Safer Access to Pesticides:

Community Interventions

World Health Organization

IASP

International Association for Suicide Prevention

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FOREWORD

From a global perspective, intentional pesticide ingestion in suicide attempts accounts for about one third of all suicide deaths each year. However until recently, the role of pesticides has received far too little attention. This may in part be due to the fact that most research on suicide prevention has come from developed countries, whereas the use of pesticides for self-poisoning is predominantly found in low and middle-income countries, in rural areas in Asia, Central and South America, Africa and on Pacific islands. Actually, for the past 20 years several nongovernmental organizations affiliated with the International Association for Suicide Prevention (IASP) have been involved in local initiatives that show clear promise in reducing pesticides poisoning and self-harm.

Recently, the World Health Organization (WHO) announced a global public health initiative to tackle this problem and signed an agreement with IASP for joint action. This publication summarizes the basic information and recommendations arising from a meeting held in Geneva, Switzerland, 10-12 May 2006, as the first activity in this collaborative programme. This meeting identified the current state of knowledge on effective and acceptable community interventions that have significant potential in preventing self-harm by pesticide poisoning. Hereby summarized are interventions that have been identified in the area of safe storage and education and also in psychosocial interventions. It is hoped that this document will stimulate key stakeholders and national leaders to implement and evaluate the effectiveness of these strategies in communities at high-risk of pesticide related suicides and attempted suicides. Future publications from WHO and IASP will concentrate on specific aspects of this topic and will also present lessons learnt at country level.

This document constitutes the first step in the collaboration between WHO and IASP, along with other relevant UN agencies, governments, academic institutions, non-governmental organizations and interested parties to rapidly become involved in activities that will reduce the global burden of pesticide poisonings.

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Safer Access to Pesticides: Community Interventions

Background

An estimated total of 877,000 people committed suicide in 2002 worldwide (Table 1). Deaths from pesticide ingestion are a major contributor to premature mortality and the global burden of suicide. As research evidence suggests that pesticide ingestion accounts for over 60% of suicides in many rural areas of China and South-East Asia, Gunnell & Eddleston (2003) estimated that there are around 300,000 pesticide suicides each year in these areas alone. In addition to deaths, other unwanted consequences of undue exposure to pesticides include non-fatal self-harm (which can be up to 10 times more frequent than suicides), accidental and occupational poisoning (for which no reliable figures are available).

Table 1: Worldwide total suicide magnitude and impact by WHO region

WHO region	Number of suicides	DALYs (%)
Africa	34,000	0.2
Americas	63,000	1.0
South-East Asia	246,000	1.7
Europe	164,000	2.3
Eastern Mediterranean	34,000	0.7
Western Pacific	333,000	2.6
World	*877,000*	*1.4*

* Disability Adjusted Life Years (DALYs) are the sum of years of life lost due to premature mortality in the population and the years of productive life lost due to disability.
Source: World Health Organization (WHO, 2003)

While suicidal behaviours have long been recognized as a major public health problem, the role of pesticides has received far too little attention. In most countries self-poisoning is the main method of self-harm. In high income countries, medicines are the substances taken by the vast majority of people who self-poison and the associated case fatality is low (<1%). In many low- and middle-income nations, pesticides are the most readily available and frequently used method of self-poisoning. Examples come from rural China, where pesticides account for over 60% of suicides (Phillips et al., 2002), rural areas of Sri Lanka, where the proportion of suicides due to pesticides is 71% (Somasundaram & Rajadurai, 1995), and Malaysia with more than 90% of pesticide suicides (Maniam, 1988).

The toxicity of different pesticides varies, but the case fatality of the commonly used varieties is at least ten times higher than that for self-poisoning with medicines. Such differences contribute to the high levels of pesticide suicides in low- and middle-income nations.

Non-fatal self-poisoning with pesticides also places a major burden on the already stretched health care resources of low-income countries because many cases require ventilation for several days and transport to specialist

hospitals because they cannot be managed in small rural hospitals. In a recent case series from India, 27% of cases of pesticide poisoning required ventilation (Srinivas Rao et al., 2005).

Evidence is emerging that pesticide poisoning is equally important in South America and Africa (Bertolote et al., 2006). In Brazil, for example, the high suicide rates in tobacco growing regions may be due to the wide use and availability of pesticides (Csillag, 1996). Over 80% of suicides were due to pesticide poisoning in one southern rural area of Trinidad (Hutchinson et al., 1999) and in Suriname, a high proportion of both fatal (55%) and non-fatal (44%) episodes of suicidal behaviour involved pesticides (Graafsma et al., 2005). In Africa, data from Zimbabwe showed that organophosphate self-poisoning accounted for around three quarters of hospital admissions for suicidal behaviour (Dong & Simon, 2001) and findings from Malawi implicated pesticide self-poisoning in almost 80% of suicides (Dzamalala et al., 2005). Although an estimate for these regions or a global estimate is not available due to the lack of large-scale, rigorous surveillance data, we may assume that we are confronted with millions of cases of intentional (i.e. suicidal behaviour) and unintentional (i.e. accidental and occupational) pesticide poisoning, hundreds of thousands of which result in deaths in low- and middle income countries each year (Roberts et al., 2003).

A WHO global public health initiative. The Impact of Pesticides on Health - Preventing Intentional and Unintentional Deaths from Pesticide Poisoning

Recognizing the urgent need for immediate action, three departments in the World Health Organization (WHO), i.e. Mental Health and Substance Abuse, Injuries and Violence Prevention, and the Programme on the Promotion of Chemical Safety, announced a global public health initiative to tackle this problem in collaboration with other relevant UN agencies, governments, academic institutions, nongovernmental organizations and interested parties. In particular, WHO and the International Association for Suicide Prevention (IASP) have signed an agreement for joint action.

Acknowledging the need of an intersectoral (e.g. health, education, media, agriculture) and multi-level (local/community, national, regional, and global) approach (World Health Organization, 1998), the overall goal of this initiative is to reduce mortality and morbidity related to pesticide poisoning.

The following objectives have been identified:

- Review and recommend improved pesticide regulatory policies;
- Implement sustainable epidemiological surveillance and monitoring of pesticide poisoning in clinical settings and communities;

- Improve the medical management and mental health care of people with pesticide poisoning in health care facilities at different levels;
- Provide training in the safe handling of pesticides and the identification and management of pesticide poisoning at different sectors and levels;
- Develop or strengthen community interventions that minimize risks of intentional and unintentional pesticide poisoning.

Any actions in working towards these objectives should be ideally framed within sound national suicide prevention strategies and pesticide policies, including their implementation at different levels. WHO is ready to provide the relevant technical assistance to its Member States in their development or improvement.

Community Interventions for Safer Access to Pesticides

As part of the broader public health initiative, WHO convened a meeting on community interventions for safer access to pesticides, bringing together leading experts working in the field of pesticide poisoning and self-harm (see Annex 2). The purpose of the three-day meeting,10-12 May 2006, Geneva, Switzerland, was three-fold:

- identify effective and acceptable community interventions that promote safer access to pesticides;
- develop an outline for the implementation of those interventions, including monitoring and evaluation (based on multiple outcome indicators); and
- identify potential sites for implementation.

By consensus, experts attending the meeting identified eight community interventions for safer access to pesticides that show the most promise in pilot studies or on theoretical grounds. The rationale, target group, key stakeholders, resource needs, activities and outcome measures for the interventions are presented below. A more detailed description of the proposed interventions is provided in tabular format in Annex 1. Special attention has been given to the description of the monitoring and evaluation of these interventions, because every effort needs to be made to provide further information about their effectiveness and cost-effectiveness in different settings.

Three main types of promising community interventions have been identified:

- safer storage
- education
- psychosocial interventions.

It is important to stress that the interventions presented herewith are but one set of public health actions that by no means exhaust all types of activities that could and should be done. Other areas for intervention include pesticide regulatory policies (e.g. production, sales, pesticide substitution), medical management of pesticide ingestion, and information systems on health hazards associated with pesticides. These areas go beyond the limits of action at community level, which is the main focus of this document.

Safer storage: locked boxes for storing pesticides in farming households

Rationale: Limiting access to toxic means prevents their use in suicidal behaviour.
Target group: All households that use pesticides.
Key stakeholders: Farmers, local government, health authorities, lock and box producers, the coordinating agency (governmental or nongovernmental), NGOs (particularly those concerned with suicide and pesticide management).
***Resource needs*:** Costs of the production of the locks and boxes, the installation of the lockboxes, personnel time in the coordinating agency, education about safe storage and the use of the boxes, and monitoring their use.

