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UNITED NATIONS ENVIRONMENT PROGRAMME

CHEMICAL ACCIDENT PREVENTION AND PREPAREDNESS

Case studies of implementation

IOMC

INTER-ORGANIZATION PROGRAMME FOR THE SOUND MANAGEMENT OF CHEMICALS

A cooperative agreement among FAO, ILO, UNDP, UNEP, UNIDO, UNITAR, WHO, World Bank and OECD

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The Inter-Organization Programme for the Sound Management of Chemicals (IOMC) was established in 1995 following recommendations made by the 1992 UN Conference on Environment and Development to strengthen cooperation and increase international coordination in the field of chemical safety. The Participating Organizations are FAO, ILO, UNDP, UNEP, UNIDO, UNITAR, WHO, World Bank and OECD. The purpose of the IOMC is to promote coordination of the policies and activities pursued by the Participating Organizations, jointly or separately, to achieve the sound management of chemicals in relation to human health and the environment.

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CHEMICAL ACCIDENT PREVENTION AND PREPAREDNESS

CASE STUDIES OF IMPLEMENTATION

UNITED NATIONS ENVIRONMENT PROGRAMME
DIVISION OF TECHNOLOGY, INDUSTRY AND ECONOMICS

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Foreword

Explosions, fires, and toxic spillages when they occur around the world, present a cost to the environment, economy and society. In the past five years, explosions alone had an estimated cost of more than US$ 20 billion. While many countries have put in place mechanisms to prevent, prepare and respond to such accidents, there are still many developing countries and countries with economies in transition that do not have sufficient provisions in place. This publication, *Chemical Accident Prevention and Preparedness – Case studies of implementation*, represents an important milestone in demonstrating the results and experience developed in the implementation of UNEP's Flexible Framework Initiative for Chemical Accident Prevention and Preparedness (CAPP), which aims at assisting governments in proactively managing their chemical accident risks.

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When UNEP decided to launch the Flexible Framework Initiative in 2007, it did so to respond to an identified need of a globally persistent and growing risk of chemical accidents. The *Flexible Framework for Addressing Chemical Accident Prevention and Preparedness: a Guidance Document*, which UNEP and technical partners developed in 2010, has been the basis for this work in supporting capacity building efforts in developing countries. The first countries to test this guidance included three African countries, Mali, Senegal and Tanzania, and three Asian countries, Cambodia, Sri Lanka and the Philippines. The capacity building activities have been to a large extent financed by the Quick Start Programme (QSP) of the Strategic Approach to International Chemicals Management (SAICM) which recognises the essential need to better prepare for chemical emergencies. Additional contributions from governments, most notably, from France, Switzerland, the United States, and Norway, as well as the commitment of independent experts made the delivery of high-quality technical support activities possible. This publication consolidates the first results of the Initiative.

The experience shows that while situations in each of these countries differ, there is an alignment in the gaps and needs for UNEP support. The countries have stressed the need of an effective information management system on chemicals and hazardous installations, enhancing capacities for risk assessment and for hazardous installations inspections and sharing of experience on effective enforcement mechanisms relating to existing regulations. The fact that the projects were implemented in differing economic, social and political contexts has allowed UNEP to gain understanding of the adaptability of the approach, as well as to confirm its robustness.

Increase in population and improved living conditions result in an exponential growth in demand for industrially processed products and an increased pressure on industry for supply. In this context the risk of accidents is high. Prevention and preparedness for chemicals accidents should remain a priority for national and local public authorities as well as industry leaders. We hope that this publication will offer inspiration and induce them to take adequate actions for prevention and preparedness. UNEP will be pleased to join efforts with those countries that commit to advance in the promotion of a CAPP culture, by supporting them in raising awareness, strengthening capacity and accompanying in their journey towards enhanced safety and security.

Arab Hoballah
Chief, Sustainable Lifestyles,
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Executive Summary

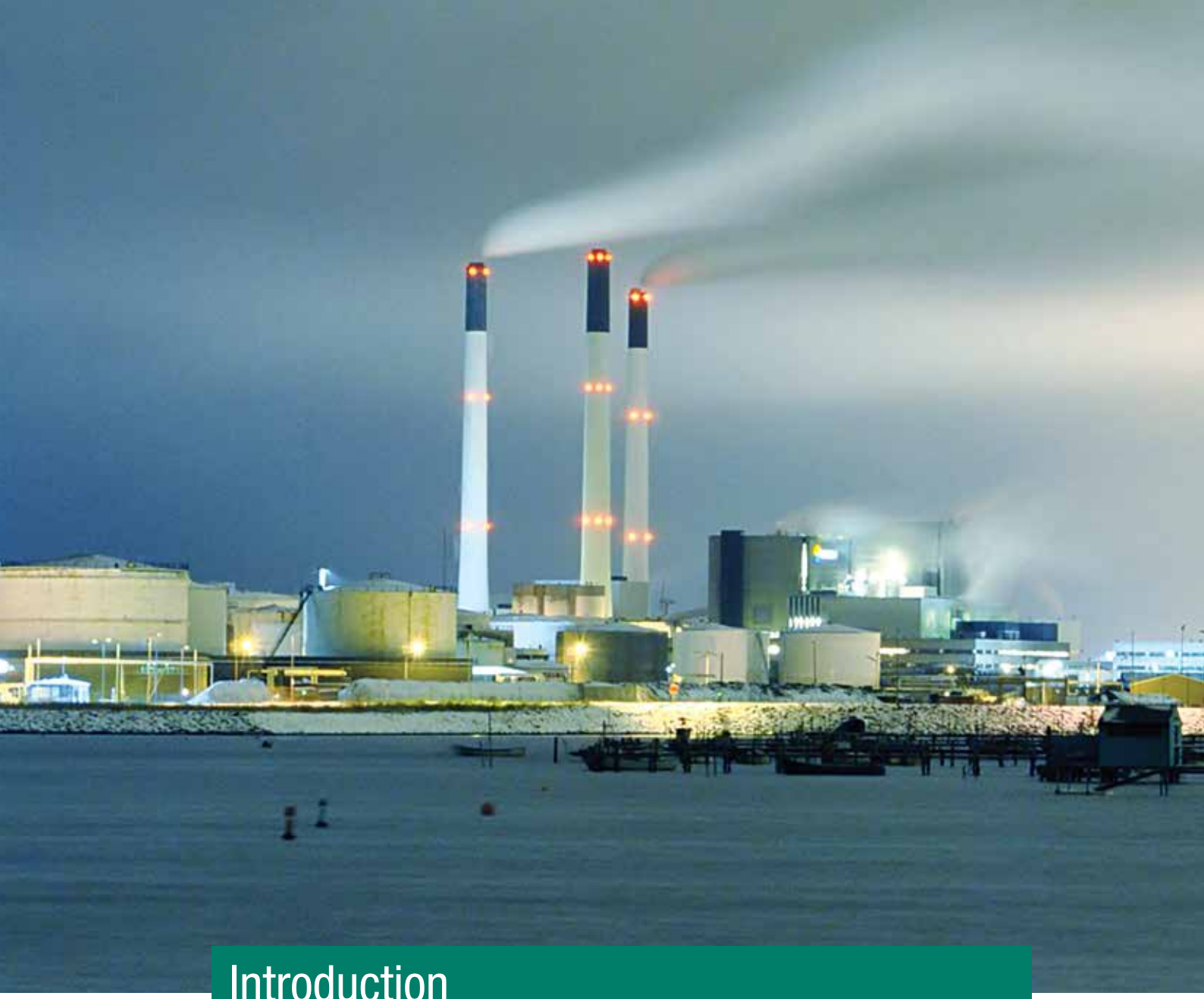
In an increasingly industrialized world, it is becoming critical for every country to integrate programmes to address chemical accidents as part of their overall measures on chemical safety in their development agendas. A chemical accident, defined in the "*Flexible Framework for Addressing Chemical Accident Prevention and Preparedness: A Guidance document" (Guidance)* as any unplanned event involving hazardous substances that causes or is liable to cause harm to health, the environment or property, can happen in any country. In order to address these challenges, UNEP launched in 2007 the Flexible Framework Initiative.

Building on the *Guidance Document*, since 2009, UNEP has worked with 6 countries including Cambodia, the Philippines, Mali, Senegal, Sri Lanka and Tanzania, to support the development or improvement of national Chemical Accident Prevention and Preparedness (CAPP) Programmes. These projects were conducted by the individual countries with technical and funding support from local and international partners including UNEP and experts involved in the development of the *Guidance*.

The overall objective of the projects was to work with individual countries to help build institutional capacity and to revise and/or develop transparent, efficient and effective systems aimed at chemical accident prevention and preparedness. This has materialized through the application of the five phased-approach of the CAPP Development Programme. *Chemical Accident Prevention and Preparedness – Case Studies of Implementation* builds on an extensive review of the deliverables prepared during and after the implementation of the CAPP projects, such as the Country Situation Reports and Roadmaps. This publication documents the results, feedback, and lessons learned from the projects and, based on this, presents a number of recommendations for countries wishing to build or enhance national CAPP Programmes.

The implementation of these projects has provided UNEP with valuable insights on the methodology. Their success has shown that there is large scope for application in all countries, relying on the Flexible Framework's adaptability to the country's level and nature of risks, to the resources available and to the political and legal contexts.

Chemical safety is a cross-cutting issue for countries, and building an effective programme to address CAPP requires political commitment and co-ordination among different agencies and authorities. Through the *Case Studies of Implementation*, UNEP demonstrates the potential for CAPP uptake in countries from a national perspective as well as to create a shared culture of regional and multi-national safety.



Introduction

Background

The development of the industrial sector has been a critical element of national economic development strategies worldwide. However, the rapid industrialisation among developing economies has led to a shift in manufacturing processes to a greater number of countries, increasing the complexity of supply chains involving the handling of chemicals. In addition to the chemicals sector, hazardous substances are being handled by oil, gas, mining and manufacturing sectors. According to the Global Chemicals Outlook (UNEP, 2013), significant growth rates of chemicals production in developing countries are expected from 2012 until 2020, leading to growth in markets for upstream suppliers, transporters, distributors and clients in these regions. This increase in the volume of hazardous chemicals being handled in developing countries, coupled with the scale of urbanisation and the consequent challenge in controlling the location of settlements is creating a new, increased or modified risk in many communities worldwide.

