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### Economic Commission for Europe

#### Committee on Trade

#### Working Party on Regulatory Cooperation and Standardization Policies

##### Twentieth session

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Item 6 (b) of the provisional agenda

**Regulatory cooperation: Sectoral projects**

### **Progress report on the sectoral initiative on Explosive Environments Equipment**

**Note by the secretariat\* \*\***

#### *Summary*

Facilities such as mines, refineries, chemical plants and mills, expose their workers and the surrounding areas to high risks. To minimize the risks of explosions and contain their potential consequences, all equipment used in these environments needs to be designed, installed, maintained and repaired in a way to avoid the risk of causing an explosion.

The goal of the Sectoral Initiative is to promote and increase safety, while at the same time eliminating barriers to the free trade and use of the equipment.

This document contains a status update on the Initiative. It includes two annexes: (a) the common regulatory objectives, approved by the Working Party at its last session and amended by participants at two meetings of the Sectoral Initiative held in 2010; and (b) an excerpt of a project proposal, aimed at organizing awareness-raising and capacity-building events.

The progress report is submitted to the Working Party for discussion.

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\* At its eighteenth session, the Working Party asked the secretariat to provide annual updates on the work of all the sectoral initiatives (ECE/TRADE/C/WP.6/2008/18, para. 63).

\*\* The present document has been submitted late by the secretariat due to the timing of the meeting of the Sectoral Initiative, held after the official documentation deadline.

## **I. Project objective and key deliverables**

1. Recent accidents and explosions in mines and offshore facilities throughout the world have cost many lives and caused unprecedented environmental damage. This highlights the urgent need to increase safety in all environments that expose workers and the surrounding areas to high risk. The equipment used in these environments should be made as safe as possible to minimize the risks of explosions and to contain their potential consequences.
2. The equipment used in these environments is highly sophisticated. Checking that it conforms to international best practice and current regulations is a complex task, even for those regulatory authorities who have substantial resources and modern equipment at their disposal.
3. Regulators therefore need to cooperate closely with the industry and independent third-party conformity-assessment bodies, since it is in these two communities that expertise is continuously being updated in accordance with technological progress.
4. The main goal of the Sectoral Initiative on Explosive Environments Equipment is to promote and enhance safety, while at the same time eliminating barriers to the free trade and use of the equipment.
5. Specifically, the purpose of the Sectoral Initiative is to develop and promote a common regulatory framework for the “Equipment for Explosive Environments” sector. The framework includes not only common regulations, but also common and agreed conformity-assessment practices and market-surveillance procedures. As it is based on a shared understanding of the regulatory objectives to be pursued, it will be referred to in the text as “common regulatory objectives” or CROs.

## **II. Current status of the project**

6. At its nineteenth session, the Working Party approved the CROs, which had been developed by the Sectoral Initiative in 2009. In 2010, they were revised at the two meetings of the Sectoral Initiative, which took place respectively in Stockholm, on 10 June, as part of the Meeting of the Bureau, Rapporteurs and Coordinators, “START” Team and “MARS” Group, and in Berlin, Germany on 1 September, as part of the Annual Meeting of the International Electrotechnical Commission (IEC) Scheme for Certification to Standards relating to Equipment for Use in Explosive Atmospheres (IECEX Scheme).
7. The revised and approved version of the CROs is given in annex I to this document. The CROs cover all industrial activities in which explosions are likely to occur (e.g. mining, refinery, chemical plants, mills), and deal with all the different kinds of hazards (potentially explosive gas and dust atmospheres, mechanical and electrical ignition sources etc).
8. The Sectoral Initiative has also collected information about the legal framework in force in this sector on the main markets. The secretariat drafted a questionnaire and compiled answers, which are available as an annex to document ECE/TRADE/C/WP.6/2009/6, available on the website: [http://www.unece.org/trade/wp6/documents/2009/wp6\\_09\\_006E.pdf](http://www.unece.org/trade/wp6/documents/2009/wp6_09_006E.pdf).

### III. Meetings held in 2010

9. The two meetings held in 2010 opened with a short presentation of the initiative and its achievements.

10. At the first, the Bureau of the Working Party and the Chair of the ATEX Administrative Cooperation Committee (ATEX ADCO) expressed broad support for the initiative. Some comments on the text of the CROs were noted. Participants said they would like a more formal and structured setting for the work of the Sectoral Initiative, based on stable participation by national members.

