. SMEs in the industry are taking multiple measures to recruit and retain skilled workers. Giving people the right work-life balance is increasingly seen as a means of improving recruitment. Some firms are encouraging entrepreneurship, enabling more freedom at work while adopting incentive wage systems. Spain's Grupo ADI, a medium-sized distributor employing 85 people, aims to retain its best workforce by fostering an entrepreneurial spirit through a bonus scheme worth around 20–35 per cent of salary. The bonus is based on the amount of net margin each sales person can achieve, rather than on sales.¹²

⁸ C. Shaw: "Recruiting the best", in *ICIS Chemical Business*, (Vol. 277, Issue 9, 8–14 Mar. 2010), (Sutton, Surrey), pp. 30–31.

⁹ S. Ainsworth: "Finding a chemistry postdoc position in industry", in *Chemical and Engineering News (C&EN)* (Vol. 90, Issue 37, 10 Sep. 2012), (Washington, DC), pp. 48–50.

¹⁰ C. Shaw, op. cit.

¹¹ S. Hamm: "International isn't just IBM's first name", in *BusinessWeek* (New York, NY), 28 Jan. 2008, pp. 36–40.

¹² W. Beacham: "Recruiting the best pays off", in *ICIS Chemical Business* (Vol. 281, Issue 18, 21–27 May 2012), (Sutton, Surrey), pp. 23–24.

21. Initiatives to improve wage equality and working conditions need to contribute to increasing the number of female workers in the chemical industry. Table 2 shows the share of female workers in total employment in the chemicals and chemical products sector (International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 3, Division 24) in selected countries between 2006 and 2010. It shows that the share of female workers is much lower than that of male workers, and that female workers' participation in the sector has not improved over time. The chemical industry needs to hire more female workers and enable them to progress on a career path. In some companies, women returning from maternity leave are provided with the option of working flexible hours, for example. It is also reported that, on average, companies with the highest percentages of women board directors outperformed those with the lowest by 66 per cent.¹³

Table 2. Share of female workers in total employment in the chemicals and chemical products sector, selected countries, 2006 and 2010 (percentages)

Country	2006	2010
Azerbaijan	37.2	38.5
Bulgaria	47.2	48.1
Croatia	39.5	40.5
Cyprus	52.8	50.3
Ethiopia	33.9	35.7
Georgia	44.2	43.9
India	9.8	9.2 ^a
Indonesia	33.6	34.2 ^b
Iran, Islamic Republic of	13.1	11.9 ^b
Japan	26.1	26.1 ^b
Jordan	17.3	21.5
Kuwait	4.8	4.0
Kyrgyzstan	27.2	31.3
Lithuania	40.1	36.6
Malaysia	27.2	27.2
Morocco	23.6	24.9
Philippines	33.9	33.6
Sri Lanka	28.6	32.7
Turkey	14.9	15.1 ^a
Viet Nam	39.5	39.3

^a Data for 2008. ^b Data for 2009.

Source: UNIDO: *International Yearbook of Industrial Statistics 2013* (Cheltenham, Gloucester, Edward Elgar, 2013).

¹³ N.M. Carter et al.: *The bottom line: Corporate performance and women's representation on boards* (New York, Catalyst, 2007).

2.4. Green jobs initiatives

22. In the chemical industry, the discussion on green jobs initiatives is frequently connected to the emerging field of green chemistry. By definition, a chemical's risk is a function of intrinsic hazards and exposure. Efforts at reducing risk to human health from chemicals have focused both on eliminating the hazards, and on reducing the probability and magnitude of exposure. The track record for predictions of both hazard and exposure is abysmal. Green chemistry seeks more environmentally benign processes and products by using less hazardous catalysts, solvents and reagents; maximizing energy and feedstock efficiency; and using alternative and renewable energy sources and recycled and renewable materials. Green chemistry intends to maximize efficiency and minimize the hazards of any chemical process.
23. Over the past several years, the concept of green chemistry has shown increasing promise in a range of businesses that produce and use chemicals. This promising approach to chemical synthesis and manufacture aims to design chemicals and chemical processes that meet the functional demands of the market, but are also inherently safer and more resource- and energy-efficient. Green chemistry can create jobs.¹⁴ In 2013, the World Bank and the Government of China published a report which suggested that China needed to "go green", among other things, in order to transform environmental stresses into green growth as a driver for development.¹⁵
24. In recent years, countries in South America have invested considerably in greener technologies. Among those in the lead is Brazil: Braskem's 200,000 metric tonnes per year ethylene plant at Triunfo uses sugar cane-derived ethanol to make polyethylene. Braskem will also build a fully integrated, world-scale bio-polyethylene plant. Companies such as Dow Chemical, Solvay and Mitsui Chemical will produce bio-polyethylene in South America.¹⁶
25. In the European Union countries, over half (52 per cent) of SMEs currently offer green products or services with environmental features; 29 per cent do so in the area of recycled materials, and 20 per cent do so in renewable energy or solid waste management.
26. In 2012, the Italian Minister of Environment and the Italian trade union confederations, Italian General Confederation of Labour (CGIL), Italian Confederation of Workers' Unions (CISL), Italian Labour Union (UIL) and General labour Union Italy (UGL) agreed a strategy for the protection and enhancement of the environment and the territory as fundamental for the good of Italy and its citizens, initiating a process of sustainable development, increasing employment and enabling the country to achieve the objectives of European and international strategies. As an initial employment plan, the protocol agreed between the Ministry of Environment and the unions called for the creation of more than 60,000 jobs by adopting industrial policies aimed at implementing new technologies to

¹⁴ B. Tuncak: *Driving innovation: How stronger laws help bring safer chemicals to market* (Washington, DC, The Center for International Environmental Law (CIEL), 2013), p. 17.

¹⁵ World Bank and Development Research Center of the State Council, the People's Republic of China: *China 2030: Building a modern, harmonious, and creative society* (Washington, DC, World Bank, 2013).

¹⁶ K. Sissell: "Latin America: Profiting from the upturn", in *Chemical Week* (Vol. 173, issue 26, 24–31 Oct. 2011), (Englewood, Colorado), pp. 23–27.

improve energy efficiency, curb emissions and boost renewables and energy distribution networks.¹⁷

27. The employment generation potential of the greener economy depends in part on the right policies. Many chemicals and chemical products depend on petroleum and other fossil fuel inputs. The upstream linkages to the petroleum sector limit the job creation potential of expanding production of these chemicals. Estimates suggest that a greener chemical industry could create more jobs than in the petroleum industry and the current chemical industry.
28. In table 3, Heintz and Pollin show the estimates of employment generated in the United States for each \$1 million spending on output, comparing the petroleum sector with bio-based sectors, including the direct and indirect effects of such spending. Table 3 shows that \$1 million in spending on petroleum and gas extraction would generate 1.1 direct jobs and 2.2 indirect jobs, for a total of 3.3 jobs. Other industries in the traditional plastics supply chain have relatively low employment multipliers for each \$1 million spent: petroleum and gas drilling (3.9 direct and indirect jobs), petroleum refineries (1.8 direct and indirect jobs), and petrochemical manufacturing (2.7 direct and indirect jobs). In contrast, the job creation effects in the sectors which supply the raw materials for bio-based plastics are significantly higher: wet corn milling (9.3 direct and indirect jobs), grain farming (12.7 direct and indirect jobs), and vegetable farming (10.1 direct and indirect jobs).