The challenge for rapidly developing economies is to adopt and promote the safe management of chemicals, in terms of business practices as well as legal structures, to keep up with the growing

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development and to address the growing concern among local, regional and national governments.

Examples of chemical accidents include fires, explosions, spills of toxic substances, a release of toxic gas, or a dust explosion. Such accidents may occur at small facilities such as pesticide warehouses as well as at large installations such as refineries, at public facilities including water treatment plants using chlorine or private manufacturing facilities for the chemical, pharmaceutical, and consumer products industries; in urban settings and industrial parks or in rural areas where there might be mining operations or refrigeration facilities.

Chemical safety is a cross-cutting issue for countries and contributes to the overall sound chemicals management and disaster risk reduction efforts of countries. National chemical accident prevention and preparedness programmes are an important aspect of sustainable development and a method by which governments can respond to international initiatives to foster responsible industrial systems and address the challenges of a green economy. An effective chemical accidents programme is a wise investment as it is less expensive to take appropriate actions to prevent accidents and reduce its consequences than it is to deal with their impacts on environment, and society without being prepared for it.

For example, the sudden release of about 30 tonnes of methyl isocyanate that occurred at the Union Carbide pesticide plant at Bhopal (India, December 1984) led to the death of over 2 800 people living in the vicinity and caused respiratory damage and eye damage to over 20 000 others. Estimates of the damage vary widely between US $350 million to as high as US$3 billion. (Source: UNEP, A Training Resource Package: Management of Industrial Accident Prevention and Preparedness, 1996)

The implementation of the Chemical Accidents Prevention and Preparedness programme will contribute to the objectives of the SAICM. Specifically on risk reduction resulting from chemical exposure, including chemical accidents.

Hon. Dr. Seif Rashid (MP), Minister for Health and Social Welfare, United Republic of Tanzania.

More recently, it is estimated that in addition to 30 fatalities and 10,000 injured, the Ammonium Nitrate explosion of Toulouse (France, September 2001) resulted in costs of US$1.8 billion (in 2001 US dollar terms). The oil storage depot explosion in Buncefield (United Kingdom, December 2005) resulted in 3,408 ligitants claiming damages. The estimated total cost of the accident is at US$1.5 billion (in 2011 US dollar terms, of which US$14.6 million are accounted for by fines and costs (Source UNEP Global Chemicals Outlook, 2012). In August 2014, millions of gallons of copper sulphate, sulphuric acid and heavy metals were spilled from copper mine into the Sonora River, Mexico. Federal Attorney for Environmental Protection (Profepa) estimated the costs of the spill to be over US$133million.

Chemical accidents can have devastating impacts on human health, environment, community prosperity and the wider economy. Risk management helps prevent releases of chemicals into the environment in the first place. Being adequately prepared will ensure that negative immediate consequences are minimised as much as possible and wastes and contaminated sites are handled in a manner in which adverse long-term effects to health and the environment are minimised.

Often, the challenge for governments is to enhance the focus on prevention of accidents, alongside reinforcing efforts on preparedness for response. UNEP recognises that the development of a chemical accidents programme should be part of an overall effort to address chemical safety. This can contribute to the safe management of chemicals throughout their lifecycle practices through implementation of multi-lateral environmental conventions, including:

- **Basel Convention** on the Transboundary Movements of Hazardous Waste
- **Bamako Convention** the ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa
- **ILO Convention 174** on the Prevention of Major Industrial Accidents
- **Montreal Protocol** on Substances that Deplete the Ozone Layer
- **Rotterdam Convention** on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade
- **Stockholm Convention** on Persistent Organic Pollutants
- **UNECE Convention** on the Transboundary Effects of Industrial Accidents

This aligns with UNEP's work pursuant to the Strategic Approach to International Chemicals Management (SAICM)[1], which aims to "achieve by 2020, the use and production of chemicals in ways that lead to the minimisation of significant adverse effects on human health and the environment." [2] In particular, it responds to the SAICM Global Plan of Action work area that calls for the "formulation of prevention and response measures to mitigate the environmental and health impacts of emergencies involving chemicals."

1 Adopted in February 2006.

2 The achievement of SAICM objectives is supported by the Quick Start Programme (QSP) which includes a voluntary time-limited trust fund administered by UNEP and other forms of bilateral and multilateral co-operation. The QSP's objective is to support initial enabling capacity building and implementation activities in developing countries, least developed countries, small-island developing states and countries with economies in transition. This "2020 goal" was adopted by the World Summit on Sustainable Development in 2002 as part of the Johannesburg Plan of Implementation.

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UNEP's Flexible Framework Initiative for Chemical Accident Prevention and Preparedness

In 2007, UNEP established the *Flexible Framework Initiative* to promote chemical accident prevention and preparedness. Two main publications have been developed as part of the Initiative: the *Flexible Framework Guidance* (*Guidance*)[3] and the *Implementation Support Package* (*ISP*)[4].

The *Guidance* was developed by UNEP in collaboration with an Expert Working Group (see section: National Partners and International Experts), who has also advised on the implementation of the *Guidance* and the development of the *ISP*. The *Guidance* offers in-depth information on critical

3 Flexible Framework for Addressing Chemical Accident Prevention and Preparedness – A Guidance Document

4 Flexible Framework for Addressing Chemical Accident Prevention and Preparedness – An Implementation Support Package

elements of an industrial chemical accident prevention and preparedness programme, based on international references. As an IOMC[5] publication, it takes into account international agreements in this area (especially the ILO Convention 174 and UNECE TEIA Convention[6]), key national/regional laws/regulations (in particular the Seveso II Directive of the European Union and laws of the United States of America[7]) and other international guidance materials, such as UNEP's Awareness and Preparedness for Emergencies at Local Level Programme, and the OECD Guiding Principles for Chemical Accident Prevention, Preparedness and Response[8]. Hence, it reflects more than 30 years of experience in addressing chemical accident prevention and preparedness.

5 Established in 1995, the Inter-Organisation Programme for the Sound Management of Chemicals (IOMC) was established to promote co-ordination of the policies and activities of participating organisations which include FAO, ILO, UNEP, UNIDO, UNITAR, WHO, and OECD. The World Bank and UNDP are observers.

6 ILO Convention 174 on the Prevention of Major Industrial Accidents; UNECE Convention on the Transboundary Effects of Industrial Accidents

7 US Environmental Protection Agency Risk Management Plan (Title 40 CFR, § 68) (which implements Section 112(r) of the 1990 Clean Air Act) and Occupational Safety and Health Administration's Process Safety Management of Highly Hazardous Chemicals Standard (Title 29 CFR 1910.1190)

8 OECD, Guiding Principles for Chemical Accident Prevention, Preparedness and Response (Paris, 2nd ed., 2003)

The *Guidance* sets out a five phase process to help countries prepare and prevent accidents at fixed hazardous installations, consisting of: an initial phase; an assessment phase; a development phase; an implementation phase; and a review and revision phase. This is illustrated in Figure 1.

Developing or reviewing a CAPP Programme is an iterative process and it may be necessary to revisit or repeat the steps at different points. Additionally, some steps, such as an absolute need to obtain and retain political commitment and the need for effective co-operation among key stakeholders within and outside government, are continuous in nature. Equally importantly, the implementation phase is a long term set of actions that may span a decade or more.

The *Guidance* offers the value of flexibility in an international context, and therefore can be adapted by every country, regardless of their initial situation as per CAPP (countries with no chemical accidents programmes or limited legal or policy instruments that relate to chemical safety, or countries with existing capacity) and regardless of their level of industrialisation (countries with a limited number of hazardous installations or countries with significant industry involving hazardous installations).

In order to allow each country to decide how best to organise its law, regulations, policies, programmes and other instruments, the *Guidance* reflects on

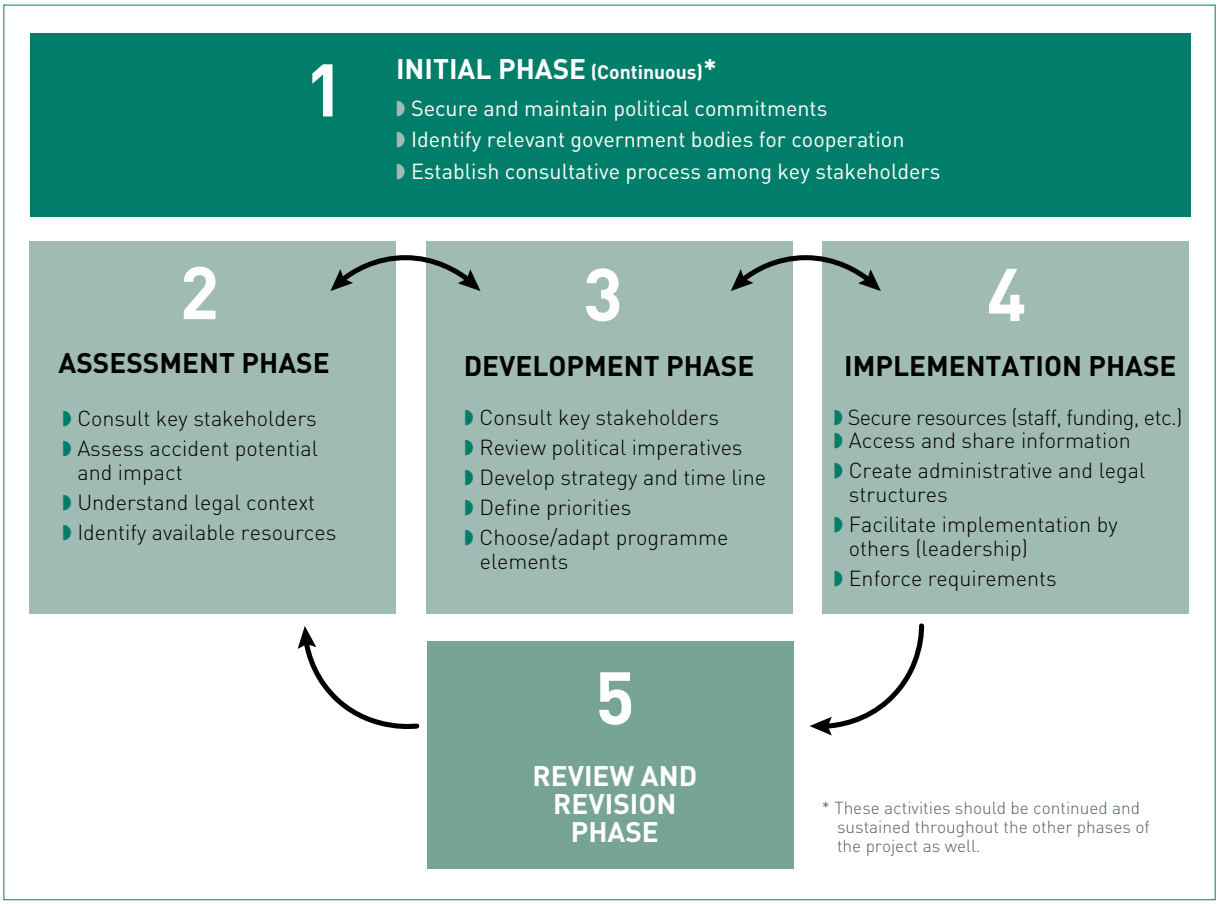
how each element is implemented in practice but does not prescribe how each element should be implemented. Its flexibility allows the countries to establish a CAPP Programme which is in proportion to their level of risks, resources, and identified priorities. The *Guidance* describes how a country can set up a comprehensive programme on CAPP[9] and it describes which elements are typically contained in such a programme. These elements are drawn from international experience in implementing CAPP programmes over the past 30 years and are divided according to the roles of competent authorities and the responsibilities of industry. This list of 13 elements can be used as a starting point by the countries to review the list of possible elements, and then adapt chosen elements taking into account their priorities as well as the availability of resources and the cultural/ legal context. The elements are further listed in Annex II.

