PQRST

(Pesticides Quick Response Surveillance Team)

A Practical Guide

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Published by
Pesticide Action Network (PAN) Asia and the Pacific

ACKNOWLEDGEMENTS

This document has been produced with the financial assistance of the Swedish International Development Cooperation Agency, Sida, which has been arranged by the Swedish Chemicals Inspectorate, KemI. The views herein shall not necessarily be taken to reflect the official opinion of Sida or KemI.

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Public Media Agency www.publicmediaagency.net

Published by:
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Perpustakaan Negara Malaysia
Cataloguing-in-Publication Data
Quijano, Romeo F.
PQRST : pesticides quick response surveillance team/ Romeo F. Quijano.
ISBN 978-983-9381-38-2
1. Pesticides industry. 2. Biological pest control agents.
3. Pesticides -- Controlled release I. Title. 632.96

December 2008

ISBN 978-983-9381-38-2

9 789839 381382 >

Introduction

Pesticide and chemical poisoning merits a lot of studies, and materials but sadly, the majority of pesticide users in developing agricultural countries like the Philippines still unknowingly become victims because of the low level of awareness and lack of information dissemination. The open market prescription of the GATT World Trade Organisation has flooded our market with a vast array of pesticides and our farmers are left bearing the brunt of this silent menace.

Fuelled by the politics of profit, a highly manipulative consumer campaign and the lack of political will of the government to shift to alternative modes of production, the demand for pesticide and chemical use becomes greater. It is also this setting where the most inappropriate and reckless disregard for safety in the use of pesticides abound and create impact to the peoples' disadvantage.

The banned organochlorine pesticides have been largely replaced by organophosphates which, despite being less persistent have more acute toxic health effects. Due to their persistency in nature, we cannot mark down the chronic implications it will have on the health of the affected population.

The Pesticide Quick Response and Surveillance Team is conceptualised primarily as a grassroots approach to monitoring pesticide poisoning.

Realising the gap between the abundance of knowledge regarding this field and the barriers that prevent these information to be accessed by the basic sectors who are the directly affected, the Pesticide Quick Response and Surveillance Team is conceptualised primarily as a grassroots approach to monitoring pesticide poisoning. It will involve maximum advocacy in a community based set-up considering the need for a group trained to respond to reports of adverse events related to pesticides within a reasonable period of time. Advocacy in order to answer the gap and community based approach because this will ensure the most effective mechanism for surveillance and providing immediate health care. It will also be the appropriate venue for instituting policy changes regarding pesticide use.

Objectives

Objectives:

To establish a pilot system within 2 years that will immediately address the issue of pesticide poisoning at the community level on two aspects:

a. monitoring and documentation
(for advocacy, policy change and social transformation).

b. intervention (medical treatment and support for the actual victims).

Basic Principles and Requisites:

a. community members: (farmers/agricultural workers) on the frontline.

b. the referral system is two way.

c. participatory, rather than expert, specialist oriented.

d. based on the dynamic interplay of the different concerned sectors
(e.g. Farmers, workers, health workers, health professionals, academe, scientists, etc.)

- multisectoral networking and organising is needed.
- continuous advocacy is a fundamental aspect.

Immediate Services

- food issue
- land issue
- issue of wages
- other fundamental issues

Policy/advocacy

- national
- media project
- accountability

National Formation

- Farmers organisation
- NGO/support institutions
- Health sector, academe, etc.

Long term concerns:

Medical/Legal intervention

- health sector assistance with PO
- legal assistance for demands

For accountability and Compensation

Multisectoral Formation

- farmers organisation
- PAN-AP and other anti-pesticides groups
- other NGOs
- health sector; scientists

Policy advocacy

- dialogue with local government
- poison control centre
- accountability
- media project

Community level

- PQRST team composed of

  Health workers, farmers/ workers organisers/leaders

- Task: document illness/incident
  i. write Signed Statements or testimonies and fact sheets
  ii. provide relief if possible
  iii. initiate link up
  iv. media projection

1. What is PQRST?

PQRST is **Pesticide Quick Reaction and Surveillance Team**. This consists of highly trained anti-pesticide advocates who are able to respond to reports of adverse events related to pesticides within a reasonable period of time. The main purpose of the team is to provide a support mechanism to communities which are likely to be victims of pesticide poisonings.

2. What are the functions of the PQRST?

The major functions of the team would be:

a) to determine the veracity of the report,
b) gather relevant data,
c) properly document the incident/ adverse event,
d) make an initial evaluation on the association of the observed adverse event and pesticide exposure,
e) undertake initial response measures and
f) make appropriate recommendations for further action.

3. What is the composition of the PQRST?

There shall be three main levels of PQRST:

a) Community PQRST

This will be established in community areas participating in the CPAM (Community Pesticide Action Monitoring) project. The local participating organisation shall identify individuals who are qualified to be members of the team. There should be at least 3 members of the team, one of whom should have undergone training on community health work, including administering first aid to poisoning cases. One other member should be someone with experience as coordinator or community organiser who will act mainly as the liaison officer. The third member of the team will be a support staff who will act mainly as the documenter. The team members should have undergone CPAM training. Specific tasks shall be defined by the team members in consultation with the CPAM participating organisation. The Community PQRST will be the first tier in the PQRST system, seeking out and responding to pesticide-related incidents reported by members of the community and conducting an initial fact-finding mission. The team will then file an incident report and may request for further investigation by the National PQRST if necessary.

b) National PQRST

This will be established to respond to requests from Community PQRSTs for further investigation and other measures as necessary and feasible. This team shall be organised by the network partner/s of PAN AP. There should also be at least 3 members of the team, one of whom should, if possible, be based in an institution (e.g., national poison centre, tertiary hospital, university, environment institute) with technical capabilities to undertake more in-depth investigation and response measures on the incident reported by the Community PQRST. Another member should

act as coordinator and should belong to the partner organisation of PAN AP. The third member of the team will be a support staff and act mainly as documenter. Arrangements should be made to be able to tap the technical services of other experts and institutions when necessary (special services such as laboratory analysis).

c) International PQRST

In certain instances, it would be necessary for an International PQRST to respond to an incident report. This team could be called upon on an ad hoc basis tapping individuals who are already members of National PQRSTs. The request for an International PQRST can come from a National PQRST. An international PQRST secretariat, preferably based at PAN AP, should be established to receive and compile incident reports and to coordinate with National PQRSTs. This secretariat shall organise an International PQRST whenever necessary. Incidents that may need a coordinated response at the international level will be the primary concern of the International PQRST. The Kamukhaan, IRRI, and Kerala (endosulfan) cases are examples of such incidents.