Table 3. United States: Estimates of employment generated for each \$1 million spending on output, comparing the petroleum sector with bio-based sectors

Industry supplying raw materials	Direct	Indirect	Direct + indirect
Bio-based emphasis			
Grain farming	8.4	4.4	12.7
Vegetable farming	4.8	5.3	10.1
Sugarcane and sugar beets	26.1	5.3	31.4
Fruit farming	10.5	6.2	16.7
Wet corn milling	0.5	8.8	9.3
Plastics	\$3 335	–	1.30%
Transportation equipment	\$38 221	–	2.90%
Petroleum emphasis			
Petroleum and gas extraction	1.1	2.2	3.3
Petroleum and gas drilling	1.2	2.7	3.9
Petroleum refineries	0.1	1.7	1.8
Petrochemical manufacturing	0.2	2.5	2.7

Source: J. Heintz and R. Pollin: *The economic benefits of a green chemical industry in the United States: Renewing manufacturing jobs while protecting health and the environment* (Amherst, MA, University of Massachusetts, Political Economy Research Institute (PERI) and Blue/Green Alliance, 2011), p. 33.

¹⁷ Protocol between the Ministry of Environment and the unions CGIL, CISL, UIL and UGL, Rome, 9 Aug. 2012.

3. Vocational education and training

29. The Human Resources Development Convention, 1975 (No. 142),¹ calls for ratifying member States to encourage the adoption of a holistic and integrated approach to human resources development. The Human Resources Development Recommendation, 2004 (No. 195),² recommends that member States should, based on social dialogue, formulate, apply and review national human resources development, education, training and lifelong learning policies which are consistent with economic, fiscal and social policies. Human resources development systems should be well thought out and integrated, rather than piecemeal collections of policies and programmes. Most importantly, the human resources development system should be closely tied to employment policies and programmes. After all, the main function of a human resources development system is to help people find and retain a job, and to help firms obtain the skilled workers they need. In many countries, governments, the chemical industry and trade unions have introduced innovative initiatives to further such vocational education and training.

3.1. Vocational education and training initiatives in the chemical industry

30. In 16 countries in sub-Saharan Africa, trade union representatives from unions affiliated with IndustriALL have developed comprehensive strategies to urge their governments to put in place progressive policies to promote and support industrialization and development, investment in education, training and research and development, and support for skills transfer.³ In May 2013, IndustriAll launched a global debate on sustainable industrial policy among its 50 million members: how to “promote a union perspective on the key sustainability issues for industry”.⁴ This initiative has its basis in the Action Plan adopted at the IndustriALL Founding Congress in Copenhagen in 2012, with the aim to “promote strong industrial policies that recognize manufacturing as a key engine of growth for national economies; encourage investment in research and development, and training and skills to assure sustainable industrial production and long-term employment prospects; ... pursue union participation in all aspects of industrial policy development and implementation”.⁵

¹ ILO: Human Resources Development Convention, 1975 (No. 142), http://www.ilo.org/dyn/normlex/en/f?p=1000:12100:0::NO::P12100_INSTRUMENT_ID:312287 [accessed 30 July 2013].

² ILO: Human Resources Development Recommendation, 2004 (No. 195), http://www.ilo.org/dyn/normlex/en/f?p=1000:12100:0::NO::P12100_ILO_CODE:R195 [accessed 30 July 2013].

³ IndustriALL Global Union: “African unions commit to prioritizing sustainable industrial development”, press release, 30 Apr. 2013.

⁴ IndustriALL Global Union: “Sustainable Industrial Policy launch”, 17 May 2013, http://www.industriall-union.org/sustainable-industrial-policy-launch?utm_source=Newsletters+in+english&utm_campaign=b24ea76a19-Headlines_IndustriALL_44&utm_medium=email&utm_term=0_65751b77d5-b24ea76a19-10714929 [accessed 30 July 2013].

⁵ IndustriALL Global Union: “Action Plan of IndustriALL Global Union), <http://www.industriall-union.org/about-us/action-plan-of-industriall-global-union> [accessed 30 July 2013].

31. In April 2011, European Union social partners in the chemicals industry signed a framework agreement on competence profiles for process operators and first line supervisors in the chemical industry.⁶ This initiative covers employees in the industry in all 27 European Union Member States; its purpose is to ensure conformity of competences in the European Union, through the following specific aims:

- to contribute to an equal quality and value of education and training in order to enhance employability and mobility in the European chemical industry;
- to ensure the conformity of these competences within Europe, which will facilitate their transferability;
- to enable, through these core competences, the establishment of benchmarks for national qualifications, national vocational education and training programmes and company human resources development, where recognition of existing qualifications gained through “learning by doing” or training on the job might be part of the training; and
- to favour the active support of the social partners in adapting and modernizing vocational education and training systems at European and national levels and in-company training and lifelong learning.

3.2. Apprenticeships

32. At the Toronto Summit in June 2010, G20 Leaders welcomed the document prepared by the ILO: *A skilled workforce for strong, sustainable and balanced growth: A G20 training strategy*.⁷ In preparing this strategy, the ILO worked closely with employers and workers, consulted other international organizations, and drew on the *Conclusions on skills for improved productivity, employment growth and development*,⁸ which were adopted by the International Labour Conference at its 97th Session (June 2008). In May 2012, in Guadalajara, Mexico, G20 Labour and Employment Ministers agreed to “promote, and when necessary, strengthen quality apprenticeship systems that ensure high level of instruction and adequate remuneration and avoid taking advantage of lower salaries”. Quality apprenticeships have been considered by the G20 Task Force on Employment as one of the key policy tools to promote effective school-to-work transitions. Given the differences in apprenticeships and taking into consideration the diversity of national contexts in the G20 countries, the Task Force drew up 16 key elements that apprenticeship programmes may include in their design and implementation.⁹

⁶ European Chemical Employers Group (ECEG) and European Mine, Chemical and Energy Workers’ Federation (EMCEF): *European Framework Agreement on Competence Profiles for Process Operators and First Line Supervisors in the Chemical Industry*, Brussels, 15 Apr. 2011.

⁷ ILO: *A skilled workforce for strong, sustainable and balanced growth: A G20 training strategy* (Geneva, 2011), http://www.ilo.org/wcmsp5/groups/public/---dgreports/---integration/documents/publication/wcms_151966.pdf [accessed 30 July 2013].

⁸ ILO: *Conclusions on skills for improved productivity, employment growth and development* (Geneva, 2008), http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_103457.pdf [accessed 30 July 2013].

⁹ G20 Task Force on Employment: *Key elements of quality apprenticeships*, 27 Sep. 2012, http://www.skillsforemployment.org/wcmstest4/groups/skills/documents/skpcontent/ddrf/mdq5/~edisp/wcmstest4_049635.pdf [accessed 30 July 2013].