11. At the second meeting, the Coordinator of the Initiative presented a project proposal for organizing awareness-raising and capacity-building events not just in the UNECE region but worldwide. The proposal—an abstract of which is reproduced as annex II of this document—aims at showing regulatory authorities the high risks and challenges that are inherent to the sector, and highlighting best practice in industry, standardization and certification bodies.

12. The participants supported the proposal. They were of the opinion that regulatory authorities in developing countries, countries with economies in transition and emerging markets needed to be better informed about the tools available for drawing up legislation in this sector. Some participants also wanted to see changes in the policies of developed countries, which they viewed as unnecessarily restrictive to international trade flows.

13. These comments underscored the need for financial resources as well as for backup and expertise. IEC offered the logistical support of its regional branches should the events be organized in regions where it had offices. In choosing the location of the events, the industry should be consulted because it knew which markets and challenges were the most important.

14. Comments that were made on the text of the CROs, either at the session or afterwards, have been incorporated in the 2010 version of the CROs, which is reproduced in annex I to this document.

15. Several practical suggestions on how to proceed were made:

- Prepare a formal document that could be prepared with an endorsement of the CROs by the bureaux of standardization committees involved, as well as IECEX, and UNECE.
- Discuss the Sectoral Initiative in national member bodies.
- Make a call for proposals for national and regional workshops.
- Learn from the experience of other UNECE bodies active in harmonization of legislation (for example in transport).

16. It was agreed that the next steps would be:

- A joint UNECE-IECEX publication of the CROs.
- Continue efforts for fundraising, particularly for developing countries.

### IV. Deliverables for the annual session

17. The main outcome of the work of the Initiative is the revised version of the CROs, which the Working Party is requested to endorse.

18. The Working Party is invited to encourage more delegations to participate in the work of the Initiative, including by nominating representatives who will attend the meetings regularly.

## **V. Responsibility for the continuation of the work**

19. The current Coordinator of the Sectoral Initiative is Mr. Frank Lienesch.

## **VI. Role of the secretariat**

20. The secretariat will continue supporting the work of the Initiative by trying to raise funds for the proposed project, as well as servicing its meetings (prepare the invitation, agenda and supporting documents) and preparing the reports of the meetings. The website of the Initiative will be kept up to date. The secretariat could assist the Convener in maintaining and developing contacts with the counterparts of the Initiative in the national Governments.

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## **Annex I**

### **Common regulatory objectives**

#### **Version 2010-01**

#### **1. Background**

1. Explosion protection is an essential part of the overall risk management to be conducted for industrial plants and appliances, to ensure safety in industrial processes using or producing hazardous materials like – for example - combustible gas, dusts or vapours.
2. The basic principles of explosion protection have been applied in industry and mines for over 100 years. They have been codified in international standards such as the International Electrotechnical Commission (IEC) 60079-0, and conformity assessment best practice such as the International Organization for Standardization (ISO) System No.5 product certification schemes – for example, the IECEx.
3. The significance of the international standards upon which the industry relies can be seen by the increased participation in IEC TC 31, which reached 44 countries as of April 2009, either participating or observing.
4. Many national and regional regulations already use the technical requirements contained in the standards drawn up by IEC TC 31, which also develops standards covering non-electrical equipment (mechanical).
5. The ISO and IEC standards are increasingly adopted by participating countries at the regional and national level, either in full, without any variation, or in part, with supplementary requirements contained in national standards.
6. Countries use standards in their regulations in different ways, including:
  - (a) By making standards mandatory through a legislative act;
  - (b) By making compliance with the standards a means of proving compliance with the essential health and safety requirements laid out in the legislation: under this approach, equipment that complies with the provisions of the standards is “deemed to comply” with the requirements specified in the regulations.

#### **2. Purpose of the Sectoral Initiative on Equipment for Environments with an Explosive Atmosphere**

7. The purpose of the Sectoral Initiative on Equipment for Environments with an Explosive Atmosphere is to promote the convergence of national technical regulations currently in place in this sector towards a shared framework. This will reduce barriers to trade in this equipment, as well as costs. It will also increase the safety of the installations and the well-being of personnel working in the sector, as well as that of the communities living near the installations.