Activities:

1. Design and production of the boxes in collaboration with local communities.
2. Identification of households that will be given the boxes.
3. Identification of the best site for the box (house or close to the fields).
4. Community education about safe storage of pesticides.
5. Training households with boxes in their use and maintenance.
6. Monitoring the use of the boxes.
7. Assessment of the cost of producing and installing lockboxes and of promoting and monitoring their use.
8. Monitoring of all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community.

Evaluation: outcomes:

- rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning);
- methods of suicide and attempted suicide;
- methods of storage and disposal of pesticides in community households;
- cost-effectiveness of the intervention;
- per cent of households with locked boxes that use them appropriately;
- per cent of households who install locked boxes on their own;
- per cent of fatal and non-fatal pesticide ingestions (suicidal and accidental) that used pesticides stored in the locked boxes.

Safer storage: centralized communal storage of pesticides

Rationale: Limiting access to toxic means prevents their use in suicidal behaviour.
Target group: Communities that have high rates of pesticide-related suicides and attempted suicides.
Key stakeholders: Farmers, community leaders, local government, health authorities, agricultural authorities, pesticide retailers, NGOs (particularly those concerned with suicide and pesticide management).
***Resource needs*:** Funds to build and maintain centralized storage facility, facility manager, personnel to conduct public promotion and to deal with complaints of users of the storage facility.

Activities:

1. Discussion of which method of communal storage* would be most acceptable and feasible in the community.
2. Construction of the centralized storage facility and identification and training of the manager(s) for the facility (see training for retailers).
3. Promotion of the utilization of the communal storage throughout the community.
4. Use of communal storage to dispose of unwanted pesticides or re-sale of pesticides to other farmers.
5. Monitoring the use of the communal storage and ensuring that there is a mechanism for soliciting feedback about the new system and making appropriate changes in response to complaints.
6. Assessment of the cost of building and managing the storage facility, and of promoting and monitoring the use of the facility.
7. Monitoring of all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community.

* (a) centralized location where each farming family has its own locker that they can access at any time; (b) centralized storage that has to be opened by a 'manager' before a family can get access to its own locker; (c) centralized storage with individual lockers, but only manager has direct access to pesticides, on request the manager dilutes amount of pesticide the farmer plans to use in the current day; (d) centralized purchase/distribution in each village by a single authorized (or licensed) distributor who provides pre-application diluted form of pesticide for use in current day.

Evaluation: outcomes:

- rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning);
- methods of suicide and attempted suicide;
- methods of storage and disposal of pesticides in community households;
- cost-effectiveness of the intervention;
- per cent of fatal and non-fatal pesticide ingestions (suicidal and accidental) that used pesticides stored in the communal facility.

Education: Train pesticide users about health risks associated with pesticide use and about safe use, storage and disposal of pesticides

Rationale: Education can change both knowledge and attitudes and, thus, result in changes in behaviour related to the safe storage of pesticides.
Target group: Farmers working in areas with high rates of suicide and attempted suicide using pesticides.
Key stakeholders: Local agricultural experts, health authorities, retailers, agrochemical industry, managers of communal storage facilities, NGOs (particularly those concerned with suicide and pesticide management).
***Resource needs*:** Materials for target group, trainers, and trainers for the trainers, distribution system for educational materials, venues to provide training.

Activities:

1. The content of the educational intervention* needs to be brief and simple enough so most in the target group can understand it, but detailed enough that it provides all the essential information about:
   (a) appropriate methods of preparation, application, storage and disposal;
   (b) description of labelling symbols;
   (c) health and environmental risks associated with pesticide use; and
   (d) recognition, first aid, and reporting of acute toxic effects following intentional or unintentional pesticide poisoning.
2. Monitoring of all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community.

* Multiple methods have been employed to transmit this educational content, such as peer-led education, group meetings, TV, radio, posters and leaflets, street plays, etc., but there is no clear evidence about the benefits and disadvantages of the different methods. The method(s) chosen need(s) to be appropriate for the educational level and other characteristics of the target community.

Evaluation: outcomes:

- rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning);
- methods of suicide and attempted suicide;
- methods of storage and disposal of pesticides in community households;
- cost-effectiveness of the intervention;
- changes in knowledge and attitudes about pesticide-related safety issues.

Education: Identify key resource persons/opinion leaders from whom pesticide users obtain information about pesticides and ensure that they have the most up-to-date information on the prevention, identification and acute management of health problems associated with pesticide use

Rationale: Farmers' knowledge, beliefs and attitudes about pesticide use are strongly influenced by key resource persons/opinion leaders in the community, so identifying and training these individuals can have a community-wide influence on local practices and, thus, lead to decreased rates of pesticide-related suicidal behaviour.
Target group: Agronomists, farmers or other individuals who act as key resource persons/opinion leaders in their community (e.g. experienced or successful farmers, local leaders, retailers).
Key stakeholders: Ministry of agriculture / agricultural authorities, local government, health authorities, local health staff, NGOs (particularly those concerned with suicide and pesticide management).
***Resource needs*:** 'Training the trainers' materials adapted for the target group, experts to provide the training, training venues.

Activities:

1. 'Training of the trainers' will depend on the key resource persons/opinion leaders * that exist in the community.
2. Focus the training on the appropriate use, storage and disposal of different types of pesticides, but also on the suicide risks related to pesticides, and the recognition and first-aid management of the toxic effects following intentional or unintentional pesticide poisoning.
3. Enhancement of the 'key resource person/opinion leader' role of the trained individuals in the community.
4. Monitoring of all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community.

* This can be government agronomists (-> training packages as part of their government-sponsored continuing education); retailers (-> training as part of the 'retailer intervention', see training retailers); or other community members, e.g. local farmers or officials (-> training sessions suitable to their educational level and availability).

Evaluation: outcomes:

- rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning);
- methods of suicide and attempted suicide;
- methods of storage and disposal of pesticides in community households;
- cost-effectiveness of the intervention;
- knowledge and attitudes of key resource persons/opinion leaders before and after the educational intervention;
- knowledge, attitudes and pesticide-related practices of pesticide users before and after the key resource person's/opinion leader's training.

Education: Train pesticide retailers to teach pesticide users about health risks and appropriate use, storage and disposal of pesticides, and monitor their compliance with regulations

Rationale: Responsible sale to responsible/licensed users, compliance with local and/or national regulations related to the sale of pesticides, training of farmers at time of purchase and refusal to sell pesticides to those suspected of suicidal intent should decrease pesticide-related suicidal behaviour.
Target group: Pesticide retailers.
Key stakeholders: All pesticide retailers, manufacturers of pesticides, licensing authorities, government agencies responsible for monitoring the sale of pesticides, health authorities, NGOs (particularly those concerned with suicide and pesticide management).
***Resource needs*:** Educational materials for retailers to give to farmers, training materials for the retailers, and for those who make site visits to retail sites.

Activities:

1. Regular visits every two months by Community Health Officer or local Agricultural Officer (or appropriate equivalents) to all retail outlets for pesticides in a defined area to check on retailers.
2. Provision of retailers with educational brochures for pesticide users and instruction on how to train them in the safe use, storage and disposal of pesticides. Training of retailers about the dangers of suicide by pesticide ingestion and about steps that could be taken if they are suspicious about the intention of a particular purchaser.
3. Education to change the behaviour of non-compliant retailers.
4. Determination of the location of purchase of pesticides employed in suicidal behaviour; this information is then reported to the pesticide monitoring agency/officer and published in community reports.
5. Monitoring of all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community.

Evaluation: outcomes:

- rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning);
- methods of suicide and attempted suicide;
- methods of storage and disposal of pesticides in community households;
- cost-effectiveness of the intervention;
- number of illegal retailers in the community;
- number of legal retailers that sell internationally banned pesticides;
- proportion of retailers who follow recommendations about screening and educating buyers;
- proportion of pesticide-related suicidal behaviours that employed pesticides that were internationally banned at the time of purchase.

Education: Encourage local media to support programmes aimed at reducing pesticide-related suicides and to decrease inappropriate reporting of suicides that can lead to copycat suicides

Rationale: The media (newspapers, TV, radio, etc.) have a strong influence on public attitudes and, thus, can be employed to enhance the effect of educational programmes about pesticides; or, negatively, can increase rates of suicidal behaviour by inappropriate glamorization, excessive coverage, and overly detailed reports of suicides.
Target group: All local media outlets that are widely available in a target community.
Key stakeholders: Government departments responsible for the media, journalists, journalism schools, agencies implementing programmes to decrease pesticide-related suicides in the target community.
***Resource needs*:** Guidelines for reporting suicides adapted to needs of local media, suicide experts who can act as consultants for local media, personnel to collect all local media reports about suicide and about the pesticide management programme and to make a qualitative assessment of the appropriateness of the reports.