The elements that are considered the responsibility of competent authorities comprise establishing systems for information management, designing and maintaining an inspections programme, requiring and organising adequate preparedness planning off-site and ensuring that industrial siting and land-use planning are undertaken, in such a way that effects of any eventual accident to the community are minimised.

Industries are responsible for the safety of their installations, therefore some elements focus on the requirements of industry, which establishes the types of requirements generally imposed on industry (or which industry undertakes in order to meet a general obligation to operate their installations safely). These requirements include establishing a General Duty Clause, notifying the existence of CAPP installations, establishing a prevention policy, applying an appropriate Hazard Identification and Risk

9 However, the approach is designed to be modular so that countries can flexibly implement a programme that can be realistically implemented with the available resources.

Figure 1: Five Phases of CAPP Programme Development (Source: Flexible Framework Guidance)



Assessment, preparing a safety report, developing on-site preparedness plans and providing the information needed by authorities to develop off-site plans.

These elements also include information to the public, which describes the types of information that should be provided to those potentially affected in the event of an accident; as well as accident reporting, investigation, and follow-up, which aims to document and understand the root and contributing causes of accidents and lessons learnt from accidents.

We are used to response, but here we are going to discuss prevention. We need to build capacity and expertise on prevention, which is a totally new paradigm shift.

Mr. Geri Geronimo Sañez, EMB-DENR

To supplement the *Guidance* and provide further support to countries implementing CAPP, UNEP also developed an *Implementation Support Package* (*ISP*) with the support of an Expert Working Group (see section: National Partners and International Experts). The goal of the *ISP* is to facilitate country projects, helping countries follow the process set out in the *Guidance* with external support (by UNEP or others). The *ISP* captures experience from the first four CAPP country-level pilot Projects and provides guidance and materials for countries wishing to develop or review their CAPP Programmes. The *ISP* guides the implementing country[10], technical support partners and experts in:

- Establishing a Task Force, which is a national multi-agency body responsible for leading the CAPP Programme;
- Preparing a Country Situation Report, outlining the country's vulnerability to chemical accidents and providing the background information needed to adapt the training and other activities to local circumstances, leading to a plan of action to improve national laws and policies;
- Organising workshops and training sessions to improve understanding of the technical and policy issues associated with CAPP;
- Drafting a National Roadmap for CAPP, based on a needs assessment and allocation of responsibilities, timeline and resource needs for implementation.
- The Development Phase culminates in the development of the Roadmap. The *Guidance* envisages an Implementation Phase that follows as well as a periodic Review and Revision Phase, which may adjust the Roadmap.

10 Implementing Country: a country taking action to develop or improve its chemical accident prevention and preparedness programme, using the Flexible Framework Guidance and this Implementation Support Package (receiving support from a Technical Support Partner).

National Partners and International Experts

Throughout the development, co-ordination and implementation of the *Initiative*, a number of international experts in the fields of chemical safety and prevention of industrial accidents have been involved in different capacities such as Expert Working Groups to develop the *Guidance* and the *ISP*; Technical Support Partners or as individual (national and international level) experts. These experts have also contributed to shaping country-level projects (see section: Country-level CAPP Programme Projects (2009-2014)). In addition, a number of experts around the world were involved in the peer review of the *Guidance* and the *ISP*.

These experts include representatives from agencies such as the Asian Disaster Preparedness Centre (ADPC), the Ibero-American Programme for Science, Technology and Development (CYTED), the Directorate General for Environment of the European Commission (DG-ENV), the Swiss Federal Office for the Environment (FOEN),the International Council of Chemical Associations (ICCA), the International

Labour Organisation (ILO), the French National Institute for Industrial Environment and Risks (INERIS)[11],the Joint UNEP/OCHA Environment Unit (JEU), the Major Accidents Hazards Bureau of the European Commission' Joint Research Centre (JRC-MAHB), the Swedish Civil Contingencies Agency (MSB), the United Nations Economic Commission for Europe (UNECE), the United Nations Industrial Development Organisation (UNIDO), the United Nations Institute for Training and Research (UNITAR), the Organisation for Economic Co-operation and Development (OECD),the US Environmental Protection Agency (US EPA), and the World Health Organisation (WHO), Health and Safety Executive, UK, and individual independent experts in chemical accident prevention and preparedness.

Leadership of the Country-level CAPP Programme Projects was with a national focal ministry. In most countries this was the Ministry of Environment or a related agency. The national partners were:

- Central Environmental Authority, Sri Lanka
- Directorate of Environment and Classified Establishments, Senegal
- National Directorate for Sanitation and Pollution Control, Mali
- Environmental Management Bureau of the Department of Environment and Natural Resources, Philippines
- Government Chemist Laboratory Agency, Ministry of Health and Social Welfare, Tanzania
- Ministry of Environment, Cambodia

The country projects have also extensively drawn upon the expertise of national level partners representing the University of the Philippines and the Chemical Industries Association of the Philippines (Philippines), Université de Bamako (Mali), Université Cheikh Anta Diop and Quartz Afrique (Senegal), Senghor University (Egypt), University of Moratuwa (Sri Lanka), Ardhi University and University of Dar es Salaam (Tanzania) and other independent experts recognised in their countries for their expertise in addressing chemical safety. These experts not only participated in the workshops, but also contributed with technical inputs to develop project deliverables (see next section).

The technical support partners and international experts are also engaged in an advisory role after the projects' closure.

11 *Institut National de l'Environnement Industriel et des Risques*

CAPP Expert Group © UNEP

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Country-level CAPP Programme Projects (2009-2014)

Overview

One of the key components of the *Initiative* has been the implementation of CAPP Programme Projects which help individual countries in building the institutional capacity to revise or develop programmes aimed at chemical accident prevention and preparedness. Figure 2 illustrates the CAPP Programme Project Structure, in the context of the five phase approach of the *Flexible Framework Guidance*.

Between 2009 and 2014, CAPP Programme projects were organised with support from UNEP in Cambodia (pilot), the Philippines (pilot), Mali and Senegal (joint regional proposal), Sri Lanka and Tanzania following country requests, as shown in Figure 3. The countries followed the same framework of activities (described in the *Guidance*), and adapted the activities to their specific needs and context.

Figure 2: Typical structure of a CAPP Programme Project (source: Implementation Support Package)

