



for a toxics-free future

REPUBLIQUE DU NIGER

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Chili powder to mix with soap



PICS bags



Neem oil from DIOUNDIU



Insecticide à base de neem

Neem-based insecticide

ALTERNATIVES TO HIGHLY HAZARDOUS PESTICIDES IN NIGER

EXECUTIVE SUMMARY OF THE REPORT

January 2021

Executive Summary

Synthetic chemical pesticides are being used in agriculture in Niger despite their adverse effects on human health and the environment. Fortunately, new alternatives to HHPs have been developed and increasingly used by producers since the beginning of the last decade; this is considerably reducing the dependence on chemical pesticides and their negative impacts.

Biological alternatives are mainly a category of plant species used against pests (including aqueous solutions of neem, pepper, tobacco or their by-products), insects as biological control such as *Habrobracon hebetor* against millet caterpillars or PICS bags against cowpea insects.

These alternatives have many health and environmental benefits; they are available and accessible to all farmers at a lower cost (compared to chemical pesticides). However, massive dissemination is dependent on the resources available in order to reach the maximum number of users.

National institutional framework for integrated pest management in Niger

➤ Institutions developing new alternative technologies to HHPs in Niger

In Niger, alternatives to HHPs are increasingly being developed with the involvement of public and private institutions as well as non-governmental organizations.

The government strongly supports the development of alternatives through the financing of development projects. Examples include The West African Agricultural Productivity Program (WAAPP), the Climate Smart Agriculture Support Project (PASEC), the Community Action Program (PAC3), and many others.

The General Directorate for Plant Protection (DGPV), a department of the Ministry of Agriculture, is responsible for the design and implementation of the national plant protection policy. It is within this framework, and in collaboration with other institutions (such as projects, universities, NGOs, and CBOs), that it popularizes products and new technologies to reduce the use of chemical pesticides.

The National Institute of Agricultural Research of Niger (INRAN), and the Network of Chambers of Agriculture (RECA), which represent the entire agricultural profession in Niger, defend the interests of rural producers and act as an interface between farmers' organizations and the public authorities, as well as with development partners. These structures develop alternative technologies in collaboration with other institutions such as the Dan Dicko Dan Koulodo University of Maradi or the General Directorate of Plant Protection (PGPV) and other projects working on the same theme.

The Association Vie & Développement Kowa Murna (AVD-Kowa Murna) participates alongside other institutions in the popularization of alternatives to HHPs such as neem extracts (oils, soaps, or insecticides) and in the supervision of producers.

➤ Policy frameworks that support the manufacture, import, distribution, and use of biopesticides

Niger supports and encourages the development of new alternative technologies to HHPs, but to date no specific legal act has been adopted. Thus, in the national agricultural policy this is not clearly defined; mainly because the search for alternatives to pesticides is a process that is still in progress. However, the country is aligned with the regional policy of the Inter-State Committee for Drought Control in the Sahel (CILSS) countries. CILSS also has a policy to support member countries in the search for alternatives and the approval of pesticides in the region. The national agricultural policy encourages the promotion of integrated pest management as the main technology for environmentally friendly phytosanitary protection. It aims to ensure that through all popularized control methods against plant pests, integrated pest management is prioritized by producers by effectively using the required techniques for best results.

- **The main alternative products to HHPs in Niger and their level of dissemination**
- ❖ **The most widespread alternatives and the most requested by producers**

Details on the process of manufacturing and using alternatives to HHPs in Niger are presented in this report. They include:

- ***Biological control of the millet earworm caterpillar by releasing a parasitoid (*Habrobracon hebetor*)***

The methodology consists of using a beneficial insect to control a crop pest. The parasitoid used in this case is a wasp to control the earworm. This wasp is reared in a laboratory on an alternative host.

- ***Aqueous plant solutions (*Neem, pepper, tobacco*)***

The use of plant extracts in the protection of vegetable crops is an alternative to pesticides. Several techniques are used by some producers, including:

- ✓ aqueous solution of neem grains;
- ✓ aqueous solution of chili pepper (chili);
- ✓ aqueous solution of tobacco.

These three solutions are effective against insects; they act on the nervous system of insects, act as an antifeedant and interfere with their growth and reproduction.

- ***PICS (*Purdue Improved Cowpea Storage*) bags***

Cowpea (*Vigna unguiculata L. Walp*) is a crop of great food stock and economic value in West Africa. Unfortunately, this plant is heavily infested by insects during both production and storage. Aphids, lepidoptera and bugs can cause a plant loss of up to 90%, which often explains the low yield of the crop (Raheja 1976). It also has critical problems with storage pests which increases the loss.