4. How will the PQRST work?

Members of the PQRSTs at all levels will work entirely on a voluntary basis. PAN AP will be the main organiser and administrator of the scheme and will work with national partners to seek funds accordingly. It shall seek the cooperation of various network partners in several countries and plan accordingly. Recruitment of members of the PQRSTs shall be the primary responsibility of the network partners. Community organisations as well as participating organisations in the pesticide community monitoring project (CPAM) should be encouraged to organise and develop Community PQRSTs as soon as feasible. Likewise, national partners of PAN AP should be encouraged to form national PQRSTs. PQRST training should be incorporated in the CPAM trainings that are being conducted at the national and community levels. A training module on PQRST should also be developed.

5. How will the PQRSTs determine the veracity of a report?

The credibility and reliability of the source of the report is the most important factor.At the community level, members of a local organisation who have participated in any CPAM training/ education activity would have high credibility and reliability if they are the sources of the information. Direct testimonial evidence from the affected persons themselves should be sought. Physical evidence such as photographs, pesticide labels or containers, or records of pesticide use should be obtained whenever possible. Corroborating testimonies/evidence should also be sought. Other relevant information should be obtained as much as possible.

6. What relevant data should be obtained?

Proof of illness or adverse event, proof of exposure and their temporal relationship should be obtained as much as possible. A detailed description of the incident or adverse event should be obtained. The exact words of the person or people directly affected should be documented as accurately as possible.The standard demographic data should not be forgotten, such as name, age, sex, address, etc. Information on the occurrence of similar incidents in other areas or in the past should be sought. A structured questionnaire should be used whenever practicable so as not to miss important information.

7. How should the incident/adverse event be documented?

Testimonial evidence should be recorded as accurately as possible. A structured questionnaire prepared specifically for the incident should be used whenever possible. Handwritten notes should be clearly legible and organised with identifying information included. Signed statements should be obtained if possible. Physical evidence should be collected and preserved in an appropriate manner. Photographs, video or audio recording will be very helpful. Local records, such as those from health centres or local government offices, about the incident should be sought and obtained if possible. If they have not done so, the affected people should be encouraged to lodge a complaint at the local authorities.

8. How will the association between the adverse event incident and pesticides be established?

There are several factors to consider in establishing the association:

a) Proof of illness/adverse effects

i. testimonial evidence – direct and indirect
ii. physical evidence – actual presence of victims, pesticide labels or containers, photographs, video or audio tapes, etc.
iii. documentary evidence – signed statements, local records, notes
iv. laboratory evidence
v. geographic consistency

b) Proof of exposure

i. testimonial evidence
ii. physical evidence
iii. documentary evidence
iv. laboratory evidence
v. geographic consistency

c) Biologic plausibility – the adverse effects/ incident can be expected from the known characteristics of the pesticide/s:

i. hazard characteristics – intrinsic, available scientific data
ii. physico-chemical characteristics
iii. mechanism of toxicity
iv. empirical evidence

d) Temporal relationship

i. exposure to pesticide followed by appearance of illness/adverse event attributable to the pesticide
ii. onset of illness/adverse event consistent with onset of exposure
iii. withdrawal or reduction of pesticide followed by disappearance or eduction of illness episodes/adverse events

e) Dose-response relationship

i. the greater the exposure, the greater the effect
ii. amount and duration of exposure correlates with geographic distribution, incidence and severity of adverse events

f) Consistency of association

i. occurrence of similar incidents in the past
ii. similar occurrences in other areas
iii. presence of other corroborating evidence

g) Specificity of association

i. presence of expected characteristic effects
ii. preponderance of effects expected of suspected cause

h) Consideration of alternative explanations/ causes

i. presence of other possible causes
ii. likelihood of association with other possible causes
iii. relative strength of association with other possible causes

i) Credibility of sources of information

i. integrity of people/institutions collecting, generating and interpreting data
ii. presence of vested interests
iii. reliability of methods in generating, collecting and interpreting data
iv. presence of systematic bias

j) Strength of association

i. overall appraisal of all evidence
ii. risk characterisation and appraisal
iii. statistical analysis
iv. common sense

8.1 Proof of illness/adverse effects

8.1.1 Testimonial evidence

Testimonial evidence is evidence given orally, in writing or in any other way that expresses what a person has experienced, felt, thought, or perceived and his/her appreciation of facts or events. Direct testimonial evidence is when the information is provided by the person who has directly experienced the illness or adverse event. This is the most basic form of evidence in so far as proof of illness or adverse effects is concerned. It emanates from the fact that the most competent, credible and reliable source of information pertaining to what actually happened to a person is the affected person himself or herself; no one else could better describe the signs and symptoms, illness, or the adverse effects.

It is for this reason that in clinical medicine, the physician gives primary importance to what the patient says about his illness, sometimes even overriding laboratory examinations. For example, when a person comes in for consultation and complains of episodes of "difficulty of breathing", the physician cannot just dismiss the complaint as "psychological" when a chest x-ray or a lung function test turns out to be normal. The physician should always be on a lookout for plausible abnormality that may be undetected by laboratory examination. Even in cases where complaints may be considered "psychological" in nature, very often these cases may reflect behavioural manifestations of an underlying biological abnormality or illness.

The person (witness) giving the testimony must be deemed competent. To be competent, the witness must fulfil certain requirements. Firstly, the witness must indicate voluntariness and truthfulness in giving the testimony. There should be no coercion or duress in whatever form nor any undue enticement or promise of reward to elicit desired information.

The witness should be made to affirm that his/her statements are truthful and are in accordance with what he/she actually felt, experienced, observed, or perceived to the best of his/her recollection of events. Secondly, the witness must have personal knowledge about what he/she is talking about, having perceived something with his senses that is relevant to the subject of his/her testimony. Thirdly, the witness must have a recollection of what he/she perceived. And lastly, the witness should be able to communicate what he/she perceived.

