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An Assessment of Regulatory Framework for Monitoring of Pesticides in Sindh Province of Pakistan

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Abstract: Numerous companies have entered the pesticide market in Pakistan due to windfall profits and liberal policies of the government since 1980s, when new agriculture policy was announced and the import and sale of pesticides were shifted to private sector. Easy imports, low prices and availability of a variety of pesticides are the distinct advantages of liberal policies. On the other hand, sale of substandard pesticides is a common problem of farming community due to regulatory and institutional deficiencies. This study was conducted to evaluate and to redesign regulatory framework for monitoring of pesticides by Agriculture Extension in view of stakeholders' perceptions during 2003-04. Finding of the study revealed that during three years (2000-2002) 2190 samples were tested in provincial laboratories of Sindh and 268 (12%) were declared substandard. Out of 268, 150 FIRs (56%) were lodged and 86 (32%) cases were challenged in courts while only 47 (18%) cases were decided by the courts. Majority of the stakeholders including District Officers Agriculture (100%) and Sales Executives(63%) were not satisfied with the present monitoring system for pesticides. All the Pesticide Dealers interviewed were of the opinion that pesticide companies be named in FIR when samples are declared unfit by the laboratories, because they purchase sealed pesticides from pesticide companies.

Key words: Monitoring, policy framework, pesticides

INTRODUCTION

The rules and regulations of pesticide manufacture, import, sale and monitoring are stated in the Agriculture Pesticide Ordinance 1971 and Agriculture Pesticide Rules 1973. The ordinance was amended later in favor of importers. Liberal schemes of import of pesticide in Form 16 and 17 were introduced in 1992 and 1997, respectively. According to these schemes, the pesticides registered in other countries can be imported without going through pesticide trials at two research stations to test it efficacy against the target pest(s) for two seasons. Due to these liberal schemes and windfall profits, numerous pesticide companies have entered pesticide market in Pakistan. Easy imports, low prices and availability of a variety of pesticides are the distinct advantages of liberal policies. On the other hand, sale of substandard pesticides is a common problem of farming community due to regulatory and institutional deficiencies.

Statement of the problem: Supply of poor quality of pesticides has remained one of the top ranked problems responsible for less production and over/misuse of pesticides due to poor implementation of Agricultural Pesticide Ordinance 1971 (APO-71). Although the APO-71 has been amended from time to time, the proposed amendments could not make any significant changes towards supply of quality of pesticides. Stakeholders' problems have remained unattended due to lack of follow-up studies by third parties presenting their perceptions about lacunas in legal documents and problems in implementation of rules. Official documents (NFDC, 2002) also mentioned complaints of stakeholders regarding unfair rules and regulations.

Objectives of the study: The main purpose of the study was to critically evaluate the regulatory framework especially focusing on monitoring of pesticide in view of stakeholders' perceptions. The focus of study was to explore the problems of the regulatory bodies due to which quality pesticides are not supplied. Finally, in consultation with the stakeholders, recommendations regarding revamping of APO-71 especially focusing on monitoring of pesticides were developed. The specific objectives of the study were:

- To critically evaluate the regulatory framework for monitoring of pesticides.
- To identify problems of regulatory bodies for monitoring of pesticides.

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- To recommend the improvements and amendments in regulatory and policy framework for monitoring of pesticides.

MATERIALS AND METHODS

Research design: Research design used in this study was descriptive survey. According to Cohen and Manion (1980), a descriptive survey design is appropriate for obtaining people's perceptions on social issues and social facts concerning the current status of phenomena and/or for describing the nature of existing conditions in a situation. Thus, a descriptive survey design was selected because the primary purpose of the present study was to determine the existing nature, strengths, weaknesses of regulatory and policy framework of monitoring of pesticides with special reference to Sindh province of Pakistan.

Target groups of the study: Stakeholders of the pesticide industry selected for the interview were divided into two groups: (1) Key respondents and (2) Sample respondents. There were 7 key respondents and 42 sample respondents, thus a sample of 49 respondents were interviewed. Detail of the respondents is given as follows:

Key informants:

- Chief Chemist, Federal Pesticides Testing and Reference Laboratory, Department of Plant Protection, MINFAL, Karachi;
- Chairman, Crop Life Pakistan (organization of pesticide companies), Karachi;
- Director, Department of Plant Protection, Directorate General, Agriculture Extension, Hyderabad;
- Chemist, Agricultural Pesticide Laboratory, Hyderabad;
- 3 District Officers, Agriculture Extension.

