Special Report
April 2013

Making a Mark

Reporting on Firearms Marking in the RECSA Region

By James Bevan and Benjamin King

A study by the Small Arms Survey and the Regional Centre on Small Arms in the Great Lakes Region, the Horn of Africa and Bordering States; with support from the US Department of State's Office of Weapons Removal and Abatement

Copyright

Published in Switzerland by the Small Arms Survey

First published in April 2013

Small Arms Survey
Graduate Institute of International and Development Studies
47 Avenue Blanc, 1202 Geneva, Switzerland

Copy-edited by Biddy Greene
Proofread by John Linnegar (johnlinnegar@gmail.com)

Cartography by MAP*grafix*

Typeset in Optima and Palatino by Richard Jones (rick@studioexile.com), Exile: Design & Editorial Services

Printed in France by GPS

ISBN 978-2-9700856-1-4

ISSN 1661-4453

The Small Arms Survey

The Small Arms Survey is an independent research project located at the Graduate Institute of International and Development Studies in Geneva, Switzerland. Established in 1999, the project is supported by the Swiss Federal Department of Foreign Affairs and current contributions from the Governments of Australia, Belgium, Canada, Denmark, Finland, Germany, the Netherlands, Norway, Sweden, the United Kingdom, and the United States. The Survey is grateful for past support received from the Governments of France, New Zealand, and Spain. The Survey also wishes to acknowledge the financial assistance it has received over the years from different United Nations agencies, programmes, and institutes.

The objectives of the Small Arms Survey are: to be the principal source of public information on all aspects of small arms and armed violence; to serve as a resource centre for governments, policy-makers, researchers, and activists; to monitor national and international initiatives (governmental and non-governmental) on small arms; to support efforts to address the effects of small arms proliferation and misuse; and to act as a clearinghouse for the sharing of information and the dissemination of best practices. The Survey also sponsors field research and information-gathering efforts, especially in affected states and regions.

The project has an international staff with expertise in security studies, political science, law, economics, development studies, sociology, and criminology, and collaborates with a network of researchers, partner institutions, non-governmental organizations, and governments in more than 50 countries.

Small Arms Survey
Graduate Institute of International and Development Studies
47 Avenue Blanc, 1202 Geneva, Switzerland

p +41 22 908 5777 **f** +41 22 732 2738
e sas@smallarmssurvey.org **w** www.smallarmssurvey.org

The Regional Centre on Small Arms in the Great Lakes Region, the Horn of Africa and Bordering States

The Regional Centre on Small Arms in the Great Lakes Region, the Horn of Africa and Bordering States (RECSA) is an intergovernmental organization that was established in June 2005.

Its mission is to coordinate action against the proliferation of small arms and light weapons in the great lakes region and horn of Africa, in order to establish a safe and secure sub-region in a peaceful continent, free from arms proliferation.

Initially known as the Nairobi Secretariat, RECSA was set up to coordinate the implementation of the Nairobi Declaration on the Problem of the Proliferation Illicit Small Arms and Light Weapons in the Great Lakes Region and the Horn of Africa.

The Nairobi Declaration was signed on 15 March 2000 by ten countries: Burundi, Democratic Republic of Congo, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Sudan, Tanzania and Uganda. Central African Republic, Congo, the Seychelles, Somalia, and South Sudan have since signed, bringing the total number of RECSA member states to fifteen, as of March 2013.

Regional Centre on Small Arms and Light Weapons
P.O. Box 7039-00200, Nairobi, Kenya

p +254-20-3876023 **f** +254-20-3877397
e info@recsasec.org **w** www.recsasec.org

Contents

List of maps, figures and tables

Maps

Figures

Tables

About the authors

James Bevan has more than a decade of experience in tracking weapons in armed conflicts across Africa. A former field researcher with the Small Arms Survey and head of the UN Group of Experts on Côte d'Ivoire, he is now the director of Conflict Armament Research—a UK-based organization that identifies and tracks conventional weapons in contemporary armed conflicts.

Benjamin King is a Researcher for the Small Arms Survey. He specializes in topics relating to physical security and stockpile management (PSSM), particularly assistance programs designed to improve national standards. He currently coordinates the Small Arms Survey's Unplanned Explosions of Munitions Sites (UEMS) project, and is involved in several assessments of PSSM assistance programmes. He has conducted extensive field research in China and throughout Africa.

Foreword

Both the UN Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All Its Aspects (PoA) and the Nairobi Protocol for the Prevention, Control and Reduction of Small Arms and Light Weapons in the Great Lakes Region and the Horn of Africa (Nairobi Protocol) underscore the importance of marking, record-keeping and tracing to counter the illicit proliferation of small arms.

Governments have spent more than ten years and millions of dollars to make good on their commitments in this regard. The 15 members of the Regional Centre on Small Arms in the Great Lakes Region, the Horn of Africa and Bordering States (RECSA)—together with generous support from many donors, including the United States and the 27 members of the European Union—have made great progress in attaining their objectives.

But progress is not uninterrupted or even. Why have some governments made greater strides whereas others have moved forward haltingly? And what can governments learn—both from within and outside of the region—from RECSA members' experiences?

This study, *Making a Mark: Reporting on Firearms Marking in the RECSA Region*, is the latest example of the mutually beneficial collaboration the Small Arms Survey and the RECSA Secretariat have long enjoyed. The studies' three researchers—James Bevan, Benjamin King, and Jonah Leff—together with Godfrey Bogonza, Barbara Munube, and Francis Waraigu, from the RECSA Secretariat, who helped procure the marking machines, develop the accompanying record-keeping software, provide the requisite training for these systems' use, and administer and manage the assistance program to RECSA members, are to be congratulated for providing such a useful piece of research and analysis. The U.S. Department of State's Office of Weapons Removal and Abatement deserves credit for not just underwriting the purchase of equipment and associated training, but also for seeing the value of examining how their investment was used and how its assistance can be made more effective in the future.

We note that the systems now in place as a result of these initiatives have already resulted in successful weapons tracing and likely have deterred diversion from occurring in the first place. We look forward to working together to examine how the six RECSA member states not part of this study fare in meeting their objectives as well as following the progress of the nine countries visited and which form the basis of this initial undertaking.

Dr. Francis K. Sang
Executive Secretary
RECSA Secretariat

Nairobi, 27 February 2013

Eric G. Berman
Managing Director
Small Arms Survey

Geneva, 27 February 2013

Acknowledgements

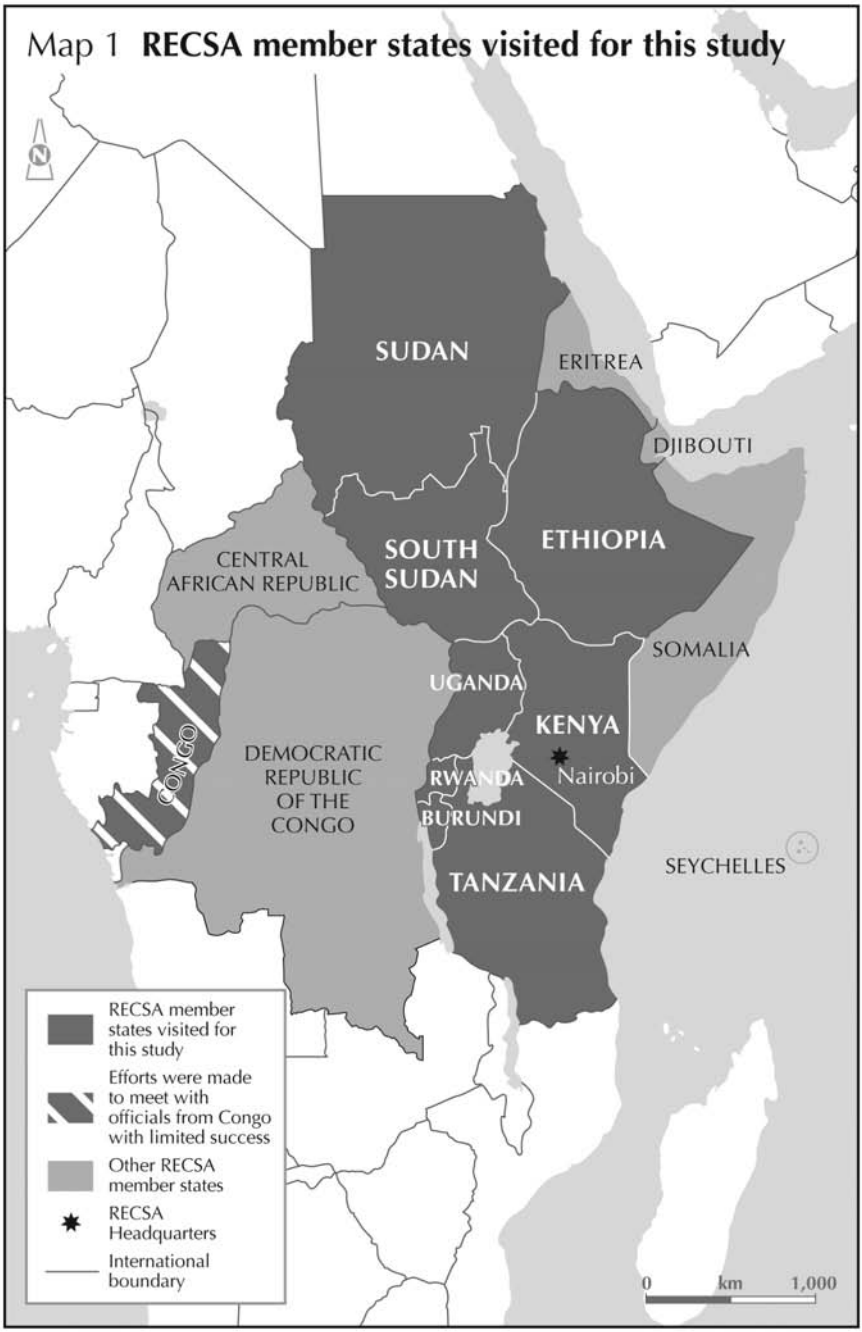
The authors wish to extend their thanks to all of the people who took the time to respond to our questions. The country assessments were made possible thanks to the participation of each country's National Focal Points plus other involved persons. Our sincere appreciation goes to: Zenon Ndabaneze in Burundi; Yemane Gessesew and Eyob Tesfu in Ethiopia; David Kamaiyo in Kenya; Emmanuel Misingo and Sam Karemera in Rwanda; Riak Gok Majok, Christo Fataki, and John Mekki Malou in South Sudan; Abdel Aziz Malik Mohamed and Dr. Mahmoud Zinelabdin in Sudan; Esaka Mugasa and Mayala Towo in Tanzania; and Ahmed Wafuba in Uganda. We would also like to thank Marius Kahl from BICC for his assistance.