Activities:

1. Identification of media widely available in the target community and arrangement of meetings with media representatives.
2. Encourage media to stimulate public support for the pesticide management programme and to promote the specific educational messages of the programme.
3. Provision of guidelines to the media for 'appropriate' reporting of suicides.
4. Provision of contact numbers of key figures in the pesticide management programme and of suicide prevention experts for help and tutorials.
5. Periodic meetings (every six months) between media representatives and programme organizers to discuss the content of media reports.
6. Monitoring of all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community.

Evaluation: outcomes:

- rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning);
- methods of suicide and attempted suicide;
- methods of storage and disposal of pesticides in community households;
- number and quality of local media reports about the pesticide management programme and increased press-coverage concerning safe storage;
- improved reporting of suicide.

Education: Train school children about safe use, storage and disposal of pesticides

Rationale: Training children not only educates the next generation of farmers, but children who have learnt this material can indirectly train the adults in their household and/or encourage appropriate behavioural changes regarding the use, storage and disposal of pesticides.
Target group: School-age children in communities that have high rates of pesticide-related suicide and attempted suicide.
Key stakeholders: Education authorities, teachers, parents, agricultural authorities, health authorities, NGOs (particularly those concerned with suicide and pesticide management).
***Resource needs*:** Educational experts and agricultural experts will need to work together to develop the teaching materials and to regularly modify the materials; printing and distribution of the materials; training sessions for the teachers who will conduct the courses need to be organized; and back-up psychological experts will be needed in case the course content elicits extreme reactions from the students.

Activities:

1. Meetings of education authorities, teachers and parent groups to discuss the importance of educating students about pesticides and the best way to incorporate this content into the school curriculum.
2. Development of age-specific teaching materials and teaching manuals that focus on the safe use, storage and disposal of agricultural chemicals (although suicide is not directly mentioned, information about the health hazards related to pesticide use is included).
3. Training of teachers, including instructions on how to discuss pesticide-related suicide if students bring this up as part of the discussion. Provision of back-up psychological support.
4. Monitoring of changes in knowledge and attitudes about pesticide use of school-age students and of responses to the course material of students, parents and teachers. Regular modification of the course content and method based on these evaluations.
5. Monitoring of all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community.

Evaluation: outcomes:

- rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning);
- methods of suicide and attempted suicide;
- methods of storage and disposal of pesticides in community households;
- cost-effectiveness of the intervention;
- knowledge and attitudes about pesticide use, storage and disposal by school-age students, their parents, and their teachers.

Psychosocial interventions to augment community-based pesticide management measures

Rationale: A number of factors may influence pesticide-related suicides, and adherence to pesticide management and storage recommendations. These include mental disorders, impulsive personality traits, psychological distress, social isolation, acute interpersonal stressors, alcohol use, domestic violence, etc. Psychosocial support strategies can decrease the impact these factors have on the risks of ready access to highly toxic means (i.e. pesticides).
Target group: Areas with high rates of suicide and attempted suicide using pesticides. Focus may also be on individuals who have made prior suicide attempts or are at high risk for some other reason (e.g. people with mental disorders, alcohol abuse, isolated elderly, families in conflict).
Key stakeholders: Community-based health workers, government agencies responsible for community welfare services, health authorities, NGOs (particularly those concerned with suicide and pesticide management).
***Resource needs*:** Volunteers and/or professionals to provide the psychosocial support; trainers, training materials and training sites to train the providers of the services; management expertise to select target communities and individuals, to supervise the provision of services, and to conduct on-going evaluations; community locations for group sessions.

Activities:

1. Periodic (fortnightly or monthly) individual or group meetings that may be situation specific (focused on a specific stressor) or more generally focused on stress management and/or conflict management. All interventions should include assessment of psychosocial barriers to compliance with proper pesticide management procedures and proactively try to reduce these barriers. Groups may be time-limited with fixed membership or on-going with open membership. Same-sex groups are typical but mixed-sex groups are also possible. Youth groups and elders' groups should probably be separated from those for married adults.
2. Monitoring of all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community.

Evaluation: outcomes:

- rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning);
- methods of suicide and attempted suicide;
- cost-effectiveness of the intervention;
- changes in quality of life, hopelessness, and depression;
- level of compliance with pesticide management recommendations;
- prevalence and severity of suicidal ideation.

Recommendations

In view of the magnitude of the problem and the availability of effective and affordable interventions, herewith presented, it is highly desirable that:

- Member States review the list of authorized agricultural products in their country and eliminate those that do not meet the Basel, Rotterdam, and Stockholm Conventions, which cover key elements of the management of hazardous chemicals (www.basel.int; www.pic.int; www.pops.int; last accessed on 20 October 2006).

- Member States explore the impact of fatal and non-fatal suicidal behaviour in the national mortality profile and national injury profile of their country and the specific role of pesticides therein.

- In countries or regions where intentional and unintentional pesticide poisoning represents a public health problem, the following steps be followed by interested parties (governments, regions, communities, NGOs, etc.):

Recommended steps to assess the feasibility and effectiveness of the proposed community interventions and to adapt them to local conditions

1	**Selection of intervention(s):** Decide if pesticide-related fatal and non-fatal suicidal behaviour is an important concern for the country and, if so, which of the recommended interventions should be assessed in which communities (localities or population subgroups).
2	**Establishment of a Coordinating Group and a Working Group:** **a)** identify individuals (agencies) responsible for coordination, funding, implementation, and evaluation of the activities (there may be different individuals or agencies for each type of intervention); **b)** establish a Coordinating Group (situated in a government ministry or a high-profile NGO) of stakeholders and experts to monitor and adjust the intervention over time; **c)** appoint a Working Group that will be responsible for the day-to-day work of implementing the decisions of the Coordinating Group; and **d)** provide the Coordinating Group and Working Group with the personnel and other resources needed.
3	**Identification of potential sites for pilot testing of interventions:** Sites for pilot testing should be reasonably representative of the eventual target population for the interventions. If time and resources permit, different interventions should be conducted in different locations before combinations of interventions are simultaneously conducted in a single location. The alternative method of employing a group of interventions simultaneously, though quicker and less expensive, has the disadvantage that the 'active component' of the intervention will remain unknown until further research is conducted. The number of sites selected and their population need to be sufficient to provide a clear answer about the effectiveness of the intervention.
4	**Situation analysis in target sites:** **a)** assess acceptability of intervention(s) to local leaders, potential target group, and individuals (agencies) responsible for implementation; **b)** collect baseline data (if good-quality retrospective data is available this can be employed; if not, prospective baseline data must be collected); **c)** determine the availability of needed personnel and other resources; and **d)** evaluate local opportunities and constraints for implementing the intervention.
5	**Adaptation of the intervention(s):** In collaboration with local community leaders and opinion leaders revise the proposed target groups, activities, and evaluation procedures based on the site-specific situation analysis. Add any feasible supplemental activities that will increase the local acceptability and feasibility of the intervention, and, thus, increase the community 'ownership' of the programme.

6	**<u>Establish a clear method for formally assessing the effectiveness of the intervention:</u>** **a)** include non-intervention 'control' sites (used for comparison with the intervention sites); **b)** assess reliability and validity of methods of assessing outcome measures; **c)** where possible use single-blind assessment of 'soft' outcome measures (e.g., satisfaction, attitudes, subjective well-being, etc.); and **d)** assess 'fidelity' of application of intervention(s) (i.e., degree to which intervention is administered as intended).
7	**<u>Pilot test, revision and implementation of the intervention:</u>** **a)** develop management procedures to ensure fidelity of application and quality control of the intervention; **b)** provide appropriate training to all persons who provide the intervention or evaluate the intervention; **c)** pilot test the proposed intervention and evaluation procedures in 2-3 representative locations to ensure that the planned activities are feasible; **d)** based on the results of the pilot test, revise the intervention and evaluation procedures as needed; and **e)** implement the intervention in all target sites.
8	**<u>Monitoring of all outcomes of interest:</u>** In addition to monitoring intervention-specific outcome measures, reliable monitoring system(s) for the following measures should be established in ALL of the 'intervention' communities and 'control' communities: **a)** access of community members to different classes of pesticides; **b)** proportion of households that appropriately store pesticides; **c)** proportion of pesticide users who follow recommended methods of preparation, usage and disposal; **d)** rates of attempted and completed suicide by all methods (adjusted based on estimates of the rates of missing and misclassified cases); **e)** rates of fatal and non-fatal accidental poisoning with pesticides; and **f)** direct and indirect costs associated with the intervention (to use in the cost-benefit assessment for each specific outcome measure).
9	**<u>Assessment of sustainability, revision of the intervention and promulgation of the results:</u>** **a)** continue administering the intervention in the original target sites beyond the period used to formally evaluate effectiveness and assess the resource needs and changes in activities and evaluation procedures needed to sustain the intervention activity indefinitely; **b)** based on the evaluation, revise the intervention and evaluation activities for application at other (new) locations; and **c)** mobilize community support and government and non-government resources needed to sustain the intervention and to gradually 'upscale' (disseminate) the intervention to other locations in the country.