Sample respondents:

- 23 Pesticide Dealers;
- 19 Sales Executives of pesticide companies;

Selection of Sales Executives and Pesticide Dealers: To determine a representative sample size, the following equation was used:

$$n = \frac{N\pi(1-\pi)}{(N-1)(C/Z_{\alpha/2})^2 + \pi(1-\pi)} \quad (1)$$

Where n is recommended sample size, N is population size, π is characteristic of interest, C is $\pm$ error rate and $Z\alpha/2$ is tabulated value for confidence interval (Tryfos, 1996).

There were 87 pesticide firms/companies registered with the Directorate General, Agriculture Extension, Hyderabad, Sindh in 2003-04. On the basis of key informant input, it was ascertained that there were about 30 pesticide companies in the study area selling pesticides through their active sales network. Using Eq. 1 for the population size of 30, proportion of 0.5, error rate of $\pm$10% and confidence interval of 90%, a representative sample size of 19 was determined. Nineteen companies were randomly selected. From each selected company one Sales Executive was purposively selected; randomization was not possible because of mobile nature of job of Sales Executives.

For the selection of Pesticide Dealers, three cotton districts of Sindh, namely Sanghar, Nawabshah and Naushoro Feroze were purposively identified because most of the pesticides are applied on cotton. In the first stage, one taluka from each district was randomly selected as per plan depicted in Table 1.

According to information provided by District Offices (Agriculture), there were 16 Pesticide Dealers in Nawabshah city, 16 in Shahdadpur and 3 in Bhirya City; thus, in all, there were 35 Pesticide Dealers in three taluka headquarters. Using Eq. 1, a sample of 23 Dealers was suggested for proportion of 0.5, error rate of $\pm$10% and 90% confidence interval. The suggested sample of pesticide dealers was divided into three taluka headquarters disproportional to their population sizes because the number of Pesticide Dealers in Bhirya City was quite small as compared to other two talukas. The sampling plan is depicted in Table 1. A sample of 10 dealers from Shahdadpur, 10 from Nawabshah and 3 dealers from Bhirya City were selected for the study.

Table 1: Clustering sampling plan for the selection of Pesticide Dealers

District	Taluka	Selected	Population	Sample
Sanghar	Sanghar Jam Nawaz Ali Khipro Shahdadpur Sinjhoro Tando Adam	Shahdadpur	16	10
Nawabshah	Daulat Pur Safan Nawabshah Sakrand	Nawabshah	16	10
Naushoro Feroze	Bhirya Kandiaro Moro N. Feroze	Bhirya	3	3
Total		3 Talukas	35	23

Table 2: Progress of pesticides quality measures during 2000-2002

Activity	Year	2000	2001	2002	Total
Samples Analyzed	N	955.0	618.0	617.0	2190.0
Sample found unfit (substandard)	N	81.0	71.0	116.0	268.0
	%	8.5	11.5	18.8	12.2
F.I.R. Lodged	N	76.0	45.0	29.0	150.0
	% of unfit samples	93.8	63.4	25.0	56.0
No. of cases challenged	N	63.0	11.0	12.0	86.0
	% of unfit samples	77.8	15.5	10.3	32.10
Total cases decided	N	36.0	4.0	7.0	47.0
	% of unfit samples	44.4	5.6	6.0	17.5

Table 3: Summary of appeals submitted to the Department of Plant Protection, Karachi during 2002

Description	N	%age	%age of samples tested
Total appeals received	60	100.0	--
Regretted due to not Submission of appeals in time	2	3.3	--
Total samples tested	58	96.7	100.0
Samples tested and passed	15	--	25.9
Samples tested and rejected	43		74.1

RESULTS AND DISCUSSION

Progress of pesticides quality measures during 2000-2002: Progress of quality measures during 2000-2002 has been shown in Table 2. The table indicates that during three years 2190 samples were tested in Sindh. Out of 2190, 268 (12%) were declared substandard. In all, 150 FIRs were lodged which is equivalent to about 56% of all the samples reported to be unfit. Only 32% of unfit cases were challenged and accused were produced before judges. Very small proportion (18%) of the unfit cases was decided by the courts while remaining cases were under trial during the data collection period. This clearly indicates that there is weak coordination between monitoring and evaluations agencies (Agri. Extension, Police and Judiciary). During interviews with the pesticide Inspectors, it was informed that due to lack of coordination of public sector institutions (extension, laboratories and police) most of the pesticides cases were disposed of by imposing few thousand rupees fine while the profits made with pesticide business were too high.