Special thanks are necessary for Barbara Munube, Godfrey Bagonza, and Francis Wairagu from the RECSA Secretariat for the thorough clarifications they provided throughout the course of the study.

The authors also wish to acknowledge several colleagues from the Small Arms Survey. In particular, thanks to Jonah Leff for conducting several of the country assessments as well as to Anna Alvazzi del Frate for serving as an advisor throughout the study. And, finally, we are grateful for all of the hard work the production team contributed to this publication, especially Jovana Carapic for her timely fact-checking, Biddy Greene for editing the draft, and Martin Field for overseeing the entire production process.

Abbreviations and acronyms

BICC	Bonn International Center for Conversion
CAR	Central African Republic
CES	Central Equatoria State
DRC	Democratic Republic of the Congo
EAC	East African Community
EU	European Union
FDN	Burundian National Defence Force (Force de défense nationale)
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Agency for International Cooperation)
ISO	International Organization of Standardization (classification)
IT	Information technology
ITI	International Tracing Instrument
KDF	Kenya Defence Force
NFP	National Focal Point (on small arms and light weapons)
PM/WRA	Bureau of Political-Military Affairs, Office of Weapons Removal and Abatement (US Department of State)
PNB	Burundian National Police (Police nationale du Burundi)
PSSM	Physical security and stockpile management
RECSA	Regional Centre on Small Arms in the Great Lakes Region, the Horn of Africa and Bordering States
RDF	Rwanda Defence Force
SSPS	South Sudan Police Service
UNDP	United Nations Development Programme
UPDF	Uganda People's Defence Force
UPF	Uganda Police Force
UWA	Uganda Wildlife Authority


Map 1 RECSA member states visited for this study
N
SUDAN
ERITREA
DJIBOUTI
ETHIOPIA
SOUTH SUDAN
CENTRAL AFRICAN REPUBLIC
SOMALIA
UGANDA
KENYA
Nairobi
CONGO
DEMOCRATIC REPUBLIC OF THE CONGO
RWANDA
BURUNDI
TANZANIA
SEYCHELLES
RECSA member states visited for this study
Efforts were made to meet with officials from Congo with limited success
Other RECSA member states
RECSA Headquarters
International boundary
0 km 1,000

Introduction

With the signing of the Nairobi Protocol in 2004, 11 member states of the Regional Centre on Small Arms in the Great Lakes Region, the Horn of African and Bordering States (RECSA)[1] committed themselves to marking their national stockpiles of small arms and light weapons. The objective of this exercise was to ensure that any weapon found on the illicit market could be traced[2] back to its original, legal owner through a unique identifying code. The participating states viewed this measure as an essential precursor to controlling diversion – the 'unauthorized transfer of arms and ammunition from the stocks of lawful users to the illicit market' (Bevan, 2008, p. 43).

In 2006, the US Department of State provided RECSA with the first of a series of grants for the purchase of weapon-marking machines (see Figure 1) and to

Figure 1 **A dot-peen marking machine in operation**

Butaleja, Uganda, 18 November 2011 © Conflict Armament Research Ltd.

finance the associated training of the machine operators. Additional donors contributed to the effort, notably the government of Japan's financial support for the development of national record-keeping software. In the six years leading up to 2012, and with assistance from other international donors, RECSA member states have been able to mark hundreds of thousands of weapons.

This assessment examines the progress made by eight RECSA states[3] during the 2007–2012 marking initiative. It summarizes the findings from an extensive Small Arms Survey field evaluation, conducted from October 2011 to March 2012. During the evaluation, the Survey's staff assessed all aspects of national marking programmes, including the suitability and functioning of marking equipment, necessary logistical arrangements (such as vehicles to transport marking machines) and, critically, the success of these states in establishing effective national record-keeping systems.

The assessment's main findings include the following:

- The RECSA states surveyed had not met their commitments to mark all small arms and light weapons by December 2008, although some states had made significant progress towards this goal.
- States need to exhibit greater commitment to resolving challenges on their own when solutions are within their means.
- The states had, in general, found it relatively easy to mark weapons stockpiled in capital cities, but face logistical challenges to marking weapons in outlying areas (mainly due to a lack of mobility).
- Donor governments should consider allocating greater financial support to the logistical aspects of marking initiatives, providing funds to enhance the mobility of marking teams (including vehicles, fuel, and subsistence budgets).
- Existing marking equipment in use by the states is adequate for the needs of the marking programme, although the realistic marking rate (between 100 and 200 weapons daily) is slower than originally estimated.[4]
- Most states still need long-term record-keeping solutions. This would entail the use of adequate software and the means to link all records nationally.
- The states face problems in centralising records of weapons that are deployed in far-flung areas, because defence and security forces have no means of sharing electronic information remotely.

- The states mark weapons in phases, on a region-by-region basis, but, because of sporadic funding, marking is periodically dormant, so security force redeployment necessitates uneconomical repeat visits to each region.
- National marking progress is often difficult to evaluate due to conflicting reports and inconsistencies between accounts provided by National Focal Points (NFPs)[5] and the RECSA Secretariat.

This assessment paper examines the progress of RECSA member states towards meeting the goals inherent in the marking of firearms. It includes an analysis of the efficacy of the marking technology, the advances made in establishing effective record-keeping systems, and the progress made in enhancing the tracing capability.

Lessons from this analysis should have programmatic implications for both future marking performance among the currently participating states, and to similar marking initiatives getting under way in other regions.

Development of the initiative

The firearm-marking initiative originates in a commitment made by the region's states to Article 7 of the Nairobi Protocol (2004, Art. 7b). Article 7 stipulates that the parties must mark firearms under national control or jurisdiction with 'a simple marking permitting identification of the country of import and the year of import, and an individual serial number if the small arm or light weapon does not bear one at the time of import so that the source of the small arm or light weapon can be traced'.

In 2005, the region's states agreed upon a common weapons marking format, which consists of a star to denote state-owned weapons in the RECSA region, an International Standards Organization (ISO) country code and a unique serial number (RECSA, 2005, p. 15). States may also introduce codes that specify the particular branch of service or particular unit of the defence or security forces.

Figure 2 **Marks applied to a Uganda Police Force (UPF) weapon**

☆	Denotes state-owned weapons in the RECSA region
UG	ISO country code for Uganda
POL	Uganda Police Force
56-128119640	Serial number
25072	Accounting number
☐	Dot matrix code (enables electronic reading)

Weapon marking initiative at the Butaleja District Police Headquarters, Uganda, 18 November 2011.

In 2005, the states that were signatory to the Nairobi Protocol further committed themselves to marking their entire stocks of small arms and light weapons by the end of 2008 (RECSA, 2005, p. 15). This was an unrealistic objective – particularly given that RECSA did not supply the majority of the marking machines until 2009 – but it provided an important impetus for states to commence with marking operations. At the time of writing, the Central African Republic (CAR), Congo, Democratic Republic of Congo, Djibouti, Eritrea, and Somalia were the only RECSA member states not marking firearms.[6]

Procurement of the marking equipment used in the RECSA region occurred over the course of four grants.[7] RECSA procured 26 machines through two grants provided by the US Department of State's Office of Weapons Removal and Abatement (PM/WRA). The first set of seven Couth MC 2000 was delivered in 2008, while the remaining 19 machines were delivered in 2009.

The East African Community (EAC) also supplied marking machines to its five member states,[8] all of whom are also RECSA members. The EACs first round of marking machine procurement came in 2008 thanks to financial support provided by the German Agency for International Cooperation (GIZ). Five machines were purchased, one for each of the EAC member states. In 2010, the EAC procured an additional seven marking machines through a grant with the European Union (EU) (EAC, 2010). Thus, while this is a RECSA-led initiative, the complementary efforts added to the programme by other entities make it a 'RECSA region' initiative.

With funding from the Government of Japan, the RECSA Secretariat designed specialized software to serve as the basis of national databases for each country's defence and security force.[9] The development of this software began in February 2010, when the RECSA Secretariat held a brainstorming session with NFPs and representatives from several regional and international organizations.[10] The software was briefly piloted in October 2010 by Uganda and Seychelles. Their experience informed the changes that followed in the second version. This second version, developed in May 2011, also benefitted from reviews from Rwanda and Zambia. In May 2012, Rwandan police became the first force to use the software.

RECSA's role in the programme is one of facilitator rather than implementer – because the Nairobi Protocol signatory states have a responsibility to implement

their own national marking programmes.[11] In this role, RECSA has obtained funds for the initiative, assisted in the distribution of marking machines, facilitated trainings and technical support, and served as a central coordination mechanism for NFPs on small arms and light weapons in the region.

As of March 2012, RECSA member states had received a combined total of 38 marking machines. Twenty-six of these were supplied by RECSA, and 12 by the EAC (five of these marking machines were designated specifically for EAC member countries).

The Small Arms Survey field evaluation, however, estimates that six of these (held by various states) are currently unused (see Figure 5). By March 2012, hundreds of thousands of weapons had been marked. There is, however, a significant variation in national totals (see Table 5). This is the result of various factors, including the differing sizes of national stockpiles, differences in national capacity and varying degrees of national commitment to the initiative (see Table 6).

Objectives of a marking initiative

The overall aim of firearms marking is to prevent (or at least hinder) diversion. Diversion involves the loss, theft, or sale of weapons from legal users – including defence and security forces and civilian users – to illicit users (Bevan, 2008, p. 43).