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Annex 1

INDEX OF COMMUNITY INTERVENTIONS

SAFER STORAGE
INSTALL **LOCKED BOXES** FOR STORING PESTICIDES IN FARMING HOUSEHOLDS
ENCOURAGE CENTRALIZED **COMMUNAL STORAG**E OF PESTICIDES

EDUCATION
TRAIN **PESTICIDE USERS** ABOUT HEALTH RISKS ASSOCIATED WITH PESTICIDE USE AND ABOUT SAFE USE, STORAGE AND DISPOSAL OF PESTICIDES
IDENTIFY **KEY RESOURCE PERSONS/OPINION LEADERS** FROM WHOM PESTICIDE USERS OBTAIN INFORMATION ABOUT PESTICIDES AND ENSURE THAT THEY HAVE THE MOST UP-TO-DATE INFORMATION ON THE PREVENTION, IDENTIFICATION AND ACUTE MANAGEMENT OF HEALTH PROBLEMS ASSOCIATED WITH PESTICIDE USE
TRAIN PESTICIDE **RETAILERS** TO TEACH PESTICIDE USERS ABOUT HEALTH RISKS AND APPROPRIATE USE, STORAGE AND DISPOSAL OF PESTICIDES, AND MONITOR THEIR COMPLIANCE WITH REGULATIONS
ENCOURAGE LOCAL **MEDIA** TO SUPPORT PROGRAMMES AIMED AT REDUCING PESTICIDE-RELATED SUICIDES AND TO DECREASE INAPPROPRIATE REPORTING OF SUICIDES THAT CAN LEAD TO COPYCAT SUICIDES
TRAIN **SCHOOL CHILDREN** ABOUT SAFE USE, STORAGE AND DISPOSAL OF PESTICIDES

PSYCHOSOCIAL INTERVENTIONS
PSYCHOSOCIAL INTERVENTIONS TO AUGMENT COMMUNITY-BASED PESTICIDE MANAGEMENT MEASURES

INSTALL LOCKED BOXES FOR STORING PESTICIDES IN FARMING HOUSEHOLDS	
Rationale	Limiting access to toxic means prevents their use in suicidal behaviour.
Evidence of effectiveness	Preliminary data from Sri Lanka and Sichuan.
Cost-effectiveness	None yet available.
Target group(s)	All households that use pesticides.
Key stakeholders	Farmers; local government; health authorities; lock producers; box producers; agency (governmental or nongovernmental) that coordinates the distribution of the boxes and education about safe storage and the use of the boxes, and monitors the use of the boxes; NGOs (particularly those concerned with suicide and pesticide management).
Activities	1) Design and produce the boxes; this is preferably done locally in collaboration with the local communities. 2) Identify households that will be given the boxes: all farming households, a random selection of farming households, or farming households in which there has already been a suicide attempt or individuals with other high-risk factors (mentally ill, isolated elderly, etc.). Decide whether box will be free of charge or have a token cost. 3) Identify the best site for the box (house or close to the fields). 4) Provide community education about the importance of safe storage of pesticides and the benefits of the boxes. 5) Provide training to those households that receive the boxes in the use and maintenance of the boxes (specify method and location of installation, inclusion of message on box, use of single or double keys, ownership and location of placement of key(s), etc.); make visits every two months to encourage the continuation of the use of the locked boxes. 6) Monitor the use of the boxes and the factors that increase or decrease its appropriate use. 7) Assess cost of producing and installing the boxes and of promoting and monitoring the use of the locked boxes. 8) Monitor all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community and identify where the subject obtained the pesticide ingested.
Resource needs	Costs of production of the boxes, locks, and box installation; personnel time in the agency or agencies that coordinate the distribution of boxes, education about the use of the boxes, and monitor use of the boxes.
Sustainability	The ongoing maintenance and replacement of broken boxes is relatively inexpensive, but if the intervention proves effective it is probable that boxes will eventually need to be placed in ALL farming households (not just select households) in each community and that there will need to be periodic educational or promotional efforts to ensure that the farmers continue to use the boxes.
Potential ethical issues	This intervention highlights the whereabouts of pesticides and could increase, not decrease, access if there is ready access to the keys for the boxes. There might also be some conflict about which households get the boxes, as well as about receiving funds from the agrochemical industry.

EVALUATION OF LOCKED BOXES	
Background monitoring	1) Demographic characteristics of community (education, income, neonatal death rate, etc.) including total annual volume of pesticides sold with breakdown by type of pesticide. 2) Community rates of suicide and attempted suicide with breakdown by method (including specific type of pesticide). 3) Community rates of fatal and non-fatal accidental or work-related pesticide poisoning with breakdown by specific type of pesticide. 4) Annual survey of randomly selected community households to determine (a) types and amount of pesticides available in homes (if any), location of purchase, and method of storage; and to determine (b) community members' knowledge about appropriate use, storage and disposal of pesticides, about the health risks of pesticide use, and about the recognition and first aid management of the acute toxic effects of pesticide poisoning.
Control group	Matched community with similar rates of pesticide-related suicide and attempted suicide that does not institute a household pesticide lockbox programme.
Primary outcomes	1) Rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning). 2) Methods of suicide and attempted suicide. 3) Methods of storage and disposal of pesticides in community households. 4) Cost-effectiveness of the intervention (per prevented suicide and per prevented attempted suicide).
Secondary outcomes	1) Per cent of households with locked boxes that use them appropriately. 2) Per cent of households who install locked boxes on own (not provided by the study). 3) Per cent of fatal and non-fatal pesticide ingestions (accidental or suicidal) that use pesticides stored in the locked boxes.
Process measures	Qualitative assessment of acceptability of lockboxes including reasons for refusing to use lockbox, difficulties in training farmers about use of lockbox, relative willingness to accept one or two keys, willingness to pay for lockboxes, etc.
Instruments/scales	Annual household survey about pesticide storage and knowledge of community members; form to assess usage of the lockboxes by the assigned households; form for assessing costs associated with the programme.
Timing of evaluation	Baseline, at six months and 12 months after installing locked boxes and then annually thereafter.

ENCOURAGE CENTRALIZED COMMUNAL STORAGE OF PESTICIDES	
Rationale	Limiting access to toxic means prevents their use in suicidal behaviour.
Evidence of effectiveness	No evidence but has advantages over placing locked boxes in individual households because ALL households are involved (not just those with locked boxes), there is another level of supervision over the access to the pesticides.
Cost-effectiveness	Should be less expensive than individual lockboxes because there is less construction and because less individual monitoring is required.
Target group(s)	Communities that have high rates of pesticide-related suicides and attempted suicides.
Key stakeholders	Farmers, community leaders, local government, health authorities, agricultural authorities, pesticide retailers, NGOs (particularly those concerned with suicide and pesticide management).
Activities	1) Discussion with community leaders and pesticide end users to identify which method of communal storage would be most acceptable and feasible in the community. The models vary along a continuum of low to high autonomy for the individual farmer: (a) a centralized location for pesticide storage in the village where each farming family has its own locker that they can access at any time; (b) a centralized storage where lockers are housed in a secure location that has to be opened by a 'manager' before a family can get access to its own pesticide locker; (c) centralized storage of pesticides with individual lockers for each household but only manager has direct access to pesticides, on request from end user manager dilutes amount of pesticide end user plans to use in the current day; (d) centralized purchase/distribution of pesticide in each village by a single authorized (or licensed) distributor who provides pre-application diluted form of pesticide to end user for use in current day (like in the old commune system in China). 2) Construct the centralized storage facility and identify and train the manager(s) for the facility. The design and construction of the facility and the selection of a manager (e.g., a retired farmer) should be done with as much local involvement as possible. The training of the manager should follow the model described for training retailers (see training for retailers). 3) Promote the utilization of the communal storage throughout the community. A variety of media should be employed to describe the importance and value of the centralized storage. 4) Use the communal storage to dispose of unwanted pesticides or to re-sale pesticides to other farmers. 5) Monitor the use of the communal storage and ensure that there is a mechanism for soliciting feedback about the new system and for rapidly dealing with complaints. 6) Assess cost of building and managing the storage facility, and of promoting and monitoring the use of the facility. 7) Monitor all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community and identify where the subject obtained the pesticide ingested.
Resource needs	Funds to build and maintain centralized storage facility; manager for facility (may need to be paid); personnel to conduct public promotion and to deal with complaints of users of the storage facility.
Sustainability	Depends on acceptability to community and enthusiasm of local government and/or NGOs who promote the effort.
Potential ethical issues	Decreased autonomy of individual farming families, inconvenience to farmers, change in power structure within the community, potential abuse of power by paid manager.