Inspectors' perception about problems in monitoring of pesticides: Inspector did not show satisfaction with the judicial procedure faced by them to get the culprits punished. They stated that in courts they were not given due protocol of an officer, but treated as an ordinary petitioner. They shared their experiences that on the applications of the pesticide companies, the cases were transferred to other courts easily accessible by Sales Executives of pesticide companies. On every hearing, Inspectors had to be present there without traveling and daily allowance by the Agriculture Extension, so much so that they paid court fees from their pocket to collect true copies of the cases from respective courts. None of the accused had been fined more than few thousand rupees while according to section 21/2-b of Agricultural Pesticide Ordinance 1971, in case of substandard pesticide, in relation to first offence with imprisonment for a term shall not be less than six month or more than 2 years and with fine which may extend to five hundred thousand rupees. Most of the cases were disposed of on the basis that any doubt always goes in favor of accused, not in favor of an applicant.

Two District Officers Agriculture (DOA) out of three agreed that pesticide companies were too influential to get the pesticide reports in their favor. To control these malpractices and to get fair results from pesticide laboratories and to get the culprits punished, the DOA extended that in the whole process honesty is a basic thing that can be panacea for all the problems.

Appeals for testing second sample of pesticide: Summary of the appeals submitted to the Department of Plant Protection, Karachi for retesting of the second samples is given in Table 3. In 2002, the Department of Plant Protection, Karachi received 60 applications from the Pesticide Dealers for checking second samples of pesticides. Out of 60, 2 (3%) applications were rejected on the plea that the appeals were submitted after expiry of one-month period after declaration of test result of pesticides by Department of Plant Protection, Directorate of Agricultural Extension, Hyderabad. Fifty-Eight samples were tested and 15 (26%) samples were passed and remaining 43 (74%) samples were rejected.

Reasons of samples declared unfit by the provincial laboratories and declared fit by federal laboratory:

- Inspectors are not trained enough how to take samples.
- At the time of taking pesticide samples, Inspectors do not shake the pesticide bottles in order to mix the active ingredient with its inert (non-poisonous liquids or powders).
- Some Inspectors are biased to Dealers.
- Chemists working in the provincial pesticide laboratories are not trained enough to test all types of pesticides efficiently. If one gets proper

knowledge in the pesticides marketed in Pakistan, s/he is transferred due to internal management of the Agriculture Department at provincial level.

Sales Executives' perceptions about monitoring of pesticide by agriculture extension: On an overall basis, only 37% of the Sales Executives were satisfied with sampling by the Agriculture Extension as shown in Table 4. The table also reveals satisfaction with monitoring system is related with professional position of staff of pesticide companies i.e. as the position of Sales Executives changes form senior to junior (From Regional Manager to Area Manager and finally to TSO), the proportion of satisfied Sales Executives decreases. The proportions of Regional Managers, Area Managers and TSOs satisfied with the monitoring of pesticides by Agriculture Extension were 38, 33 and 20 % respectively. The same proportions of Area Mangers and TSO were reported as satisfied with the laboratory results while half of the Regional Mangers were enumerated as satisfied with the laboratory results.

Since the job security and financial package of TSO was directly dependent on the quantum of their sale in small geographical territory, they could ill-afford any issues identified by the monitoring system; and, hence were generally critical of the system. On the other hand, main reasons of comparatively higher proportions of Regional Managers satisfied with the monitoring of pesticides and laboratory results were that most of them were confirmed employees, their sale territories were relatively 3 to 4 times larger than that of TSOs and they were conscious to share their perceptions because of their older ages. Age is an important socioeconomic characteristic which may reflect changing attitudes and roles. Mohai and Twight (1987) reported that people may become more cautious due to the biological, psychological and social changes they experienced as they grow older.