Table 1 **Markings on government-owned firearms, by country**

Country	Star[a]	Country code	Unit Codes[b]	Locations	Dot matrix	Example
Burundi	*	BI	PNB, FDN	Receiver Bolt carrier	Yes	* BI PNB UA1234
Ethiopia	*	ET	FP	Receiver	Yes	* ETFP NM12345
Kenya	*	KE	KP, KDF	Barrel Breech block Receiver	Yes	* KE KP 12345
Rwanda	*	RW	DF, PL, INT SEC	Receiver Bolt carrier	No	* RDF 12345
South Sudan	*	Not applied[c]	SSPS, WL, FB, PS, C	Receiver	Yes	* WLCES
Sudan	*	SD	Khsp	Slide	Yes	* SD PKHAP 12345
Tanzania	*	TZ	PL, CAR	Slide and/or receiver	Yes	* TZ POL 12345
Uganda	*	UG	UPDF, UWA, POL	Receiver	Yes	* UG UPDF 56-123456

Notes:

This table is based on information gained during assessment interviews.

a. The star stamp denotes state-owned weapons.

b. These were the codes marked at the time of the study. Some of the services had yet to be marked (e.g. in Ethiopia).

c. South Sudan was not a country when they began their marking programme, and therefore they did not include a country code in their markings. Instead, the state in South Sudan where the firearm is held is indicated by a two- or three-letter abbreviation. In the example, in the table the CES refers to Central Equatoria State.

From a counter-proliferation perspective, marking serves two purposes. First it dissuades legal users (for example, soldiers) from selling weapons into illicit markets for fear that they might be identified as the 'diverting party'. In the second place it enables the tracing of weapons, after diversion, to the persons or units responsible for transferring them into illicit markets. This implies that, for a marking project to be successful, not only must weapons be marked so that they may be uniquely identified, but also records of the weapons and their users must be accurate, accessible, and searchable.

These principles are established in a non-binding international agreement through the International Tracing Instrument (ITI). The ITI clearly declares that tracing operations occur as a result of three mutually reinforcing pillars, namely marking, record-keeping and cooperation between states (UNGA, 2005, paras. 7–23). Marking, in combination with accurate record-keeping, enables weapons to be traced back to a legal user (see Table 1 for the identification information marked by the assessed states). Bilateral or multilateral cooperation then facilitates tracing by providing a means of exchanging information across international borders. Record-keeping and cooperation are therefore crucial components of any marking initiative.

About this study

Analysis criteria

The analysis has been separated into two layers:

a. The marking initiative itself. The marking initiative needs to fulfil a number of requirements in order to achieve its counter-proliferation objectives. The actual marking of firearms is just one of these requirements. Record-keeping and tracing mechanisms must also exist. The marking initiatives are therefore evaluated according to the criteria shown in Table 2.
b. The evaluation of the programme. This study breaks down the evaluation of the gun-marking programme according to the two distinct processes involved: the *set-up* and the *implementation*. This distinction is important to acknowledge; the RECSA Secretariat provides assistance in certain key areas

Table 2 **Assessment criteria**

Category	Sub-category	Indicators
Marking	(a) Technology	Marking rate Number of operable machines
	(b) Process	Total marked Information marked
Record-keeping	(a) Accounting system	Appropriate data recorded (weapons ID, user ID) Use of daily issue procedures
	(b) IT infrastructure	Existence of a national database Is data retrievable?
Tracing	(a) Capacity	Can traces be performed?
	(b) International mechanisms	Number of international traces conducted Established procedures

in setting up the process,[12] but each member state is responsible for the implementation of the initiative within its borders.

Information-gathering process

The study relied on some 40 key informant interviews and on-site field visits to assess technical performance, regional assistance, and national implementation processes.

During the information gathering, 14 member states possessed firearms-marking equipment supplied by RECSA. Owing to financial and time constraints, only nine countries were selected to participate in the field assessments – the selection criterion being that the country should already have a marking initiative in operation. Most of the assessments were conducted from 15 October through 28 November 2011 (see Table 3). The Kenya assessment was completed in March 2012, owing to scheduling constraints. A ninth assessment had been planned for Congo, but unforeseen complications prevented a November 2011 trip, and the researchers were not able to return until April 2012, one month after the devastating ammunition depot explosion in Brazzaville. The explosion

Table 3 **Interviews with key informants, by country (month, year)**

Country	NFP	Police Rep.	Military Rep.	On-site visit
Burundi	Nov. 11	Nov. 11	Nov. 11	Nov. 11
Congo	April 12	–	April 12	N/A
Ethiopia	Nov. 11	Nov. 11	Not granted	Nov. 11
Kenya	March 12	Not granted	Not granted	Not granted
Rwanda	Nov. 11	Nov. 11	Nov. 11	Nov. 11
South Sudan	Oct. 11	Oct. 11	Not granted	Not granted
Sudan	Nov. 11	Nov. 11	Not granted	Nov. 11
Tanzania	Nov. 11	Nov. 11	Not granted	Nov. 11
Uganda	Nov. 11	Nov. 11	Nov. 11	Nov. 11

Note: The 'on-site visit' column indicates that the researcher was allowed to view the marking process in action and interview members of the marking team.

destroyed all of the marking equipment and the marked firearms, so only limited information could be gathered.

The NFP was the first point of contact in each country. Interviews were sought from key personnel who had first-hand familiarity with their country's firearm marking initiative. Interviews were also conducted with the police and military officials who managed the daily marking operations. Often these interviews were facilitated through the NFP. Finally, when possible, on-site observations of the marking process were conducted.

RECSA and EAC officials were also interviewed regarding their role in the marking process. These interviews took place in parallel with the country assessments at their offices – in Nairobi, Kenya, and Arusha, Tanzania, respectively. The RECSA Secretariat also granted two follow-up interviews, at which they displayed the new software (June 2012) and commented on the draft of this assessment report (October 2012).

Supplementary sources on national marking programmes were few. The most relevant publicly available sources were RECSA Monthly Activity Reports. These reports provide brief updates on the current activities of member states and the RECSA Secretariat. Another useful, though limited, source was speeches made by government representatives at the United Nations General Assembly.

Limitations of the study

The success of the assessment depended on the cooperation of the interviewees. The limited number of secondary sources unfortunately prohibited the cross-checking of most information. The researchers made every effort to verify significant claims (using methods such as random spot checks of markings on operational firearms), but some information could not be independently verified. Conflicting information has been highlighted as necessary.

In addition, despite the researchers' efforts, not all of the key interlocutors were interviewed in each country. NFPs of each assessed country were interviewed, but access to the police and the military and/or on-site observations were not always granted (see Table 3). This led to an unevenness in country reporting.

Findings

Setup – RECSA's role in the marking initiative

The decisions made by the RECSA Secretariat regarding system design and procurement had consequences for the entire implementation. RECSA's main contribution to the marking effort was to provide the equipment and initial training.

Marking technology: performance of the equipment

States in the RECSA region use the Spanish-manufactured Couth MC 2000 dot-peen marking machine. Dot-peen machines punch a set of marks onto the receiver or frame of a weapon to create letters, numbers and images (Persi Paoli, 2010, p. 3). There are two basic components: the machine itself and the control unit. A petrol or diesel generator is also required, to provide electricity to the computer and to the compressor operating the pneumatic marking head.

Figure 3 **Marking on a curved surface**

Marks applied to the bolt carrier of an AKM assault rifle, Kamenge, Burundi, 24 November 2011.

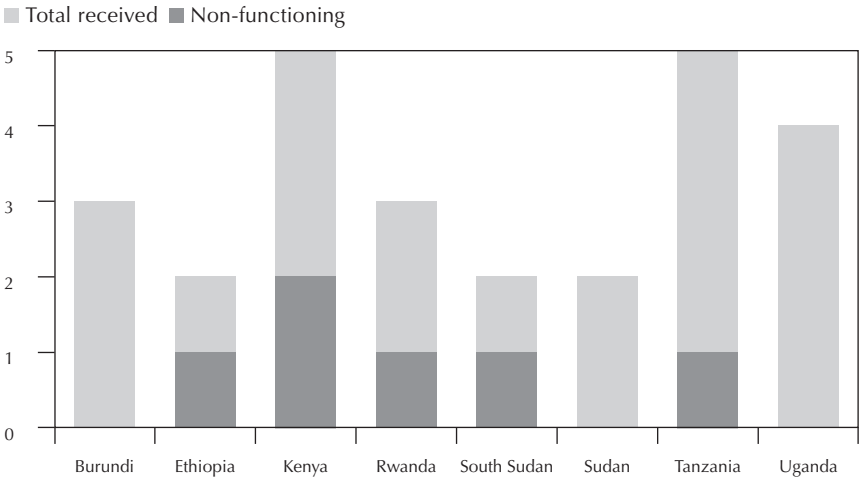
Figure 4 **A Ugandan marking team seats a 1970s-era AKMS assault rifle in the Couth MC 2000 marking machine**

The marks applied by the Couth MC 2000 meet the marking needs of the member states. These machines can easily mark most flat surface areas, but curved surfaces (such as the barrel of a weapon) can sometimes result in a mark of varied depth and definition. The machine is fast and can imprint a mark in less than five seconds. The full process of recording a weapon, however – entering its details into a computer and properly seating it in the marking machine – can take an experienced marking team three minutes or more from start to finish (see Figure 4).

Although the marking machines are fairly ruggedly built, one controller was damaged during transit (see Figure 5). This is primarily because of ad hoc transport arrangements – machines carried unboxed in the back of a pick-up truck on untarred roads. Lessons could be learned in this respect from South African marking initiatives, in which extensive preparations were made for the transport of marking machines, including the provision of purpose-built boxes and compartments affixed to vehicles (SAPS, 2012).

Some of the compressors supplied with the marking machines failed to deliver sufficient pressure. Markers in Burundi, Ethiopia, South Sudan, Sudan, Tanzania, and Uganda all reported experiencing difficulties in this regard and

Figure 5 **Total numbers and numbers of non-functioning machines in the assessed countries**[13]



some states have replaced their compressors with more powerful models, available from the civilian market.