### 3. Scope statement of the common regulatory objectives contained in this document

8. The Common Regulatory Objectives (CROs) presented in this document have been drawn up in accordance with Recommendation L of the Working Party on Regulatory Cooperation and Standardization Policies of the United Nations Economic Commission for Europe (ECE/TRADE/378 – UNECE Recommendations on Standardization Policies).

9. The purpose of the CROs is twofold. On the one hand, they can be used as a model to draw up legislative instruments in countries that do not currently have regulations in this sector. On the other, they can be used to align existing national regulation with an internationally harmonized best practice.

10. The CROs are drawn up with reference to international standards and conformity assessment procedures developed by IEC and ISO and to best practice in the assessment of conformity to such standards, within the IECEX.<sup>1</sup>

11. The CROs address the requirements both for electrical and mechanical equipment being placed on the market (part one of the present document) and for the safe installation and use of the equipment in the workplace (part two of the present document).

12. Explosion protection in industry can be assured through a variety of legitimate means. The present document is based on one of them, namely, the “IEC Zone Concept”.<sup>2</sup> This concept classifies hazardous locations as high, medium and low risk zones based on a standard risk-assessment methodology.

13. Additionally, the present document is based on the life-cycle approach, which requires proper inspection, maintenance and repair of explosion-protected equipment. This approach guarantees effective and efficient explosion protection and the elimination of potential ignition risk, at all times when a facility or product is in use.

14. Most national regulatory frameworks require that conformity assessment be conducted by independent, third-party inspection bodies. This is a prerequisite for safety in a sector where hazards are substantial and may involve many casualties.

15. The main drawback of such a system is that equipment traded internationally may have to undergo repeated testing and conformity assessment for each of the national markets to which it is exported. This greatly increases the cost of the equipment without a corresponding increase in safety for workers and end-users.

16. Additionally, the existence of disparate safety procedures in a sector that operates as a truly global and integrated industry may in and of itself constitute a hazard. Indeed, as workers move from one location to another, they may be insufficiently familiar with local safety procedures.

17. For these reasons, an internationally recognized certification scheme, such as the IECEX, is of essential importance in order to reduce unnecessary costs associated with duplication of testing and assessment and as the basis for sound risk management. In time, this should be flanked by a system of personnel certification aimed at ensuring competencies within a system of standard safety procedures, such as the new IECEX Certificate of Personal Competency Scheme.

18. One final and essential element of the present document relates to market surveillance. Market surveillance is necessary to monitor the proper application of the

<sup>1</sup> IEC System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres.

<sup>2</sup> See [http://www.iec.ch/zone/fsafety/fsafety\\_entry.htm](http://www.iec.ch/zone/fsafety/fsafety_entry.htm).

CROs by industry and increase confidence in the effectiveness of the CROs. Common guidelines will be defined to support the national authorities defining and implementing actions and procedures, including for the removal of unsafe products from the national market.

## **Common regulatory objectives**

### **Part one**

#### **Requirements for placing products and equipment on the market**

##### **A. Definition of applicable standards**

19. Potential ignition sources that may occur when electrical and mechanical equipment is used in accordance to its intended use must be eliminated. The list of potential ignition sources published in the applicable international standards assists in identifying risks caused by stand-alone equipment (see appendix, A1).

20. To eliminate the ignition sources validated protection concepts (“types of protection”) have to be applied, as laid down in applicable IEC or international standards (see appendix, A2). Equipment is to be manufactured under ongoing third-party surveillance. The manufacturer has to operate a Quality Management System that complies with the requirements of the applicable ISO/IEC standard (see appendix, A.3).

21. The documentation accompanying the equipment has to cover instructions about the intended use, and details for installation and repair. The documentation has to be available in English. On request of the customer of the equipment, the manufacturer must provide a translation into a national language.

##### **B. Definition of applicable conformity assessment procedures**

22. Compliance with this CRO shall be by use of an international certification scheme such as IECEx for direct market acceptance of products carrying IECEx Certification. Alternatively, where national legislation does not allow for use of IECEx certificates, national certification of compliance should be based on IECEx testing and assessments.

## **Common regulatory objectives**

### **Part two**

#### **Requirements for the safe use of the equipment**

23. All substances intended for use in a plant or facility characterized by an explosive atmosphere have to be classified concerning their safety characteristics by applying the applicable ISO/IEC standards (see appendix, B.1).