If a witness forgets what he is supposed to be testifying about, the interviewer can assist the witness in several ways. One, the witness can be asked to stop a while, relax, walk around and calm his nerves. Very often, the witness feels anxious about giving a testimony. Second, you can ask a leading question to try to refresh his recollection. For example, the witness residing near a banana

plantation may remember an illness episode like having abdominal pain and diarrhoea but may not remember any exposure to pesticides at the time of the illness episode. You can remind him that the nearby plantation regularly sprays pesticides and help him recall whether he noticed a backpack sprayer or if he smelled "chemicals" that day immediately preceding the illness episode. Non-specific symptoms like abdominal pain and diarrhoea are commonly presumed to be caused by "bacteria" in food or water and seldom attributed to pesticide exposure. Even if no clear acute pesticide exposure is elicited in the testimony, having the witness affirm that there was most likely pesticide spraying at that time, based on his knowledge of the plantation practices on pesticide use, would have probative value.

Third, you can attempt to refresh the witness's recollection by showing certain "refreshing objects", such as a picture of a backpack sprayer or an airplane spewing pesticide mist that might help him recall exposure events. Asking the witness to recall details of his activities on that particular day as much as he could, giving particular attention to potential exposure situations (such as walking along the road right beside the bananas) might also help.

The frailty of the witness's memory does not nullify his competence as a witness. Bias, interest, prejudice, and other grounds to doubt the credibility of a witness go only to the weight of his testimony and do not affect his competence. Deficiencies in knowledge generally affect only the weight and not the substance of the testimony, so long as the witness perceived something relevant.

Indirect testimonial evidence is testimonial evidence obtained from a person who is able to describe what happened to the victim and not from the person who actually experienced the illness episode or adverse effects. For example, when a victim dies of pesticide poisoning, indirect testimonial evidence can be obtained from the wife, parents, or anybody close to the victim and who has personal knowledge of what happened to the victim. This witness now expresses what the victim had experienced, felt, thought, or perceived and his/her appreciation of facts or events. Indirect testimonial evidence can also be obtained to corroborate direct testimonial evidence.

Testimonial evidence is evidence given orally, in writing or in any other way that expresses what a person has experienced, felt, thought, or perceived and his/her appreciation of facts or events.

8.1.2 Physical evidence

Physical evidence is evidence that is tangible, such as the victim himself who is making the testimony, pesticide labels or containers, photographs, video or audio tapes, medical and/or laboratory reports, notes (or any other relevant document), etc. The inherent weakness of testimonial evidence is that it is subjective in nature. A person's memory of an event is not always what actually occurred. The perception of the witness can be incomplete, distorted, or even imagined, at times. It is not unusual that a person relating an event may subconsciously fill in details of events that they did not fully perceive. A person can also have personal motivations for either consciously or unconsciously distorting events in their minds and some people tell falsehoods for some reason. Nevertheless, a good testimonial evidence when supported by physical evidence, is very strong and can be definitive. Physical evidence provides tangible proof that an event occurred.

Since physical evidence is very important, it is essential that an investigator knows how to correctly collect and preserve this type of evidence. Properly collected and preserved evidence can establish the occurrence of an illness episode or

adverse effect and can provide a strong link to pesticide exposure. Physical evidence that is not handled correctly can weaken or even destroy objective information that is essential to establish a case, especially when legal remedies are being contemplated. If evidence is documents, collected and stored in a suitable manner, it can be a silent "eyewitness" that can be presented to a judge or jury several years from the time of the actual incident in question. Evidence or the lack of evidence can also be used to either bolster or contradict a witness statement (either for or against a particular case) or any statement that the subject may make. Physical evidence can also point in the direction where further information can be obtained to bolster the case.

Every PQRST community monitor should make an effort to learn as much about recording, packaging, and storing evidence as possible. The investigator should also be able to recognise evidence, what can be done with it, what maximum amount of information from that evidence can be taken and who is the best expert to call to help interpret the evidence. Before an investigator begins collecting evidence, he or she must be able to recognise what will constitute evidence in a certain case. This recognition is developed by researching, learning, and experience. There are at least three general categories of physical evidence constituting proof of illness or adverse effect.

These categories include:

1. Evidence that can absolutely establish that an illness or adverse effect occurred (sometimes establishing, but not necessarily so, the link to pesticide exposure). For example, a medical record of the victim (who gave testimonial evidence that he was poisoned by pesticide) showing a diagnosis of pesticide poisoning by the attending physician, especially if there is laboratory confirmation or corroboration of the physician's diagnosis (e.g., cholinesterase test, pesticide residue analysis) belongs to this category. This type of evidence establishes both the occurrence of the illness/ adverse effect and the pesticide exposure. Another example might be a photograph of a congenital abnormality or skin lesions known to be caused by pesticides in the scientific literature. The victim himself is the physical evidence and you preserve that evidence by taking a photograph. This evidence establishes that the illness/adverse effect occurred but only suggests the link to pesticide exposure, as there are other possible causes of the congenital abnormality or the skin lesions. Other types of evidence would need to be considered to be able to establish such link.

Since physical evidence is very important, it is essential that an investigator knows how to correctly collect and preserve this type of evidence.

2. Evidence that can indicate with a high degree of probability that an illness or adverse effect indeed occurred in the person exposed to pesticides. An example would be a consultation record of the victim at the village health centre describing his signs and symptoms but without the benefit of being diagnosed by a physician or any laboratory analysis. Another example might be a school record of a child showing consistently poor performance indicating learning disability. A photograph or a video record showing a bedridden person with a bloated face, abdomen and legs but without any medical record would also fit this category of physical evidence.

3. Evidence that indicates a reasonable degree of probability that an illness or adverse effect occurred in a person exposed to pesticides. An example is a documented verbal or written testimony of the affected person describing a transient illness episode or adverse effect without the benefit of being seen or examined by a third party at the time when the illness or adverse effect occurred.

Category 1 evidence is the strongest and best evidence establishing beyond reasonable doubt that the illness episode or adverse effect indeed occurred. Category 2 is strong evidence and provides a high degree of proof of illness/adverse effect. Category 3 is the weakest evidence, but when taken together with other types of evidence or when occurring consistently in significant numbers, can provide an important contribution to establishing proof of illness/adverse effect.