Table 4: Proportions (%) of Sales Executives satisfied with M and E of pesticides and lab results

	Regional Mangers	Area Mangers	Technical Sales Officers	Overall
M and E by Agri. Ext.	37.5	33.3	20.0	36.6
Lab. Results	50.0	33.3	20.0	36.8

Table 5: Pesticide Dealers satisfied with the monitoring of pesticide by Agri. Extension and lab results

	Share of multinational companies in total sale				
	0-25%	26-50%	51-75%	76-100%	Overall
Agri. Ext.	100.0	77.8	60.0	50.0	65.2
Lab. Results	100.0	77.8	40.0	12.5	47.8

Dealers' perceptions regarding monitoring of pesticides by agriculture extension: Dealers' responses regarding satisfaction with the sampling of pesticides by Agriculture Extension were gathered. Most of the Dealers were very conscious to reply categorically whether they were satisfied or not. On an overall basis, 65% of all the Dealers interviewed were satisfied as given in Table 5. Negative relationship between various categories representing share of multinational companies in total sale and proportion of satisfied Dealers was more obvious. Proportions of the Dealers satisfied with sampling of pesticides by Agriculture Extension having share of multinational companies ranging between 0, 25, 26, 50, 51-75 and 76-100% were computed to be 100, 78, 60 and 50%, respectively.

Although majority (65%) of the Dealers interviewed was satisfied, the unsatisfied Dealers (35%) were very annoyed with the Inspector of Agricultural Extension. One of the anguished Dealers shared his views that most of the Inspectors had developed their shares in pesticide business with Dealers. Besides, Pesticide Dealers were inclined to have share with Inspector so that they could be excluded from unfair sampling of pesticides.

Little less than half (48%) of the Pesticide Dealers were satisfied with the pesticide laboratory reports. The figure revealed that the proportion of satisfied Dealers decreased as the share of the multinational companies increased. The calculated proportions of satisfied Dealers belonging to category 0-25, 26-50, 51-75 and 76-100% were 100, 78, 41 and 13%, respectively.

Obvious reasons of the more share of multinational companies in total sale, the less proportion of satisfied Dealers with sampling by Agriculture Extension and laboratory tests could be twofold: (1) Dealers working with multinational companies were more confident to express their views/problems than those working with local companies; (2) As reported by the Sales Executives of multinational companies that disproportionately more pesticide samples of the multinational companies were taken because Inspectors knew that the multinational companies maintain quality of their products. In case Inspectors had collected more pesticide samples of local companies, there would have been more chances of declaring unfit samples by pesticide laboratory and as a

Table 6: Dealers' perceptions regarding who should be named in FIR for selling adulterated/substandard pesticides

	Share of multinational companies in total sale				
	0-25%	26-50%	51-75%	76-100%	Overall
Dealers alone	0.0	0.0	0.0	0.0	0.0
Companies alone	100.0	66.7	40.0	75.0	65.2
Both	0.0	33.3	60.0	25.0	34.8

result the Inspectors would have to follow the judicial procedure that was cumbersome for Inspectors as well.

Dealers' perception about who should be named in FIR for selling unfit pesticides: Who should be punished for unfit pesticides is a debatable issue among all the stakeholders of pesticide industry. Under prevailing conditions, the FIR is lodged against whom the pesticide sample is taken. Usually, pesticide samples are taken from the dealers' shops and when the samples are declared unfit, FIRs are lodged against them. During discussions, the pesticide Dealers stated that it was unfair with the pesticide Dealers to involve them in adulterated/substandard cases because they had purchased the same pesticides from registered pesticide companies and the pesticide were properly sealed by the companies. Besides, they maintained all the records viz. invoice, sale register and stock register.

Sales Executives of the pesticide companies claimed that their pesticides were checked by the Federal Pesticide Laboratory, Department of Plant Protection, MINFAL, Karachi, during import. Therefore, companies were excluded from involving in FIRs by the policy makers. However, during interviews with the Chief Chemist, Pesticide Laboratory, Karachi, it was informed that pesticides imported in Pakistan in finished form or locally formulated were not checked in Federal Laboratory because of lack of trained manpower, equipments and pesticide standards (chemicals used to test pesticides). This clearly showed that policy makers were not informed that batches of pesticide imported were not checked in Pesticide Laboratory; otherwise, the pesticide companies would have been named in FIR with Dealers for selling adulterated /substandard pesticide.