Training

The first marking training took place in November 2008 in South Africa, through the support of the EAC.[14] Training was provided to personnel from Burundi, Eritrea, Ethiopia, Kenya, Rwanda, Seychelles, Sudan, Tanzania, and Uganda.[15]

Each member state also received training through RECSA. The RESCA Secretariat provided in-country training on operating the equipment to each recipient, upon delivery of the marking equipment. Burundi, Kenya, Rwanda, Tanzania, and Uganda received their equipment and training in December 2008. The next rounds of training occurred during October and November 2009 in (chronologically) Ethiopia, Burundi (for a second time), Seychelles, Djibouti, Sudan, and the DRC. From there, users in Zambia[16] (March 2010), South Sudan (June 2010), CAR (December 2010), Eritrea (April 2011), and the Congo[17] (August 2011) were trained.[18]

Operating the Couth marking equipment has proved to be a simple, repetitive task, one easy to master. The necessary skill set is easily transferable. After a single initial lesson, trainees in most countries were able to commence marking their national stocks. Several of the countries now provide their own training to new marking team recruits.

RECSA's training also taught basic maintenance and equipment repairs. Each piece of equipment was assigned one of three methods of maintenance. First, the commonly worn parts (the marking head units and marking pins) would be handled internally, since these components were designed to be easily replaceable. Secondly, the electrical parts of the marking equipment sometimes need repair; however, that requires much greater expertise, so states were instructed not to attempt any repairs of this kind. Electrical problems, and any other problems involving internal components, were to be directed to RECSA. Thirdly, faults with the various accessories (computer, compressor, or generator) were believed to be solvable by in-country technicians as they involve non-specialized equipment.[19]

Overall, the success of the training has been difficult to gauge. The lessons on operating the machinery appear to have been sufficient, as trainees in each country have mastered the marking process. Repair and maintenance training

has, however, been less successful. The three-tiered approach to effecting repairs is not being universally followed. Some states require RECSA's help in replacing marking pins, a task that people operating the machine should certainly be capable of performing.

The methods of repairing the compressor – the most frequently problematic component – have been varied. Some states have found local technicians able to repair them, or have simply purchased new ones on the local market. Other states have abandoned the compressor and thus the accompanying marking equipment and simply waited for RECSA to hand them a solution. This latter example is less a case of unsuccessful training than of a lack of state initiative.

Record-keeping

RECSA did not provide record-keeping software in the original marking equipment package. By the time the design for the software began in 2010, ten countries had already received their marking machines and training, and many had already started marking. As a result, each state needed to find a solution to cover their particular record-keeping needs.

Table 4 **Software use by country**

Country	Software	Awaiting RECSA software
Burundi	UNDP designed (police, civilian, and military)	No
Ethiopia	Microsoft Excel (federal police)	Yes
Kenya	Unspecified	Yes
Rwanda	Unspecified	Yes[a]
Tanzania	FirePro 6 (police and civilian)	Yes
South Sudan	Microsoft Word (police)	Yes
Sudan	Unspecified (police)	Yes
Uganda	Microsoft Excel (military)	Yes

Notes:

All of the data for this table was obtained during the in-country assessments that occurred between November 2011 and February 2012.

a. As at May 2012, the Rwandan police were using the RECSA software, according to updated reports from the RECSA Secretariat (author's interview with two RECSA Secretariat representatives, Nairobi, 22 October, 2012).

The majority of RECSA member states had planned to use the RECSA software, so interim solutions were necessary. (See Table 5 for a list of the interim software used by member states.) Member states decided on one of two types of record-keeping platforms: either Microsoft Office or specialized software. These platforms were temporary solutions for all but one member state.

As the new software becomes available, member states must transfer the data from their current records and, at the same time, become proficient in the new software. This transition from the old platform to the new software will be critical. It is unclear at this point how long that process will take. The possibility of errors occurring during the data transfer should be a real concern. Furthermore, the costs and time spent could be significant.

RECSA's decision to design specialized software was taken after careful review of what made sense in 2008.[20] Commercial asset management software existed at the time, but RECSA found it wanting. In the past five years, commercial tailor-made firearm inventory software has been developed.[21] And one country has expressed its willingness to share its national software, which UN member states or regional organizations may wish to pursue.[22]

The RECSA software

The RECSA software is essentially an inventory-management system. Its features allow it to serve as a national database for state and civilian weapons. Using the accompanying server, field offices should be able to connect their records to the national database.

The information recorded in the database contains the key components necessary for a state's inventory-management and tracing needs. Records include weapon type, all of the markings (both manufacture and post-manufacture), the authorized location, the weapons status (in duty, missing, destroyed, etc.), and, in the case of civilians, information identifying the legal owner. The system is also widely searchable. Full or partial pieces of information can be searched to identify the precise item or, failing that, a range of possibilities based on the criteria provided. This has proved to be a very effective tool for tracing weapons back to their original authorized locations.

One of the strengths of the system appears to be its security features. Electronic keys and passwords restrict access to the database. All modifications to the

records are permanently linked to a specific user through a history tracking feature, and any user's alterations to the database are also recorded. This could discourage attempts to manipulate the stored data.

As the system was not in operation in any of the RECSA states at the time of the research, it was impossible to assess its merits fully. The primary concern regarding the software is that this is a brand-new system. Since it is an untested product, it is difficult to predict what glitches or flaws may come to light once the system is fully operational. Given the amount of time governments will be spending on entering information into it and, especially, given the sensitivity of the information, the possibility of such problems arising must be considered.

Implementation – the efforts of member states

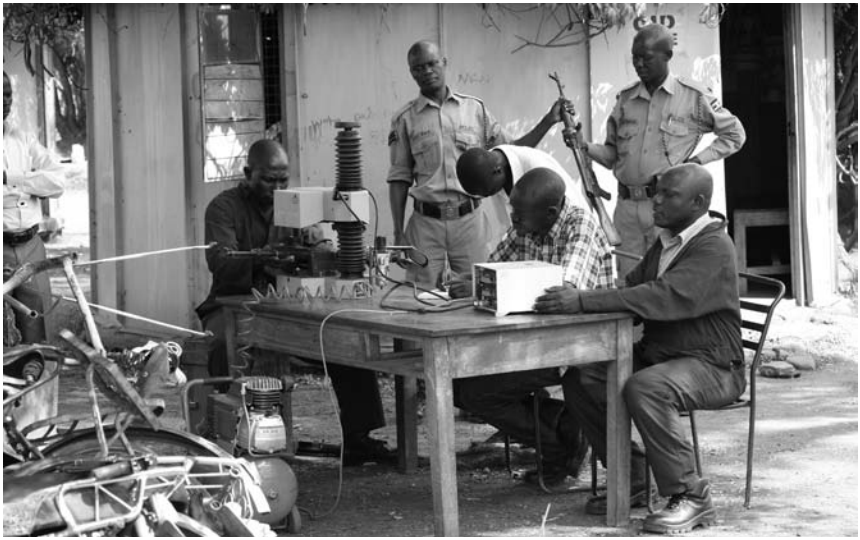
While the RECSA Secretariat supplied its member states with the equipment and training necessary to initiate marking programmes, it was the states themselves who were responsible for moving the effort forward. Member states developed their own strategies to undertake the marking exercise.

Marking

The marking process varies slightly from state to state. Marking is conducted in teams of two to six members. To increase efficiency, labour is divided, depending on the number of markers, much like a production line. Each team typically assigns one person to manage the marking machine (loading the firearm into the vice and lowering the machine for marking), one to operate the control unit, and another to create the record, usually manually entering information into a computer (see Figure 6). Others include disassembling and reassembling a firearm and general labour involving moving and storing firearms.

On average, states mark between 90 and 200[23] firearms a day. This is far below the envisaged rate of 1,500,[24] which now appears impracticable, given the time it takes to load a firearm into a vice before marking and to remove it afterwards. Surprisingly, the limited data available suggests that there is no correlation between the marking team composition and the speed of marking

Figure 6 **A Ugandan firearm-marking team**



(see Table 5). Having more team members does not necessarily appear to lead to increased daily rates. Anecdotal evidence suggests that more important factors of efficiency include the centralization of firearms at a fixed location and the marking of firearms of a similar type during the same session.[25]

Marking team mobility. One of the main challenges facing weapons markers in the region is the wide dispersal of defence and security forces across often-difficult terrain. States report that it is comparatively easy to conduct civilian marking and registration programmes, because government authorities can request civilians to present their weapons to a central registry within a certain period of time. Serving defence and security forces, however, cannot always be recalled from active duty and this necessitates the deployment of mobile marking teams to duty areas, where they mark weapons *in situ*.

Mobile marking has imposed severe delays on marking initiatives in most of the region's states. The reasons for these delays include time spent in travelling long distances to often small and isolated units. More importantly, delays also result from a shortage of vehicles, fuel and personnel assigned to marking teams.

Table 5 **Country marking totals, rates and team composition**

Country	Unit	Number in team	Date started	Percentage complete[a]	Estimated rate per machine per day
Burundi	PNB FDN	– –	May 2010[b]	64 N/A	– –
Ethiopia	Federal police	4	Spring 2010	N/A (100% FP in Addis Ababa)[c]	90
Kenya	Police KDF	5	May 2009	60 30	–
Rwanda	Police RDF	5 6	Jan. 2009[d]	100 N/A	– 200
South Sudan	SSPS Wildlife Fire Brigade Prisons[e]	–	Nov. 2010	Not available (100% of 2010 imports and 0% of old stocks)[f]	–
Sudan	Police Civilian	–	March 2011	80% in Khartoum	–
Tanzania	Police Wildlife Civilian	3	2008	45 60 N/A	150
Uganda	UPDF UPF UWA	3	Nov. 2009	20 98 100	–

Notes:

a. These percentages are based on updated totals, provided by RECSA Secretariat, 22 October 2012. During the in-country assessments (Nov. 2011–Feb. 2012) we obtained the total numbers of firearms marked. (These totals are given in the unpublished Country Assessment Reports.) Note: Some states expressed reservations about publishing the total number of marked firearms, so the Survey has used percentages to illustrate the progress in a country.

b. August 2010 RECSA Activity Brief.

c. Data was available for federal police in Addis Ababa. No data was available for other agencies or locations.

d. September 2009 RECSA Activity Brief.

e. Data for South Sudan was for a single combined procurement order for all four agencies.

f. Total percentage not available. 100% of firearms comprising the 2010 procurement were marked. Pre-existing stocks were not marked

There is little evidence that, beyond a few cases, states have allocated substantial defence and security force resources – such as vehicles, fuel and personnel – to mitigate these difficulties. Rather than part-financing marking initiatives from defence and security budgets, the region's states have largely relied on foreign donations, including tranches of regional development assistance, intermittent funds acquired by NFPs, and the successful self-financing by relatively small organizations such as the Uganda Wildlife Authority (UWA).[26]

Reliance on external donations has resulted in sporadic marking, with long periods of dormancy whilst states await new donor funds. These dormant periods not only slow the marking process but, more importantly, have knock-on resource implications for national marking programmes. For example, when a state marks weapons deployed by its forces in one region, then ceases marking operations for several months because of a budget shortfall, security forces with unmarked weapons may redeploy into the region. The result is a mixing of marked and unmarked weapons, necessitating yet another marking operation in the region.