Once the PQRST community monitor knows how to recognise evidence and the role it can play in an investigation, then he or she should take a methodical approach to gather, analyse and preserve evidence. The monitor must gather as much information as possible about a case in order to determine the scope and value of any evidence that may be present. This information gathering may include statements by affected persons, household members, and other community residents, factual information, expert opinion, etc. The investigating person should use logic and common sense when searching for evidence, but he or she should also use imagination and avoid becoming narrow-minded. As monitors become more experienced, they know that certain patterns emerge and certain elements are common among similar cases. They also know that they have to keep an open mind when deciding what evidence is and where it will be found. This is due to the unpredictable nature of people and the forces of chaos. Once the monitor has gathered as much information as possible about a case, then he or she should form a mental or written plan to proceed with the documentation, collection, and preservation of the evidence. The only time that an investigator should make rapid decisions concerning evidence is when the evidence is in danger of being destroyed. In that case, this evidence should be preserved, or documented and collected as quickly as possible. The investigator should also pass any relevant information to an expert (e.g. medical toxicologist) whenever necessary. This will allow the expert to make decisions concerning the best approach to the analysis and what information can be determined from the evidence.

Documentary evidence is real evidence. It is a thing the existence or characteristics of which are relevant and material (evidence that is likely to affect the determination of a matter or issue) to the incident in question.

8.1.3 Documentary evidence

Documentary evidence consists of written documents (relevant to establishing the occurrence of illness or adverse effects) such as statements, affidavits, scientific/technical reports, publications, notes, medical, laboratory and other records. A signed, written testimony of the victim himself is the best documentary evidence that need to be obtained as soon as possible. If the victim is not literate, some form of authentication must be established, such as asking him to put a thumb mark into the document or having a witness sign the document to attest to the authenticity of the document. Certain documents, such as certified copies of public records, official documents, medical and laboratory records, professional records, newspapers, periodicals, technical papers/reports, acknowledged documents, certificates of the custodians of business records, and certain commercial paper and related documents are, to one extent or another, self authenticating.

Documentary evidence is real evidence. It is a thing the existence or characteristics of which are relevant and material (evidence that is likely to affect the determination of a matter or issue) to the incident in question. It is usually a thing that was directly involved in some event in the case. For example, the written testimony of the victim upon which a complaint against the pesticide user (e.g. the banana plantation) is based is real evidence both to prove its terms and that it was executed by the victim.

To be useful, documentary must be relevant, material, and competent. The relevance and materiality of real evidence are usually obvious and its competence is established by showing that it really is what it is supposed to be by the process of authentication.

The proponent of the evidence may be required to establish that the document has not changed or been altered between the events and the time the evidence is being appraised or used. This can sometimes be a tall order, or can require the testimony of several witnesses. If there is any time from the events in question to the time of appraisal during which the location of the item cannot be accounted for, the competency of the documentary evidence may be put into question.

Documentary evidence can also be demonstrative, rather than real. Demonstrative evidence demonstrates or illustrates the testimony of a witness. It will be useful when it fairly and accurately reflects that testimony and is otherwise unobjectionable. Typical examples of demonstrative evidence are pictures (not necessarily of the victim) or sketches of signs and symptoms, maps, diagrams of clusters of incidences, schedule or table of pesticide applications, etc. Because its purpose is to illustrate testimony, demonstrative evidence is authenticated by the witness whose testimony is being illustrated. That witness will usually identify salient features of the exhibit and testify that it fairly and accurately reflects what he saw or heard on a particular occasion, such as the location of people or things on a diagram.

There may be a question as to whether particular photographs are only demonstrative in nature or whether they have evidentiary value by themselves This issue may be particularly important when there is no witness who could confirm what the photograph shows.

The use of mechanically produced duplicates or photocopies, unless a party has raised a genuine question about the accuracy of the copy or can show that its use would be unfair, is usually acceptable. However, there is always the possibility that a document may be questioned, so it is important to be ready to produce originals of any documents involved or to produce evidence of why the original can't be made available.

When investigating the occurrences of illnesses that may be associated with pesticide exposure, it would be very helpful if such results can be obtained from the hospital or clinic where such procedures have been done.

8.1.4 Laboratory evidence

Results from the medical laboratory such as x-rays, ultrasound, blood or urine tests, biopsy, and other laboratory procedures can provide confirmation of the occurrence of illness or adverse effect in a person exposed to pesticides. When investigating the occurrences of illnesses that may be associated with pesticide exposure, it would be very helpful if such results can be obtained from the hospital or clinic where such procedures have been done. Although a definitive diagnosis may still not be possible, laboratory results can strengthen the testimonial evidence provided by the affected person. More often than not, however, there is very little laboratory evidence that can be gathered since affected persons in the community can hardly afford the cost of laboratory examinations. Furthermore, even if there had been such laboratory examinations done, the results are usually kept by the clinic or hospital and the patient is seldom given a copy of the results. Nevertheless, the patient or immediate relatives have the right to obtain a copy of such laboratory results. An independent physician, if available, can help obtain such results by writing a request letter to the clinic or hospital where the records are kept.

Very rarely, laboratory tests showing pesticide residues in the biological sample (e.g., blood or urine) of the person exposed to pesticides or showing depressed cholinesterase levels, may be available. If so, these results would provide a very strong confirmation of the illness episode and its association with pesticide exposure. When considering a prospective community pesticide action monitoring, it would be very useful to include a plan to have such tests conducted, when feasible. Such tests, however, are not absolutely necessary. The overall evidence showing the association of illness episodes and exposure to pesticides may be sufficient without such laboratory tests.

8.1.5 Geographic consistency

Geographic consistency refers to the congruence of the observed illness episodes and the pesticide exposure area. It may happen that an individual describing an acute illness episode may have actually been outside the area of pesticide use during the time of occurrence of acute symptoms attributed to pesticide exposure. It is not uncommon that some residents within the pesticide exposure area actually work far away from their community and their illness episode may be explained by some other toxicants or causative factors. The community monitor should be on the look out for this possibility. It will be useful to make a map of the pesticide exposure area (including possible run-off areas and spray drift areas) and mark the households where acute illness episodes are reported. When the illness described is of chronic nature, geographic consistency is assumed but the presence of other potential causative factors outside the pesticide exposure area should be investigated.

Geographic consistency refers to the congruence of the observed illness episodes and the pesticide exposure area.

8.2 Proof of exposure

The elements constituting proof of exposure are essentially the same as in proof of illness/adverse effects, except that the focus of these elements is exposure to pesticides, rather than the illness or adverse effects.