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33. In collaboration with governments, the chemical industry is also promoting apprenticeships. Apprenticeship, which is a system characterized by close collaboration between public policy, training providers and enterprises, works best where workplace and classroom learning are combined, where the skills acquired are broadly recognized, and where regulations and employment contracts reflect the outcomes of social dialogue with respect to wages, duration of the employment contract and working conditions, and where there is co-financing. In 2011, the Government of the United Kingdom introduced “higher apprenticeships” in accountancy, construction, information technology and the chemical sciences sectors, in collaboration with those industries. A higher apprenticeship is a vocational alternative to a university undergraduate programme that confers a degree-level qualification. Through this programme, many areas of research and development are being supported – from the creation of new molecules through to biological testing, and scaling up from bench to pilot plant to production scale, including putting the product into the right packaging.¹⁰

3.3. Partnerships in education

34. The ILO and the Russian Federation have developed a partnership on delivering an innovative skills development programme in selected countries. This project is pursuing the interest indicated by the Russian Federation to work with the ILO on supporting the application of the G20 training strategy to skills development and employment needs in a range of countries. It will be implemented in line with the Russian Federation development cooperation strategy, focusing on developing national vocational training programmes that meet labour market demand, and on developing and implementing training programmes for managers of vocational education and training systems. The initiative aims to bridge education and training to support economic growth, economic diversification, and the creation of more and better jobs. The assistance provided will improve the quality and relevance of vocational education and training and entrepreneurship in order to better meet current labour market needs and prepare the workforce and enterprises for new market and trade opportunities. The initiative envisions a substantial knowledge-sharing component, through events both inside the Commonwealth of Independent States (CIS) and beyond.
35. Science, technology, engineering and mathematics (STEM) are essential to keep the chemical industry competitive. In the United States, the Educate to Innovate campaign was launched in 2009, and relies on initiatives to improve STEM education. Initially valued at more than \$250 million over the next decade, the campaign doubled in size in 2010 when a second stage of public–private initiatives worth \$240 million was rolled out to focus on increasing the numbers of, and providing assistance to, STEM teachers. The majority of resources for these initiatives comes from companies, non-profit organizations and philanthropic groups. The ten-year commitment involves expanding programmes to train mathematics and science teachers. The Educate to Innovate campaign also includes some funding that will be used to expand several fellowships to universities.¹¹

¹⁰ J.M. Crow: “Higher apprenticeships offer degrees of difference”, in *Chemistryworld* (London, Royal Society of Chemistry), 17 Apr. 2013.

¹¹ S.R. Morrissey: “Educate to Innovate”, in *Chemical and Engineering News (C&EN)* (Vol. 88, Issue 4, 25 Jan. 2010), (Washington, DC), pp. 25–26.

36. Countries in the Middle East have long been struggling with a shortage of skilled workers among their local populations. Governments of the member States of CCASG,¹² as well as the region's oil and gas and chemical industries, have been pouring funds into vocational education and training. Around one quarter of national budgets are now being allocated to education. In order to cope with the long-term shortage of qualified workers in the industry, higher education institutes in science and technology have been set up in the region to provide skilled workers to the sector. In alliance with multinational energy companies, the Abu Dhabi Petroleum Institute was set up by the Abu Dhabi National Oil Company (ADNOC) to meet its need for qualified staff. Saudi Aramco has established the King Abdullah University of Science and Technology (KAT) as a source of skilled workers. KAT will have 13 specialist research centres, including for catalysis, nanomaterials and nanochemistry, materials and advanced technologies. Qatar has been building a science park to bring academia and business together. Dubai has built a Knowledge Village and Academic City.¹³

3.4. Training focusing on SMEs

37. The share of SMEs in the chemical industry is relatively high. In 2009, SMEs with fewer than 250 employees represented 96 per cent of all chemical companies in the European Union. These SMEs provided 37 per cent of all jobs and generated 30 per cent of sales.¹⁴ Increasing vocational education and training opportunities for disadvantaged young people, such as school drop-outs, would help to resolve skills gaps in the industry. Publicly-funded vocational education and training programmes could prevent additional financial burdens on SMEs. A working group in India comprised of representatives of the Government of India and industry recommends that polytechnics and industrial training institutes should be encouraged to organize short-term programmes for vocational education and training of school drop-outs in a variety of multiskilled job positions that would be available in SMEs. In evolving these training programmes, industry involvement should be mandatory and employer-based training programmes should be encouraged.¹⁵
38. In 2011, the German chemical industry launched the Start programme. This initiative supports young people who have failed to secure a vocational training place or do not have the necessary skills for such training. Since 2000, over 2,200 young people have taken part in the programme, around 70 per cent of whom were subsequently able to secure a training place. This programme will be expanded to include a new measure called Start Plus, which will focus on fostering training activities on the part of SMEs.¹⁶

¹² There are six member States in the CCASG, also known as the Gulf Cooperation Council (GCC): Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates.

¹³ S. Milmo: "Plugging the skills gap", in *ICIS Chemical Business* (Vol. 274, No. 19, 17–30 Nov. 2008), (Sutton, Surrey), pp. 28–29.

¹⁴ W. Beacham: "SMEs punch above their weight", in *ICIS Chemical Business* (Sutton, Surrey), 19 July–1 August 2010.

¹⁵ Ministry of Industry, Government of India: *Report of the Working Group on Science and Technology for Small and Medium Scale Enterprises (SMEs) for the Eleventh Five Year Plan (2007–12)* (New Delhi, 2007).

¹⁶ S. Vogel: "Social partners in chemicals negotiate new collective agreement", in *European Industrial Relations Observatory On-line (EIROOnline)*, 27 May 2011.

4. Management of chemicals

39. Chemicals are an integral part of our natural and urban environments. Their contribution to society is invaluable, but unless we manage them well they can cause harm to humans and the environment. As chemicals are everywhere, including in our workplaces, it is necessary to ensure that each chemical product comes to market only after it has been properly identified, an assessment of any possible hazardous properties has been carried out and safe-handling methods have been developed to manage risks. Chemicals can be released at every stage of their life cycle, from production or importation and processing, through manufacturing and use, to disposal. At all stages, this may lead to exposure of workers and the general population and pollution. It makes sense that an integrated approach be taken to assess and manage these risks rather than isolated measures, as some of these risks may have a global impact. However, challenges do exist. This chapter discusses some of the achievements of the ILO tripartite constituents together with the ILO itself in the management of chemical substances. It also looks at some of the challenges ahead.

4.1. Global initiatives on the sound management of chemicals

40. ILO constituents have participated for many decades in the development of international policies and commitments on the sound management of chemicals. These efforts have led to the birth of MEAs, which include the ILO Chemicals Convention, 1990 (No. 170),¹ the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal,² the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade,³ and the Stockholm Convention on Persistent Organic Pollutants.⁴ However, one disadvantage of these Conventions is that, with the exception of ILO Convention No. 170, MEAs are designed to protect one particular medium without addressing others, which leads to inconsistencies. A recent report from CIEL advocates the promotion of synergy across MEAs, with a life-cycle approach to the sound management of chemicals.⁵ Synergy will also apply to the Minamata Convention on Mercury.⁶ In addition, following the resolution concerning the harmonization of systems of classification and labelling for the use of hazardous chemicals at work, adopted by the ILO in 1989, the issue was taken up at the UNCED, held in Rio de Janeiro in 1992 (also known as the Earth Summit). Subsequent work was coordinated and

¹ ILO: Chemicals Convention, 1990 (No. 170), https://www.ilo.org/dyn/normlex/en/f?p=1000:12100:0::NO::P12100_INSTRUMENT_ID:312315 [accessed 30 July 2013].

² The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal and Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal, <http://www.basel.int> [accessed 30 July 2013].

³ The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, <http://www.pic.int> [accessed 30 July 2013].

⁴ The Stockholm Convention on Persistent Organic Pollutants, <http://chm.pops.int/default.aspx> [accessed 30 July 2013].