In summary, regional states and international donors need to give serious attention to enhancing the rate of marking in the RECSA region. Once existing national stockpiles have been marked, it will become relatively easy for states to mark newly procured weapons, since they can be marked 'straight from the box' in capital cities, with no need for mobile marking operations. The sooner the region's states reach this phase, the sooner marking costs will decrease, but the initiative requires short-term resource increases by all the parties concerned.

Record-keeping

While some of the region's states may have made considerable gains in marking weapons, record-keeping remains a significant challenge. This limits the success of the entire marking initiative. Tracing marked weapons requires searchable weapons records which uniquely identify each weapon and specify its legal user – whether a civilian or a unit of the defence and security forces. The benefits of weapon marking are substantially reduced if weapons records cannot be regularly and easily accessed.

The region's record-keeping problems arise from two factors: 1) the absence of either appropriate software or the IT systems to run it; and 2) the lack infrastructure necessary to network weapons databases in different parts of the country.

Software and IT problems. The RECSA member states have adopted at least six different record-keeping systems, within which there are also significant variations. Moreover, in some states, various branches of government administration have adopted differing and mutually incompatible types of software. For example, one state in the region runs a United Nations Development Programme (UNDP)-developed registration system for its police and civilian registries, but the country's military does not have the IT infrastructure required to run this system and, instead, compiles records of its marked weapons on laptop computers using Microsoft Excel.

Networking problems. IT networking is arguably the most severe challenge to record-keeping in the region. Marking teams often have to travel for several days to reach isolated outposts of the defence and security forces, which have neither electricity nor Internet access. Once compiled, electronic records of marked weapons have to be transported on disk back to the capital. In addition, the constant redeployment of personnel makes it virtually impossible for central record-keeping authorities to keep track of the movement of weapons after a given marking initiative – particularly since defence and security forces redistribute weapons among different units regularly. This undermines the main reason for the regional marking initiative – traceability – because records become out of date almost as soon as they are compiled.

Underlying infrastructural problems. Many of the region's states do not have a fixed infrastructure capable of supporting the networked IT systems required for effective record-keeping. Intermittent electricity supplies incapacitate the existing systems, and marking initiatives would undoubtedly benefit from greater investment in the prerequisite infrastructure, such as electricity generation. In addition, the requirement for networked systems suggests a need to consider solutions such as mobile Wi-Fi, to enable remote access to records (including remote data entry). The provision of hardware or software alone cannot solve these problems.

In summary, the fundamental obstacle to record-keeping is not limited to the availability of software, but includes also the availability of the IT infrastructure and communications systems required to update records remotely and rapidly.

Marking and tracing successes

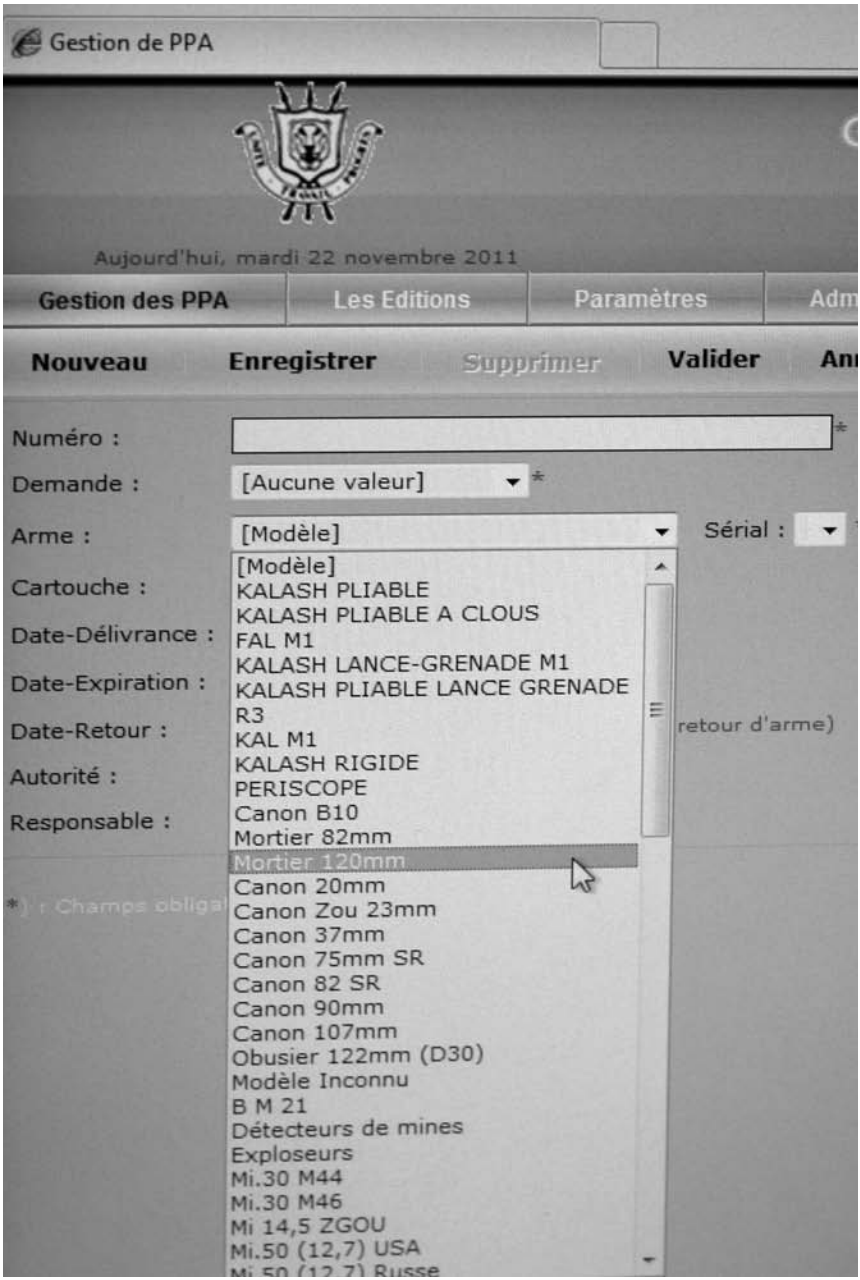
Despite problems related to the slow pace of marking, and the very mixed level of attainment of record-keeping systems, the success of the RECSA region marking initiative should not be underestimated. Before the marking initiative, many states could not even begin to estimate the number of weapons held by their defence and security forces, let alone establish their whereabouts. The region's states now have a growing capacity to make statements regarding the condition, size, deployment and security of their national small arms and light weapons stockpiles.

Cataloguing the national stockpile. Some states have been recording important information on the condition and serviceability of each weapon as it is marked – a process sometimes referred to as 'verification'. The states involved thus not only have a growing capacity to quantify their national stockpiles, but are also able to assess the quality of these weapons. This is a fundamental prerequisite for identifying surpluses of obsolete or unserviceable weapons, setting surplus destruction targets, and optimizing future arms procurement. Integrated platforms, such as the one used by Burundi, are more than just national weapons registries; they are comprehensive arms management systems which enhance the functioning of defence and security forces at the same time as deterring the proliferation of illicit weapons.

Figure 7, from the Burundi police arms management system, shows that the system permits a wide variety of information to be retrieved. For example, it allows searches by weapon category and condition, or by the region, unit or person to which the weapon was issued. The database includes major conventional weapons.

Identifying diversion. National capacity to trace weapons has improved significantly following the marking initiative – a result that is likely to become even more evident in the future. Although states have experienced difficulties in establishing networked record-keeping systems, the fact that the region now

Figure 7 **A webpage from Burundi's arms management system**



hosts numerous weapons that, from their marks alone, can be identified as belonging to a particular state or branch of the armed forces is a critical first step in combating diversion.

Several of the region's states have already discovered marked weapons on illicit markets.[27] Nevertheless, accurate tracing – the capacity to identify the specific person responsible for the loss or theft of a weapon – necessitates more comprehensive record-keeping. Attaining this target is the next challenge for the region.

Lessons learned

The RECSA region marking initiative is the first regional programme of its kind on the African continent. The challenges faced in its development and in the solutions adopted by the region's states together with the programme's overall successes, provide valuable lessons for future initiatives – whether on the continent or further afield.

Comprehensive national implementation plans. The supply of marking machines and record-keeping software was not, on its own, sufficient to maintain brisk, uninterrupted weapons marking in the region. Most of the region's states have not been able to sustain marking operations for periods longer than

Anticipating operating costs

Each marking team comprises a marking machine and the personnel needed to assemble and operate it. Their tasks include assessing the quality of the weapons which pass through their hands and verifying the information on the unit or the person in possession of them. The Survey's evaluation of the RECSA region initiative suggests:

Staffing:

- Three- or four-person marking teams are often sufficient;
- Larger teams have not proved more efficient, and cost more.

Transportation:

- Marking equipment is bulky and vehicles must also accommodate marking team personnel;
- Small 4 × 4 vehicles do not comfortably accommodate marking teams and machines – which could result in damaged equipment;
- More than one vehicle may be required to transport marking machines and teams;
- Marking equipment should be boxed, padded and secured to prevent damage in transit.

Consumable resources:

- Fuel costs should not be underestimated, especially as they often increase quickly;
- Marking teams require subsistence allowances when deployed outside capital cities.

a few weeks. This is due to resource limitations that include access to vehicles and fuel, personnel, and subsistence allowances. Moreover, the strain on these resources increases as marking operations move outside of capital cities.