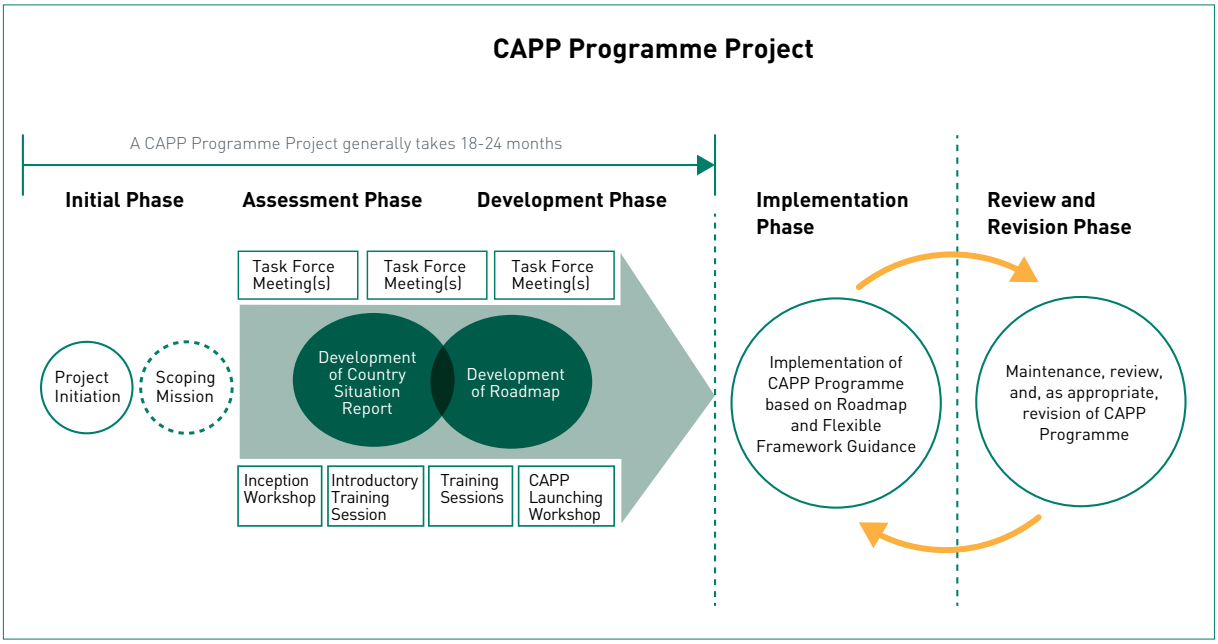
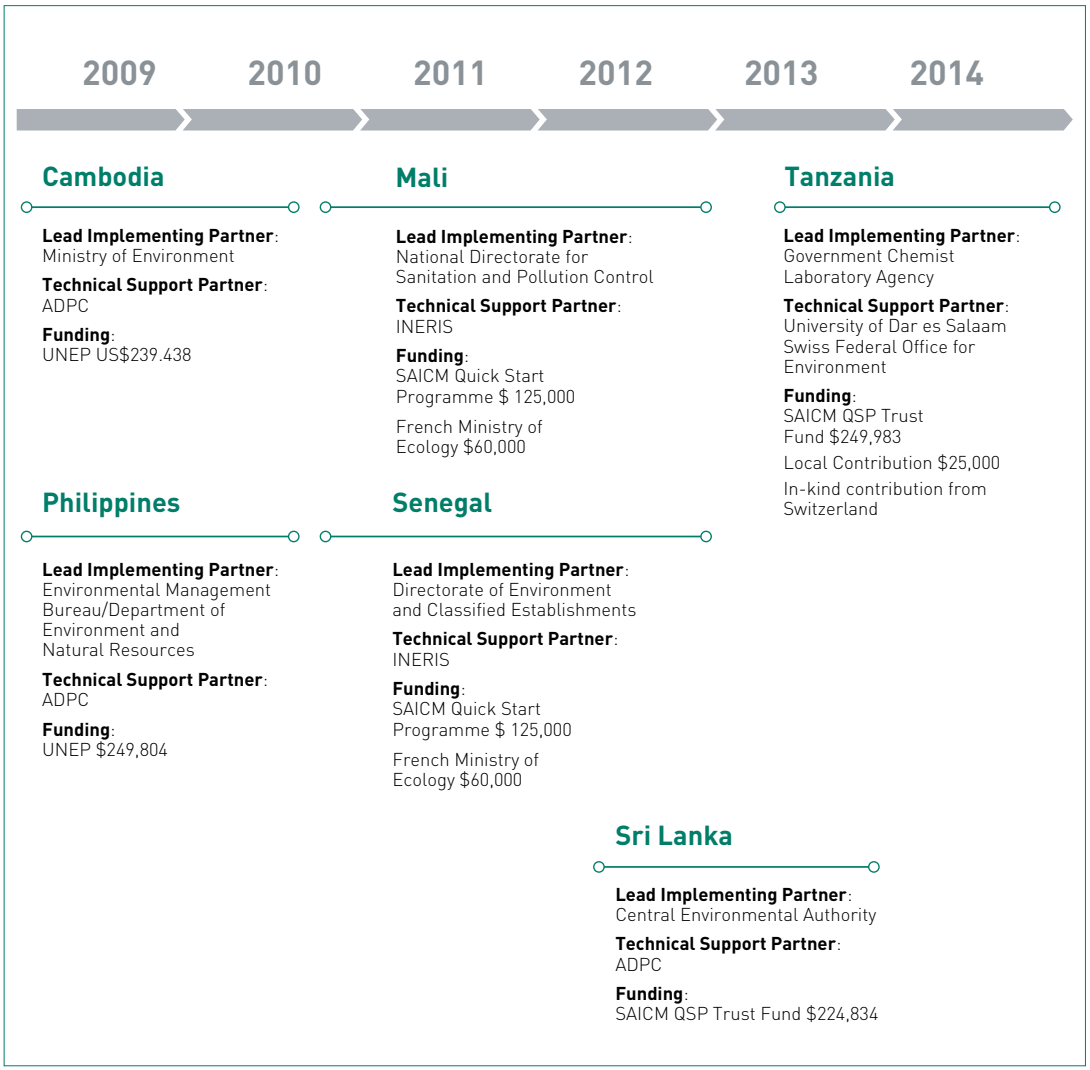


Figure 3: CAPP Programme Projects 2009-2014Package)



Multi-stakeholder Co-ordination

Effective action to address chemical management risks requires strong political commitment as well as multi-stakeholder co-ordination across relevant agencies and bodies which have a role to play. This will include government bodies responsible for environmental protection, occupational health and safety, public health, civil defence, emergency response, disaster risk management and industrial development, industry representatives, community groups, and the civil society. Therefore, the *Guidance* recommends the establishment of a Task Force defined as an inter-agency body responsible for leading the effort to develop and facilitate the implementation of a CAPP Programme.

The Task Force allows authorities from the public and private sectors and academia to work together. In creating a Task Force, the goal should be to be inclusive, with relevant interests represented, but without becoming so large that it is too cumbersome for it to carry out its mission. It is up to each Implementing Country to decide on a structure that will best meet its needs.

For example, in Tanzania, the Task Force was divided into three sub-working groups (Assessments and Reports, Meetings and Trainings, Monitoring and Evaluation) which worked closely with GCLA. This helped to streamline the members' new roles in the

Task Force with their normal routine obligations in their respective institutions and to fully utilise the knowledge and expertise of each Task Force member. A similar strategy was used in Mali and Senegal where the Task Force decided to dedicate one sub-group to work specifically on the Needs Assessment and Roadmap.

The composition of the Task Forces differed among countries but typically included representatives of the ministries/agencies responsible for environmental protection; public health; occupational safety and health; industrial development/industrial estates; agriculture; transportation; energy; and-use planning; civil defence/civil protection; disaster management; and emergency response (fire, police, medical).

In some of the CAPP implementing countries Task Forces were established on existing committees or working groups. When this was not possible, newly constituted bodies were created. For practical reasons and in order to facilitate the development, implementation and review of the CAPP Programme after the end of the CAPP Projects, the establishment of the Task Force on an existing structure has been preferred. This has improved the long-term sustainability of the Task Forces since the structures remained in place and functioning after the Projects.

For example, in Senegal, the Directorate of Environment and Classified Establishments[12] *decided to build the Task Force on the existing National Technical Committee for Environmental and Social Impact Assessment and the National Commission for the Management of Chemical products*[13] *to sustain project activities in the future. The National Technical Committee, established by Ministerial Decree in 2001*[14] *and hosted by the Environment Agency of Senegal, is along with others, in charge of assessing and validating the safety reports, which are developed on the basis of the national safety report guidance. The National Technical Committee is composed of all relevant administrative structures under which a safety assessment study is conducted. Also, if needed, the National Technical Committee may appeal to any person or institution that could help carry out its mission.*

12 Direction de l'Environnement et des Etablissements Classés

13 Ministerial Decree N° 000852 of 08 February 2002 National Commission for the Management of Chemical products (*Arrêté ministériel n°000852 du 08 février 2002 portant commission nationale de gestion des produits chimiques sur l'Environnement*)

14 Ministerial Decree N° 009469 of 28 November 2001 defining the organization and functioning of the technical committee (*Arrêté Ministériel N° 009469 du 28 novembre 2001 portant organisation et fonctionnement du comité technique national sur les études d'impact sur environnemental et social*)

Multi-stakeholder group during an industrial site visit in Thailand © CEA Sri Lanka

In the case of Tanzania, GCLA constituted a 15-member Task Force consisting of public institutions and private sector representatives, who were on the legally existing Emergency Response Committee. This Committee as mandated by the Tanzanian Industrial and Consumer Chemicals Act (CAP 182) to respond to various aspects related to chemicals management including chemical accidents. In addition, the Committee has the following specific roles: to prepare chemical disaster preparedness and contingency plans, to implement the approved contingency plans in case of emergencies, to advise the Government on how to deal with chemical emergencies and accidents, to liaise with any other Disaster Management Authorities or institution and ensure collaboration with stakeholders.

The Task Forces drove the CAPP Programme Projects, coordinating the necessary support within the country, and managing the preparation of the project deliverables (see section below). The Task Forces met regularly, and consulted with other stakeholders, throughout the course of the Project. Each country's Task Force decided on the number of required meetings based on their identified priorities and project timelines.

The Task Force in Sri Lanka decided to meet on a monthly basis. In Tanzania, nine Task Force meetings were held during the project implementation phase, whereas, fewer meetings were considered sufficient in other countries.

To ensure the sustainability of the country's CAPP Programme and the implementation of the Roadmap (see section below), it is recommended that the Task Force, or a successor organisation, remain active after the Project to support the further efforts needed to develop and implement the CAPP Programme, and to periodically review and revise the Programme, as appropriate. This is often easier to achieve when the Task Force is established on the basis of existing structures.

For example, in Sri Lanka, the Task Force has acknowledged that their long term commitment is required to retain the momentum beyond the project timeline and have continued to hold monthly meetings after the closure of the CAPP Project in November 2013. In Tanzania, the roles of the Task Force were resumed to the Emergency Response Committee, after the closure of the project phase, towards implementation of the CAPP Programme.

In Tanzania, it was considered important to engage industry. During the 2nd training workshop, 17 industries were invited and the Responsible Care programme was introduced to them as a voluntary industry initiative that supports the CAPP responsibilities of industry.

Establishing Priorities and Developing a Roadmap

One of the key roles of the national Task Forces is to determine the most relevant issues and priorities related to chemical accident prevention and preparedness within the country, as well as a path forward for the implementation of the CAPP Programme elements. These constitute the project deliverables:

- A **Country Situation Report** presenting an overview of the nature and extent of chemical accident risks within each country, as well as the existing legal structures and responsibilities related to the management of chemical accident risks[15]. Each country's report was prepared by gathering information from official records, as well as consultations, stakeholder records,

15 The Country Situation Report consists of 9 parts: Background Information; Accident Potential and History; Government Infrastructure; Regulatory and Non-regulatory Context; Non-governmental Activities; Community Awareness; Available Resources; Other Relevant Information; Conclusions

Industrial site visit in Senegal © DEEC Senegal

media reports and other sources. The primary goal is to develop an overview of each country's situation with respect to hazardous activities and the legal framework in order to identify gaps and assign priorities for the CAPP Programme implementation.

- A **Needs Assessment** (later incorporated as part of the Roadmap) summarising the main requirements and priorities of each country to improve its CAPP management. While each country's Needs Assessment was different, the process included a review of the status of CAPP Programme elements in the country, resource and capacity building needs for CAPP Programme development, possible sources of funding, and recommendations.

- A **Roadmap** providing an outline of the necessary steps to implement a CAPP Programme in order to address the priorities highlighted in the Needs Assessment. It includes a schedule of priority actions and needs, medium to long term goals, timeline, responsibilities and resource requirements.