⁵ B. Tuncak and D. Ditz: *Paths to global chemical safety: The 2020 goal and beyond*, report to the Swedish Society for Nature Conservation (Stockholm, CIEL, 2013).

⁶ United Nations Environment Programme (UNEP): “Minamata Convention agreed by nations”, 19 Jan. 2013, <http://www.unep.org/newscentre/default.aspx?DocumentID=2702&ArticleID=9373> [accessed 30 July 2013].

managed under the auspices of the Inter-Organization Programme for the Sound Management of Chemicals (IOMC) Coordinating Group for the Harmonization of Chemical Classification Systems (CG/HCCS). Among others, the ILO was identified as a focal point for work on hazard communication. The first draft of the GHS was then transferred to the United Nations Economic Commission for Europe (UNECE). The first official version was adopted in December 2002, and endorsed by the Committee of Experts on TDG and on the GHS. The United Nations Economic and Social Council (ECOSOC) Sub-Committee of Experts on the GHS acts as custodian of the GHS, making it available for worldwide use and implementation, and promoting and monitoring its implementation. The GHS is discussed in section 4.3.3.

41. The Strategic Approach to International Chemicals Management (SAICM) was developed as a voluntary mechanism to fill the gaps not covered by MEAs. Established by the ICCM in 2006, the SAICM was conceived as a policy framework to guide efforts to achieve the goal set out in the Johannesburg Plan of Implementation of the World Summit on Sustainable Development that, by 2020, chemicals would be produced and used in ways that minimize significant adverse effects on human health and the environment. It is a unique governance mechanism for achieving sound management of chemicals involving all relevant sectors and stakeholders - governments, trade unions, the chemical industry, civil society networks, academia and the private sector - through a transparent and open decision-making and implementation process.
42. The chemical industry and trade unions participated positively, together with the ILO, in the formation of the SAICM. The industry's participation sent an explicit message to the public that the industry would take a lead role in the safe management of chemicals in the global arena. To this end, the industry has promoted a set of voluntary initiatives, including the Responsible Care Global Charter,⁷ the Global Product Strategy, the Long-range Research Initiative, and the SubChem platform.
43. In 2007, the ILO organized a Meeting of Experts to Examine Instruments, Knowledge, Advocacy, Technical Cooperation and International Collaboration as Tools with a view to Developing a Policy Framework for Hazardous Substances in order to promote the SAICM among ILO constituents and others. The Meeting of Experts adopted recommendations which included a plan of action based on the following fundamental pillars: information and knowledge; preventative and protective systems aimed at reducing risks; capacity building; social dialogue; and good governance. The plan of action requests ILO member States to implement a number of ILO OSH standards, such as Convention No. 155; the Protocol of 2002 to Convention No. 155; Convention No. 170;⁸ Convention No. 174; Convention No. 187; and the ILO *Guidelines on occupational safety and health management systems*, (ILO-OSH 2001); and to undertake joint action in partnership with workers, employers and governments, based on the principles of the Global Strategy on Occupational Safety and Health, adopted by the International Labour Conference at its 91st Session in 2003.⁹

⁷ International Council of Chemical Associations (ICCA): *Responsible Care*, <http://www.icca-chem.org/en/Home/Responsible-care/> [accessed 30 July 2013].

⁸ On 23 November 2012, the European Commission adopted a proposal for a Council Decision authorising Member States to ratify, in the interests of the European Union, the Chemicals Convention, 1990 (No. 170), <http://uk.practicallaw.com/6-522-6388?source=relatedcontent> [accessed 30 July 2013].

⁹ ILO: *Meeting of Experts to Examine Instruments, Knowledge, Advocacy, Technical Cooperation and International Collaboration as Tools with a view to Developing a Policy*

4.2. Responsible Care (RC) initiatives

44. The chemical industry's voluntary initiatives contribute to creating a consistent and coherent sound management of chemicals globally. RC is the chemical industry's unique global initiative that drives continuous improvement in health, safety and environmental performance, together with open and transparent communication with stakeholders.¹⁰
45. The International Council of Chemical Associations (ICCA) is the key forum for promoting RC, taking a lead role through the participation of nearly 60 national chemical manufacturing associations, which are the key implementing actors at national level. RC has fostered the development of the Global Product Strategy, which seeks to improve the industry's management of chemicals, including the communication of chemical risks throughout the supply chain. Through RC, the chemical industry is reporting and tracking its progress on critical elements of product stewardship.¹¹
46. Tools to achieve a degree of consistency include the development of indicators for performance measurement, policies for the encouragement of member firms to participate in RC, and the provision of forums in which company management and RC coordinators can share views and exchange experiences. In addition, procedures to verify implementation of the measureable elements of RC in member companies have to make sure that all companies which sign up to RC commit to its guiding principles. These principles encompass observance of legal requirements; the presence of policies to avoid an unacceptable level of risk to employees, contractors, customers, the public or the environment; the integration of RC principles into business strategies; the provision of health, safety and environmental information to stakeholders; and the presence of training and emergency response systems pertaining to health, safety and environmental risks; as well as a commitment to continuous improvement of performance and interaction with the communities in which chemical facilities are located.
47. There are, however, some areas for improvement with respect to RC.
48. First, the initiative is not universally applied. National associations have interpreted the guiding principles rather differently from each other. As a result, there are variations in the range of substances and issues on which performance data are collected.
49. Second, there is the way in which performance data are published. The most common situation found around the globe is one where performance data for individual firms are not made available to other industry members, but only to representatives of the respective trade associations in charge of compiling the reports.¹²

Framework for Hazardous Substances, Final report (Geneva, 2008), http://www.ilo.org/sector/activities/sectoral-meetings/WCMS_161949/lang--en/index.htm [accessed 30 July 2013].

¹⁰ ICCA: *ICCA and sustainability: The global chemical industry's contributions to sustainable development and the green economy* (Brussels, 2012).

¹¹ ICCA: *Responsible Care*, <http://www.icca-chem.org/en/Home/Responsible-care/> [accessed 30 July 2013].

¹² T. Conzelmann: "A procedural approach to the design of voluntary clubs: Negotiating the Responsible Care Global Charter", in *Socio-Economic Review* (Vol. 10, Issue 1), (Oxford, Oxford University Press, 2012), pp. 193–214.

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50. Third, even at national level, approaches on RC are not necessarily harmonized. The case of the United States elaborates this point. The American Chemistry Council (ACC) carried out a strategic review of RC, in part because of the ACC's third-party verification requirement, which is a condition of membership. Third-party verification is also used under RC in other countries. One of the voluntary initiatives of Brazil's chemical industry, the *sistema de avaliação de saúde, segurança, meio ambiente e qualidade* (SASSMAQ) (health, safety, environment and quality assessment system), aims to reduce the risk of accidents in chemicals transport and distribution, and offers accredited independent certification of the performance of the Brazilian Chemical Industry Association (ABIQUIM).¹³
51. An ACC external advisory panel for RC issued recommendations focused on improvement and expansion in four key areas: product safety, performance improvement, communications and governance, and globalization. The ACC has formed task forces of member company executives to focus on these segments. One of the advisory panel's recommendations on performance is to align the programme's metrics with international methods such as the Global Reporting Initiative, and that the ACC's RC metrics should be aligned with internationally accepted practices. Since European firms support RC14001 (which is based on the International Organization for Standardization (ISO) ISO14001 for environmental management systems and has been expanded to address RC principles), the ACC advisory panel also recommends that the ACC combine the two certification programmes – the Responsible Care Management System (RCMS) and the RC14001 – because it would make it more understandable globally. The ACC's member chemical companies are split about 50–50 between RCMS and RC14001, and it is clear that companies with no operations in Europe favour RCMS over RC14001.¹⁴

4.3. Protection from hazardous chemicals

4.3.1. OSH challenges

52. In 2008, some 651,279 deaths were caused by exposure to dangerous substances, including workplace chemicals.¹⁵ In 2006, it was estimated that nearly 440,000 people throughout the world died as a result of occupational exposure to hazardous chemicals. Cancer is considered to be the most serious occupational disease: over 70 per cent of the total figure, or nearly 315,000 people, died of cancer (table 4). The figure is thought to be an underestimate of the real burden attributable to chemicals, as only a small number of chemicals were included in the analysis owing to limited data availability.