8.2.1 Testimonial evidence

Anybody who has seen, felt, or experienced through his senses the use of pesticides in the area of concern can provide direct testimonial evidence to prove pesticide exposure. People in the pesticide exposure areas usually know the details of pesticide exposure, although they may not know exactly what pesticides are being used. They see with their own eyes the airplane passing over the roofs of their houses spewing a toxic mist which cause itchiness or stinging sensation in their eyes and skin. Some would even experience coughing and difficulty of breathing. They would recognise the bad smell of the poison, sometimes causing them to feel dizzy, nauseous or even to vomit. They also see the pesticide applicators pumping poison mist from their backpack sprayers unto the banana trees or whatever crop the plantation is growing.

The community residents see and even pick up some of the pesticide-laden blue plastic bags used to wrap the banana fruits. Some of them would even describe perhaps the itchiness or burning sensation in their feet and legs, progressing into non-healing wounds later, when they walk through the contaminated water from the plantation canals. Some of the pesticide applicators and workers, themselves, from the plantation would perhaps spontaneously relate their use of various kinds of pesticides describing their exposure and complaining of similar illnesses and adverse effects as experienced by the residents in the nearby community. All these would constitute direct testimonial evidence of pesticide exposure and would generally be sufficient to prove

beyond reasonable doubt exposure to pesticides. Unlike testimonial evidence of illness or adverse effect, where numerous confounding factors often inject a shadow of doubt in the statements, the testimonial evidence of pesticide exposure is usually straightforward and definitive, with very little shadow of doubt as to whether or not people were exposed to pesticides.

8.2.2 Physical evidence

Again, as in the previous discussion, the physical evidence of pesticide exposure is generally more straightforward and definitive compared to physical evidence of illness or adverse effect. Video footages or photographs - an airplane passing over the community with its trail of pesticide mist, a pesticide applicator pumping his backpack sprayer, a pesticide container carelessly left lying around the community with the label clearly recognizable - all these unmistakably point to pesticide exposure.

8.2.3 Documentary evidence

Official records of pesticides use by a company can be obtained from the pesticide regulatory agency or from some other agencies (e.g., health, environment, local government agencies or even international agencies). The company itself often discloses the pesticides they use in their website or in their official communications. Pesticide inventory or application schedule records or work diaries describing pesticide use may be available from former workers or supervisors from the company. Published articles (e.g., feature articles in newspapers or agricultural or business magazines) describing the production practices of the company may also include a description of their use of pesticides. Other sources of documentary information can come from proceedings of conferences, seminars, or even minutes of meetings, including minutes of meetings at the village level.

People in the pesticide exposure areas usually know the details of pesticide exposure, although they may not know exactly what pesticides are being used.

8.2.4 Laboratory evidence

Rarely, records of pesticide residues in water, fish, crops, soil and air, as well as residue levels in biological samples may be available, especially from scarcely known scientific papers or university theses. As mentioned also above (section 8.1.4), pesticide residue analysis of biological samples such as blood or urine may be available. This would provide the most definitive proof of pesticide exposure but is not absolutely essential to demonstrate proof of exposure.

8.2.5 Geographic consistency

Someone from the PQRST team should map out the approximate pesticide exposure area and mark out the specific places (households) where the illness incidents/adverse effects occurred. Some knowledge of the details of pesticides use (what, where, when, how and how much) would be necessary for an approximation of the pesticide exposure area. Complete information is not usually available and the PQRST team should have enough resourcefulness and adequate skills to construct a reasonable estimate of the exposure area. Very often, the team will have to rely on testimonies from community members. Extra efforts should be exerted in eliciting details of pesticide use. Data of pesticides use from published information on the details of pesticides use on particular crops can be obtained and used as an additional basis for approximation of the pesticide exposure area. Some modelling

methods are also available to estimate the likely disposition (including run-off and spray drift) of the identified pesticides in various environmental and biological media.

8.3 Biologic plausibility

Biologic plausibility refers to the reasonable likelihood that a pesticide will cause harm to a human being due to the inherent characteristics of the pesticide and the overall experience of adverse effects from exposure to it or to closely related chemicals. In other words, the adverse effects can be expected from whatever information is known about the pesticide. Most of the information necessary to evaluate this type of evidence will come from the scientific literature and would be highly technical. It is therefore advised that a technical person be tapped to gather and evaluate this type of information.

8.3.1 Hazard characteristics

Hazard characteristic is the inherent capacity to cause harm. Pesticides are inherently hazardous since they were purposely introduced to kill biologic organisms. The numerous, interconnected and complex biologic structures, processes, and units that are remarkably similar among all living organisms, even among seemingly very different kinds, make it absurd to claim "selective toxicity" in one organism and innocuousness in another. For some chemicals, there is available scientific data to allow characterisation of the degree of potential to cause harm, a hazard classification. For example, the WHO classifies pesticides into Class I (Extremely/highly hazardous), Class II (Moderately hazardous), Class III (Slightly hazardous), and Class IV (Not considered hazardous under recommended conditions of use). This classification, however, has limitations, one of which is the fact that it refers only to acute toxicity. This is a severe limitation since the potential to cause harm is greater with respect to chronic toxicity compared to acute toxicity and there is no pesticide that is not hazardous. It is only the degree, extent and the probability of harm that needs to be the subject of inquiry, not whether the pesticide is hazardous or not. For many pesticides, the claim of safety is often based on the fact that no adequate toxicological studies and hazard assessments have been done. Nevertheless, given the voluminous scientific and empirical data on the hazardous nature of pesticides that have been introduced for the past several years, any newly introduced pesticide and any old pesticide with little or no toxicological information should be considered likely to cause harm until proven otherwise. For a pesticide, the biologic plausibility to cause harm is always present. What needs to be done is to grade the degree of biologic plausibility to cause harm, e.g., high, moderate, and low. It must be noted that the grading here does not necessarily refer to the extent or seriousness of harm but only to the plausibility or likelihood of harm.

For a pesticide, the biologic plausibility to cause harm is always present.

8.3.2 Physical-chemical characteristics

For most synthetic chemicals introduced over past years, the physical-chemical characteristics are already known. This could form the basis of assessment in the grading of pesticides according to biologic plausibility to cause harm. For example, the analysis of structure activity relationship for organochlorine group of chemicals has been developed to a fairly advance stage such that regulatory decisions regarding such chemicals can be based on the prediction of toxic and other biological effects based on structure activity relationship.

8.3.3 Mechanism of toxicity

Closely related to physical-chemical characteristics would be the mechanism of toxicity. For many chemicals, knowledge of the chemical structure and metabolic pathways give an indication of the potential toxicity.