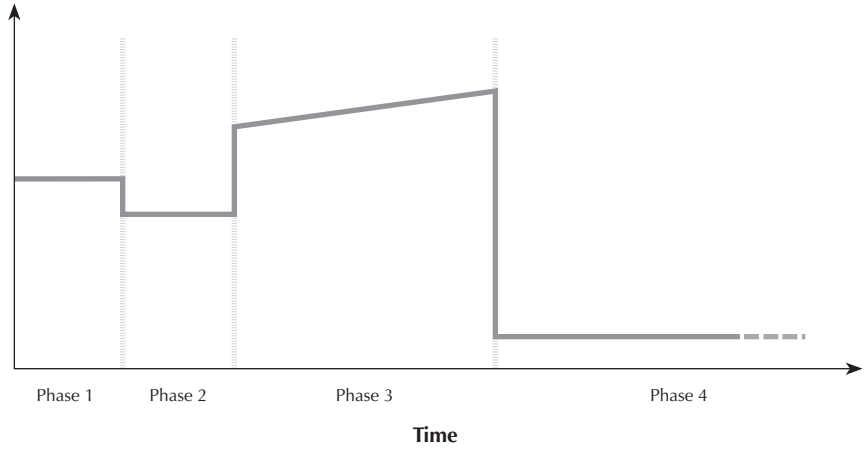
Given that most states in the region began weapons marking in capitals and then proceeded into the countryside, initial budget allocations have proved insufficient, because of the rapid – and to some extent unanticipated – increase in resource demands (mainly relating to transport logistics). The graph in Figure 8 provides a simple illustration of this trend (an explanation of the four phases follows).

Phase 1 requires start-up resources, including expenditure on training, marking machines, IT infrastructure, software and the allocation of fixed assets such as offices and marking spaces in military or police facilities.

Phase 2 consists of weapons marking in capital cities (for example, at police and military facilities or civilian registries). Resource requirements are relatively light, because neither marking machines nor weapons have to be transported over long distances.

Phase 3 involves the deployment of marking teams into the countryside. Distances increase as the teams move further afield, and resource expenditure – on vehicles, fuel, personnel and subsistence allowances – increases accordingly.

Figure 8 **Fluctuating resource demands during a typical national marking initiative**



The daily rate of weapon marking diminishes progressively, since marking teams have to travel to ever-smaller units of the defence and security forces.

Phase 4 begins when the state has marked its entire existing weapons stockpile. Resource demands fall dramatically because the state can now mark weapons when it imports them, installing marking machines in the facilities where the weapons are unpacked and catalogued – and before they are deployed to military or police personnel.[28]

An evaluation of marking progress in the RECSA region suggests that international donors and national governments considered the resource implications of Phases 1 and 2, but gave less consideration to the escalating resource demands of Phase 3. This is evidenced by the fact that many states have had to rely on ad hoc funding and in-kind support for Phase 3 operations. This includes

Table 6 **Factors that have led to a successful progression in marking firearms**

Country	Indicators of success			Possible determinant variables		
	Sustained operations without prolonged delays	Completed police or military weapons marking	Marked outside of the capital	Received EAC vehicle(s)	Received money from donors (excluding $6,600 start-up)	State-provided budget (not including salaries)
Burundi	✓	×	✓	✓	✓[a]	✓[a]
Ethiopia	✓	×	✓	×	×	✓
Kenya	n.d.[b]	×	✓	✓	✓[a]	✓
Rwanda	✓	✓	✓	✓	✓[a]	✓[a]
South Sudan	×	×	✓	×	✓	×
Sudan	×	×	×	×	×	×
Tanzania	×	×	✓	✓	✓[a]	×
Uganda	✓	✓	✓	✓	✓[a]	✓[a]

Notes:

a. RECSA, 2010b, pp. 13–14.

b. No information on this indicator was available for Kenya.

the piecemeal acquisition of funds from a variety of international donors, including gifts such as the provision of vehicles for marking operations (see Table 6). To some extent, such problems could have been expected of a project that was largely untested in the region or in other regional initiatives. Nevertheless, these factors need to feature heavily in any further decision making regarding the future of the RECSA marking initiative – as well as in any initiatives of this kind elsewhere (for example, in West Africa).

In particular, there is a clear need for national governments to work more closely with prospective international donors in the drafting of 'lifecycle' implementation plans. These plans should anticipate resource demands throughout the entire marking initiative. Efficient lifecycle planning would aid national governments in conducting long-range forecasts of resource requirements – facilitating specific, scheduled requests for donor assistance to fill funding gaps – and in the advance mobilisation of security forces (involving personnel, vehicles and fuel). Such comprehensive lifecycle planning would, arguably, mitigate the periodic dormancy which has to date hindered marking in the region.

Investment in prerequisite logistics and infrastructure

Experiences in the RECSA region highlight a number of difficulties related to both the short-term logistics required to implement marking initiatives and the infrastructure required to sustain initiatives in the long term. Again, good lifecycle planning would provide states and international donors with a better grasp of these problems.

From a logistical perspective, the largest component of expenditure on project resources needs to be channelled into mobile marking operations. As mentioned above, the US Department of State's Office of Weapons Removal and Abatement (PM/WRA) provided funds to RECSA in 2007/8 for the purchase of 26 marking machines, and for training and logistical support. These funds, and those of other donors such as the EU, kick-started the project, but on their own they are not sufficient to see the project through to completion. To realise the project's full potential – and capitalise on the great gains already made – international donors will need to consider providing further tranches of funding for specific, measurable activities within the national marking initiatives. At the same time, national governments will need to reassess their existing

(often scant) allocation of resources to marking initiatives, and consider making greater use of the logistical capacity of defence and security forces. Priority resource allocations include personnel and vehicles. States should thus be prepared to maintain prolonged budgets for the marking initiative, while donors should consider allocating funds towards clearly demarcated support.

Regarding infrastructure, investment requirements are likely to increase as national marking initiatives head towards completion. At present, the region's states have installed record-keeping software and necessary IT equipment in capital cities. While the systematic marking of the existing national weapon stockpile continues, such measures will probably be adequate for compiling a basic, central registry of small arms and light weapons. However, to sustain an up-to-date national registry, changes in weapon ownership (including the circulation of weapons among different units of the defence and security forces) need to be updated quickly. Given that many units are in only sporadic contact with headquarters, national governments and international donors need to give more thought to developing procedures which will allow remote units to update registries remotely.

One option would be to create a series of regional registries. These could monitor distant outposts more frequently and be linked remotely to a central record-keeping system in capital cities. This is not a new concept and several of the region's states are already moving towards the construction of these networked registries. They require, at a minimum, the following facilities: one computer terminal per district or sector, a means of remote communication (such as mobile Wi-Fi), the ability to back up and securely store records, and, in most cases, generators and fuel to power the systems. Such commitments would entail significant resource allocation, but they are fundamental to ensuring the long-term success of national marking initiatives. If these resources are not installed and maintained, national records will quickly become outdated, seriously hindering efforts to manage and trace small arms and light weapons.

Exploiting the wider benefits of the marking initiatives. Marking initiatives have enabled states to begin to clarify the size and quality of their national stockpiles. This suggests obvious advantages regarding physical security and stockpile management (PSSM) enhancement programmes. In Burundi, for example, the German Gesellschaft für Internationale Zusammenarbeit (GIZ) has

worked in parallel with the national marking initiative to improve PSSM at local weapons stockpiles (EAC, 2011). These activities include the comprehensive cataloguing of armoury contents; the racking of weapons; and the introduction of security measures such as exterior lighting, roof and window bars, and secure doors and locks. Programmes such as these, which are often funded by agencies unconnected with national marking initiatives, suggest potentially beneficial coordination. These programmes can help states to integrate national-level marking and record-keeping systems into armoury-level accounting practices. This would involve the development of coordinated accounting systems (including the minimum requirements for paper-based systems) in which armourers catalogue weapons according to a standard national format. Moreover, such initiatives are likely to present avenues for logistical support to national marking initiatives, such as the co-deployment of PSSM personnel and mobile marking teams – with the aim of improving PSSM measures and marking weapons at the same time.

Conclusion

Despite severe challenges, and varying degrees of progress at national levels, RECSA member states have made significant advances in their efforts to mark and record small arms and light weapons. A region that once hosted hundreds of thousands of largely 'anonymous' weapons is now increasingly populated with weapons that are marked with information that can pinpoint them to specific countries and particular branches of the defence and security forces. This alone is a great step forward towards mitigating diversion and the proliferation of small arms and light weapons.

Much remains to be finished, however. The region's states are essentially at the beginning of the process – or, in a few cases, halfway through – rather than approaching its end. The marking of weapons is a costly and time-consuming activity and its resource implications grow as marking teams have to operate further and further from capital cities in an effort to mark the whole of a nation's weapons stockpile. The region's governments, working alongside international donors, will have to devise ways to forecast these costs accurately, and adapt strategies to ensure that the marking operations currently underway continue without interruption.

In the long term, the region's states will have to put in place the necessary infrastructure to ensure that their new national record-keeping systems do not slide out of date due to a lack of maintenance. In particular, both governments and donors will need to develop solutions to the problem of updating national registries quickly and remotely. The spread of telecommunications infrastructure in most of the region is advancing at great speed. National record-keeping systems need to exploit this to the fullest, but doing so will require careful planning and the targeted allocation of resources – particularly in developing ways to update national records locally.

Above all, the region's states and their international supporters need to look carefully at the initiative's progress to date. States now have a clearer idea of the

challenges involved in marking national weapons stockpiles and the corresponding commitment of resources. These lessons provide valuable information which governments can use to devise comprehensive implementation plans for concluding national marking initiatives. Finally, the RECSA region experience provides a valuable lesson to other regions, whether in Africa or elsewhere, of the processes required in implementing large-scale weapons-marking programmes.

Endnotes

1 Originally comprising 10 member states, RECSA now includes 15 states: Burundi, Central African Republic, Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Kenya, Republic of Congo, Rwanda, Seychelles, Somalia, South Sudan, Sudan, Tanzania, and Uganda.

2 For more information on weapons tracing, see Bevan (2009, pp. 106–133).

3 Burundi, Ethiopia, Kenya, Rwanda, South Sudan, Sudan, Tanzania and Uganda.

4 1,500 was the original estimate cited in RECSA's 2008 US PM/WRA funding proposal, p. 5.