¹³ ABIQUIM: SASSMAQ, <http://canais.abiquim.org.br/sassmaq/> (in Portuguese) [accessed 30 July 2013].

¹⁴ K. Sissell: "Responsible Care", in *Chemical Week* (Vol. 173, Issue 17, 4–11 July 2011), (Englewood, Colorado), pp. 19–23.

¹⁵ J.S. Takala et al.: "Roles of occupational safety and health organisations in global and regional prevention strategies", ICOH Special Issue 2009, in *Occupational Health Southern Africa* (Durban, Technique (Pty) Ltd), p. 18, www.occhealth.co.za [accessed 30 July 2013]. See also ILO: *The prevention of occupational diseases: 2 million workers killed every year: World Day for safety and health at work 28 April 2013* (Geneva, 2013).

Table 4. Estimated annual average number of deaths attributable to occupational exposure to hazardous chemicals by condition worldwide in 2006

Causes of death	Number of deaths		Estimated percentages attributed to hazardous substances (%)		Number of deaths attributed to hazardous substances
	Men	Women	Men	Women	
<i>Cancer</i>					
Lung cancer and mesothelioma	996 000	333 000	15	5	166 050
Liver cancer	509 000	188 000	4	1	22 240
Bladder cancer	128 000	42 000	10	5	14 900
Leukaemia	117 000	98 000	10	5	16 600
Prostate cancer	253 000	–	1	–	2 530
Cancer of the mouth	250 000	127 000	1	0.5	3 135
Cancer of the oesophagus	336 000	157 000	1	0.5	3 517
Stomach cancer	649 000	360 000	1	0.5	8 290
Colorectal cancer	308 000	282 000	1	0.5	4 490
Skin cancer	30 000	28 000	10	2	3 560
Pancreatic cancer	129 000	99 000	1	0.5	1 785
Other and unspecified cancers	819 000	1 350 000	6.8	1.2	71 892
Total					314 939
Cardiovascular diseases, 15– 60 years	3 074 000		1	1	30 740
Nervous system disorders, 15+ years	658 000		1	1	6 580
Renal disorders, 15+ years	710 000		1	1	7 100
Chronic respiratory diseases, 15+ years	3 550 000		1	1	35 500
Pneumoconioses estimate	36 000		100	100	36 000
Asthma, 15+ years	179 000		2	2	3 580
Total					434 439

Source: P. Baichoo, B. Dardelin and J. Krueger: "ILO activities in the area of chemical safety", in *African Newsletter on Occupational Health and Safety* (Vol. 16, No. 3, Dec. 2006), (Helsinki, Finnish Institute of Occupational Health), pp. 52–55.

53. No chemical substance can cause adverse effects without first entering the body or coming into contact with it. There are four main routes of exposure for chemical substances to enter the human body: inhalation, absorption, ingestion, and transfer across the placenta of a pregnant woman to the unborn baby. Most chemicals used at the place of work may be dispersed into the air to form dust, mist, fumes, gas or vapour and can then be inhaled. In this way, workers who do not handle them but stay within their reach can be exposed to a mixture of chemicals from various sources. Handling chemical substances without proper protection exposes the worker to the risk of absorbing harmful amounts of a chemical through the skin. This usually happens when handling the chemical in liquid form. Dust may also be absorbed through the skin if it is dampened by, for instance, sweat. The capacity of different chemical substances to penetrate the skin varies considerably. Skin absorption is, after inhalation, the second most common route through which occupational exposure may take place. The protective external layer of skin may be softened by toluene, dilute washing soda solution, thus permitting other chemicals to enter readily into the bloodstream, such as aniline, phenol, benzene. Eyes may also absorb chemical substances, either from splashes or from vapours. Dangerous chemicals can enter the body through

ingestion as gases, dusts, vapours, fumes, liquids or solids. Inhaled dust may be swallowed, and food or cigarettes may be contaminated by dirty hands.

4.3.2. Addressing the risks caused by hazardous chemicals at enterprise level

54. An essential purpose of OSH is the management of occupational risks. In order to do that, hazard and risk assessments have to be carried out to identify what could cause harm to workers and property, so that appropriate preventive and protective measures can be developed and implemented. The five-step risk assessment method of the Health and Safety Executive (HSE) of the Government of the United Kingdom is shown in figure 1.

Figure 1. Five-step risk assessment



Source: HSE, Government of the United Kingdom: *Five steps to risk assessment*, Leaflet INDG163(Rev.3), revised June 2011, <http://www.hse.gov.uk/pubns/indg163.pdf> [accessed 30 July 2013].

55. A risk assessment procedure can be tailored to the size and activity of the enterprise, as well as to available resources and skills. Installations, such as a chemical plant, will require specific risk assessment evaluations and mobilize a high level of resources and skills. Two risk assessment processes that are essential for the management of occupational risks are the determination of occupational exposure limits (OELs) and the establishment of lists of occupational diseases. Most of the industrialized countries establish and maintain OEL lists. These limits cover chemical, physical (heat, noise, ionizing and non-ionizing radiation, cold) and biological hazards. One list that is outstanding in terms of coverage and strong scientific peer-review process, and therefore used as a reference by other countries, is the list of threshold limit values (TLVs) of the American Conference of Governmental Industrial Hygienists (ACGIH).¹⁶ A recent case in the United States dealt with the health risks of n-propyl bromide (nPB) on cushion workers in a company in North Carolina. The compound nPB is used for glues. It is also used by many workers in auto

¹⁶ ILO: *Background information for developing an ILO policy framework for hazardous substances* (Geneva, 2007).

body shops, dry cleaners and high-tech electronics manufacturing plants. Uses for nPB have increased as a substitute for methylene chloride, although nPB is known to be just as hazardous as methylene chloride. It can cause neurological damage and infertility when inhaled at low levels over long periods. Substitutes for nPB are available, but they are more expensive than nPB. In the North Carolina case, multiple factors contributed to causing serious health damage to cushion workers from nPB. The company failed to take adequate health protection measures, such as ensuring appropriate ventilation in the workplace; and, because there were no official safety standards for nPB, the safety authority could not force the company to comply by levying fines or mandating safety schemes such as respirators. This case illustrates the importance of setting appropriate exposure limits to hazardous chemicals with a proper enforcement mechanism.¹⁷