EVALUATION OF COMMUNAL STORAGE	
Background monitoring	1) Demographic characteristics of community (education, income, neonatal death rate, etc.) including total annual volume of pesticides sold with breakdown by type of pesticide. 2) Community rates of suicide and attempted suicide with breakdown by method (including specific type of pesticide). 3) Community rates of fatal and non-fatal accidental or work-related pesticide poisoning with breakdown by specific type of pesticide. 4) Annual survey of randomly selected community households to determine (a) types and amount of pesticides available in homes (if any), location of purchase, and method of storage; and to determine (b) community members' knowledge about appropriate use, storage and disposal of pesticides, about the health risks of pesticide use, and about the recognition and first aid management of the acute toxic effects of pesticide poisoning.
Control group	Matched community with similar rates of pesticide-related suicide and attempted suicide that does not institute a communal pesticide storage program.
Primary outcomes	1) Rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning). 2) Methods of suicide and attempted suicide. 3) Methods of storage and disposal of pesticides in community households. 4) Cost-effectiveness of the intervention (per prevented suicide and per prevented attempted suicide).
Secondary outcomes	Per cent of fatal and non-fatal pesticide ingestions (accidental and suicidal) that used pesticides stored in the communal facility.
Process measures	1) Focus groups on the level of acceptability of the new storage method and about problems users have faced in implementing the new system. 2) Monitoring of management of communal storage facility (e.g., How many of the individual lockers are actually used? Are lockers clearly marked and locked? Is the overall facility locked at all times? etc.)
Instruments/scales	Annual household survey about pesticide storage and knowledge of community members; focus group outlines to assess acceptability of communal storage; form to assess management and utilization of communal pesticide storage facility; form for assessing costs associated with the programme.
Timing of evaluation	Baseline, at 6 months and 12 months after setting up communal storage and then annually thereafter

TRAIN PESTICIDE USERS ABOUT HEALTH RISKS ASSOCIATED WITH PESTICIDE USE AND ABOUT SAFE USE, STORAGE AND DISPOSAL OF PESTICIDES	
Rationale	Education can change both knowledge and attitudes and, thus, result in changes in behaviour related to the safe storage of pesticides.
Evidence of effectiveness	Some evidence of effectiveness from non-randomized trials in Nicaragua. There is parallel research showing educational interventions can improve the safe storage of medication.
Cost-effectiveness	No evidence yet available.
Target group(s)	Farmers working in areas with high rates of suicide and attempted suicide using pesticides.
Key stakeholders	Local agricultural experts, health authorities, retailers, agrochemical industry, managers of communal storage facilities, and NGOs (particularly those concerned with suicide and pesticide management).
Activities	1) The content of the educational intervention needs to be brief and simple enough so most in the target group can understand it, but detailed enough that it provides all the essential information about: (a) appropriate methods of preparation, application, storage and disposal; (b) description of labeling symbols; (c) health and environmental risks associated with pesticide use; and (d) recognition, first aid, and reporting of acute toxic effects following intentional or unintentional pesticide poisoning. Multiple methods have been employed to transmit this educational content, such as peer led education, group meetings, TV, radio, posters and leaflets, street plays, etc, but there is no clear evidence about the benefits and disadvantages of the different methods. The method(s) chosen needs to be appropriate for the educational level and other characteristics of the target community. 2) Monitor all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community and identify where the subject obtained the pesticide ingested.
Resource needs	Materials for target group, trainers, and trainers for the trainers, distribution system for educational materials, venues to provide training.
Sustainability	Brief educational interventions repeated periodically over a long period are more effective than one longer intervention, so the goal must be to include the training with other activities that are regularly repeated at the community level. This, however, requires the long-term commitment of the implementing agency (health education department, NGO group, agricultural department, etc.) which is often difficult to effect as agencies' priorities change over time.
Potential ethical issues	If the agrochemical industry provides the educational materials or coordinates/funds the training, attention should be made not to promote the sale of specific products.

EVALUATION OF TRAINING OF PESTICIDE USERS	
Background monitoring	1) Demographic characteristics of community (education, income, neonatal death rate, etc.) including total annual volume of pesticides sold with breakdown by type of pesticide. 2) Community rates of suicide and attempted suicide with breakdown by method (including specific type of pesticide). 3) Community rates of fatal and non-fatal accidental or work-related pesticide poisoning with breakdown by specific type of pesticide. 4) Annual survey of randomly selected community households to determine (a) types and amount of pesticides available in homes (if any), location of purchase, and method of storage; and to determine (b) community members' knowledge about appropriate use, storage and disposal of pesticides, about the health risks of pesticide use, and about the recognition and first aid management of the acute toxic effects of pesticide poisoning.
Control group	Individuals and households in a matched community that does not receive the educational intervention but has similar rates of pesticide-related suicide and attempted suicide.
Primary outcomes	1) Rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning). 2) Methods of suicide and attempted suicide. 3) Methods of storage and disposal of pesticides in community households. 4) Cost-effectiveness of the intervention (per prevented suicide and per prevented attempted suicide).
Secondary outcomes	Changes in knowledge and attitudes about pesticide-related safety issues.
Process measures	1) Level of participation, interest and satisfaction with training activities (lectures, courses, etc.). 2) Degree of exposure of the target group to the educational materials (pamphlets, posters, TV, radio spots, etc.). 3) Availability of target-group (age group, gender etc.) specific education materials in the community. 4) Appropriateness of materials for target population (assessed by external 'expert').
Instruments/scales	Annual household survey about pesticide storage and knowledge of community members; community survey about level of exposure to, participation in, and response to the educational activities.
Timing of evaluation	Before, immediately after and six months after training intervention; periodic (biannual) reassessments.

IDENTIFY KEY RESOURCE PERSONS/OPINION LEADERS FROM WHOM PESTICIDE USERS OBTAIN INFORMATION ABOUT PESTICIDES AND ENSURE THAT THEY HAVE THE MOST UP-TO-DATE INFORMATION ON THE PREVENTION, IDENTIFICATION AND ACUTE MANAGEMENT OF HEALTH PROBLEMS ASSOCIATED WITH PESTICIDE USE	
Rationale	Farmers' knowledge, beliefs and attitudes about pesticide use are strongly influenced by key resource persons/opinion leaders in the community, so identifying and training these individuals can have a community-wide influence on local practices and, thus, lead to decreased rates of pesticide-related suicidal behaviour.
Evidence of effectiveness	Strong evidence from market research that farmers often follow the advice of community resource persons.
Cost-effectiveness	No evidence available.
Target group(s)	Agronomists, farmers or other individuals farmers who act as key resource persons/opinion leaders in their community (e.g. experienced or successful farmers, local leaders, retailers, etc.)
Key stakeholders	Ministry of agriculture / agricultural authorities, local government, health authorities, local health staff, and NGOs (particularly those concerned with suicide and pesticide management).
Activities	1) The type, duration and frequency of 'training of the trainers' developed will depend on the resource persons that exist in the community. If the primary resource persons are government agronomists, then the training packages can be given as part of their government-sponsored continuing education. If retailers are important resource persons for farmers then their training should be conducted as part of the 'retailer intervention' (see training retailers). If other community members (local farmers or officials) are identified as important resource persons, then separate training sessions suitable to their educational level and availability must be designed. The content of the training will focus on the appropriate use, storage and disposal of different types of pesticides but it will also include information about the suicide risks related to pesticides, and the recognition and first-aid management of the toxic effects following intentional or unintentional pesticide poisoning. Activities that enhance the 'resource person' role of the trained individuals in the community should be undertaken. They could, for example, become the trainers in community-level activities aimed at training all pesticide users. 2) Monitor all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community and identify where the subject obtained the pesticide ingested.
Resource needs	Training the trainers' materials adapted for the target group. Experts to provide the training. Training venues.
Sustainability	The provision of advice to farmers by local resource persons needs to be on-going, not time-limited. If the resource people identified are government employees, then clearly specifying this expanded training responsibility as part of their job descriptions should be sufficient to ensure sustainability. If, however, key resource people are local farmers or other community members, there will need to be some oversight agencies (probably the local agricultural bureau) that encourages them to continue in this role, that continues to provide them with up-to-date information, and that identifies new community resource persons over time.
Potential ethical issues	Should the community-based resource persons be paid and, if so, by whom? If the agrochemical industry provides the educational materials or coordinates/funds the training, attention should be made not to promote the sale of specific products.

