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PESTICIDE ABUSE IN PAKISTAN AND ASSOCIATED HUMAN HEALTH AND ENVIRONMENTAL RISKS

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Indiscriminate pesticide use in Pakistan has increased manifold in recent years. Such a use has created environmental risks like poisoning of soil, loss of biodiversity, food chain poisoning, and health hazards such as cancer, low fertility and a retarded immune system of body. Injudicious application of pesticides on major field crops e.g. cotton and vegetables is a common practice. Practically, no systematic gauge has been invented so far to assess the application of pesticide and its effects on environment. However, some studies show a dangerous level of pesticide residues in farm worker's blood, cottonseed and marketed vegetables. Therefore, there is a dire need to create awareness among farmers about pesticide abuses and to regulate appropriate pesticide use in the country.

Key words: environmental risks, human health risks, Pakistan, pesticide abuse

INTRODUCTION

Since the mid 1970s, continuous increase in population and a decreased rate of expansion of cultivable area has intensified the efforts to increase per acre *yield* of various crops. To achieve this goal, improved varieties, proper and timely irrigation, fertilizer application, pesticide use and efficient managing practices were introduced resulting in sizeable increase in per acre yield. But increased use of agro-chemicals endangered the life on soil-water-air because of environmental health hazards associated with the preparation and use of these chemicals. The use of pesticides to deter and kill insect pests, poses the most serious danger to human health. Illiteracy and lack of information and awareness in our farming community about the use of these chemicals has further worsened the situation.

Pesticide poisoning is not adequately reported in Pakistan. Here the scientists and policy makers focused their attention on quality/efficiency of pesticides and have launched no planned campaign about the proper use of pesticides. Presently, indiscriminate use of pesticides on our major crops has reached a level which no doubt is dangerous for human health. The quotation of *Rache/ Carson* in her book, "Silent Spring" gave a clear idea about the pesticide poisoning. According to her, "What we have to face is not an occasional dose of poison which has accidently got into some article of food, but a persistent and continuous poisoning of the whole human environment".

Major environmental hazards associated with indiscriminate use of pesticides include poisoned soils, destruction of untargeted biological species, poisoning of food chain, and development of a formidable resistance in insect pests and a lot of human health issues such as blisters and muscular pain, cancer, low fertility and suppression of the body's immune system. This horrible picture of the overuse of pesticides gave us a clear idea about its abuses. Therefore, an attempt has been made to review pesticide abuse in Pakistan and to draw the attention of scientists, policy makers, print and electronic media and general public towards this increasing menace.

Chemical pesticides were used for the first time in this country during 1950 when locust attack was reported. In 1954, formulated pesticides amounting to 254 metric tonnes were imported for the first time in Pakistan which marked the beginning of pesticide business and history in this country (Nasira. 1996). Afterwards, pesticide consumption in Pakistan increased from 906 thousand kg/L a.i. (active ingredient) in 1981, when 4% of the total farms adopted crop protection measures, to 5518 thousand kg/L a.i. in 1990 when the percentage of the farms adopting crop protection measures increased to 25 (Jabbar and Mallick, 1992).

There was a dramatic increase in pesticide consumption in 1994 to 1995. In 1994 total consumption was 24869 metric tonnes which increased to 43373 metric tonnes in 1995, the highest amount ever consumed in the country. In 1996, the total pesticides consumed were 43219

metric tonnes, worth Rs.9987 million (Anonymcus, 1995-96). Ninety percent of the total pesticides were used on cotton (Anonymous, 1993). However, when cotton production in the country and pesticides consumed were compared, there seemed no positive relation between the two. During 1991-92 seasonwe achieved maximum total production of cotton lint which was 12.82 million bales, while total pesticide consumption was 23439 metric tonnes. In 1995 the amount of total pesticides used was 43373 metric tonnes, whereas cotton lint production declined to 8.69 million bales (Anonymous, 1995-96).

Injudicious use of pesticides in Pakistan is characterized by many technical and occupational irregularities. According to Nasira (1996) there is hardly any system of assessing and monitoring the field situation i.e. how pesticides are selected by the farmers and how these are used in the field. The overall situation seems bleak regarding use and strict enforcement of existing rules concerning these pesticides. It appears as if there are no regulations to govern the use of agro-cehmicals. The anxiety at the policy level seems to be more a concern about quality standards of pesticide (which of course is important) rather than the question of proper use of pesticides. Recent legislation also reflects the concern about spurious and adulterated pesticides. There is an evident lack of concern about the frequency and quantity of pesticides being used. Pesticides are being used mainly on crops such as cotton, rice, potato, sugarcane, wheat, fruits and vaqetables. According' to an estimate 90% of the total insecticides are used on cotton (Anonymous, 1993).