- 56.** In addition, technical measures can be used to prevent chemical hazards at source, and to prevent the transfer of dangerous chemicals. It is possible to reduce the exposure of workers by technical means. First, an effective control method for any hazardous chemical is substitution: the hazardous chemical is replaced with a less hazardous one. This is especially important when the chemicals in question can cause cancer, damage to reproductive functions or create allergic reactions. Choosing a safer process or changing an old and hazardous process to a less dangerous one effectively reduces the risks. Second, if hazardous chemicals cannot be replaced by less dangerous ones, exposure must be prevented by protecting the worker: enclosing the hazardous process or chemical is an effective method. However, it is not always possible to enclose all dangerous operations. Properly designed local exhaust ventilation is the second choice when it comes to removing contaminants at source. Where it is difficult or impossible to prevent hazardous chemicals, fumes, dusts, mists or particles from entering the workplace air at source, a general dilution ventilation can be installed.
- 57.** A safety committee should be formed with the task of working regularly with safety issues. It could work with organizational measures; by assessing chemical hazards and set priorities concerning safety in the organization; create emergency plans for the assessed hazards; organize occupational health care and regular surveys; organize contacts with authorities/laboratories to create a monitoring system for chemical hazards and to measure and/or estimate occupational exposure to chemicals when needed; collect case studies of accidents and sickness records in the enterprise to create a basis for priority measures in the control of hazards; identify chemicals in use; obtain information on these chemicals; collect data and make an inventory of all chemicals used in the workplace; and involve workers in safety organization, such as safety representatives and safety committees.
- 58.** The management systems approach is critical in improving. ILO–OSH 2001 reflects the ILO tripartite approach and the principles defined in its international OSH instruments, particularly the Occupational Safety and Health Convention, 1981 (No. 155). ILO–OSH 2001 highlights worker participation as an essential element of the OSH management system in the organization, and it requests that employers ensure that workers and their safety and health representatives are consulted, informed and trained on all aspects of OSH, including emergency arrangements, associated with their work”.¹⁸

¹⁷ I. Urbina: “As OSHA emphasizes safety, long-term health risks fester”, in *The New York Times* (New York, NY), 31 March 2013.

¹⁸ ILO: *ILO Guidelines on occupational safety and health management systems: ILO-OSH 2001* (Geneva, 2001), section 3.2.

4.3.3. Addressing the risks caused by hazardous chemicals at international level

59. Regulations have been introduced on the management of chemical substances which should contribute to improving workers' occupational health and safety by providing better information, establishing and improving channels of communication between employers and suppliers, and removing substances that pose a high risk to human health and the environment from the market. One such example is the European Union's REACH, which entered into force in 2007, with the aim of ensuring a high level of protection of human health and the environment from the risks that can be posed by chemicals.
60. REACH makes industry responsible for assessing and managing the risks posed by chemicals and for providing appropriate safety information to their users. Before 31 May 2013, manufacturers and importers of substances had a general obligation to submit a registration to the European Chemicals Agency (ECHA) for each substance manufactured or imported in quantities of 1,000 tonnes or more per year per company. On 31 May 2013, a new phase for chemicals of lower tonnages, such as products manufactured or sold in the European Union in quantities of 100 tonnes or more per year, entered into effect. In addition, implementation of the GHS in European Union Member States is now mandatory with the Regulation on classification, labelling and packaging of substances and mixtures (CLP) coming into force under REACH.¹⁹
61. A number of chemical substances for which sufficient hazard and exposure data are available is of great concern. The ILO *List of occupational diseases (revised 2010)*²⁰ is used by ILO member States as guidance for establishing and maintaining their national lists of occupational diseases. Many ILO member States have established a list of OELs that regulate chemical substance concentration levels to which workers may be exposed via inhalation, ingestion or skin contact for specified time periods without being at risk. These limits can be binding or indicative. The introduction of REACH does not change employers' obligations to protect workers from chemical exposure. REACH requires chemical manufacturers and sellers to develop health-based derived no-effect levels (DNELs). These are used to establish risk management measures that must be communicated to employers and workers. The DNELs apply to all routes of exposure (inhalation, dermal, oral) and to both workers and consumers. European Union employers still have to comply with the OELs under the pre-existing Directive 98/24/EC – Risks related to chemical agents at work (7 April 1998).²¹
62. These and other regulations concerning the management of chemicals should improve good practice on the part of chemical users and workers, as well as encourage implementation of current guidance in order to minimize exposure. To this end, they must be adequately informed by the chemical manufacturers and sellers across the whole supply chain about the chemicals and risk management measures that they use. The Chemicals Convention, 1990 (No. 170), emphasizes that information should flow from manufacturers to users, and such information must be exchanged among all constituents of the ILO.

¹⁹ European Commission: *CLP/GHS – Classification, labelling and packaging of substances and mixtures*, <http://ec.europa.eu/enterprise/sectors/chemicals/classification/> [accessed 30 July 2013].

²⁰ ILO: *List of occupational diseases (revised 2010)*, http://www.ilo.org/safework/info/publications/WCMS_125137/lang--en/index.htm [accessed 30 July 2013].

²¹ European Agency for Safety and Health at Work: *Directive 98/24/EC – Risks related to chemical agents at work (7 April 1998)*, <https://osha.europa.eu/en/legislation/directives/exposure-to-chemical-agents-and-chemical-safety/osh-directives/75> [accessed 30 July 2013].

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- 63.** Several countries have enacted environmental protection and chemicals regulations. In China, as from 1 March 2013, companies are required to report data on the environmental impact of chemicals to the Ministry of Environmental Protection.²² Progress is being made to develop better information on the effects of chemicals, for example through data submission under the European Union’s REACH, and through national chemical regulations, such as China’s new chemical laws, the United States’ Toxic Substances Control Act, Canada’s Chemicals Management Plan, and Japan’s Chemical Substances Control Law, however the data remain limited to individual chemicals. New materials, such as nanomaterials, pose additional challenges. The growing list of nanomaterial applications includes cosmetics, food packaging, clothing, disinfectants, surface coatings and paints. It is estimated that 400,000 workers were employed in nanotechnology industries worldwide in 2010, and this number is expected to rise to 6 million by 2020.²³ Global chemicals outlook: *Towards sound management of chemicals*, published by the UNEP, states that, of the estimated over 140,000 chemicals on the market today, only a fraction have been thoroughly evaluated to determine their effects on human health and the environment.²⁴ The OECD estimates that sharing chemicals assessment information would enable governments and the chemical industry to save about \$210 million per year. Such information sharing would be particularly useful in evaluating the safety of high-production-volume chemicals, most of which are produced and marketed in multiple countries.²⁵
- 64.** The GHS and the Chemicals Convention, 1990 (No. 170), are important tools that countries can draw upon to develop national chemical hazard communication systems: they provide a basis for establishing comprehensive chemical safety programmes; they represent a key step in harmonizing national chemical hazard communication systems worldwide; and they have great potential to improve chemical safety across all relevant sectors.
- 65.** The GHS is a consistent and coherent approach to identifying chemical hazards and providing information on those hazards and associated protective measures to users or those who may be exposed. The system is structured so that appropriate elements for classification and communication, which consider the target population, can be selected. The GHS:
- enhances the protection of people and the environment by providing an internationally comprehensible system for chemical hazard communication;
 - provides a recognized framework for those countries without an existing system;
 - reduces the need for duplicative testing and evaluation of chemicals;
 - facilitates international trade in chemicals whose hazards have been properly assessed and identified on an international basis.

²² W. Beacham: “GlobalChem 2013: Chemical regulation goes global”, in *ICIS Chemical Business* (Sutton, Surrey), 22 February–March. 2013, pp. 11–12.