EVALUATION OF KEY RESOURCE PERSONS/OPINION LEADERS	
Background monitoring	1) Demographic characteristics of community (education, income, neonatal death rate, etc.) including total annual volume of pesticides sold with breakdown by type of pesticide. 2) Community rates of suicide and attempted suicide with breakdown by method (including specific type of pesticide). 3) Community rates of fatal and non-fatal accidental or work-related pesticide poisoning with breakdown by specific type of pesticide. 4) Annual survey of randomly selected community households to determine (a) types and amount of pesticides available in homes (if any), location of purchase, and method of storage; and to determine (b) community members' knowledge about appropriate use, storage and disposal of pesticides, about the health risks of pesticide use, and about the recognition and first aid management of the acute toxic effects of pesticide poisoning. 5) Conduct survey of randomly selected local farmers to identify the sources of information they use to decide on their usage of pesticides, the primary 'resource persons' they use (if any), the settings in which these resource persons typically transmit this information, and the relative importance they give to information obtained from these resource persons. 6) Conduct focus groups with these resources persons to determine where and how they obtain their knowledge about pesticide use, and to assess the best ways to provide them with 'updated' information (teaching materials, small groups, videos, etc.).
Control group	Resource persons and pesticide end users in a matched community (with similar rates of pesticide-related suicide and attempted suicide) that does not get the specialized training of resource persons.
Primary outcomes	1) Rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning). 2) Methods of suicide and attempted suicide. 3) Methods of storage and disposal of pesticides in community households.4) Cost-effectiveness of the intervention (per prevented suicide and per prevented attempted suicide).
Secondary outcomes	1) Knowledge and attitudes of resource persons before and after the educational intervention. 2) Knowledge, attitudes and pesticide-related practices of end users of pesticides before and after the resource persons attend the training sessions.
Process measures	Attendance of identified resource persons at the training sessions and reported acceptability of the training to the identified resource persons.
Instruments/scales	Annual household survey about pesticide storage and knowledge of community members; interview form for farmers to identify sources of information they use to decide on pesticide use; focus group outline for meeting with resources persons about the sources of their information on pesticide use; scales to assess knowledge, attitudes and practices of resource persons and of end users of pesticides; and form to assess attendance and acceptability of training sessions to the resources persons.
Timing of evaluation	Prior to intervention, three months after end of training of resource persons and annually thereafter.

TRAIN PESTICIDE RETAILERS TO TEACH PESTICIDE USERS ABOUT HEALTH RISKS AND APPROPRIATE USE, STORAGE AND DISPOSAL OF PESTICIDES, AND MONITOR THEIR COMPLIANCE WITH REGULATIONS	
Rationale	Responsible sale to responsible/licensed users, appropriate storage of pesticides within shops, compliance with local and/or national regulations related to the sale of pesticides, training of farmers at time of purchase and refusal to sell pesticides to those suspected of suicidal intent should decrease pesticide-related suicidal behaviour and decrease case fatality following intentional ingestion of pesticides (because of restricted access to the most toxic pesticides).
Evidence of effectiveness	Research on the sale of alcohol, tobacco, and firearms confirms the value of a retailer-focused intervention strategy to limit access to restricted products. Ecological evidence from Sri Lanka indicates that restricting availability of more toxic pesticides results in decreased case fatality following pesticide self-poisoning.
Cost-effectiveness	Given the limited number of retailers, this type of intervention is relatively low-cost. It is, however, uncertain to what extent stricter enforcement of current regulations and retailer-centered education of end users can reduce rates of pesticide-related suicide and attempted suicide, so there is currently no cost-effectiveness information for this intervention.
Target group(s)	Pesticide retailers.
Key stakeholders	All pesticide retailers; manufacturers of pesticides, licensing authorities, and government agencies responsible for monitoring the sale of pesticides; health authorities; and NGOs (particularly those concerned with suicide and pesticide management).
Activities	1) Regular visits every two months by Community Health Officer or Local Agricultural Officer (or appropriate equivalents) to all retail outlets for pesticides in a defined area to check that: (a) the retailers are legally entitled to sell pesticides; (b) they do not sell pesticides that contravene existing regulations; (c) the pesticides they sell meet packaging and labeling requirements; (d) the wholesale distribution chain for the retailers does not include unlicensed producers or distributors; (e) they are not receiving bonuses/incentives based on volume of pesticide sales; (f) they ensure that the volume sold is appropriate to the needs of the end user; and (g) they know how to instruct purchasers about safe usage, storage and disposal of the pesticides. 2) During these visits retailers are provided with educational brochures for end users and instructed how to train end users in the safe use, storage and disposal of pesticides. The principle of purchasing the smallest amount necessary for the current needs of the end user will be emphasized in this training. The retailers are also taught about the dangers of suicide by pesticide ingestion, about the characteristics of purchasers who might be at risk for suicide, and about steps that could be taken if they are suspicious about the intention of a particular purchaser.

Activities (continued)	3) Provide education, encouragement and, if necessary, use any available legal means to change the behaviour of non-compliant retailers or wholesalers (e.g., those that produce restricted pesticides or provide retailer incentives by volume of sales, etc.). It may also be possible to reward the high performance retailers by product discounts. 4) For each pesticide-related suicide or attempted suicide in the target area a determination is made about where and when the pesticide was purchased and about whether or not the employed pesticide met regulations at the time of purchase. The retailer involved is interviewed and a report is sent to the pesticide monitoring agency/officer (and will be discussed with the retailer at the time of the next visit). Community reports of the location of purchase of pesticides used for self-poisoning can be published as an incentive to get retailers to follow the recommendations. 5) Monitor all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community and identify where the subject obtained the pesticide ingested.
Resource needs	Educational materials for retailers to give to farmers, training materials for the retailers, and for those who make site visits to the retail sites.
Sustainability	The monitoring of compliance with pesticide sales regulations and training of retailers will need to become an on-going activity that is assigned to a specific government official or department. The monitoring and training should be conducted at least once a year after the main study (when it is done every second month), but may need to be more frequent in areas where there are high rates of non-compliance or where there is rapid turn-over of pesticide retailers. Monitoring of pesticides used in fatal and non-fatal suicidal behavior should be conducted for one year in the initial study. If at the end of the year there continue to be cases in which non-compliant pesticides have been employed in suicides the monitoring should become on-going, but if there are no suicides using non-compliant pesticides periodic monitoring (e.g., for three months every two years) will be sufficient. If, however, reports on the location of purchase of pesticides used for self-poisoning are considered effective in changing the behavior of the retailers, it may be of value to do on-going monitoring.
Potential ethical issues	Reporting of criminal behavior among informants (sale of illegally produced pesticides or sale of pesticides at unlicensed outlets). Potential legal problems in determining that a suicide was enacted using a pesticide that was sold illegally (families could take the retailer to court and use the researcher as a witness). Training materials for retailers and end-users may be provided by agrochemical industry and, thus, give the impression that they are promoting specific agents.

EVALUATION OF RETAILERS' TRAINING AND COMPLIANCE	
Background monitoring	1) Demographic characteristics of community (education, income, neonatal death rate, etc.) including total annual volume of pesticides sold with breakdown by type of pesticide. 2) Community rates of suicide and attempted suicide with breakdown by method (including specific type of pesticide). 3) Community rates of fatal and non-fatal accidental or work-related pesticide poisoning with breakdown by specific type of pesticide. 4) Annual survey of randomly selected community households to determine (a) types and amount of pesticides available in homes (if any), location of purchase, and method of storage; and to determine (b) community members' knowledge about appropriate use, storage and disposal of pesticides, about the health risks of pesticide use, and about the recognition and first aid management of the acute toxic effects of pesticide poisoning. 5) Situational analysis of target communities that includes: (a) all local and national regulations related to sale and labeling of pesticides including penalties for non-compliance; (b) mechanisms in place to monitor compliance with the regulations (if any); (c) number of locations in the community (both legal and illegal) where community members purchase pesticides; (d) level of knowledge about the regulations among pesticide retailers; (e) degree to which the regulations are actually implemented by the identified retailers; and (f) proportion of pesticides stored in homes that were non-compliant with current regulations at time of purchase.
Control group	Retailers and a random selection of households in matched community (with similar rates of pesticide-related suicides and attempted suicides) in which there is no intervention with retailers.
Primary outcomes	1) Rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning). 2) Methods of suicide and attempted suicide. 3) Methods of storage and disposal of pesticides in community households. 4) Cost-effectiveness of the intervention (per prevented suicide and per prevented attempted suicide).
Secondary outcomes	1) Number of illegal retailers in the community. 2) Number of legal retailers that sell internationally banned pesticides. 3) Proportion of retailers who follow recommendations about screening and educating buyers (e.g. assessed by mock buyers). 4) Proportion of pesticide-related suicidal behaviors that employ pesticides that were internationally banned at time of purchase.
Process measures	1) Qualitative assessment of difficulties retailers have in complying with the regulations and in providing the educational package to pesticide users. 2) Qualitative assessment of effectiveness of methods for training retailers and of methods used to encourage retailer compliance with recommendations.
Instruments/scales	Annual household survey about pesticide storage and knowledge of community members; establish clear criteria for compliant and non-compliant pesticides that are used to classify pesticides sold by retailers, pesticides stored in households and pesticides employed in suicides and attempted suicides; recording forms for bimonthly assessment of retailers and for classification and reporting of pesticide-related suicides and attempted suicides.
Timing of evaluation	Outcomes should be assessed at end of one year and annually thereafter.