Several biologic structures, receptors, processes, etc, are known to be susceptible to certain chemical configuration or structural elements. A certain reactive element in the chemical structure maybe a known binder of certain types of receptors or of critical endogenous transmitters of biologic information such as hormones.

8.3.4 Evidence of harm in other species

The plausibility of harm to humans is made more likely by evidence of harm in other species, especially in animals. For many pesticides, there is already a lot of scientific and popular information regarding the adverse effects in various kinds of animal species such as birds, fishes, rodents, frogs, reptiles, etc. The thinning of eggshells, reproductive and physical abnormalities, failure to thrive, abnormal behaviour, organ dysfunctions, cancer, and many other adverse effects in various animal species have already been documented and scientifically investigated.

Certain classes of pesticides are associated with particular types of adverse effects, such as reproductive abnormalities even at very low levels of exposure to organochlorines, nerve degeneration and fish kills with organophosphates, eggshell thinning with DDT, and many more.

Documentation of similar adverse effects in animal species at the pesticide exposure area would further strengthen the case against the pesticide/s.

Documentation of similar adverse effects in animal species at the pesticide exposure area would further strengthen the case against the pesticide/s. Even in the absence of prior scientific data on a particular pesticide, if it belongs to the class of pesticides with known adverse effects, then that particular pesticide can be reasonably presumed to act in a similar manner as the other pesticides belonging to same class.

Empirical data should also be gathered. Testimonies of local residents knowledgeable about the changes in the environment as a result of exposure to pesticides should be gathered. If feasible, samples of affected species should be preserved, photographed or documented in whatever way possible. Effects on plants and other organisms should also be noted since these will also add on to the overall evidence of harm brought about by pesticides use in the community.

8.4 Temporal relationship

Particular attention should be given to the sequence of events observed in the community. A description of the situation before the advent of pesticides use should be elicited from the senior members of the community. Quite often, the elders in the community would be able to give a fairly accurate and vivid description of what their community looked like at certain periods of time. They would likely describe the abundance of fish, the lush vegetation, and a healthier people before there was use of pesticides in their area. A historical account of the community's situation in earlier years can also be determined from published reports, if available. Going to the local government records or to the nearest academic institution (if there is) might reveal some good information about the situation in earlier years prior to the advent of pesticides use.

For particular reports of suspected pesticide incidents or adverse events, a detailed description

of the time relationship between the exposure to the pesticide and the appearance of illness/ adverse event should be elicited and recorded. For recent incidents and for acute effects, this would not usually pose difficulties. However, for chronic effects and events that have occurred for some time in the past, there might be some difficulties in precisely describing the time when the events occurred. In these instances, it might be sufficient to determine that the exposure to pesticides preceded the onset of symptoms of illness. To reasonably attribute an illness episode to the exposure to pesticides, the onset of illness/ adverse event must be consistent with time of exposure to the pesticides.

The association between illness incidents/adverse effects and pesticide exposure is strengthened when there is documentation that the withdrawal or reduction of the use of pesticide is followed by the reduction or disappearance of illness episodes/ adverse events. It might also happen that a reintroduction of pesticide use is followed by a resurgence or recurrence of illness episodes or adverse effects, especially for acute episodes. When this happens and it is well documented, the cause and effect relationship between illness and pesticide is almost certain, unless significant confounding factors are present that could explain the observation.

When designing a community monitoring plan, the monitoring should be able to capture this type of time relationship when it occurs. More often than not, however, there would be no clear demonstration of such relationship since very often the illness episodes are non-specific and the background incidents of illnesses are already high because of other factors(e.g. poverty, malnutrition) contributing to ill health in the community. In addition, many of the illnesses attributable to pesticide exposure have long gestation and remission periods such that changes in incidences may not be observable within the monitoring period. Nevertheless, efforts should be made to capture such time relationships between illness incidents and pesticide exposure.

8.5 Dose-response relationship

In general, for most pesticides, the greater the exposure, the greater would be the effect. It is therefore useful to determine, or at least have a reasonable estimate, of the amount of pesticides used in the exposure areas and the degree of exposure(duration, frequency and quantitative description of exposure) of individuals who developed illnesses or adverse effects. Similarly, there should also be a description of the severity, duration, and frequency of illnesses or adverse effects attributable to the pesticide exposure. In most situations, the actual amounts of pesticides used are difficult to obtain but it should be possible to come up with reasonable estimates based on field data (e.g., duration and frequency of spraying in particular areas, usual volumes and concentrations used for certain pesticides, etc.). The workers themselves usually can give a reasonable estimate of how much pesticides are used.

Quantifying the illness episodes and adverse effects is a little more subjective and challenging. One way is to count the number and to stratify the duration of illness episodes/adverse effects. Another way is to "grade" (e.g., mild, moderate, severe) the severity and frequency of a particular illness episode in a particular individual. Still another way is to quantify the geographic distribution of illnesses. The objective is to construct a range of quantifiable units of illness/ adverse effects and match it with a range or degree of exposure to pesticides. This way, a dose-response relationship may be established. If the amount and duration of exposure correlates with geographic distribution, incidence and severity of adverse events, then this would provide another strong evidence of the association the observed illnesses and pesticide exposure.

It must be noted, however, that the demonstration of dose-response relationship is not absolutely necessary to prove the association between illness and pesticide exposure. The other types of evidence may be more than sufficient to indict

the pesticides as a cause of the observed illnesses and adverse effects. In addition, many illnesses and adverse effects (e.g., cancer, endocrine disruption, reproductive toxicity) due to pesticide exposure are not dose dependent and, therefore, a dose-response relationship may not be expected to be found.

8.6 Consistency of association

When the PQRST team is confronted with reports of illnesses suspected to be caused by pesticides, the occurrence of similar incidents in the past (especially if occurring under similar or exposure situations) should be a subject of further inquiry. Earlier incidents may not have been suspected to be related to pesticide exposure and historical data (from interviews, records, or reports, if available) may give some elucidation of current observations. Past incidents may have been casually dismissed as "normal" occurrence or may have been attributed wrongly to some other causative factors because of lack of information that has only been available to the members of the community at the present time.