²³ V. Murashov: “WHO guidelines on nano-materials and workers’ health”, in *African Newsletter on Occupational Health and Safety* (Vol. 22, No. 3, Dec. 2012), (Helsinki, Finnish Institute of Occupational Health), pp. 64–65.

²⁴ UNEP: *Global chemicals outlook: Towards sound management of chemicals* (Nairobi, 2013).

²⁵ A. Jagger: “New era in chemical management”, in *ICIS Chemical Business* (Sutton, Surrey), 6–12 December 2010, pp. 21 and 22.

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- 66.** The ILO participates in the United Nations Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals (UNCETDG/GHS). The ILO and the United Nations Institute for Training and Research (UNITAR), through the UNITAR–ILO Global GHS Capacity Building Programme, are the focal points for capacity building. The goals of the programme are, among others, to strengthen capacities in developing countries and countries with economies in transition towards effective implementation of the GHS, and to decrease the negative effects of the use of hazardous chemicals on the environment and human health.²⁶
- 67.** Major chemical-producing countries in Asia, including Indonesia, Malaysia and Viet Nam, are considering introducing requirements for the submission of safety data sheets and product labels, to implement the GHS. In the Republic of Korea, the legislation governing chemicals registration and evaluation includes the requirement for existing chemicals manufactured or imported in quantities over one tonne to be notified. Priority evaluation chemicals and new chemicals will have to be registered over an eight-year period from 2015. India is creating an inventory of several thousand chemicals that are exported.²⁷
- 68.** This chapter shows that collaboration and coordination need to be fostered among voluntary initiatives and MEAs, with a particular emphasis on promoting the ratification and implementation of the ILO’s OSH-related instruments and the implementation of the GHS.

²⁶ UNITAR: *The GHS and the Global Partnership: A success story from Rio to Rio: Achievements, lessons learned and future directions* (Geneva, 2012).

²⁷ W. Beacham: “GlobalChem 2013: Chemical regulation goes global”, in *ICIS Chemical Business* (Sutton, Surrey), 22 February–3 March 2013, pp. 11 and 12.

5. Industrial relations

69. This chapter discusses the relationships between employers and workers and their organizations in the chemical industry. One clear impact of the global economic crisis on industrial relations in the chemical industry has been the swift and realistic approach taken by the social partners to cope with the immediate challenges, as well as pre-emptive action to address future challenges, using social dialogue mechanisms at both national and international levels. Cases demonstrate that the chemical industry's industrial relations practices can lead to amicable solutions to many difficult challenges.

5.1. The role of sectoral collective bargaining

70. The role of sectoral collective bargaining has been receiving more attention in the chemical industry in response to the greater diversity of individual company circumstances. The German chemical industry has demonstrated that it is possible to maintain the system of firmly established sectoral collective labour agreements while at the same time meeting the demands of companies for increased flexibility; for example, in the collective bargaining between the German Federation of Chemical Employers' Associations (BAVC) and the German Chemicals Industry Trade Union (IG BCE). Four major "opening clauses" were introduced into the German chemicals industry agreements. In 1994, there was the introduction of a working-time corridor, which allowed companies either to extend or to shorten the collectively agreed working time of 37.5 hours per week by up to 2.5 hours. In 1995, the parties concerned agreed on the introduction of an opening clause for the agreed annual bonuses. In 1997, a wage corridor was introduced which, under certain circumstances, allowed companies to reduce collectively agreed pay by up to 10 per cent for a limited period of time. In 2011, the parties concerned concluded a new agreement that included, among other things, a clause to allow company-level agreements either to bring forward pay increases by one month or to postpone them for up to two months.¹

5.2. Coping with an ageing workforce

71. Population ageing is one of the most significant features of global demography, with every country projected to experience an increase in the share of people aged 60 and over in the coming decades. It is projected that by 2050 there will be 2 billion people aged 60 or over, compared with 680 million today. When the young population share is stagnant and the elderly population share rises, the relative size of the working-age segment of the population (ages 15–64) declines. The ratio of the working-age population to the non-working-age population has been falling in Japan and Europe and is beginning to fall in the United States. This ratio is about to reach a peak in China, but it will soon be falling both there and in the Russian Federation. Brazil is not far behind, with the ratio there projected to peak around 2020.²

¹ R. Bispinck and T. Schulten: *Sector-level bargaining and possibilities for deviations at company level: Germany* (Dublin, European Foundation for the Improvement of Living and Working Conditions (Eurofound), 2011).

² D.E. Bloom and A. Sousa-Poza: "Aging and productivity: Introduction", in *Labour Economics* (Vol. 22, 2013), (Amsterdam, Elsevier), pp. 1–4.

72. In 2008, the social partners in the German chemical industry signed a collective agreement to assist a smooth transition from work to retirement and to retain older workers in the workforce. The agreement allows the employer and the works council to conclude a works agreement which may stipulate the use of long-term working time accounts and progressive retirement, as well as partial retirement plans.³ The chemical industry needs to take further action to cope with an ageing workforce.

5.3. Outsourcing and collective bargaining

73. A wide range of occupations are now outsourced in the chemical industry. In Brazil, in 2009, nearly half the workers in the industry (48 per cent) were contract workers.⁴ In March 2013, the Unilever South Africa workers' trade union waged a solidarity work stoppage in support of Unilever workers in the Netherlands. In 2012, Unilever signed a deal with Sodexo over the outsourcing of the company's facility management services in Europe.⁵

74. IndustriALL argues that contract work issues can be resolved through bipartite social dialogue. According to a seminar held in November 2010 in India by the International Federation of Chemical, Energy, Mine and General Workers' Unions (ICEM), which is now part of IndustriALL, all the average salaries quoted by outsourced workers in India from BASF, GAG, Goodyear, Holcim, Lafarge, Rhodia, and other chemical firms, were lower than that considered to be sufficient to maintain a family. Around 25–60 per cent of all workers were reported to be outsourced. For these workers, the average wage was 4,000–6,000 Indian rupees (INR) (about \$75–120), while the suggested living wage was INR15,000 (about \$280).

75. Various cases suggest that collective bargaining is an effective means of redressing the challenges of outsourcing. In 2010, an agreement was reached at the Labour Secretariat of São Paulo between BASF and the chemical workers of Guaratinguetá. The agreement aims to regulate the use of contract workers and requires the company to pay the same salary and benefits to contract workers as it does to permanent, directly employed workers. Failure to implement the agreement will result in a fine of 500 Brazilian reals (about \$250) per worker, per day.⁶

³ O. Stettes: "Social partners sign new package of agreements for chemicals industry", in *European Industrial Relations Observatory On-line (EIROOnline)*, 3 June 2008. See also: S. Vogel, "Chemicals agreement aims to motivate older workers", in *EIROOnline*, 10 February 2012.

⁴ International Federation of Chemical, Energy, Mine and General Workers' Unions (ICEM): *Contract and agency labour campaign* (Geneva, 2011).

⁵ IndustriALL Global Union: "South African Unilever workers' solidarity for Dutch colleagues", Press release, 21 Mar. 2013.

⁶ ICEM: *Contract and agency labour campaign* (Geneva, 2011).