24. If it is not possible to avoid explosive atmospheres, the different risk levels in an area according the IEC Zone classification concept have to be assessed by applying the applicable IEC standards (see appendix, B.2).

25. The selection of equipment in a classified area (Zones 0, 1, 2, 20, 21 and 22) has to be aligned with the applicable Equipment Protection Level Ga, Gb, Gc, Da, Db, Dc, Ma and Mb installed accordingly (see appendix, B.3).

26. The equipment has to be installed properly by taking into account specific local conditions (e.g. ambient temperature, potentially aggressive materials) and the intended use of the equipment, specified in the product documentation (see appendix, B.3).
27. The installation and the equipment needs to be inspected and maintained by appropriate and effective procedures that have to be implemented in the quality system of the plant (see appendix, B.4)
28. In the case of personnel performing work functions that govern the selection, installation and use of equipment, the personnel shall be appropriately qualified as being competent. Compliance with this requirement may be demonstrated by use of an international Certification Scheme such as IECEx for acceptance of persons carrying an IECEx Certificate of Personal Competency. Alternatively, where national legislation does not allow for use of IECEx certificates, national certification of compliance should be based on IECEx assessment of persons according to IECEx requirements.
29. In case of necessary repair of equipment, appropriate repair procedures have to be implemented in the quality system of the plant (see appendix B.5). Compliance with this requirement may be demonstrated by use of an international Certification Scheme for acceptance of Repair Facilities like IECEx Certification to the applicable IEC standard (see appendix, D3). Alternatively, where national legislation does not allow for use of IECEx certified repairers, national certification of compliance should be based on IECEx assessment and audit of such facilities.
30. All rationales and concepts related to the explosion risk assessment and the adequate measures to eliminate these risks have to be documented in the “Explosion Protection Document”.

## **Common regulatory objectives**

### **Part three**

#### **Reference list to international standards providing the presumption of conformity with this regulation model**

31. Standards providing the presumption of conformity with the requirements in part one and two are listed in the appendix, chapter A and B. The list of standards is to be updated as frequently as necessary depending on the publication output of IEC or ISO/IEC standards relevant to the objectives of this regulation model.
32. The group of countries that have implemented this regulation model shall form a Standard Acceptance Group (UNECE-ExSAG) which will concern itself with the acceptance of IEC or ISO/IEC standards providing the presumption of conformity with this regulation model. The members of this group seek for access to all standardization work of IEC (drafts, meetings) in order to influence standardization with concerns of regulators in an early stage. After the working group has accepted it, the standard will be listed in the appendix to this regulation model. If there is a former edition of the standard, this former edition will be withdrawn from the list within three years.

## **Common regulatory objectives**

### **Part four**

#### **Recognition of conformity assessment bodies**

33. The accreditation of conformity assessment bodies and test laboratories has to follow the applicable ISO/IEC standards (see appendix, D.1). The accreditation body has to



be member of ILAC/IAF. One member of the assessor team needs competence in the field of explosion protection (see e.g. the list of approved IECEx assessors).

34. Certificates have to be in line with ISO Type 5 requirements of the applicable ISO/IEC standard resp. guide (see appendix, D.2)

35. The use of the IEC Conformity Assessment System IECEx provides the presumption of conformity with the requirements of Part Four.

## **Common regulatory objectives**

### **Part five**

#### **UNECE explosion protection steering committee**

36. To monitor the application experience within the countries that have based their national legislation on the UNECE regulation model and to update the regulation model in the light of their experience, a UNECE Explosion Protection Steering Committee (UNECE-ExSC) is to be formed and operated under the umbrella of UNECE WP.6.

37. The ExSC agrees on a constitution and other governing rules and procedures of the daily operations (e.g. voting procedures).

38. The ExSC notifies the members of the Standard Acceptance Group (UNECE-ExSAG).

39. Members of the ExSC with the right to vote are the representatives of those countries having implemented the regulation model. Observers are also invited to attend the meetings: representatives from IEC-SMB, IEC-CAB, IEC/TC 31, IECEx, "MARS" group.