5 All RECSA members are legally bound to 'establish National Focal Points to, inter alia, facilitate the rapid information exchange to combat cross-border small arms and light weapons trafficking' (Ministerial Declaration, 2004, 16(a)).

6 The Seychelles was also not marking during the assessment period, but that was because they had completed the project in 2011.

7 The original marking machine selected for use was the MB 32 stamping machine. RECSA purchased twelve in 2008. However, the MB32 was never distributed to the member states because it had the potential to damage firearms during the marking process. The stamping method places enormous pressure on the firearm during the marking process (Persi Paoli, 2010, p. 3). These machines were returned and replaced by the Couth machines.

8 The five East African Community (EAC) states are Burundi, Kenya, Rwanda, Tanzania, and Uganda.

9 RECSA April 2010 Activity Report.

10 Author's interview with two RECSA Secretariat representatives, Nairobi, 22 October 2012.

11 Author's interview with two RECSA Secretariat representatives, Nairobi, 22 October 2012.

12 RECSA's involvement in the marking effort of the member states includes: acquisition and distribution of marking machines, organizing initial training on using the equipment, handling requests for parts and repairs as implementation proceeds, developing record-keeping software for the use of member states, organizing opportunities for countries to share their experiences, evaluating the outcomes, and, recently, facilitating financial assistance despite logistical obstacles in the implementation.

13 The information in Table 4 was provided by the NFPs in each country during the in-country assessment period (Nov. 2011–Feb. 2012). It does not reflect changes that might have occurred later on. In October 2012 the RECSA Secretariat provided new information on the non-functioning machines. Compressors were at fault in Ethiopia, South Sudan, and Tanzania. Kenya had one machine down with a stripped marking head and another with a faulty controller. Rwanda had never sent an official request to RECSA for repairs as theirs is an EAC-procured machine. Its controller was damaged in transit. Uganda, although not indicated on the table as all machines were functioning at the time of this research, has a problem with the controller because it can no longer mark the number '4': author's interview with two RECSA Secretariat representatives, 22 October 2012, Nairobi.

14 The training was funded by the German development agency, Gesellschaft für Internationale Zusammenarbeit (GIZ).

15 Author's interview with two RECSA Secretariat representatives, 22 October 2012, Nairobi.

16 Zambia is not a RECSA member state, but PM/WRA funds did go towards their training. PM/WRA supports the gun-marking efforts in the Southern African Development Community (SADC), of which Zambia is a member.

17 Author interview with Congolese military representative, 3 May 2012.

18 Training schedule provided by a RECSA Secretariat representative.

19 Author's interview with two RECSA Secretariat representatives, Nairobi, 22 October 2012.

20 According to a RECSA Secretariat representative, the other software they examined had extra costs and maintenance fees that were deemed unacceptable.

21 Author's interview with a representative from Traceability Solutions, 23 January 2012.

22 Statement by Gary Fleetwood, Australian Crime Commission, to the 4th Biennial Meeting of States to the UN PoA. 17 June, 2010.

23 Several interlocutors provided Small Arms Survey with estimated marking rates during the in-country interviews. These estimates were not tested for their accuracy.

24 The RECSA Secretariat's Funding Proposal to the United States, August 2008, p. 5. Information provided by PM/WRA.

25 Clamping the firearm in place for marking is one of the longer steps in the marking process. The clamp does not need much adjusting if the firearms are the same model.

26 The UWA used its own vehicles, fuel and personnel to mark almost its entire complement of weapons between 2010 and 2011. In November 2011, it reported having marked 1,512 weapons, leaving only 30 weapons 'in far flung areas' requiring marking. Meeting with representatives of the UWA in Kampala, Uganda on 17 November 2011.

27 The Ugandan NFP mentioned two recent cases where stolen police firearms had been identified because of the markings: author's interview, 4 December 2012, Entebbe.

28 Note: the graph in Figure 7 applies only to state-owned weapons.

Bibliography

Bevan, James. 2008. 'Arsenals Adrift: Arms and Ammunition Diversion.' In Small Arms Survey, eds. *Small Arms Survey 2008: Risk and Resilience*. Cambridge: Cambridge University Press, pp. 42–75.

—. 2009. 'Revealing Provenance: Weapons Tracing during and after Conflict.' In *Small Arms Survey. Small Arms Survey 2009: Shadows of War*. Cambridge: Cambridge University Press, pp. 106–33.

EAC (East African Community). 2010. 'EAC Hands Over Small Arms Marking Equipment to Partner States'. Press release. EAC Website. Accessed 25 October 2012. <http://www.eac.int/news/index.php?view=article&catid=48%3Aeac-latest&id=315%3Aeac-small-arms-marking-equipment&tmpl=component&print=1&layout=default&page=&option=com_content&Itemid=69>

—. 2011. EAC-GIZ Peace and Security Program. EAC website. Accessed 9 August, 2011. <http://www.eacgermany.org/index.php/peaceasecurity>

Fleetwood, Gary. 2010. 'Statement by Mr Gary Fleetwood, Australian Crime Commission to the Fourth Biennial Meeting of States on the United Nations Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons, in All Its Aspects regarding the Consideration of the Implementation of the International Instrument to Enable States to Identify and Trace, in a Timely and Reliable Manner, Illicit Small Arms and Light Weapons.' 17 June. <http://www.unny.mission.gov.au/unny/100621BMS.html>

Ministerial Declaration. 2004. *Second Ministerial Review Conference of the Nairobi Declaration on the Problem of the Proliferation of Illicit Small Arms and Light Weapons in the Great Lakes Region and the Horn of Africa. Nairobi, 20–21 April*. Accessed 20 August, 2012. <http://www.recsasec.org/pdf/Min%20Dec3.pdf>

Nairobi Protocol. 2004. *Nairobi Protocol for the Prevention, Control and Reduction of Small Arms and Light Weapons in the Great Lakes Region and the Horn of Africa* ('Nairobi Protocol'). Adopted in Nairobi, Kenya, 21 April.

Persi Paoli, Giacomo. 2010. 'The Method behind the Mark: A Review of Firearm Marking Technologies.' *Issue Brief Number 1*. Geneva: Small Arms Survey.

RECSA (Regional Centre on Small Arms). 2005. *Best Practice Guidelines for the Implementation of the Nairobi Declaration and Nairobi Protocol on Small Arms and Light Weapons*. Third Ministerial Review Conference, 20–21 June. Nairobi: RECSA.

— . 2009. 'September 2009 Activity Report.' RECSA Monthly Email Report. September.

— . 2010a. 'April 2010 Activity Report.' RECSA Monthly Email Report. April.

— . 2010b. 'May 2010 Activity Report.' RECSA Monthly Email Report. May.

SAPS (South African Police Service). 2012. 'The Marking of Firearms: A Short History and Glimpse of the Future.' Unpublished presentation.

UNGA (United Nations General Assembly). 2005. International Instrument to Enable States to Identify and Trace, in a Timely and Reliable Manner, Illicit Small Arms and Light Weapons ('International Tracing Instrument'). A/CONF.192/15 of 8 December. Accessed 20 August 2012. <http://www.poa-iss.org/InternationalTracing/InternationalTracing.aspx>

Publications list

Occasional Papers

1 *Re-Armament in Sierra Leone: One Year After the Lomé Peace Agreement*, by Eric Berman, December 2000

2 *Removing Small Arms from Society: A Review of Weapons Collection and Destruction Programmes*, by Sami Faltas, Glenn McDonald, and Camilla Waszink, July 2001

3 *Legal Controls on Small Arms and Light Weapons in Southeast Asia*, by Katherine Kramer (with Nonviolence International Southeast Asia), July 2001

4 *Shining a Light on Small Arms Exports: The Record of State Transparency*, by Maria Haug, Martin Langvandslien, Lora Lumpe, and Nic Marsh (with NISAT), January 2002

5 *Stray Bullets: The Impact of Small Arms Misuse in Central America*, by William Godnick, with Robert Muggah and Camilla Waszink, November 2002

6 *Politics from the Barrel of a Gun: Small Arms Proliferation and Conflict in the Republic of Georgia*, by Spyros Demetriou, November 2002

7 *Making Global Public Policy: The Case of Small Arms and Light Weapons*, by Edward Laurance and Rachel Stohl, December 2002

8 *Small Arms in the Pacific*, by Philip Alpers and Conor Twyford, March 2003

9 *Demand, Stockpiles, and Social Controls: Small Arms in Yemen*, by Derek B. Miller, May 2003

10 *Beyond the Kalashnikov: Small Arms Production, Exports, and Stockpiles in the Russian Federation*, by Maxim Pyadushkin, with Maria Haug and Anna Matveeva, August 2003

11 *In the Shadow of a Cease-fire: The Impacts of Small Arms Availability and Misuse in Sri Lanka*, by Chris Smith, October 2003

12 *Small Arms in Kyrgyzstan: Post-revolutionary Proliferation*, by S. Neil MacFarlane and Stina Torjesen, March 2007, ISBN 2-8288-0076-8, also in Kyrgyz and Russian (first printed as *Kyrgyzstan: A Small Arms Anomaly in Central Asia?*, by S. Neil MacFarlane and Stina Torjesen, February 2004)

13 *Small Arms and Light Weapons Production in Eastern, Central, and Southeast Europe*, by Yudit Kiss, October 2004, ISBN 2-8288-0057-1

14 *Securing Haiti's Transition: Reviewing Human Insecurity and the Prospects for Disarmament, Demobilization, and Reintegration*, by Robert Muggah, October 2005, updated, ISBN 2-8288-0066-0

15 *Silencing Guns: Local Perspectives on Small Arms and Armed Violence in Rural South Pacific Islands Communities*, edited by Emile LeBrun and Robert Muggah, June 2005, ISBN 2-8288-0064-4

16 *Behind a Veil of Secrecy: Military Small Arms and Light Weapons Production in Western Europe,* by Reinhilde Weidacher, November 2005, ISBN 2-8288-0065-2

17 *Tajikistan's Road to Stability: Reduction in Small Arms Proliferation and Remaining Challenges*, by Stina Torjesen, Christina Wille, and S. Neil MacFarlane, November 2005, ISBN 2-8288-0067-9