5.4. Global social dialogue and global framework agreements

76. Global social dialogue has been increasing in significance for promoting good industrial relations in the chemical industry. The conclusions on the Tripartite Meeting on Promoting Social Dialogue on Restructuring and its Effects on Employment in the Chemical and Pharmaceutical Industries (Geneva, 24–27 October 2011) state:

The Meeting noted and welcomed a bilateral agreement entitled “Starting Global Social Dialogue in the Chemical Industry (Geneva Declaration)”, adopted in Geneva on 26 May 2011 between the International Chemical Employers’ Labour Relations Committee (LRC) and the International Federation of Chemical, Energy, Mine and General Workers’ Unions (ICEM) [now part of IndustriALL]. The Geneva Declaration is not binding on Governments.⁷

77. As part of this move towards global social dialogue in the industry, global framework agreements (GFAs) have been put in place to create a synergy in industrial relations within companies operating in multiple countries. GFAs are an evolving feature of social dialogue in multinational companies; across the globe they are providing innovative and socially agreed solutions to challenges through focusing on the ILO Conventions and Recommendations. GFAs are negotiated on a global level between trade unions and a multinational company, and have established monitoring mechanisms between the multinationals and IndustriALL. IndustriALL has 43 GFAs at the following multinational companies: Aker, AngloGold, BMW, Bosch, Brunel, Daimler, EADS, EDF, Electrolux, Endesa, Eni, Enel, Evonik, Ford, Freudenberg, GDF Suez, GEA, Indesit, Inditex, Lafarge, Leoni, Lukoil, MAN, Mann+Hummel, Mizuno, Norsk Hydro, Norske Skog, Petrobras, Prym, PSA Peugeot Citroën, Renault, Rheinmetall, Rhodia, Röchling, Saab, SCA, Siemens, SKF, Statoil, Umicore, Vallourec, Volkswagen, and ZF.⁸

78. Among other benefits, GFAs can:

- have a positive impact on understanding and facing challenges, for example, as regards the need for and design of measures to anticipate and manage change;
- promote new ways of thinking in both management and employees, notably a forward-looking approach to change and the safeguarding of equal opportunities;
- constitute a driving force for further action on social issues and introduce relevant managerial principles throughout the group;
- give substance to the role of the representative bodies in the parent company and link them more strongly to developments at national and/or local levels;
- improve mutual understanding and confidence between management and workers’ representatives at both transnational and lower levels.⁹

⁷ ILO: *Tripartite Meeting on Promoting Social Dialogue on Restructuring and its Effects on Employment in the Chemical and Pharmaceutical Industries* (Geneva, 24–27 October 2011), Note on the proceedings (Geneva, 2012), http://www.ilo.org/sector/activities/sectoral-meetings/WCMS_175205/lang--en/index.htm [accessed 30 July 2013].

⁸ IndustriALL Global Union: *Global framework agreements*, <http://www.industriall-union.org/issues/confronting-global-capital/global-framework-agreements> [accessed 30 July 2013].

⁹ European Commission: *Transnational company agreements: Realising the potential of social dialogue*, commission staff working document, SWD(2012), 264 final (Brussels, 2012).

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79. GFAs can play an important role, particularly if strategy focuses on enterprises that already enjoy a fair record of industrial relations in their home country, if enterprises are engaged in the process of business expansion, and if managers are convinced of their value as a tool for risk management.¹⁰

5.5. Voluntary initiatives

80. The flexibility offered by voluntary initiatives can serve to increase compliance in the supply chain. Voluntary initiatives in the chemical industry can promote consistency of behaviour and policies throughout an organization operating across borders, while giving chemical firms the freedom to remain in harmony with local cultures and traditions. Flexibility is a mixed benefit to SMEs. On the one hand, SMEs may lack sufficient resources to develop the programmes in compliance with complex regulations; on the other, to help SMEs implement more voluntary initiatives, such initiatives must demonstrate a business case as an investment that can pay off. Support for voluntary initiatives in SMEs would seek to build on and respond to value-based motivation; but the initiatives must resolve real problems between employees and employers. Therefore, they need to be kept practical and results-oriented.¹¹ Voluntary initiatives also need to be understood and contextualized in different national and regional situations.¹² Box 1 presents the ILO definition of corporate social responsibility.

Box 1
Corporate social responsibility (CSR) at the ILO

CSR is a way in which enterprises give consideration to the impact of their operations on society and affirm their principles and values both in their own internal methods and processes and in their interaction with other actors. CSR is a voluntary, enterprise-driven initiative and refers to activities that are considered to exceed compliance with the law.

There is considerable debate on CSR and on the role of enterprises in society. Some are concerned that the expectations of enterprise CSR initiatives extend well beyond what might be considered as the legitimate role of an enterprise in society: CSR cannot substitute for the role of government. While others might agree with the primacy given to the law and its implementation, they note that CSR should not be confused with what society considers as the social responsibilities of enterprises: CSR is a voluntary concept involving responsibilities unilaterally identified by enterprise management.

Source: ILO: *InFocus initiative on corporate social responsibility (CSR)*, Governing Body document, 295th Session, Geneva, Mar. 2006, GB.295/MNE/2/1, p.1.

81. There are, however, some issues with voluntary initiatives. Among others, they often lack mechanisms for monitoring, verification and compliance measures.¹³ Voluntary initiatives can nevertheless make valuable contributions to promoting the ILO Declaration on Fundamental Principles and Rights at Work and its Follow-up (1998). When combined

¹⁰ K. Papadakis (ed.): *Shaping global industrial relations: The impact of international framework agreements* (Geneva, ILO, 2011).

¹¹ European Commission: *Opportunity and responsibility: How to help more small businesses to integrate social and environmental issues into what they do* (Brussels, 2007).

¹² L. Preuss, A. Haunschild and D. Matten: "The rise of CSR: Implications for HRM and employee representation", in *The International Journal of Human Resource Management* (Vol. 20, No. 4, Apr. 2009), (Oxford, Taylor & Francis), pp. 953–973.

¹³ N. Acutt: *Perspectives on corporate responsibility: The South African experience with voluntary initiatives*, Centre for Social and Economic Research on the Global Environment (CSERGE), Working Paper ECM 03-05 (Norwich, University of East Anglia, 2003).

with two conditions, they can create a stable foundation for promoting the Declaration: first, the principles of fundamental rights at work should be in place, supported by enforcement by government authorities such as labour inspectorates; and second, there must be sound and independent workers' and employers' organizations which can voluntarily exercise social dialogue. Voluntary initiatives should be seen not as an alternative but as a supplement to the promotion of the principles of fundamental rights at work through collective bargaining.¹⁴

- 82.** In conclusion, social dialogue can serve as an effective tool to overcome the negative economic, social and political consequences of the continuing global financial crisis and to enhance trust among tripartite constituents to cope with existing and emerging challenges in the chemical industry. As stipulated in the Global Jobs Pact, “especially in times of heightened social tension, strengthened respect for, and use of, mechanisms of social dialogue, including collective bargaining, where appropriate at all levels, is vital”.¹⁵ An equitable balance must be in place between voluntary initiatives and global and national laws and regulations. Governments, employers' and workers' organizations all have a pivotal role to play.

¹⁴ L.A. Compa: “Corporate social responsibility and workers' rights”, in *Comparative Labor Law and Policy Journal* (Vol. 30, Issue 1, 2008), (Chicago, IL, University of Illinois), pp. 1–10.

¹⁵ ILO: *Recovering from the crisis: A Global Jobs Pact*, adopted by the International Labour Conference at its 98th Session, Geneva, 19 June 2009, para. 15, http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_115076.pdf [accessed 30 July 2013].