## **Common regulatory objectives**

### **Part six**

#### **Market surveillance**

40. To monitor proper compliance with the requirements of this model regulation in the marketplace, a network of market-surveillance experts in explosion protection is to be formed and operated (UNECE-ExMARS, see appendix F.1).

41. In case of critical non-conformance, an international alert system (ExAlertSystem) has to be used to inform all UNECE members about recently detected risks or faulty products.

## Appendix

### List of accepted standards and guidelines

#### Under maintenance of the UNECE-(IECEX) ExSAG

##### A.1 Basic concepts and methodology

EN 1127-1, EN 1127-2 (IEC/SC 31M project, will supersede EN)

##### A.2 Design requirements for electrical and non-electrical equipment

###### Electrical Equipment:

IEC 60079-0, IEC 60079-1, IEC 60079-2, IEC 60079-5, IEC 60079-6, IEC 60079-7, IEC 60079-11, IEC 60079-15, IEC 60079-18, IEC 60079-25, IEC 60079-26, IEC 60079-27, IEC 60079-28, IEC 60079-29-1, IEC 60079-29-4, IEC 60079-30-1, IEC 60079-31, IEC 61241-0, IEC 61241-4, IEC 61241-11, IEC 62013-1

###### Non-electrical equipment:

EN 13463-1, EN 13463-5, EN 13463-6, EN 13463-8, EN 14797, EN 14373, EN 14994, EN 14460, EN ISO 16852 (IEC/SC 31M project, developing ISO/IEC 80079-36, ISO/IEC 80079-37 and ff, will supersede EN)

##### A.3 Production of equipment

EN 13980 (IEC/SC 31M project, developing ISO/IEC 80079-34, will supersede EN)

##### B.1 Material characteristics for gas and vapour classification

IEC 60079-20-1, EN 13821, EN 14034 (IEC MT 80079-20-2 project, developing IEC 60079-20-2, will supersede EN)

##### B.2 Classification of Areas

IEC 60079-10-1, IEC 60079-10-2

##### B.3 Electrical installations design, selection and erection

IEC 60079-14

##### B.4 Electrical installations inspection and maintenance

IEC 60079-17

##### B.5 Equipment repair, overhaul and reclamation

IEC 60079-19

##### D.1 Conformity-assessment standards

ISO/IEC Guide 65, ISO/IEC 17025, ISO/IEC 17021, ISO/IEC 17024

##### D.2 Fundamentals of product certification

ISO/IEC Guide 67

### **F.1 Guidelines for market surveillance**

Guidelines for market surveillance are in preparation by this Sectoral Initiative in cooperation with the MARS group.

## **Annex II**

### **Project proposal: convergence of technical regulations in the sector of equipment used in environments with an explosive atmosphere**

**Time frame: through August 2012**

This project aims at promoting convergence towards a shared framework of the technical regulations in force internationally in the sector of equipment used in environments with an explosive atmosphere. This will not only facilitate trade in this sector but also increase the safety of the installations in which such equipment is used.

#### **I. Rationale of the project and current situation**

1. Offshore facilities and vessels, and onshore facilities such as mines, refineries, chemical plants and mills, are environments that expose workers and surrounding areas to high risks, inter alia because of the likelihood of explosions. Therefore, all equipment used in these environments must have a high level of safety to minimize the risks of explosions and mitigate potential consequences.
2. The basic principles of explosion protection have been applied in industry and mines for more than 100 years. They have been codified in international standards and conformity assessment best practice, and constitute the core of national regulations applied in all the regions of the world.
3. In spite of the similarities among domestic regulatory frameworks, trade in equipment used in environments with explosive atmosphere experiences very important barriers. Equipment used in mines, for example, faces delay that may be as long as two years for approval of import.
4. Most delays and costs can be attributed to the requirement that conformity assessment be conducted by independent, third-party inspection bodies. This is a prerequisite for safety in a sector where hazards are substantial, but may result in repeated testing and repeated conformity assessment for each of the national markets to which equipment is exported.
5. In a number of developing countries, and countries with economies in transition, the regulatory framework for this sector is not sufficiently elaborate if not inexistent, and national administrations and certification bodies do not have adequate expertise to conduct the required audit procedures. This greatly increases the costs of the equipment without a corresponding increase in the safety of workers and end-users.
6. The role of inspection and market surveillance authorities in this sector is especially important. For this reason, the industry and policymakers have expressed interest in developing guidance document for this work.