18 *Demanding Attention: Addressing the Dynamics of Small Arms Demand,* by David Atwood, Anne-Kathrin Glatz, and Robert Muggah, January 2006, ISBN 2-8288-0069-5

19 *A Guide to the US Small Arms Market, Industry, and Exports, 1998–2004,* by Tamar Gabelnick, Maria Haug, and Lora Lumpe, September 2006, ISBN 2-8288-0071-7

20 *Small Arms, Armed Violence, and Insecurity in Nigeria: The Niger Delta in Perspective*, by Jennifer M. Hazen with Jonas Horner, December 2007, ISBN 2-8288-0090-3

21 *Crisis in Karamoja: Armed Violence and the Failure of Disarmament in Uganda's Most Deprived Region*, by James Bevan, June 2008, ISBN 2-8288-0094-6

22 *Blowback: Kenya's Illicit Ammunition Problem in Turkana North District,* by James Bevan, June 2008, ISBN 2-8288-0098-9

23 *Gangs of Central America: Causes, Costs, and Interventions,* by Dennis Rodgers, Robert Muggah, and Chris Stevenson, May 2009, ISBN 978-2-940415-13-7

24 *Arms in and around Mauritania: National and Regional Security Implications*, by Stéphanie Pézard with Anne-Kathrin Glatz, June 2010, ISBN 978-2-940415-35-9 (also available in French)

25 *Transparency Counts: Assessing State Reporting on Small Arms Transfers, 2001–08*, by Jasna Lazarevic, June 2010, ISBN 978-2-940415-34-2

26 *Confronting the Don: The Political Economy of Gang Violence in Jamaica*, by Glaister Leslie, November 2010, ISBN 978-2-940415-38-0

27 *Safer Stockpiles: Practitioners' Experiences with Physical Security and Stockpile Management (PSSM) Assistance Programmes*, edited by Benjamin King, April 2011, ISBN 978-2-940415-54-0

28 *Analysis of National Reports: Implementation of the UN Programme of Action on Small Arms and the International Tracing Instrument in 2009–10*, by Sarah Parker, May 2011, ISBN 978-2-940415-55-7

29 *Blue Skies and Dark Clouds: Kazakhstan and Small Arms*, by Nicolas Florquin, Dauren Aben, and Takhmina Karimova, May 2012, ISBN 978-2-9700771-5-2

30 *The Programme of Action Implementation Monitor (Phase 1): Assessing Reported Progress,* by Sarah Parker with Katherine Green, August 2012, ISBN 978-2-9700816-2-3

31 *Internal Control: Codes of Conducts within Insurgent Armed Groups,* by Olivier Bangerter, November 2012, ISBN 978-2-9700816-8-5

Special Reports

1 *Humanitarianism under Threat: The Humanitarian Impact of Small Arms and Light Weapons,* by Robert Muggah and Eric Berman, commissioned by the Reference Group on Small Arms of the UN Inter-Agency Standing Committee, July 2001

2 *Small Arms Availability, Trade, and Impacts in the Republic of Congo,* by Spyros Demetriou, Robert Muggah, and Ian Biddle, commissioned by the International Organization for Migration and the United Nations Development Programme, April 2002

3 *Kosovo and the Gun: A Baseline Assessment of Small Arms and Light Weapons in Kosovo,* by Anna Khakee and Nicolas Florquin, commissioned by the United Nations Development Programme, June 2003

4 *A Fragile Peace: Guns and Security in Post-conflict Macedonia,* by Suzette R. Grillot, Wolf-Christian Paes, Hans Risser, and Shelly O. Stoneman, commissioned by United Nations Development Programme, and co-published by the Bonn International Center for Conversion, SEESAC in Belgrade, and the Small Arms Survey, June 2004, ISBN 2-8288-0056-3

5 *Gun-running in Papua New Guinea: From Arrows to Assault Weapons in the Southern Highlands*, by Philip Alpers, June 2005, ISBN 2-8288-0062-8

6 *La République Centrafricaine: Une étude de cas sur les armes légères et les conflits*, by Eric G. Berman, July 2006, ISBN 2-8288-0073-3

7 *Small Arms in Burundi: Disarming the Civilian Population in Peacetime (Les armes légères au Burundi : après la paix, le défi du désarmement civil)*, by Stéphanie Pézard and Nicolas Florquin, co-published with Ligue Iteka, in English and French, August 2007, ISBN 2-8288-0080-6 ISSN 1661-4453

8 *Quoi de neuf sur le front congolais ? Evaluation de base sur la circulation des armes légères et de petit calibre en République du Congo*, par Robert Muggah et Ryan Nichols, publié avec le Programme des Nations Unies pour le Développement–République du Congo, décembre 2007, 2-8288-0089-X

9 *Small Arms in Rio de Janeiro: The Guns, the Buyback, and the Victims*, by Pablo Dreyfus, Luis Eduardo Guedes, Ben Lessing, Antônio Rangel Bandeira, Marcelo de Sousa Nascimento, and Patricia Silveira Rivero, a study by the Small Arms Survey, Viva Rio, and ISER, December 2008, ISBN 2-8288-0102-0

10 *Firearms-related Violence in Mozambique*, a joint publication of the Ministry of the Interior of Mozambique, the World Health Organization–Mozambique, and the Small Arms Survey, June 2009, ISBN 978-2-940415-14-4

11 *Small Arms Production in Brazil: Production, Trade, and Holdings*, by Pablo Dreyfus, Benjamin Lessing, Marcelo de Sousa Nascimento, and Júlio Cesar Purcena, a joint publication with Viva Rio and ISER, Septemer 2010, ISBN 978-2-940415-40-3

12 *Timor-Leste Armed Violence Assessment: Final Report*, edited by Robert Muggah and Emile LeBrun, October 2010, ISBN 978-2-940415-43-4

13 *Significant Surpluses: Weapons and Ammunition Stockpiles in South-east Europe*, by Pierre Gobinet, a joint publication of the Regional Approach for Stockpile Reduction, the US Department of State's Office of Weapons Removal and Abatement, and the Small Arms Survey, December 2011, ISBN 978-2-9700771-2-1

14 *Enquête nationale sur les armes légères et de petit calibre en Côte d'Ivoire: les défis du contrôle des armes et de la lutte contre la violence armée avant la crise post-électorale*, by Savannah de Tessières, a joint publication of the United Nations Development Programme, the Commission Nationale de Lutte contre la Prolifération et la Circulation Illicite des Armes Légères et de Petit Calibre, Côte d'Ivoire, and the Small Arms Survey, April 2012, ISBN 978-2-9700771-6-9

15 *Capabilities and Capacities: A Survey of South-east Europe's Demilitarization Infrastructure*, by Pierre Gobinet, a joint publication of the Regional Approach for Stockpile Reduction, the US Department of State's Office of Weapons Removal and Abatement, and the Small Arms Survey, April 2012, ISBN 978-2-9700771-7-6

16 *Availability of Small Arms and Perceptions of Security in Kenya: An Assessment*, by Manasseh Wepundi, Eliud Nthiga, Eliud Kabuu, Ryan Murray, and Anna Alvazzi del Frate, a joint publication of Kenya National Focus Point on Small Arms and Light Weapons, and the Small Arms Survey, with support from the Ministry of Foreign Affairs of Denmark. June 2012, ISBN 978-2-9700771-8-3

17 *Security Provision and Small Arms in Karamoja: A Survey of Perceptions*, by Kees Kingma, Frank Muhereza, Ryan Murray, Matthias Nowak, and Lilu Thapa, a joint publication of the Danish Demining Group and the Small Arms Survey. September 2012, ISBN 978-9700816-3-0

18 *Costs and Consequences: Unplanned Explosions and Demilitarization in South-east Europe*, by Jasna Lazarević, a joint publication of the Regional Approach for Stockpile Reduction, the US Department of State's Office of Weapons Removal and Abatement, and the Small Arms Survey, November 2012, ISBN 978-2-9700816-7-8

Book Series

Armed and Aimless: Armed Groups, Guns, and Human Security in the ECOWAS Region, edited by Nicolas Florquin and Eric G. Berman, May 2005, ISBN 2-8288-0063-6

Armés mais désoeuvrés: groupes armés, armes légères et sécurité humaine dans la région de la CEDEAO, edited by Nicolas Florquin and Eric Berman, co-published with GRIP, March 2006, ISBN 2-87291-023-9

Targeting Ammunition: A Primer, edited by Stéphanie Pézard and Holger Anders, co-published with CICS, GRIP, SEESAC, and Viva Rio, June 2006, ISBN 2-8288-0072-5

No Refuge: The Crisis of Refugee Militarization in Africa, edited by Robert Muggah, co-published with BICC, published by Zed Books, July 2006, ISBN 1-84277-789-0

Conventional Ammunition in Surplus: A Reference Guide, edited by James Bevan, published in cooperation with BICC, FAS, GRIP, and SEESAC, January 2008, ISBN 2-8288-0092-X

Ammunition Tracing Kit: Protocols and Procedures for Recording Small-calibre Ammunition, developed by James Bevan, June 2008, ISBN 2-8288-0097-0

The Central African Republic and Small Arms: A Regional Tinderbox, by Eric G. Berman with Louisa N. Lombard, December 2008, ISBN 2-8288-0103-9

Security and Post-Conflict Reconstruction: Dealing with Fighters in the Aftermath of War, edited by Robert Muggah, published by Routledge, January 2009, ISBN 978-0-415-46054-5

'L'insécurité est une autre guerre': Analyse de la violence armée au Burundi, by Stéphanie Pézard and Savannah de Tessières, April 2009, ISBN 978-2-940415-12-0

'Insecurity Is Also a War': An Assessment of Armed Violence in Burundi, by Stéphanie Pézard and Savannah de Tessières, published by the Geneva Declaration Secretariat, October 2009, ISBN 978-2-940415-20-5

The Politics of Destroying Surplus Small Arms: Inconspicuous Disarmament, edited by Aaron Karp, published by Routledge, July 2009, ISBN 978-0-415-49461-8

Primed and Purposeful: Armed Groups and Human Security Efforts in the Philippines, by Soliman M. Santos, Jr., and Paz Verdades M. Santos, co-published with the South–South Network for Non-State Armed Group Engagement, April 2010, ISBN 978-2-940415-29-8