Similar occurrences of illnesses in other areas with similar exposure situations to pesticides also have corroborative value. For example, when a banana company operates plantations in different community areas, illness incidents in one area would most likely be similar in other community areas where the banana company operates. Investigation of the incidents, therefore, should not be limited to just one area Limitations of resources, however, is often a constraint and the investigators may have to be very selective in the kind and amount of data they would get from other areas apart from the main area of concern. Data should also be sought of similar occurrences from other countries. For example, similar incidents of illnesses and adverse effects associated with pesticide use in banana plantations have been documented in Costa Rica, Honduras and other Latin American countries. The published reports regarding these incidents in foreign countries would certainly provide additional corroborative evidence to the contention that the illnesses observed in the local communities are associated with the use of pesticides by the banana plantation.

Other corroborating evidence that adds to the consistency of association would include experimental evidence showing a mechanism of toxicity that would explain the illness observed in humans. For example, experimental evidence of mutagenicity of the pesticide in microbial assay and other "in vitro" procedures would be consistent with field observations of increased incidence of cancer in pesticide exposed population.

8.7 Specificity of association

With some pesticides, it might be possible to demonstrate the presence of expected characteristic effects or the occurrence of unique abnormalities associated only with exposure to particular chemicals. For example, paraquat is specifically associated with pulmonary fibrosis, a toxicologic effect not found with exposure to other kinds of pesticides. Similarly, organophosphates such as chlorpyrifos, dichlorvos, phosphamidon and mevinphos, are specifically associated with organophosphate induced delayed neuropathy. When such specific illnesses occur in the pesticide exposure areas, the particular pesticide or at least the class of pesticide responsible for such illnesses can be readily identified.

In the absence of specific illnesses identifiable with specific pesticides, the preponderance of effects expected of certain pesticides can indicate specificity of association. For example,

The presence of other possible causes of the illnesses or adverse effects should be investigated thoroughly.

in endosulfan sprayed community areas, the preponderance of neurotoxic effects, including cerebral palsy, convulsive disorders, and neurobehavioral effects found among the exposed population strongly indicate specific association with endosulfan exposure since these neurotoxic effects are expected from the known mechanism of toxicity of endosulfan and from previous scientific studies demonstrating such constellation of effects.

8.8 Consideration of alternative explanations/causes

The presence of other possible causes of the illnesses or adverse effects should be investigated thoroughly. The relative absence or weak presence of alternative explanations or causes would greatly strengthen the association of the illnesses with the pesticide exposure. For example, it is important the elicit information about smoking and drinking habits of the affected individuals. Furthermore, a diligent effort should be exerted to determine the presence of and characterise open dumpsites and burning of household wastes. The presence of industrial and other activities that are potential sources of pollutants and the likely exposure pathways that may bring the pollutants into the community should also be investigated. Failure to elicit detailed information about such confounding causative factors would introduce a lot of uncertainties and doubts about the cause and effect relationship between the exposure to pesticides and the occurrence of illnesses.

With detailed information available about possible alternative causes, the likelihood of association of the observed illnesses with such possible causes can then be assessed. Each possible cause need to be assessed also in terms of degree of exposure, biologic plausibility, temporal relationship, dose-response relationship, etc., the same way as assessing the association of the illnesses with the pesticide exposure is being done. Then the relative strength of association with other possible causes can be determined compared to the strength of association with pesticides. A semi-quantitative method to quantify and tabulate the relative strengths of association based on the different parameters of assessing cause and effect relationship can perhaps be developed.

8.9 Credibility of sources of information

In all the stages of investigation or monitoring, the integrity of the sources and the people or institutions collecting, generating and interpreting data is a critical factor. In community generated data, spontaneity and absence of inducements, intimidation or coercion must be ensured. The objective is to find out the truth and not to attempt to prove a pre-determined conclusion. The PQRST team should be on the look out for possible vested interests and hidden agenda among those involved in the monitoring or investigation, either as subjects, data collectors, evaluators or facilitators. For example, it is possible that some individual complainants attributing their illnesses to pesticides may exaggerate their stories because they might have been induced into expecting monetary compensation. Such exaggerations will seriously compromise the validity of results and conclusions later and will impair the credibility of the PQRST team, not to mention the waste of resources and time spent on the investigation. On the other hand, the PQRST team must be on the look out for deliberate withholding of information, or even issuance of false information, by individuals or even government officials or institutions that are influenced, and perhaps given financial rewards, by the company using the pesticides in fear of damage action suits that my ensue as a result of the investigation and monitoring of illnesses which are attributed to pesticide exposure. It must be remembered that those using the pesticides are powerful companies with tremendous power and influence.

Additionally, credibility of the results will much depend on the reliability of methods in generating, collecting and interpreting the data gathered by various means and of different quality. As much as possible, the methods used must be scientifically and technically sound. Whenever feasible, the services of technical experts such as medical doctors, toxicologists, environmental scientists, and others should be sought and made available. A careful selection of these experts must be done, however, since many so-called "experts" often introduce systematic biases, such as adherence to the dominant corporate "risk assessment" paradigm, the belief that "absence of proof" is "proof of absence" and the attitude that pesticides are innocuous until proven through rigorous and often impossible technical procedures to establish cause and effect relationship (the "smoking gun" evidence). The absence of appropriate scientific and technological capacity should not inhibit the PQRST team in obtaining the best available information through the best available techniques and procedures, even in the absence of so-called experts.

8.10 Strength of association

An overall appraisal of all available evidence (sections 8.1 – 8.9) should then be undertaken to determine how strong the evidence is linking the occurrence of illnesses or adverse effects to pesticide exposure, risk characterisation and appraisal using statistical analysis and/or common sense.