Farmers usually select a pesticide on the basis of its availability on credit with the local dealer or suggested by the dealer or they follow other farmers, or whichever is provided by the landlord in case of a tenant. The injurious effect of pesticide can be felt while mixing pesticides, spraying, during cultural practices such as weeding and harvesting e.g. hand picking of cotton. As a normal practice during spray, most of the farm workers wrap a piece of cloth around their faces. In very rare cases spectacles are used. Majority of farmers are even not aware of the protective coverings such as coveralls, gloves, protective goggles, boots, respirators, etc.

In a study, 22 out of 25 blood samples from the farmers of Multan division were found contaminated with pesticide residues (Hassan, 1994)., Another Multan based study (Jabbar and Mallick, 1992) revealed that out of a total 88 female cotton pickers, only one percent could be termed out of danger. Nearly 74% had blood acetylcholine esterase (AChE) inhibition between 12.5%-40%, 25% were in dangerous condition where blood AChE inhibition was between 50-87.5%. Of the male cotton workers studied, 12% could be ranked as out of danger. About 51% had blood AChE inhibition between 12.5 and 50%, 36% workers were dangerously exposed i.e. they had AChE inhibition from 50 to 87.5%. Of the 250 cottonseed samples obtained from Multan division, 70% were found to be contaminated and 35% exceeded the maximum residual ceiling.

Many countries in the world have already imposed restriction on the use of chemicals such as Monocrotophos, Methamidophos, Aldicarb, Furadon, etc. In Pakistan, some of these chemicals are extensively used on cotton and even on vegetables. Influenced by international campaigns, the use of 21 pesticides/fungicides has been bannedin the country. Table 2 shows a list of such agro-chemicals.

Presently, the key issue regarding pesticide use in the country is the farmers's increasing dependenceon all kinds of pesticides. Adulteration and over- and underuse of pesticides have resulted in development of resistance in insect pests against the chemicals with ultimate increase in their population. Farmers are spraying their crops frequently with heavy doses of pesticides. In this way, the flora and fauna have been destroyed causing imbalance in biodiversity. if not checked, this practice would further complicate the situation and a sudden pest outbreak may result in a total failure of crops.

Vitamins and minerals are essential for the growth and maintenance of human health. Vegetables provide a major proportion of these essential food constituents. According to a study conducted by the Environmental Society of Agrarians, Pakistan (ESA-PAK, 1997), vegetables are no more a safe source of minerals and vitamins because of frequent spray of highly toxic and persistent pesticides. The study was conducted in the suburbs of Faisalabad within a 20 Km radius of the city. Farmers were found spraying crops such as cauliflower and eggplant with pesticides generally recommended for cotton e.g. "Polytrill-~> lorsban, etc. The most daunting fact 'revealed during the study was that farmers sprayed their crops in the morning with these highly persistent .insecticides and the next day they sent the produce to the market without observing withholding period. Tables 3 and 4 show some selected examples from the study. A study conducted by Rehman (1994) in the same area also showed similar findings.

As far as pesticide residues in marketed fruit and vegetables are concerned, a 3-year study conducted by the Pakistan Agricultural Research Council (PARC),

Table 1. Pesticide consumption in Pakistan (000 kg/L a.l.')

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1992
Insecticide	952 (181)"	1471 (74)	2162 (88)	3022 (88)	3480 (86)	3804 (87)	4173 (85)	3986 (85)	4265 (85)	4698 (85)
Fungicide	171 (13)	185 (10)	204 (8)	240 (7)	283 (7)	253 (6)	277 (6)	341 (7)	365 (7)	542 (10)
Herbicide	94 (7)	119 (7)	102 (4)	103 (3)	162 (4)	253 (6)	277 (6)	341 (7)	365 (7)	542 (10)
Acaricide	03 -	06 -	51 (21	60 (2)	81 (2)	19 H	82 (2)	- -	- -	03 -
Rodenticide	69 (6)	29 (1)	25 (1)	08 -	41 (1)	39 (1)	44 (1)	04 (4)	27 (1)	- -
Total	1289;1810		2544	3433	4047	4368	4353	4676	5022	5518

Courtesy: Jabbar and InayatuUJ\. 1990; • a.i. active ingredient .• 'Values in parentheses represent percent of the total.·

Table 2. List of pestiCideslfi:lngicides banned in Pakistan

Binapacryl	Oalapon	Ethyene dichloride carbontetrachloride (EDCT)
Bromophos	DOT	Leptophos
Captafol	Dibromochloropropane + Dibromochloropropene	Mercury compound
Chlordimeform	Dicrotophos	Mevinphos
Chlorobenzilate	Dieldrin	Propergite
Chlorthiphos	Disulfoton	Toxaphene
Cyhexatin	Endrin	Zineb

Source: MINFA. Pakistan (1993).