In this context, the first meetings of national Task Forces were critical in establishing priorities for the project deliverables. In particular, they facilitated the development of the Country

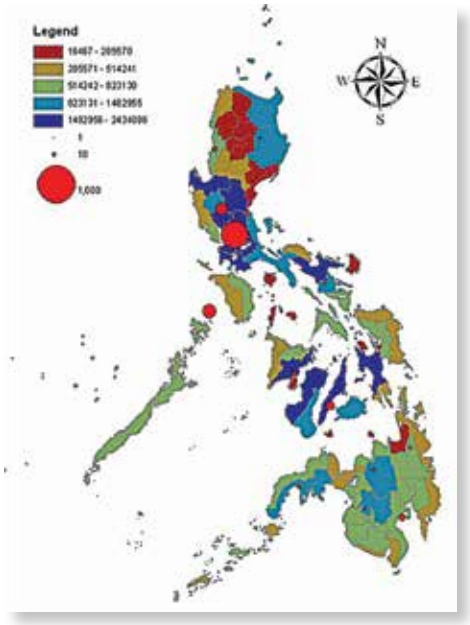
Situation Report by identifying the relationship between the project and existing chemical management mechanisms in the country or proposed resolutions related to chemical safety. While all the countries used a format now included in the *ISP* to prepare their country specific Roadmaps and Needs Assessment, the way in which they were prepared differed (some used questionnaires, while others gather data through industrial site visits, formal or informal meetings, consultants, etc.).

Subsequent Task Force meetings were used to fill in information gaps in Country Situation Reports (such as lack of data on hazardous installations within the country, identifying prominent industries where chemicals are used etc.), and, in some cases, to establish sub-groups to work on the Needs Assessment and Roadmap.

The progressive development of these deliverables and enhanced communication between stakeholders helped engage additional stakeholders in the development of the country's priorities. *In the Philippines, for example, the Task Force identified the need to include the Bureau of Fire Protection in the Task Force as they are responsible for the prevention, control and mitigation of dangerous conditions related to handling of hazardous materials. Further, in the third meeting of the Task Force, the members recognised the need to incorporate the industrial sector in the project to obtain more information on their activities.*

We have to work together to implement the roadmap, to establish a proper mechanism for a Zero Accident environment. We have to be alert on prevention and preparedness because we still don't have disposal facilities for hazardous wastes generated by such chemical accidents.

Ms. Nelka Perera – Project Coordinator, Central Environmental Authority, CAPP Sri Lanka



Chemical products manufacturing in the Philippines, as per Country Situation Report
© EMB-DENR Philippines

In some cases international peer learning also contributed to the development of these deliverables. *For example, the Sri Lankan Task Force found that recommendations by international experts and a study tour to Thailand, including guidance from Thai representatives (Mahidol University, the Industrial Estate Authority, and the Department of Industrial Works) served as a starting point for the Needs Assessment and consequently, the Roadmap.*

The final Task Force meetings focused on reviewing the results of the Needs Assessment and Roadmap to prioritise actions for the short, medium and long term. They had to assign responsibilities, develop indicators for CAPP performance, and analyse the need for resources based on identified priorities and existing capacities. *The Cambodian Task Force prioritised capacity building and development of safety systems for petroleum exploration which was undergoing rapid expansion in the country, whereas Mali prioritised programme implementation in Bamako as 277 of the 343 identified national industrial units are present there.*

Workshops and Training

The projects started with an Inception Workshop which served to launch the respective CAPP Programme Projects. The role of the Inception Workshop is to promote an increased understanding of the issues and benefits of a CAPP Programme, and ensure the commitment of the different stakeholders to the Project. Therefore, high-level decision-makers and technical staff from the key government bodies participated in the Inception Workshops.

Example: In Tanzania, the Inception Workshop was attended by 80 participants from various government agencies (e.g., Environment, Health, Labour, Industry, Ports ,Agriculture), industries (e.g., Statoil Tanzania Ltd, Freight Forwarders Tanzania Ltd., Panafrica Tanzania Ltd., Swiss Ports Tanzania, Bakhressa Group Tanzania Ltd., Sumaria Group Tanzania Ltd., Puma Energy Tanzania, Geita Gold Mine), Universities (University of Dar es Salaam and Ardhi University), international organisations (International Labour Organisation, the European Commission, Swiss Cooperation Office) and industry organisations (e.g., Confederation of Tanzanian Industry, Chamber of Mining and Trade, Tanzanian Plantation and Agriculture Workers Union).

In addition to that, the lead implementing agency for the CAPP Project in the country organised training and capacity building workshops, with technical support from UNEP, international experts and technical support partners. The key objectives of the workshops were to offer technical guidance in the development of a CAPP programme and to build the institutional capacity for the eventual implementation of the programme.

Each country held at least one and, often two or three, Training Workshops of 2 to 5 days each. These were adapted to the country's specific needs and priorities, and were designed by the implementing agency and project partners, with the technical support of international experts. The first training workshops were designed to respond to the situations described in the Country Situation Report and where a second training workshop was held, this was designed based on the Needs Assessment.

While the primary objective of the workshops was to familiarise the Task Force members and other stakeholders with the different *Guidance* and *Initiative* elements through presentations and group exercises, the sessions also served to highlight each country's specific needs as viewed not only by the country representatives, but also by international experts. Generally the training workshops placed emphasis on: roles and responsibilities of authorities and industry, defining the scope of a CAPP programme, hazard identification and risk assessment as well as safety inspection. The workshops included industrial site visits within the country or region to focus on specific CAPP elements in that country.

Industrial Site Visit Example 1: The Central Environmental Authority of Sri Lanka identified the need to first train their national Task Force members on critical elements to build a national CAPP Programme. Their introductory training was held in partnership with the Department of Industrial Works of Thailand and included an all-day industrial site visit to Map Ta Phut Industrial Area in Thailand. The visit provided an opportunity for the Task force to learn from an effective public-private partnership, a well-developed industrial estate with robust safety management programmes, adherence to regulatory enforcement and safety and chemical management approaches such as the Globally Harmonised System for Classification and Labelling of Chemicals (GHS). The visit also developed relationships between countries and provided a source of ongoing assistance.

Industrial Site Visit Example 2: Cambodia's and the Philippines' Task Forces identified a need to understand inspections, procedures for hazard identification, and review existing safety management systems for improvements. Hence industrial site visits were organised to a Chlorine Bleach Production facility (Mabuhay Vinyl Corporation) in the Philippines and Petroleum Fuel Depot (SOKIMEX) in Cambodia.

Industrial Site Visit Example 3: Mali and Senegal undertook a joint site visit to a Senstock, *a fuel and LPG storage facility outside Dakar (Senegal), for practical*

Industrial site visit during the 2nd CAPP-SL training workshop © CEA Sri Lanka

exercises and discussions. This site visit acted as a source of inspiration to improve cross-border collaboration on industrial safety and CAPP in the broader context of the West African region.

As with other Project components, the workshops were adapted according to the country's identified needs. Table 1 provides an overview of the training workshops. Although all training workshops covered all the elements of a typical CAPP Programme, as described in the *Guidance*, some elements were particularly emphasised. These are highlighted in the Column entitled 'Specific Workshop Focus'.

Country Site Visit Example 4: In Senegal, the 2nd training workshop focused on a specific need identified by the Task Force. The training aimed to enhance the skills of the participants to critically review safety reports that are submitted by companies for the approval of the National Technical Committee for Environmental and Social Impact Assessment. The site visit preparation included the review of the industrial facility's safety report and onsite exercises included comparing the report with the real, actual situation at the site.

Prevention is better than a cure. We need to build the capacity of inspectors and customs officials in identifying and addressing chemical hazards.

His Excellency, Mr. Khieu Muth Secretary of State of Cambodia

Table 1: Overview of Training Workshops

Country	Number of Workshops	Number of Participants in Each Workshop	Industrial Site Visit
Cambodia	Two 3-day workshops in Phnom Penh	Approximately 30	Petroleum Fuel Depot SOKIMEX
The Philippines	One 5-day workshop in Manila	Approximately 40	Chlorine Bleach Production Facility Mahubay Vinyl Corporation
Mali	Three 2-day workshops: One workshop in Bamako, targeting Task Force, One video-conference from Paris, and one practical training workshop in Dakar, Senegal	Task Force members – 22	Petroleum Depot and LPG Bottling Facility Senstock
Senegal	One 3-day workshop and one 2-day workshop in Dakar	Approximately 40	Petroleum Depot and LPG Bottling Facility Senstock
Sri Lanka	One 4-day workshop for the Task Force in Bangkok, Thailand, and one 3-day workshop in Colombo, Sri Lanka	First Workshop: Task Force Second Workshop: Approximately 70	Map Ta Phut Industrial Estate and Oil and Gas Depot PTT GC, Rayong, Thailand Sapugaskanda Oil Refinery and Paint Factory
Tanzania	Two three-day workshops in Dar es Salaam and Mwanza, respectively	Approximately 110	Port of Dar es Salaam

The Project closure activity is intended as a launch platform for CAPP Programmes in the country. Participants provided feedback on the workplans and timeframes in the Country Roadmaps to reach an agreement on the strategy and steps for development and implementation of a CAPP Programme. The CAPP Launching Workshop brings together senior officials and decision-makers (who also attended the Inception Workshop), as well as the technical experts who participated in the Training Sessions. *Therefore in Tanzania, representatives from the leading agencies including, Environmental Management Authorities, Occupational Health and Safety, Public Health, Energy and Minerals, Industries, Agriculture and Allied Sectors, Higher Learning and Research Institutions, Transporters and Logistics, Fire and Rescue Forces, as well as industry associations and companies attended the workshop to share experiences based on lessons learned from the project implementation and give recommendation on the developed Roadmap for CAPP-TZ Programme implementation. Regional representatives from the East African Countries region (Ministry of Environment, Kenya; Makerere University, Uganda; University of Nairobi, Kenya) were invited to attend the closure workshop to encourage the scaling-up of the activities at the regional level.*

Review of CAPP Programme Projects and Lessons Learned

Review of CAPP Programme Projects

In the long-term, countries should aim to develop comprehensive CAPP Programmes built on existing legislation related to chemical management and safety, emergency/disaster management, or industrial operation.