* NOTE: The interventions considered here are limited to 'community-based' interventions, so we only consider the implementation of CURRENT regulations NOT country-wide or region-wide changes in regulations governing the production, packaging, labeling, or sale of pesticides.

ENCOURAGE LOCAL MEDIA TO SUPPORT PROGRAMMES AIMED AT REDUCING PESTICIDE-RELATED SUICIDES AND TO DECREASE INAPPROPRIATE REPORTING OF SUICIDES THAT CAN LEAD TO COPYCAT SUICIDES	
Rationale	Newspapers, TV, radio, and other mass media have a strong influence on public attitudes and, thus, can be employed to enhance the effect of educational programmes about pesticides or, negatively, can increase rates of suicidal behaviour by inappropriate glamorization, excessive coverage, and overly detailed reports of suicides.
Evidence of effectiveness	There is clear evidence that inappropriate, excessive reportage of suicides leads to short-term increases in the rates of suicide (typically copycat suicides). On the positive side, the role of the media was central to the success of the recent German suicide prevention initiative that focused on increasing rates of treatment for depression.
Cost-effectiveness	No evidence.
Target group(s)	All local media outlets that are widely available in a target community that is implementing programmes to decrease pesticide-related suicides and attempted suicides.
Key stakeholders	Government departments responsible for the media, journalists, journalism schools, agencies that are implementing the programmes to decrease pesticide-related suicides.
Activities	1) Identify media that are widely available in the target community and arrange meetings between media representatives and organizers of the pesticide management programme at which methods the media can help in the programmes are discussed. 2) Depending on the type of programme, media can help stimulate public support for the pesticide management programme, can promote the goals and activities of the programme, can provide on-going reports of the progress of the programme, and can promulgate and promote the specific educational messages of the programme (e.g. about use, storage, and disposal of pesticides). 3) Discussion with the media should also consider reporting of suicides. Suicide prevention experts and/or local proponents should present evidence that inappropriate reporting can lead to increased suicide rates, provide guidelines for reporting suicides, and discuss methods that the local media could use to decrease this problem. If recent reports from the local media are available these could be used (in a positive, not critical, manner) to demonstrate what is considered 'appropriate' reporting. 4) Media representatives are given contact numbers of key figures in the pesticide management programme and of suicide prevention experts that they can contact if they would like help in preparing articles. At the request of local media, programme proponents could distribute materials to local media and/or give small group tutorials to journalists about the appropriate reporting of suicides. [Many sets of guidelines are available, so they will need to be adapted for local conditions. Generally speaking, reports should not provide detailed methods, should avoid glamorization, should present other methods of coping with problems, should clarify the negative effect of suicide on others, and should provide emergency crisis numbers for readers who are distraught.]

Activities (continued)	5) All articles related to the pesticide management programme and, more generally, to suicides that appear in the local media after the initial contact are obtained and periodic meetings (every six months) between media representatives and programme organizers should be arranged to discuss the content of these reports. Reporters and other media personnel will be asked to complete a questionnaire about their reaction to the media guidelines. Appropriate reporting could be encouraged by giving annual awards to the top three reports. 6) Monitor all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community and identify where the subject obtained the pesticide ingested.
Resource needs	Guidelines for reporting suicides adapted to needs of local media; suicide experts who can act as consultants for local media, personnel to collect all local media reports about suicide and about the pesticide management programme and to make a qualitative assessment of the appropriateness of the reports.
Sustainability	This activity should continue for as long as the pesticide management program continues. The resource needs are quite modest; the main problem will be to maintain the interest of the media over time. Continued participation by the media depends on the extent to which program organizers can have 'new' information (or new approaches) to present to the media over time and the extent to which they can encourage the media to be active participants in the program rather than passive observers of the suicide prevention effort.
Potential ethical issues	Increased media coverage of suicide prevention programs and of suicides can, if not done properly, promote suicidal behavior in a small number of particularly vulnerable or sensitive individuals, so this possibility should always be considered. Media outlets are in the business of selling their products, so care should be taken to avoid the use of high-profile (front-page) reports about suicides to sell more papers or to get a higher listenership for TV or radio programs

EVALUATION OF MEDIA ENCOURAGEMENT	
Background monitoring	1) Demographic characteristics of community (education, income, neonatal death rate, etc.) including total annual volume of pesticides sold with breakdown by type of pesticide. 2) Community rates of suicide and attempted suicide with breakdown by method (including specific type of pesticide). 3) Community rates of fatal and non-fatal accidental or work-related pesticide poisoning with breakdown by specific type of pesticide. 4) Annual survey of randomly selected community households to determine (a) types and amount of pesticides available in homes (if any), location of purchase, and method of storage; and to determine (b) community members' knowledge about appropriate use, storage and disposal of pesticides, about the health risks of pesticide use, and about the recognition and first aid management of the acute toxic effects of pesticide poisoning.
Control group	Matched community that has a similar pesticide management program in which media are not actively sought out to report on the program or to change their methods of reporting suicides. Alternatively, the pesticide management program and media participation can be considered an integrated program; in this case the appropriate control group is a matched community with similar rates of pesticide-related suicides and attempted suicides that does not have a pesticide management program and does not have any specific suicide prevention intervention aimed at the media.
Primary outcomes	1) Rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning). 2) Methods of suicide and attempted suicide. 3) Methods of storage and disposal of pesticides in community households.
Secondary outcomes	1) Number and quality of local media reports about the pesticide management programme and increased press-coverage concerning safe storage. 2) Improved reporting of suicide.
Process measures	1) Assessment of the meetings with members of the media. 2) Reaction of media to the media guidelines.
Instruments/scales	Annual household survey about pesticide storage and knowledge of community members; form to assess the type, length, and quality of media reports about the pesticide management program and about suicides (if resources are available this could be based on a formal content analysis); reporting form of the content and process of meetings with representatives of the different media; questionnaire for media about their reaction to the media guidelines for reporting suicides.
Timing of evaluation	Assessments are done at baseline and annually thereafter.

TRAIN SCHOOL CHILDREN ABOUT SAFE USE, STORAGE AND DISPOSAL OF PESTICIDES	
Rationale	Training children not only educates the next generation of farmers, but children who have learned this material can indirectly train the adults in their household and/or encourage appropriate behavioural changes regarding the use, storage and disposal of pesticides.
Evidence of effectiveness	Evidence from studies of HIV infection that training children can change parental behavior.
Cost-effectiveness	No evidence.
Target group(s)	School age children in communities that have high rates of pesticide-related suicide and attempted suicide.
Key stakeholders	Education authorities, teachers, parents, agricultural authorities, health authorities, and NGOs (particularly those concerned with suicide and pesticide management).
Activities	1) Meet with education authorities, teachers and parent groups to discuss the importance of regularly educating students about pesticides and discuss the best way to incorporate this content into the school curriculum. 2) Develop age-specific teaching materials and manuals that focus on the safe use, storage and disposal of agricultural chemicals. Different sets of materials should be developed for elementary, middle and high school. The content does not directly mention suicide but includes information about health hazards related to pesticide use and the recognition and first aid management of acute pesticide poisoning; about ten classroom sessions, e.g. one class period per week for one semester in grades 2, 5, 8 and 11. The format should allow for discussion about students' their experiences; include activities that stimulate the interest and participation of both students and parents such as household surveys (by the students), poster competitions, plays, songs, etc. 3) Train teachers (in most cases the science teacher) to do this teaching. Instruction how to discuss pesticide-related suicide if students bring this up as part of the discussion; they must be given back up psychological support (i.e., contact number for professional psychologist of psychiatrist) if discussion of the topic stimulates extreme responses in children who have had a family member or close associate commit suicide by pesticide ingestion. 4) Monitor changes in knowledge and attitudes about pesticide use of school-age students and responses to the course material of students, parents and teachers. Regularly modify course content and method based on evaluations. 5) Monitor all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community and identify where pesticide ingested was obtained.
Resource needs	Educational experts and agricultural experts will need to work together to develop teaching materials and to regularly modify materials; printing and distribution of materials; training sessions for the teachers who will conduct the courses need to be organized; and back-up psychological experts will be needed in case the course content elicits extreme reactions from the students.
Sustainability	Involving children in activities that may be seen as promoting use of pesticides and involving children in discussions on suicide should not happen if psychosocial support is not available.
Potential ethical issues	Even though pesticide-related suicides are not part of the content of the courses, discussion of pesticides may elicit stories of pesticide-related suicides in a few of the participating children; it is recommended that back-up expert psychological support be available to help teachers deal with these situations if they result in strongly negative psychological responses. If the materials used in the courses are derived from brochures created by the agrochemical industry there will be the impression that the courses are promoting the use of particular pesticides; the creators of the teaching materials must avoid direct use of referral to industry-produced materials.