Table 3. Pesticide use on cauliflower for semilooper-aphid control in the suburbs of Faisalabad city

Pesticide used	No. of sprays	Spray interval (days)	Last spray before sending to market (days)
Thiodan	8-9	8	1-2
Polytrin-c	6-7	10	4-3
Polytrin-c Sevin-85	5-6	10	4-5
	8-10	6	3-4
Sundaphos Sevin-85	8-9	7	3-4
Lorsban Karate	8-9	8	2-3
	8-9	6	2
Lorsban	10	10	7
Endosulphan Polytrin-c Sevin-85	8-9	8-9	6
Deltaphos Polytrln-c Sevin-85	8-9	8-9	6

Table 4. Pesticide use on eggplant for fruit borer control in the suburbs of Faisalabad city

Pesticide used	No. of sprays	Spray interval (days)	Last spray before sending to market
Lorsban	10	4-5	2-3 days
Polytrin-c	12	5-6	2-3 days
Polytrin-c	12	4	1-2 days
Polytrin-c	12	4	1-2 days
Cypermethrin	10	5	2-3 days
Delataphos Polytrin-c	15	2	1-2 days
Lorsban	14-20	3	1-2 days
Deltaphos	15-20	3	1-2 days

Islamabad on fruits and vegetables sol,diol~chi, indicates that the produce sold at Kara-chi '~,li Mandi (Vegetable Market) was con.tamil1lliltedwith toxic chemicals such as DOT, Methyl Parathion a,nd Methamidophos, etc. Methyl Parathion is on the' World Health Organization's (WHO) li,5tofextremel,y hazardouscornpounds ar'idMethami,dophos is on the Organization's I1i.ghly Hazardous list.

Pesticides and particularly turnigants used for the eradication of stored grain pests have emerged as a potentiatweppt in the\h~~ds 0I people intending t6 commit sUicide~iOthM~~tidCieS' ark ialsobeing' used for this purpose but the case of 'phosohtne-erruttieg' tablets calls for an urgent need t0 address this issue> A person engulfing phosphinE! tablets, which are available in the market with the brand names of phostoxin, egtoxin, celphos, Ditia, etc. have almost no chance of survival. On an average, 13 people committed suicide every month by taking these tablets in the first four months of the year 1998 (Anonymous, 1998).

Suggested Strategies: Miserable situation in cotton fields, criminal poisoning of soil, water and food products and an overall degradati.on of nation's environment, pinpoints an urgentrleed to take pesticide pollution issues seriously at every level. If pesticide onslaught on Pakistan's environment and its people's health is not adequately checked and the current indifference to pesticide issues persists in the country, our mono-crop economy and environment and ultimately the whole nation will have to pay heavily. Pesticide abuse in Pakistan is not just a matter of .environrnental concern but whole of our economy and nation's' health is at stake. A war against unregulated and indiscriminate use of pesticides in the country means a war against disease and poverty . We will have to rein these demons who are making money at the expense of nation's future. To initiate the campaign, following suggestions may be considered:

* Effects of pesticides on soil, crops andbiodiversity should be evaluated.
* Workshops should be organized that involve scientists, policy makers and farmers to analyze and publicize, the harmful effects of pesticide use on environment and society,
* Sprayofhighlypen.i$;ten,!,pe~icid.es,on vege-till!les should be strictly banned,
* Pesticides veseason leberetoeies should monitor pesticide residues in food products al:on9 with quality control.of pesti,cide,s.
* ~esistance developed In insect pests against .rent pesticides s.noul.dbe monitored and r:~,s of such research shoul,d be publicized to avolOwa,steful endinjudicious use of pesticides.
* Al:t~I').atl.y,~S to pesticides like natural and b\iplo9ic~r(;Q:ntroand inte'gr~ted pest management n~. tobe.ressivelv promoted;
* Print and eJeqtt&nic media should come forward to create awarene~.~ong masses in general and farmers in par,ticuIJl"

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