#### **II. The role of WP.6**

7. This project builds on the work and expertise of: UNECE, IECEx and the Physikalisch-Technische Bundesanstalt.

8. In 2006, the UNECE Working Party on Regulatory Cooperation and Standardization Policies (WP.6) suggested launching an initiative to develop common regulations in this sector based on the model of “Recommendation L”.

9. Specifically, the purpose of the initiative is to develop common regulatory objectives (CROs) covering the definition of area classification, verification of the equipment and its production, installation, inspection, maintenance, repair and the related conformity-assessment procedures for products, services and competency of personnel. The goal of the Sectoral Initiative is to promote and enhance safety, while at the same time eliminating barriers to the free trade and use of the equipment.

10. The Working Party conducted a country survey to document existing regulatory practices in this sector, and to use this information for the development of CROs. The results of this survey were discussed by the WP.6 Bureau in Stockholm in May 2009, and presented to regulators in Melbourne in September 2009 after the IECEX Scheme meeting. Their feedback was integrated into the draft CROs, which were adopted by the Working Party at its annual session in 2009. This opens the way for harmonizing standards in the sector of equipment used in explosive environments.

## **II. Project**

### **A. Objectives**

11. The project aims at promoting:

- Free trade in the sector of equipment used in environments with an explosive atmosphere;
- Increased safety in the plants and installations where this equipment is used.

### **B. Outcomes**

- Common requirements for electrical and mechanical equipment being placed on the market.
- Common procedures for the assessment of products and services to such requirements, eliminating the need for repeated testing and conformity assessment.
- Further development of the model regulatory framework, in particular as regards the market surveillance component

### **C. Outputs**

- Guidance documents on a model regulatory environment in the sector of equipment for explosive atmospheres, including:
  - A comprehensive description of the functioning model of the sector (highlighting cooperation among regulatory bodies, inspection authorities, and business) and regulatory best practice adopted internationally.
  - Methodology for assessing and managing the risks of plants, products, installations.
  - Methodology for assessing the effectiveness of the regulatory system in the sector and for its continual improvement.
  - Informative documents/ brochures for all stakeholders, including companies, inspection bodies and policymakers.

- Material for seminars and online courses on a common regulatory framework in the sector:
  - Course materials: presentations, workbooks for tutors and delegates, tests.
  - Online courses on the use of risk-management tools in the sector.
- Four seminars: in Latin America, Africa, South Asia and the Middle East

### **III. Actors involved**

#### **A. Partners in the execution of the project**

12. Together with UNECE (and more specifically WP.6), three other actors are important for the success of the project:

- The Government of Germany and the Physikalisch-Technische Bundesanstalt for providing expertise in developing the course materials and participating in the training courses.
- The International Electrotechnical Commission and the International Electrotechnical Commission System for Certification to Standards Relating to Equipment for use in Explosive Environments for developing the course materials and participating in the training courses.
- The other four regional commissions of the United Nations for contacts with regional and national counterparts in their regions as well logistics support.

#### **B. Target group**

13. The target group is mainly composed of:

- Policymakers (e.g. from the Ministry of Economy, Ministry of Trade) from South-East Asian developing countries
- Representatives of national standardization organizations (working on technical regulations, conformity assessment, market surveillance, etc.) from South-East Asian developing countries

### **IV. Plan**

#### **A. Expected accomplishment**

EA1: Informing policymakers and representatives of standardization organizations about the International Model for Technical Harmonization of Recommendation L and the Sectoral Initiative.

EA2: Training representatives of standardization organizations to understand the Common Regulatory Objectives of the Sectoral Initiative.

#### **B. Activities/outputs**

A1: Meetings with regulatory bodies and market surveillance authorities to further refine the model regulatory framework.

A2: Organizing a workshop in each of the four regions, gathering policymakers and representatives of standardization organizations from neighbouring countries.

A3: Collaborating with partners (PTB, IECEEx) for preparing the workshop (material, identification of individuals to target, etc.).

A4: Hiring a local consultant to help organize the workshops.

**C. Indicators of achievement**

IA1: The number of participants (baseline: N/A; target: 21 per workshop)

IA2: Evaluation of the workshop by participants as measured through detailed survey/questionnaire (baseline: N/A; target: average of 8 out of 10)

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