EVALUATION OF TRAINING OF SCHOOL CHILDREN	
Background monitoring	1) Demographic characteristics of community (education, income, neonatal death rate, etc.) including total annual volume of pesticides sold with breakdown by type of pesticide. 2) Community rates of suicide and attempted suicide with breakdown by method (including specific type of pesticide). 3) Community rates of fatal and non-fatal accidental or work-related pesticide poisoning with breakdown by specific type of pesticide. 4) Annual survey of randomly selected community households to determine (a) types and amount of pesticides available in homes (if any), location of purchase, and method of storage; and to determine (b) community members' knowledge about appropriate use, storage and disposal of pesticides, about the health risks of pesticide use, and about the recognition and first aid management of the acute toxic effects of pesticide poisoning.
Control group	Schools from matched community with similar rates of pesticide-related suicide and attempted suicide that do not institute the training courses.
Primary outcomes	1) Rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning). 2) Methods of suicide and attempted suicide. 3) Methods of storage and disposal of pesticides in community households. 4) Cost-effectiveness of the intervention (per prevented suicide and per prevented attempted suicide)
Secondary outcomes	Knowledge and attitudes about pesticide use, storage and disposal by school-age students, their parents, and their teachers.
Process measures	Focus groups with students, parents and teachers about the appropriateness, content, format and value of the training courses.
Instruments/scales	Annual household survey about pesticide storage and knowledge of community members; form to assess knowledge and attitudes about suicide in students, parents and teachers; focus group outline for assessing responses to the courses from students, parents, and teachers.
Timing of evaluation	At baseline and annually thereafter.

PSYCHOSOCIAL INTERVENTIONS TO AUGMENT COMMUNITY-BASED PESTICIDE MANAGEMENT MEASURES	
Rationale	A number of moderating factors may influence pesticide-related suicides, and adherence to pesticide management and storage recommendations. These include impulsive personality traits, mental disorders, social isolation, acute interpersonal stressors, alcohol use, domestic violence, etc. Psychosocial support strategies can decrease the impact these factors have on the risks of ready access to highly toxic means (i.e. pesticides).
Evidence of effectiveness	Unpublished data from Sri Lanka with relatively small samples shows a drop in overall suicide rates when psychosocial support is combined with the placement of locked boxes. Individual-based psychosocial support for suicide attempters found effectiveness in decreasing depressive affect and suicidal ideation in rural China (part of the WHO SUPRE-MISS study).
Cost-effectiveness	No studies available but these interventions are typically administered by volunteer groups, so costs are primarily limited to travel, food and (sometimes) accommodation. If psychosocial support is provided by professionals (e.g. social workers) or government workers the costs will be higher.
Target group(s)	Areas with high rates of suicide and attempted suicide using pesticides. Focus may also be on individuals in these communities who have made prior suicide attempts or are at high risk for some other reason (e.g. people with mental disorders, alcohol abuse, isolated elderly, families in conflict).
Key stakeholders	Community-based health workers, government agencies responsible for community welfare services, health authorities, and NGOs (particularly those concerned with suicide and pesticide management).
Activities	1) Periodic (fortnightly or monthly) individual or group meetings that may be situation specific (focused on a specific stressor) or more generally focused on stress management and/or conflict management. All interventions should include assessment of psychosocial barriers to compliance with proper pesticide management procedures and proactively try to reduce these barriers. Groups may be time-limited with fixed membership or on-going with open membership. Same-sex groups are typical but mixed-sex groups are also possible. Youth groups and elders' groups should probably be separated from those for married adults. 2) Monitor all intentional and unintentional pesticide ingestions (fatal and non-fatal) in the community and identify where pesticide ingested was obtained.
Resource needs	Volunteers and/or professionals to provide the psychosocial support; trainers, training materials and training sites to train the providers of the services; management expertise to select target locations and individuals, to supervise the provision of services, and to conduct on-going evaluations; community locations to conduct group sessions; funds for salaries (if needed), travel, food and lodging.
Sustainability	Both the community and the coordinating NGO or government agency must be convinced of the value of the psychosocial intervention AND of the need to make the sustained effort over time to continue the program. The sustainability of the intervention will also depend on on-going availability of personnel to provide the services, experts to train the front-line providers, an administrative structure to manage the programme and funds to keep the programme going.
Potential ethical issues	Community agreement and household head or individual (depending on focus of the intervention) consents will be necessary. This intervention has few potential risks, but issues may arise in the sessions (acute suicidality, spouse abuse, frank mental illness, etc.) that are beyond the competence of the provider of the psychosocial support. There will, therefore, need to be back-up professional support that the personnel who provide the psychosocial intervention can call in when they need help.

EVALUATION OF PSYCHOSOCIAL INTERVENTIONS	
Background monitoring	1) Demographic characteristics of community (education, income, neonatal death rate, etc.) including total annual volume of pesticides sold with breakdown by type of pesticide. 2) Community rates of suicide and attempted suicide with breakdown by method (including specific type of pesticide). 3) Community rates of fatal and non-fatal accidental or work-related pesticide poisoning with breakdown by specific type of pesticide. 4) Annual survey of randomly selected community households to determine (a) types and amount of pesticides available in homes (if any), location of purchase, and method of storage; and to determine (b) community members' knowledge about appropriate use, storage and disposal of pesticides, about the health risks of pesticide use, and about the recognition and first aid management of the acute toxic effects of pesticide poisoning. 5) Community screening to identify numbers of individuals (or households) in the community that meet pre-specified criteria of 'high-risk'. 6) Situation analysis of the current forms of psychosocial support available to community members.
Control group	If the psychosocial intervention is community-based a matched community should be selected (similar in terms of level of pesticide use and proportion of community that meet 'high-risk' criteria). If the intervention is individual-focused individuals from a matched community should be identified who are 1:1 matched to those in the intervention community (for age, gender, risk status and pesticide access status).
Primary outcomes	1) Rates of fatal and non-fatal pesticide poisoning (suicide, attempted suicide, accidental poisoning). 2) Methods of suicide and attempted suicide. 3) Cost-effectiveness of the intervention (per prevented suicide and per prevented attempted suicide).
Secondary outcomes	1) Changes in quality of life, hopelessness, and depression. 2) Level of compliance with pesticide management recommendations. 3) Prevalence and severity of suicidal ideation.
Process measures	Proportion of identified high-risk individuals who are willing to participate in the psychosocial interventions and who continue to participate after the first or second session. Acceptability of the format, content, frequency, and duration of the intervention.
Instruments/scales	Annual household survey about pesticide storage and knowledge of community members; screening measures to identify 'high-risk' individuals or households; scales that assess quality of life, depression, suicidality and level of compliance with pesticide recommendations; reporting form on the process of the support groups; evaluation forms on satisfaction with the psychosocial support groups.
Timing of evaluation	Prior to intervention, during intervention, at termination of the intervention and 6-12 months after completion of the intervention. If intervention is community-focused a random sample of the intervention and control communities can be identified and assessed repeatedly; if the intervention is individual-based these targeted individuals (and their controls) would be assessed at each time period.

Annex 2

WORLD HEALTH ORGANIZATION

First Consultation on Best Practices on Community Action for Safer Access to Pesticides **/5**

Salle "D"
Geneva, SWITZERLAND, 10 - 12 May 2006

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