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Pesticides in USAID Projects: Environmental Requirements and Considerations

[February -2017]

What are pesticides?

Pesticides are biological, chemical or physical agents used to kill unwanted plants, animals, or disease agents.

Main classes of pesticides:

acaricide (mites, ticks, spiders), Algicide (algae), attractant, avicide (birds), bactericide, defoliant, desiccant, fungicide, growth regulator, herbicide, insecticide, miticide, molluscicide, nematocide, piscicide (fish), predicide (vertebrates pests), repellent (for animals), rodenticide, silvicide (trees & woody shrubs).

What about “natural” or “biological” pesticides?

*Pesticides derived from natural sources (like **Pyrethrum**) are still pesticides.*

What about disinfectants?

*The purpose of disinfectants is to kill bacteria or viruses. **Disinfectants are also pesticides.***

Put it all together and. . .

About 900 active ingredients in 20,700 products are currently sold in world markets



Typical pesticide uses in developing countries

In-field crop protection	Area spraying for mosquito and other disease vector control	Dosing of lakes, ponds & lagoons to control disease vectors
Household insect and structural pest control	Stored product protection (seeds, food aid crops, etc.)	Insecticide treated bed nets & Interior household residual spraying
Treatment of export crops, fumigation of timber	Outbreak pest control – locusts, rodents, etc.	Livestock tick control-dipping, spraying, pouring

And other uses. . .

The need for extra scrutiny & concern



Pesticides are often essential.

But pesticides are potent killing agents. Their use has intrinsic dangers.

In developing areas, these dangers are worse because:

- *Quality control in manufacture, handling, labeling and packaging is often poor.*
- *Poor use practices are widespread.*


pesticide mis-use and mis-management can. . .

- Damage non-target ecosystems
- Affect non-target organisms (e.g., the “good bugs”)
- Cause chronic sickness, birth defects, cancers, & even death
- Persist/accumulate in the environment
- Lead to resistance and to resurgence of pests
- Result in loss of export markets

Pesticide Impacts on Humans

- ❖ **Acute Toxicity:** Immediate (acute) poisoning leading to serious sickness or death.
- ❖ **Chronic Toxicity:** effects over the long term at lower total doses.
For example, Cancer, Parkinson's Disease, Sterility, Organ Malfunction and Birth Defects.

**How do
people
receive
dangerous
doses of
pesticides?**



Human Exposure Route #1: Unsafe Application/Handling Practices



Mixing pesticides with water

Pouring pesticide into sprayer without protection



Pesticide Handling: What Not to Do

**Spraying pesticides with
no protection**



The result . . .



Skin lesions



and unfocused

**And far worse is possible
(acute poisoning, cancers,
birth defects, death. . .)**

30+ yr-old obsolete USAID-funded pesticides (found during 2003-2004 FAO Survey)

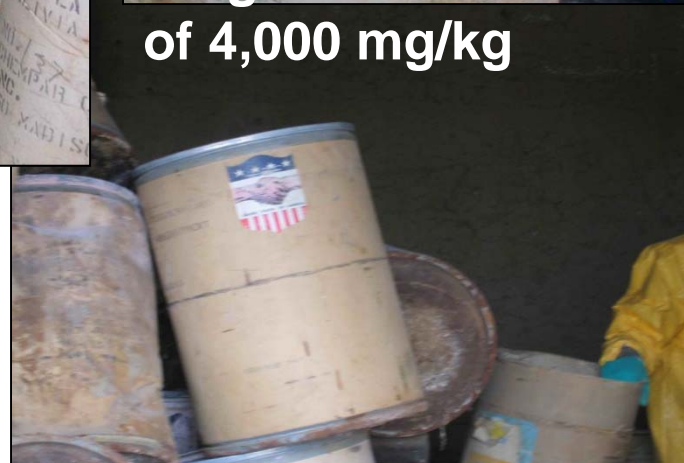


Expired pesticides & KOH (highly corrosive potassium hydroxide) jar

- Proper disposal starts at \$3,000 to \$5,000 per ton, depending on which pesticides are found. Highly toxic ones are much higher.
- Costly site cleanup also needed after the barrels are removed



FERBAM
($C_9H_{18}FeN_3S_6$)
fungicide oral LD50
of 4,000 mg/kg



Pesticides in the environment affect many organisms, not just humans.

They can. . .

- ❖ kill pollinating insects necessary for crop production
- ❖ kill predator bugs and birds that keep pests in check
- ❖ kill organisms necessary for soil health
- ❖ kill fish, crustaceans, amphibians, aquatic insects & beneficial microbes



Why are the regulations strict?