Countries that participated in the CAPP Projects shared a common objective to enhance the capacity of relevant domestic institutions to manage and respond to chemical risks. A review of the outputs of each of the Projects (Country Situation Report, Roadmap) against the 13 elements of a typical CAPP Programme described in the *Guidance*, shows that the implementing countries shared some common challenges such as the need for better enforcement of existing regulations, strengthening information management on the nature and location of hazardous installations in the country, and developing or reviewing a more comprehensive legal framework related to chemical accident prevention and preparedness. It also shows that different elements of a typical CAPP Programme were already present

Multi-stakeholder group in Cambodia © MoE Cambodia

to a certain extent within the laws and regulations, depending on the type and level of industrial activities in the countries.

However, looking deeper into the challenges shows that, as the country contexts are unique, also the nature of each of the gaps differ. Hence, the CAPP Programme priorities defined in each project are targeted. *For example, both Mali and Senegal considered land use planning as a gap. The reasons, however, are different. In Senegal, legal obligations*[16] *require a safety distance of 500 around hazardous installations, but this requirement is not enforced in practice. On the other hand, in Mali, no legal obligation requiring safety distances exists.*

16 Code de l'Environnement n°2001-01

Hazardous activities and chemicals

The type, composition and level of industrial activity in the country determines the nature, volume and use of chemicals handled in the country. These also determine the type of potential chemical accident within the country.

The benefits of a CAPP programme are many. Our developing countries are seeking to push industry to a level that would allow them to establish a strong economy and have great interest in investing on prevention and preparedness for chemical accidents.

Ms. Fagamou Sy Diop – Division Chief and Project Coordinator, CAPP Senegal

For example, Mali's economy is heavily based on agriculture and livestock farming. Hence the predominant chemicals stored and transported in the country include pesticides, mainly herbicides, and large amounts of butane for general purposes. On the other hand, Senegal's economy is heavily based on the industrial and services sector. Pesticides, fertilisers, and petroleum products are not only imported and stored in Senegal, but are also manufactured in the country.

Table 2 captures the typical hazardous installations/ activities, most common hazardous chemicals, and typical past accidents, for the CAPP country-level projects.

International expert presenting the Sandoz accident in a training in Mali © DNACPN Mali

Table 2: Overview of Country Situations

	Hazardous installations/ activities	Chemicals	Imported / Manufactured	Typical Accidents
Cambodia	Economy: Primarily agrarian. Handling of chemicals: Warehousing, mining and manufacturing. The manufacturing industry is dominated by SMEs. Largest manufacturing sectors include food & beverage and textiles/ clothing.	Petroleum/fuel products Chemical fertilisers used for rice production and industrial agriculture.	Mainly imported	Release of chemicals (oil, lubricant, waste and gas).
The Philippines	Economy: Primarily services and industry. Handling of chemicals: Storage, Processing and transport. Industrial production is centred around the production of cement, glass, industrial chemicals, fertilisers, iron and steel, and refined petroleum products, and the processing and assembly operations of diverse goods including rubber products, textiles, paints, plywood and veneer.	Chlorine, ammonium nitrate, sulfuric acid and other acids, sodium hydroxide and other bases	Both	Fires at fireworks or pyrotechnics factories. Explosions in coal mines. Release of hazardous chemicals to the environment (oil, mercury, methane, chlorine, and mine tailings chemicals).
Mali	Economy: Primarily agrarian and livestock farming. The industrial sector is largely made up of SMEs with a focus on food production as well as the fabrication of construction, textile, and dyeing, mining, and chemical products.	Acids, alkalis, phenolic products, volatile organic compounds, heavy metals, and gases (acetylene, butane, hydrogen).	Imported	Petroleum products and pesticide spills.
Senegal	Economy: Primarily industry and services. Handling of chemicals: Manufacturing and Mining	Plastic, paper, clothing, soap, phosphoric acid, nitrogen-based fertilisers, hydrocarbons, cement, ethanol, phosphates, and metals as well as agricultural products	Both	Road accidents, related to the transport of petroleum products Chemical accidents involving ammonium, chlorine, oil, bitumen, diesel, acetone, as well as dust explosions.
Sri Lanka	Economy: Agrarian, industry and services. Handling of chemicals: Production of hazardous chemicals only in a few industries.	The agriculture sector is involved in importing chemicals including fertilisers, insecticides, herbicides, and fungicides	97% is imported	Oil spillages and leaks in oil refineries and crude oil storage tanks. Fires and explosions in fireworks manufacturing factories. Chlorine and chemical leaks, chemical fires in the Colombo port.
Tanzania	Economy: Agrarian and industry. The industrial sector comprises mining, manufacturing and processing industry, and electricity and gas generation and distribution. Industrial manufacturing and processing sector is dominated by food and agricultural products processing, manufacture of cement, textiles and non-metallic products, synthetic rubber and foams and formulation of petroleum products.	The agriculture sector involves use of chemicals as fertilisers, herbicides, pesticides, or fungicides. Ammonium nitrate, sulfuric acid and sodium cyanide; toluene diisocyanate; sodium hypochlorite, hydrogen peroxide, sulfur, liquefied petroleum gas and other petrochemicals.	Over 90% of the chemicals that are used and handled by companies in Tanzania are imported.	Accidents related to chemical spillages during road transportation. Pipeline spills and release of toxic sludge from mine into the environment.

Source: UNEP (adapted from Country Situation Reports of Cambodia, the Philippines, Mali, Senegal, Sri Lanka and Tanzania)

Legal framework and requirements

The nature and location of hazardous installations and hazardous substances in the country, as well as past accidents, determine the development of the legal framework. In general, and globally, laws and regulations are often developed after an accident or near-miss and therefore reflect the vulnerability of the country to chemical accidents and the types of impacts.

Most of these countries have ratified and are implementing major Multilateral Agreements on Chemicals Management, such as Basel, Rotterdam, and Stockholm Conventions[17]. For further information on the status of implementation in the CAPP programme project countries, please refer to ANNEX I.

The starting points for strengthening legal frameworks on CAPP among the six implementing countries were quite different. All implementing countries have some legal instruments relevant to chemical accident prevention and preparedness including those at national, regional, and local levels. Generally, the responsibilities for these legal instruments are divided among a significant number of different ministries, agencies, or other authorities. The next sections describe the situations in each country, as described by the Country Situation Reports.

In **Cambodia**, *although there are no specific laws on prevention of chemical accidents is in place, a drafted law on sound management of chemicals has inserted a chapter on prevention of chemical accidents. Besides, there are number of existing laws related to the environment (Constitution of the Kingdom of Cambodia, 1993, Law on Environmental Protection and Natural Resources Management, 1996, sub decree on Global Harmonized System, 2009), and health (Law on Management of Quality and Safety of Products and Services, 2000), labour, agriculture* (Law on Management *of Pesticide and Agricultural* Fertilisers, *2012) address various aspects of hazardous chemicals management and control. These legal instruments provide measures to mitigate the negative impact that can occur during each stage of a chemical's life cycle from production, import, export, distribution/ marketing, use/handling, and to disposal.*

In **the Philippines**, *under the umbrella of the general provisions on the protection of life, health and limb of individuals and the environment under the Philippine Constitution of 1987, there are specific laws and regulations covering environmental and workplace safety in industry and agriculture. In particular, chemicals management is mainly addressed under the Toxic Substances and Hazardous and Nuclear Wastes Control Act (1990). The Department of Environment and Natural Resources is stringently regulating the import and use of chemical substances in the country by categorising it to its respective regulatory guidelines depending on its level of toxicity or hazardous nature. Recently in 2014, a legal instrument under the Department of Labour and Employment was released to enforce all workplaces of the chemicals sector to implement a chemical safety programme and to incorporate GHS as one of the programme requirements.*

Mali *is a signatory to several international agreements, but these are not the transposed at the national level. Additionally, no comprehensive regulation covering chemical accidents currently exists in Mali.*

In **Senegal**, *the Environmental Code*[18] *of 2001 and its amendments regulate major accident prevention in the country*[19]*. For example, there is an obligation to submit a safety report within the Environmental Impact Assessment Process to the National Technical Committee for validation. The legal framework follows the principles of the regulatory framework of France (adapted from the Seveso II directive) and considers*

17 The Conventions call for close co-operation and coordination with the relevant intergovernmental bodies on providing capacity building and technical assistance on, among others, the protection of human health and the environment from the harmful impacts or adverse effects of hazardous chemicals and wastes, prevention of accidents and emergency response in the case of accidents, and information generation and access.

18 *Code de l'Environnement n°2001-01*

19 The Environmental Code is the main legal instrument on chemicals management and establishes the principle of environmentally sound management of those products by integrating the international conventions to which Senegal is a party. It also strengthened the management of chemical accident by upgrading the legislation on hazardous installations.

High-level dialogue at the 2nd CAPP-TZ training in Mwanza, Tanzania © GCLA Tanzania

land-use planning obligations, inspections and on-site preparedness planning.

Sri Lanka *has several legal instruments related to CAPP activities, including the National Environmental Act No: 47 of 1980, Factories Ordinance No.19 of 2002, Control of Pesticides Act No.33 of 1980, Regulation of Fertiliser Act No. 68 of 1988, Petroleum Ordinance Act No. 24 of 1956, Ceylon Petroleum Corporation Act No. 28 of 1961, Chemical Weapons Act No 58 of 2007, Explosives Act 18 of 2005, Cosmetics, Devices and Drugs Act No. 27 of 1980, Board of Investment Law and Mines and Minerals Act: Act No. 33 of 1992. All the laws mentioned above have an impact on chemical accident prevention and preparedness or the management of hazardous substances. The legal instruments in the country show that there are some regulations related to chemical safety and there are provisions to make new regulations related to chemical accident prevention and preparedness. However, some regulatory activities related to hazardous substances have overlaps and therefore have resulted in conflicts.*

In **Tanzania**, *several national legislations, policies, regulations and guidelines pertaining to proper management of chemicals have been established and the country has been taking several initiatives to address chemical accidents prevention and preparedness. These initiatives include enactment of the Industrial and Consumer Chemicals (Management and Control) Act (ICCA), Cap 182, which currently covers the management and control of the production, import, transport, export, storage, dealing and disposal of industrial and consumer chemicals in the country. In order to strengthen implementation of the ICCA, new Regulations of 2015 made under the Industrial and Consumer Chemicals Act, has been signed by the Minister for Health and Social Welfare and announced in the Government Gazette number 25 of 30th January 2015.*

Review of CAPP Programme Elements

Given that some laws and regulations already exist in the six CAPP implementing countries, CAPP Programme elements such as information management, inspection, preparedness planning and notification are also functional to a certain degree. However, there are differences in the degree of development and enforcement of these elements.