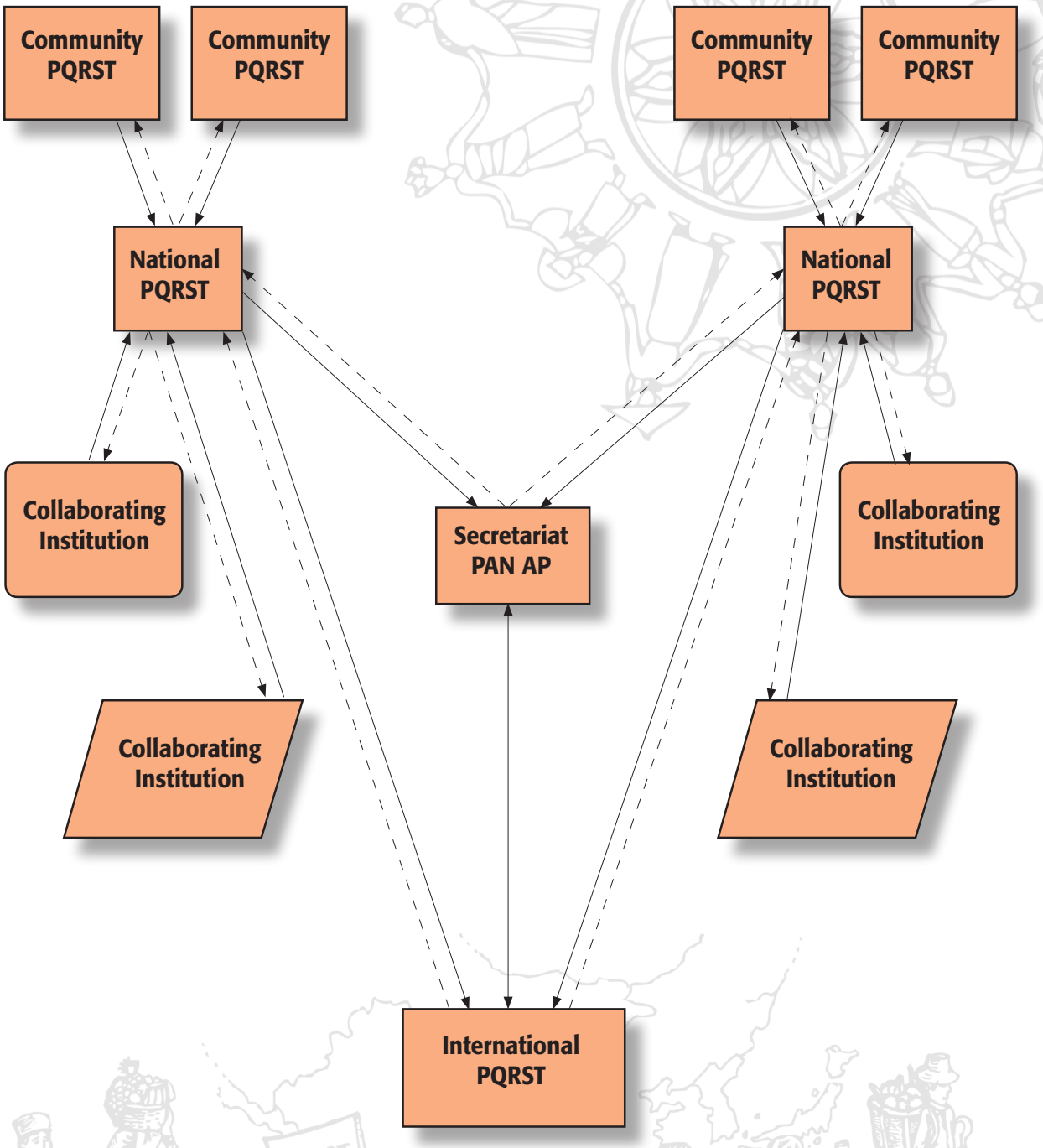
9. What kind of response measures should be initiated?

Whenever feasible, exposure to the suspected pesticide should be stopped or minimised. The source of exposure should be requested, and if necessary, forced to stop its harmful activities. This, however, may mean a long and difficult struggle that would necessitate solid organizing of community members and allied forces. In the meantime, mitigation measures should be initiated as much as possible, e.g. immediate medical and relief assistance, interim measures to prevent contamination of food and water and immediate environment, demanding action from local authorities, seeking help from media, church, public interest organisations and other sympathetic entities. Legal remedies should be sought as soon as feasible.

10. What kind of recommendations can be made by the PQRST for further action?

Continuous monitoring and follow-up should be undertaken at various levels. Specific recommendations to conduct more in-depth health and environmental survey, epidemiologic study, pesticide residue level analysis may be made. A reasonable conclusion of the association between the occurrence of the adverse event and pesticide exposure, however, may be made based on the best available evidence gathered. The in-depth studies are done not necessarily to prove the association between exposure and adverse event but mainly to determine the extent of damage done. Legal action and more comprehensive remediation measures may also be recommended. Other measures shall be determined upon consultation with the organised community and network partners. Even in the absence of definitive proof of the association of exposure and harm, preventive and remediation measures should be recommended in accordance with the precautionary principle.

PQRST Diagram



Pesticide and chemical poisoning merits a lot more studies and materials to reveal the true extent of impacts, but sadly the majority of pesticide users in many developing agricultural countries still unknowingly become victims because of the low level of awareness and lack of information dissemination.

The open market prescription and legacy of the GATT World Trade Organization has flooded our market with a vast array of pesticides, and our farmers are left bearing the brunt of this silent menace. Fueled by the politics of profit, a highly manipulative consumer campaign and the lack of political will of many governments to shift to alternative modes of production, the demand for pesticide and chemical use has increased. It is also this setting where the most inappropriate and wanton disregard for safety in the use of pesticides abound and redound to the peoples' disadvantage.

Realizing the gap between the abundance of knowledge regarding this field, and the barriers that persistently prevent information from being accessed by the sectors who are the directly affected, the Pesticide Quick Response and Surveillance Team is conceptualized primarily as a grassroots approach to monitoring pesticide poisoning. It will involve maximum advocacy in a community based set-up, considering the need for a group trained to respond and to report adverse events related to pesticides within a reasonable period of time. Advocacy in planned in order to answer the gap, and community based approach because this will ensure the most effective mechanism for surveillance and providing immediate health care. It will also be the appropriate venue for instituting policy changes regarding pesticide use.

This PQRST Practical Guide is part of the Community Pesticide Action Kit or CPAK which have been prepared to help rural communities, peoples organsations and their support civil society partners in Asia think about the problems that pesticides cause. It also encourages communities to act collectively to address some of the issues. CPAK is produced by an ASEAN team of citizens' groups and people organisations:

- **Pesticide Action Network Asia and the Pacific, based in Malaysia;**
- **Gita Pertiwi, Indonesia;**
- **Pesticide Action Network Philippines, the Philippines;**
- **Tenaganita, Malaysia.**

About PAN AP:
Pesticide Action Network (PAN) Asia and the Pacific is one of the five regional centres of PAN, a global network working to eliminate the human and environmental harm caused by pesticides, and to promote biodiversity based ecological agriculture. We are committed to the empowerment of people. We are dedicated to protect the safety and health of people, and the environment from pesticide use and genetic engineering. We believe in a people-centred, pro-women development through food sovereignty, ecological agriculture and sustainable lifestyles.

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ISBN 978-983-9381-38-2
9 789839 381382 >