Some “side effects” of pesticides on human health (and that of other non-target organisms). Pesticides can be:

- Carcinogens (cause cancer)
- Teratogens (cause developmental defects inside the womb/egg)
- Mutagens (alter genetic information, resulting in mutations)
- Fetotoxins (poison embryos or fetuses in the womb/egg)
- Neurotoxins (interfere with proper function of the brain and nervous system)
- Poisons damaging or interfering with functioning of the liver, kidneys, thyroid and endocrine systems.

- pest resistance·····
- Significant resistance leads to more toxic and expensive pesticides.
- Misuse can result in chronic sickness, birth defects, cancers, loss of workdays and even death of farmers, processors and consumers
- Misuse can result in refusal of individual export shipments or even long-term cancellation of a country’s ability to export to the U.S., Europe, Japan and other major markets
- Movement of pesticides off site can poison ecosystems that support people downstream or downwind

Objective of the regulations

It is USAID policy to apply the principles of **INTEGRATED PEST MANAGEMENT (IPM)** to every activity that involves or influences pesticide procurement or use.

Properly implemented, the regulations should assure that the principles of **IPM** are realized in practice.

What do USAID's regulations require?

Simply stated. . .

IF

“Pesticide procurement or use”
is part of a proposed activity,

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THEN:

**Additional analysis is
*required***

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**More
specifically. . .**

What is “pesticide procurement or use”?

Procurement includes . .

1. **Direct purchase of pesticides**
2. **Payment in kind, donations, provision of free samples and other forms of subsidies**
3. **Provision of credit to borrowers could be procurement**
4. **Guarantee of credit to banks or other credit providers could be procurement**

Use includes . .

1. **Sale**
2. **Handling, transport, storage,**
3. **Mixing, loading, application**
4. **Disposal**
5. **Provision of fuel to transport pesticides**
6. **Technical assistance in pesticide management**

The definition of “procurement or use” does **NOT** include. . .

- ❖ Pesticide used in **evaluation plots** & other research, IF the following requirements are met:
 - *Surface area of under 4 ha,*
 - *Supervised by researchers,*
 - *Application by trained individuals*
 - ***The treated products are not consumed by people or animals,***
- ❖ Technical assistance for development of host country pesticide regulatory capabilities
- ❖ Support for training in safer pesticide use, **not involving actual application or use of pesticides.**

Fertilizers are *not* subject to USAID's Pesticide Procedures

Fertilizers are often lumped with pesticides under the generic heading of “agrochemicals.”

BUT the Pesticide Procedures do *not* apply to:

- Use of synthetic fertilizers
- Use of organic fertilizers

Still, the IEE can specify and identify good fertilizer use and soil fertility practices.

What does “proper fertilizer use” entail?

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Based on soil chemistry tests, knowing the soil nutrient conditions for thoughtful selection of apt mixtures of nutrients

Integrated soil fertility management, guarding soil health and tilth

Good timing linked to water management

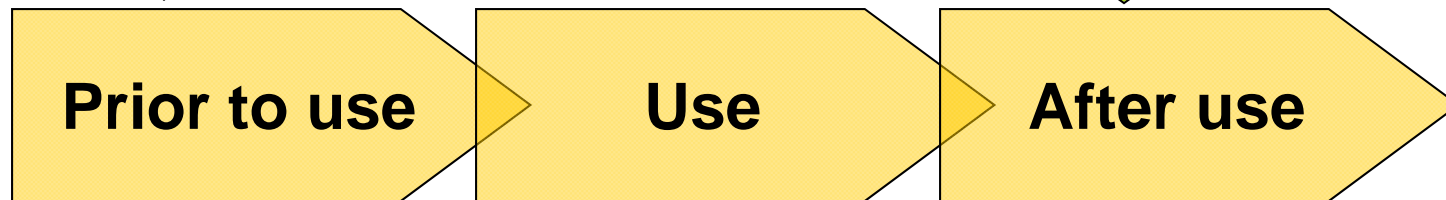
Understanding of the socio-economic conditions

Mitigation: Exposure Minimization Opportunities

Opportunities to minimize exposure exist before, during and after pesticide use. . .

Consider transport, packaging & storage practices

- Waiting periods – to use product
- Clean/bathing
- Storage & disposal practices



- Choice of formulation and equipment,
- Use of buffer zones



**All options
require training &
monitoring!**

Pesticide Evaluation Report & Safer Use Action Plan (**PERSUAP**)

- ❖ Originated in the Africa Bureau, but increasingly being adopted elsewhere, the **PERSUAP** constitutes the pesticide analysis of the IEE*, or takes its place.
 - *The PERSUAP can be self-standing, be attached to the IEE, or submitted later to resolve a pesticide use deferral*
 - *PERSUAP has two major parts:*