Example: In Tanzania, inspection of hazardous installations is conducted by official inspectors who perform activities as per legal mandates of each competent authority separately. In addition, interagency inspections are conducted whenever the need arises to address a specific issue of public interest. However, the challenge remains on inadequate number of inspectors and resources, such as vehicles and funds, relative to the size of the country and the number of hazardous installations. On the other hand, in Mali, an inspection service is to be created in the Ministry of the Environment. This service will be primarily responsible for risk prevention of chemical accidents.

Table 3 gives an overview of the presence of CAPP Programme elements in legal frameworks of each of the CAPP implementing countries.

Table 3: Presence of CAPP Programme Elements, as per Country Situation Reports

	The Philippines	Cambodia	Mali	Senegal	Sri Lanka	Tanzania
Scope				●		
Information management	●	●	●	●	●	●
Inspections	●	●	●	●	●	●
Off-site Preparedness Planning	●		●	●	●	●
Siting and Land-Use Planning	●			●	●	●
General Duty Clause	●			●	●	●
Notification	●	●		●	●	●
Prevention Policy	●			●	●	●
Hazard Identification and Risk Assessment	●			●	●	●
Safety Reports	●			●	●	●
Preparedness Planning				●	●	●
Information to the Public	●				●	
Accident Reporting	●			●	●	●

Source: UNEP (adapted from Country Situation Reports of Cambodia, the Philippines, Mali, Senegal, Sri Lanka and Tanzania)

Common Priorities Among Implementing Countries

The Roadmaps developed by the countries reflect the different individual priorities and needs. However, the level of development of regulations in the implementing countries offers an opportunity to focus on certain broad common priorities such as better enforcement, information management, and inter-agency co-ordination. The following describes the common priorities identified by the Roadmaps in more detail.

Enforcement of existing regulations and drafting new legal texts: In particular, the Roadmaps show that there is a significant need for adequate enforcement of existing regulations to ensure effective chemical accident prevention and preparedness. Almost all implementing countries identified the need to develop robust legal instruments to implement CAPP. This need is coupled with a need for competency development to enhance inspection and enforcement of existing requirements.

For example in Mali, the Needs Assessment identified establishing a department for hazardous installation inspections under the Ministry of Environment.

Information Management and Inter-agency Coordination: Another commonly identified priority is information management, specifically related to difficulty in finding information about hazardous substances, lack of a database on accidents or hazardous installations in the country, and the information co-ordination and management on hazardous materials between different agencies. This results in a situation where at the start of a CAPP Project, it is common for the stakeholders not to have a clear understanding of the location of all hazardous installations in the country. A co-ordinating mechanism was considered very important in order to ensure consistency, leverage resources, and minimise the burden on industry. A suggested solution was to establish formal mechanisms for on-going co-ordination and to facilitate peer learning.

In the Philippines, seven different agencies are involved in information management, inspections, onsite preparedness planning, notification, hazard identification, safety reports, and information to the public with little or no co-ordination between them. Hence the need for a common database to structure a co-ordination between these agencies was identified as a step towards an effective CAPP Programme.

Additional, country-specific priorities are illustrated in Table 4.

Table 4: Short-term, country-specific priorities

Country	Short-term Priorities
Cambodia	Intensified research on chemical accident prevention in conjunction with the educational sector and other agencies; and Expansion of the existing labelling decree for fertilisers and pesticides (*Sub-Degree 69 on Standard and Management of Agricultural Materials*) to cover other hazardous chemicals.
Philippines	Appropriate legislation, resources, infrastructure and programmes; Well-functioning management systems for chemical accident prevention and preparedness in place for hazardous installations; and Appropriate mechanisms for effective on-site or off-site coordination on chemical accident prevention and preparedness between operators of hazardous installations, concerned authorities, and expert agencies.
Mali	Preparedness planning, in particular the creation of emergency plans for pilot sites in Bamako; Involvement of communities in preparedness for emergencies; and Setting up of a mobile unit specialised in interventions in case of an accident.
Senegal	Revision of the existing regulations; Preparing and planning for emergencies; Strengthening and maintaining the capacities of different relevant actors; and Acting as a leader in promoting the prevention and preparedness for chemical accidents in West Africa.
Sri Lanka	Implementation Globally Harmonised System for classification and labelling of chemical substances; Establishment of siting and land-use planning of CAPP facilities; and Improved PPE for inspectors in the short term[1].
Tanzania	Define the scope of the CAPP Programme including a list of hazardous substances/wastes and a threshold; and Mainstreaming the CAPP programme into the national budget.

Success factors & Lessons learned

The six country-level projects have allowed UNEP to gain valuable experience with respect to building capacity and enhancing national CAPP Programmes. The lessons learned from the six CAPP Programme Projects showcase the replicability of the CAPP Programme for countries with varying levels of industrial activity, legal obligations, existing practices and knowledge and resources. While UNEP considers that the successful implementation of six CAPP Programme projects indicates a robust and replicable Project approach, there are several factors that can be considered critical for the sustained success of CAPP Programme implementation beyond the project phase. These include the following:

Regional upscaling: Sharing among countries in similar situations was considered important in several of the projects and led to the recommendation to upscale activities from national to regional implementation. In several cases, the CAPP Programme projects led to the design of regional proposals (West Africa, ASEAN Region proposals were developed and presented for consultation). In the future, it is expected that regional projects will rely on regional task forces representing several countries; as well as on the support regionally based technical support partners.

The CAPP project is a unique experience in West Africa, which has the merit to lay the groundwork for cooperation between Mali and Senegal in the management of major industrial chemical accidents. It deserves to be sustained to replicate its achievements through the Sub-region and the continent.

Mr. Oumar Diaouré Cissé National CAPP Coordinator, Mali

For example, in the case of the projects in Mali and Senegal, a final training and project closure workshop inspired the development of a West African Strategy for CAPP. In the case of the CAPP project in Sri Lanka, a study visit to Thailand was deemed very useful and led to the development of a project proposal on a regional CAPP programme project in Asia. In Tanzania, a consultation was organised with neighbouring countries during the closure workshop.

High-level political and stakeholder commitment: For effective implementation of the Roadmap, a country must seek high-level support, legislative changes, political endorsement and ownership. In the long run, this high level involvement will benefit from UNEP continued technical and advocacy support.

For example, at the initial stage of the Project in Sri Lanka, a cabinet paper was submitted by the Ministry of Environment and successfully approved by the Cabinet of Ministers for official recognition of the CAPP-Sri Lanka Project and approval for implementation by the Central Environmental Authority. The presence of the Honourable Minister for Environment, Mr. Susil Premajayantha, at the opening ceremony of the 2nd Training Workshop further strengthened the political commitment, which is a key success factor towards sustaining the CAPP Programme development. Further the Guidance document has been translated into Tamil and Sinhala to enable wider access of the document and to make tools and information available and understandable to local stakeholders.

Multi-stakeholder collaboration builds on existing structures to effectively capitalise on what currently exists. This avoids multiple structures and ensures that the role of Task Forces has legal backing after project. The continuation of the Task Force, whether a new or existing one, is considered the most significant success factor in the development of CAPP beyond project.

In Tanzania, constituting a multi-stakeholder task force team from both public and private sectors built upon the existing Emergency Response Committee, enhanced co-operation and information sharing between agencies and provides a good basis for ensuring that the CAPP issues will continue to be addressed in an officially recognised body in the future.

Engagement of national institutions and experts for Country Situation Reports and Roadmaps brings added value to these deliverables. National experts bring knowledge of the country situation and their extensive networks to enrich the reports and disseminate the lessons learned. Engaging regionally and nationally based organisations help build and keep the experience and learning in the country beyond the project phase helping the work to continue. Additionally, the role of "champions" (enthusiastic, passionate individuals) in driving the process forward, gathering stakeholders, organising training and enhancing awareness cannot be sufficiently underlined.

Follow-up projects and targeted activities: In many cases, a successful outcome is reached when the goals, objectives and priorities in the Roadmap are divided into less ambitious projects that can help achieve smaller but more frequent successes that show continuous progress towards the objectives of the Roadmap. Such projects have included hosting high-level dialogues, participation in events to share experience, targeted training workshops for specific audiences, setting up organisational structures for dealing with CAPP issues, hosting regular task force meetings, and linking up with other ongoing initiatives (*e.g.* Disaster Management or Chemicals Management Activities of Chambers of Commerce).

Information sharing and collaboration: Access to databases and documents, experiences of other countries, and a peer network play an important role in sustaining a CAPP Programme. It is beneficial to consider the wealth of information present within industry and associations. The support of international experts, too, helps address technical matters that benefit from practical implementation from other countries. It can be said that their support helps keep momentum and avoids 're-inventing the wheel'. In several projects, some of the workshops gained media attention, which was shown to be a good way to raise awareness of CAPP. *For example, in Tanzania, the CAPP Programme project led to 8 articles on National newspapers issued on the occasion of the workshops.*

International experts in the 2nd CAPP-SL training workshop in Colombo, Sri Lanka © CEA Sri Lanka

Conclusion and Recommendations

Between 2009 and 2014 UNEP worked with national agencies in six countries – in chronological order: Cambodia, the Philippines, Mali, Senegal, Sri Lanka and Tanzania – to implement CAPP Programme Projects. The 1.5-2 year Projects were generally implemented with UNEP and SAICM Quick Start Programme Trust Fund financial support, as well as additional financial, technical and in-kind support from international partners. This experience has strengthened UNEP's understanding of the processes involved in setting up or enhancing CAPP Programmes in developing countries. All in all, UNEP is confident in concluding that the six projects have showcased the intended flexibility of the *Guidance* and illustrated the replicability of the CAPP Programme Project approach described in the *ISP*.

The projects have led to a total of six Country Situation Reports and Roadmaps, and six Task Forces have been formed, of which two were based on existing committees. Altogether 12 training workshops were organised, leading to more than 310 trained stakeholders. The projects have allowed for the production of a package of adaptable training materials, and a tested and valuable training approach and network of trainers on CAPP. Finally, as a result of the projects, the *Guidance* has been translated in five languages (French, Khmer, Tamil, Sinhala, and Kiswahili) and the *ISP* has been published.