Table 6 reveals the survey results regarding the question who should be named in the FIR for selling adulterated /substandard pesticides. The table shows that none of the Dealers agreed that the Dealers alone should be named in FIR for selling adulterated/ substandard pesticides, however, 65% Dealers interviewed stated that the pesticide company should be named in FIR with Dealer. There were 35% of the Dealers demanding that only pesticide companies should be indicted in pesticide adulterated/substandard cases.

CONCLUSIONS

The major findings of the study revealed that about 25% of pesticides samples declared unfit by provincial laboratories were declared fit by the Federal Laboratory. The reasons behind that were lack of knowledge of Inspectors in taking samples, lack of knowledge of chemists of provincial laboratories and use of contaminated bottles for taking samples. These observations are in agreement with the findings of Ghaffar and Pervaiz (1997), who reported that there were not enough Inspectors for monitoring and evaluation of pesticides in comparison of the number of pesticides available in market and the appointed persons were not well trained.

Majority of the stakeholders including District Officers Agriculture and Sales Executives were not satisfied with the present monitoring system for pesticides. For instance, District Officers were not given TA and DA by the Department, they got no cooperation from police in lodging FIR and no protocol in courts during hearing of pesticide cases. Sales Executives stated that there was no justification of taking samples since some companies were targeted and their samples were taken repeatedly to extract money and undue favors. All the pesticide Dealers were of the opinion that pesticide companies be named in FIR when samples are declared unfit by the laboratories, because they purchase sealed pesticides from pesticide companies. These findings coincide with that of Danida (1996) and WWF-Pakistan (2000) who argued that surveillance and enforcement of rules and regulations were minimal, largely due to institutional deficiencies.

District Officers Agriculture informed that none of the Dealers/companies had been fined more than few thousand rupees by the Judges. In this regard, one court judgment of a Pesticide case was thoroughly studied. The Judge disposed of the case citing some lacunas on the part of the pesticide Inspector and the police. This shows that present system of monitoring has become ineffective to control adulterated and substandard pesticides from the market. These findings are in close agreement with those of Ghaffar and Pervaiz (1997) and Masroor (1998) who reported that court procedures to punish the culprits were ineffective. Court procedures were lengthy and the fines were low in comparison with profits made in the pesticide business. Consequently, the sale of substandard pesticides was rampant which necessitates appropriate legislation particularly focusing on monitoring system.

SUGGESTIONS

On the basis of conclusions drawn from primary data analysis and qualitative inferences, the following policy suggestions were developed:

- Separate cell of the Monitoring of Pesticides within the Directorate of Agricultural Extension may be established. The officers related to this office may be free from agricultural extension activities.

- Committees may be framed at district level from agriculture extension and representatives of pesticide companions that collect samples from pesticide Dealers.
- The pesticide companies should provide sterilized bottles for pesticide sampling purpose.
- In case Chemists of the Provincial Pesticide Laboratory make the same technical mistakes repeatedly during the testing of pesticide samples and the Federal Pesticide Laboratory passes pesticide samples, action should be taken against him.
- Trained Chemists at the Provincial Pesticide Laboratories should not be transferred unless there is disciplinary action against him.
- Advocate may be appointed to pursue the pesticide adulterate/substandard cases in the courts.
- T.A and DA as well as other expenses be paid to the Inspector by the Directorate of Agriculture Extension incurred on monitoring of pesticides
- When a pesticide sample is declared unfit, companies may be involved in the FIR because in most cases Dealers are innocent; the pesticides are supplied by the companies in sealed bottles and invoice and other records are maintained by the Dealers.
- Private witnesses may not be mandatory for the pesticide cases since private people extremely avoid court-related matters.
- More business-oriented punishments may be amended in the Agricultural Pesticide Ordinance, 1971 such as the withdrawal of the registration of pesticide products, pesticide company and dealership for the some specific period, or permanent basis.
- Pesticide cases may be registered after the declaration of pesticide report by Federal Pesticide Laboratory, Department of Plant Protection, MINFAL, Karachi or after one month of the declaration of report by Provincial Pesticide Laboratory when appeal period is expired.
- Incentives and awards may be given to Inspectors and Chemists for their excellent performance in duties assigned to them.
- Training programs for Chemists and Inspectors may be arranged.

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