The crucial problem of cowpea storage is beginning to be resolved with the implementation of the triple bagging technique introduced by Dr. Ibrahim Baoua of Dan Dicko Dan Koulodo University in Maradi. The PICS bags, consisting of one layer of woven polypropylene containing two other high-density polyethylene (HDPE) bags, each 80 microns thick, reproduce the conditions of airtight storage (Murdock et al. 2012). Thanks to these bags, cowpea grains are better preserved than in the past, with very low levels of grain weevils.

- ❖ **The level of utilization of alternatives in Niger and the outcomes**

These methods are currently being used in almost all regions, with more widespread use in the regions of Zinder, Maradi, Tahoua and Tillabéri. This is due to the presence in these regions of the institutions that develop these alternatives, but also to the proximity of NGOs working in the field. But little by little, producers are appropriating these methods, and popularizing them to those around them.

- **Benefits of using alternative products**
- ❖ **Benefits to human and environmental health**

Alternative products have many health benefits compared to highly hazardous pesticides and other synthetic pesticides that are very harmful. Their benefits are proven; regardless of the method of use, i.e., whether they are inhaled or ingested, the risks to human health are very low.

In addition to its use for pest management in agriculture, Neem oil is also used for human beings as an antiseptic, antibacterial, antimicrobial, anti-inflammatory, antiviral, antifungal, antioxidant, anti-ulcer, and antimalarial substance. It is also used:

- in veterinary hygiene (as well as in personal hygiene for men and women);

- on pets for hair care;
- in stables, as a repellent against flies and other disease-carrying pests;
- to treat products so that they can be consumed without risk.

Neem oil does not affect beneficial insects such as ladybirds or bees; it is also non-toxic to animals. However, several applications are necessary (minimum 3) to achieve optimal control. It is also a good natural treatment against ectoparasites of animals and poultry.

Neem is an ideal fertilizer for organic farming with properties such as:

- supplying nitrogen, sulphide, and trace elements to plants;
- improving the health condition of plants;
- stimulating natural defenses;
- being biodegradable and not leaving harmful residues. During the few years of practice no harmful effects have been reported;
- killing only pests that are harmful to plants, but not beneficial insects.

❖ Cost and Accessibility Benefits

The cost and accessibility benefits to farmers are large because the raw materials for the manufacturing of alternatives are local, easily available, and affordable.

Also, they are accessible in all regions and the process requires no imported technology.

As a result, these alternative methods become cheap and easily accessible without the cost of transportation and travel.

- **Efforts to popularize alternatives and some recommendations to promote biopesticides in Niger**
- ❖ Strategies used to popularize alternatives at the national level

The strategies described below are based on methods used in the Farmers' Field School and on the availability of new information technologies such as the Internet and social media. Moreover, the farmers themselves are actively involved in sharing information on the different methods used as alternatives to Highly Hazardous Pesticides.

The Farmers' Field School (Champs Ecole Paysans – CEP) facilitates the integration of techniques and technologies taking into account both the capacities of the farmers and the natural resources available. It allows farmers to learn to reason about agricultural production techniques in relation to the ecosystem.

Popularization also requires the production of communication materials adapted to the context, taking into account the mode of dissemination, languages, and the mobilization of farmers.

❖ A few recommendations for promoting alternatives to HHPs in Niger

Our recommendations can be summarized as:

- Educate and raise awareness among national distributors of chemical pesticides, farmers, and food producers about the impacts of chemical pesticides and the benefits of biopesticides in agriculture.
- Accelerate the development of integrated pest management methods and their applications through participatory research, and workshops on research outcomes.

- Involve pesticide distributors in the conversion to biopesticides and IPM. Distributors must be trained and made aware about the high demand for alternatives to HHPs and encouraged to be engaged in the production and trading of alternatives to HHPs.
- Popularize the results obtained and the already proven experiences on a large scale.
- Support local initiatives for the processing of natural products and the development of alternatives to pesticides.
- Promote alternatives by using the most accessible communication channels (audiovisual outlets, leaflets, WhatsApp, Facebook, regional or national fairs, etc.).

Table 1: Summary of alternatives to HHPs used in Niger

Type of alternative	Crops on which they are used	How they are used	Pests	Availability and costs	Regions or Divisions of largest request
Aqueous solution, powder	Almost all crops (market crops, garden crops and food crops)	Spraying or spreading	Almost all crop pests.	Available everywhere made by the farmers /food producers themselves.	All the regions in Niger
Release of parasitoid (<i>Habrobracon hebetor</i>)	Millet	Release onto crops	Millet Leafminer caterpillar (<i>Heliocheilus albipunctella</i>)	Available everywhere made by the farmers / food producers themselves.	All the regions in Niger
PICS bags	Cowpea	Bagging	Cowpea insects	Available only on order, at average cost.	Maradi, Zinder and Tahoua