While country situations in each of the CAPP Implementing Countries differed, the projects have shown some similar gaps in information management

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and enforcement of existing legal obligations. In addition, the fact that the situations differed has allowed UNEP to gain experience in the processes associated with CAPP Programme development, processes that can be similar in varying contexts. The CAPP Programme projects also offer countries a platform to fulfil their obligations to international conventions, including the need to build capacity at the national and local level to improve co-ordination among different agencies in charge of chemical safety.

While it is the responsibility of each country to take the steps set out in its Roadmap, it has become clear that many countries will continue to need external technical support and mentoring to effectively carry out these steps. To this end, establishing benchmarks for progress in CAPP Programme development, with regular review of progress may be a good way forward. In addition, the experiences gained in the period 2009-2014 showed that there are significant opportunities for collaboration and experience sharing among countries on different elements of CAPP. The successes of cross-country learning among representatives from Sri Lanka and Thailand, as well as Mali and Senegal, demonstrate the benefits of involving several countries from a region or a sub-region in CAPP Programme development activities. Coupled with experience sharing from countries in Europe or the US that have over 30 years of experience in implementing CAPP Programmes (through their Seveso and Risk Management Plan Programmes respectively) significant potential exists for triangular

cooperation (North-South-South experience-sharing) in light of developing well adapted CAPP Programmes.

It is therefore recommended that in the near future CAPP Programme Projects should be scaled up. This would enhance the creation of a shared regional safety culture, make CAPP Programme development a regional priority, enhance peer learning, and create a level playing field for industry. Regional efforts can facilitate co-operation among the different stakeholder groups and facilitate efforts to address accidents with possible trans-boundary impacts as well as improve understanding of the overall risks in the region. In addition, regional efforts can support implementation of CAPP Programmes by individual countries by leveraging resources.

Ultimately, a CAPP Programme has direct benefits in reducing the harm that can occur to individuals, communities, the environment, livestock industry etc. In addition, there are significant political benefits to having an effective chemical accidents programme. At the international level, such programmes can help countries comply with international agreements, or recommendations, related to reducing chemical risks. At the national level, a chemical accidents programme can help improve cooperation and coordination among the many agencies and bodies with relevant responsibilities. At the local level, creating an effective chemical accidents programme has significant political implications. The programme provides a platform for improving communication and trust between local leaders, the public, and other stakeholders.

UNEP CAPP online platform

UNEP manages an online platform to promote learning and knowledge-sharing in chemical accident prevention and preparedness, hosted by the Joint UNEP/OCHA Environmental Emergencies Centre. The portal includes Guidance materials, project experiences and outputs, reports produced within the scope of the Initiative, and other reference materials useful for countries wishing to implement CAPP-related activities. All the Country Situation Reports and Roadmaps referred to in this report can be found on this website.

http://www.capp.eecentre.org/

Glossary

CAPP Programme: the collection of laws, regulations, policies, guidance, and other instruments, as well as the related institutional arrangements, developed by a country to address the various aspects of chemical accident prevention and preparedness.

CAPP Programme Project (or "Project"): all activities carried out within a country ("Implementing Country") related to the Initial, Assessment, and Development Phases of the establishment of a CAPP Programme based on the Flexible Framework Guidance and this Implementation Support Package. This includes Task Force meetings and consultations, Workshops, Training Sessions, and development of a Country Situation Report and a Roadmap.

Chemical accident: any unplanned event involving hazardous substance(s) – such as a spill, release, fi re, or explosion – that causes, or is liable to cause, harm to health, the environment, or property. This excludes any long-term events (such as chronic pollution).

Country Situation Report: a document prepared by the Implementing Country providing an overview of the nature and extent of hazardous installations in the Country, a historical record of chemical accidents, and the legal and administrative context related to chemical accident prevention and preparedness.

Implementing country: a country taking action to develop or improve its chemical accident prevention and preparedness programme, using the Flexible Framework Guidance and this Implementation Support Package (receiving support from a Technical Support Partner).

Roadmap: a document prepared by the Implementing Country, as the culmination of the CAPP Programme Project, which identifies the next steps for further developing and implementing a CAPP Programme. It sets out the Country's objectives related to its CAPP Programme and specifies the path for meeting the objectives.

Technical Support partner: an organisation that has been invited by the Implementing Country to provide support for its activities related to a CAPP Programme Project. The Technical Support Partner may be UNEP (alone or with a collaborating organisation(s)), or may be a different external organisation.

ANNEX I: Status of the ratification of the major conventions in each country

	Cambodia	The Philippines	Mali	Senegal	Sri Lanka	Tanzania
Bamako Convention on the ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa	–	–	Adoption	Adoption	–	Adoption
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	Accession	Accession	Ratification	Accession	Accession	Accession
Montreal Protocol on Substances that Deplete the Ozone Layer	Accession	Accession	Accession	Accession	Accession	Accession
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	Ratification	Accession	Ratification	Ratification	Accession	Ratification
Stockholm Convention on Persistent Organic Pollutants	Ratification	Ratification	Ratification	Ratification	Ratification	Ratification

Source: UNEP

ANNEX II: Elements of CAPP Programme

1. Scope	Under the "Scope", information related to the definition of types of industries, facilities, and/or substances covered by a chemical accident prevention and preparedness programme is provided.
Role of Competent Authorities	
2. Information management	Aims to establish systems to manage the information needed for a chemical accidents programme
3. Inspections	Aims to design and maintain an effective inspection programme for hazardous installations, in order to check compliance with requirements, ensure proper safety practices and share experience
4. Off-site Preparedness Planning	Aims to ensure that there is adequate preparedness planning off-site of the facility, so that adverse effects are effectively mitigated
5. Siting and Land-Use Planning	Aims to ensure that hazardous facilities are located so as to minimise adverse effects to the community in the event of an accident and to restrict developments and maintain safety distances
Requirements of Industry	
6. General Duty Clause	Establishes the principle as a matter of law that owners/operators of hazardous installations have the responsibility for the safe operation of their installation
7. Notification	Aims to ensure that authorities are aware of, and have basic information about, any installations which fall within the scope of their chemical accidents programme
8. Prevention Policy	Aims to ensure that owners/operators of hazardous installations have in place appropriate policies, and safety management systems
9. Hazard Identification and Risk Assessment	Requires the application of appropriate hazard identification and risk assessment for all hazardous installations
10. Safety Reports	Requires the preparation of reports that demonstrate that risks are systematically assessed and managed
11. Preparedness Planning	Establishes the need for all hazardous installations to have appropriate on-site preparedness planning and cooperate with authorities in their off-site planning efforts
Information to the Public	
12. Information to the Public	Aims to provide adequate information on risks to potentially affected community
Accident Reporting, Investigation and Follow-up	
13. Accident Reporting	Aims to document and understand the root and contributing causes of accidents and learn lessons from accidents.

Source: Flexible Framework Guidance Document

Abbreviations

APELL	Awareness and Preparedness for Emergencies at Local Level
CAPP	Chemical Accident Prevention and Preparedness
FAO	Food and Agriculture Organization of the United Nations
ILO	International Labour Organization
IOMC	Inter-Organization Programme for the Sound Management of Chemicals
OECD	Organisation for Economic Co-operation and Development
QSP	Quick Start Programme
SAICM	Strategic Approach to International Chemicals Management
TEIA	UNECE Convention on the Transboundary Effects of Industrial Accidents
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
WHO	World Health Organization

About the UNEP Division of Technology, Industry and Economics

Set up in 1975, three years after UNEP was created, the Division of Technology, Industry and Economics (DTIE) provides solutions to policy-makers and helps change the business environment by offering platforms for dialogue and co-operation, innovative policy options, pilot projects and creative market mechanisms.

DTIE plays a leading role in three of the seven UNEP strategic priorities: climate change, chemicals and waste, resource efficiency.

DTIE is also actively contributing to the Green Economy Initiative launched by UNEP in 2008. This aims to shift national and world economies on to a new path, in which jobs and output growth are driven by increased investment in green sectors, and by a switch of consumers' preferences towards environmentally friendly goods and services.

Moreover, DTIE is responsible for fulfilling UNEP's mandate as an implementing agency for the Montreal Protocol Multilateral Fund and plays an executing role for a number of UNEP projects financed by the Global Environment Facility.

The Office of the Director, located in Paris, coordinates activities through:

- **The International Environmental Technology Centre** – IETC (Osaka), which promotes the collection and dissemination of knowledge on Environmentally Sound Technologies with a focus on waste management. The broad objective is to enhance the understanding of converting waste into a resource and thus reduce impacts on human health and the environment (land, water and air).
- **Sustainable Lifestyles, Cities and Industry** (Paris), which delivers support to the shift to sustainable consumption and production patterns as a core contribution to sustainable development.
- **Chemicals** (Geneva), which catalyses global actions to bring about the sound management of chemicals and the improvement of chemical safety worldwide.
- **Energy** (Paris and Nairobi), which fosters energy and transport policies for sustainable development and encourages investment in renewable energy and energy efficiency.
- **OzonAction** (Paris), which supports the phase-out of ozone depleting substances in developing countries and countries with economies in transition to ensure implementation of the Montreal Protocol.
- **Economics and Trade** (Geneva), which helps countries to integrate environmental considerations into economic and trade policies, and works with the finance sector to incorporate sustainable development policies. This branch is also charged with producing green economy reports.

DTIE works with many partners (other UN agencies and programmes, international organizations, governments, non-governmental organizations, business, industry, the media and the public) to raise awareness, improve the transfer of knowledge and information, foster technological cooperation and implement international conventions and agreements.

For more information,
see **www.unep.org**

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In an increasingly industrialized world, it is becoming critical for governments to develop, review or revise programmes on chemical accidents prevention and preparedness. UNEP published in 2010 the **"Flexible Framework for Addressing Chemical Accident Prevention and Preparedness: A Guidance Document"***, to support any government that wants to develop, improve, or review their programme for chemical accident prevention and preparedness (CAPP) related to hazardous installations. An Implementation Support Package was further developed in 2012 by UNEP and its collaborators as a supplement.*

These two publications guided UNEP's work with Cambodia, the Philippines, Mali, Senegal, Sri Lanka and Tanzania, in supporting the development or improvement of national CAPP Programmes.

This case study report has been developed to disseminate the results and lessons learned from these national projects, as well as to present a number of recommendations for countries wishing to build or enhance national CAPP Programmes.

The implementation of these projects has provided UNEP with valuable insights on the methodology. Their success has shown that there is large scope for application in all countries, relying on the Flexible Framework's adaptability to the country's level and nature of risks, to the resources available and to the political and legal contexts.

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