Seminar paper
On
Effect of Injudicious Use of Pesticide in Bangladesh

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129th Advanced Course on Administration and Development

Submitted to:

Dr. Md. Mohoshin Ali

Director, BPATC and Convener of Research Consultants

Bangladesh Public Administration Training Centre, Savar
04 October, 2020

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Abstract:

Pesticides are chemicals produced for use in the control of agricultural and public health pests. In Bangladesh pesticides are primarily used for increased crop or food production. But now a days, intensification of cultivation, introduction of susceptible HYV and hybrid variety of crop, modernization of agriculture, shipment from subsistence level to commercial level of agriculture, pesticide dependant vegetable and fruit based cropping pattern, lack of legislative embargo on easy access to buy pesticide and misleading motivation & credit facilities are forcing farmers to apply excessive doses of pesticide. Furthermore, a rise in market prices of food, specially vegetable and cereal would induce significant increases in use of pesticides to boost yield levels and profitability.

For harvesting of profit, farmers are using pesticide injudiciously, irrationally, more frequently with increased concentration and quantity. Over the past four decades, the major thrust of national policy has been to promote 'green revolution' technology that has resulted in a consequent increase in pesticide use in addition to other modern inputs. These situations led to sharp increase in pesticide use. Therefore, with the increased diffusion of 'green revolution' technology in Bangladesh, pesticides became and will continue to be a major component of modern day agriculture.

On the other hand we know, excessive and irrational use of pesticides is increasingly threatening our ecosystem, health and environment. This overuse of pesticide raises production cost. Worse still, in our country, the overdosing or misusing of pesticide is strengthening resistance in the insects, which means label recommendation doses cannot kill pest in many cases.

A holistic approach including imposing tax, strengthening IPM method and formulate a updated National Pesticide Policy, education among farmers, programs to raise farmers' awareness of the harmful effects of pesticides will open a window for better ecosystem, environment, food safety, human health, farmers livelihood.

Key Words: Pesticide, Environment, health, injudicious, IPM.

Introduction:

Background:

Bangladesh heavily depends on the uses of pesticides to protect crops and high yields. With limited land area, scope of horizontal expansion in agriculture is shrinking gradually but it is believed that increase in crop production is still possible with vertical expansion through increasing crop yield per unit area. So we need intensification of crop and simultaneously high yield necessary in sustainable growth basis. For fulfillment of this crucial demand Bangladesh introduced many agricultural means like, intensification and diversification of crops, expansion of modern agricultural technologies, shipment from subsistence level of agriculture to commercial agriculture, rice-vegetable-fruit dominating cropping pattern, HYV and Hybrid variety which are highly disease and pest susceptible etc which led to sharp increase in pesticide use. On the other hand, different popular article and scientific journals reported that our farmers are using pesticides 10-15 times the prescribed amount for producing fruits and 5-10 times for growing vegetables.

Although agricultural production increased tremendously ensuring food security but uses of pesticides grew by a staggering 1440% from only 3135 metric tons of active ingredients (AI) in 1977 to 45,172 metric tons in 2009. FAO data for the period 1990–2009 analysis had shown that a 1% increase in crop output per unit area was associated with a 1.8% increase in pesticide use. The pesticides uses was on an average 3,850 metric tons annually during 1973- 1990, which has been gradually increased to a record consumption of 37,712 metric tons in 2008 (BBS, 2008; BRAC, 2000). At present 400 registered companies import and market about 37,000 tones of pesticides annually in Bangladesh (BCPA, 2016).

Problem Statement:

Indiscriminate uses of pesticides are threatening our health, ecosystem, and environment. Pesticide poisoning is a serious global health problem and it is more prevalent in countries like Bangladesh. During the past four decades, injudicious use of chemical pesticides in agriculture has created major health and environmental problems in many developing countries (World Resources, 1998-99). The UNEP (United Nations Environment Program) and the WHO estimate pesticides poisoning rates of 2-3 per minute, with approximately 20,000 workers dying from exposure every year, the majority in developing countries like Bangladesh (WHO, 1990; Kishi *et al.*, 1995). Lengthened exposure to pesticides could lead to cardiopulmonary disorders, hematological, neurological, and skin diseases (Davies *et al.*, 1982). Existing reports revealed that The incidence of pesticides poisoning is increasing and it is guessed that about 5 million people die every year as a result of occupational, intentional and accidental exposure worldwide.

From an environmental perspective, chemically-contaminated runoff from fields has polluted surface and ground waters, damaged fisheries and ruined freshwater ecosystems (Pimental *et al.*, 1992; Tardiff, 1992). Biodiversity is declining due to the effect of pesticide use. Nunber of native fish species (*Channa spp.*, *Heteropneustes clarias,* and *Anabas testudineus)* is now endangered and the traditional rice-fish systems have been disappeared. The bird and other small wild animals are in threat because of the use of pesticides in rice, fruits and vegetables. The rice-based agro ecosystem is showing signs of unsustainability.

Emergence of pest resistance to pesticides is one of the alarming negative aspects of pesticide. We know, resistance of pest to insecticides is a heritable change in the sensitivity of a pest population that is reflected in the repeated failure to achieve the expected level of control. Resistance arises through the indiscriminate or injudicious use. When we use do not follow the optimum or label recommendation of a pesticide against a pest then resistant develops and that is why the consequent evolution of populations with resistant may occurred to that pesticide. It is widespread claim that chemicals are harmful to human health and the environment. If this overuse or misuse of pesticide will continue, with the passage of time, some pests will develop more genetic resistance to pesticides.

So, the identified problem issue is under regulated injudicious usage of pesticide and its adverse effect is prevailing in Bangladesh which is harmful for our health, environment and ecosystem. It also increases cost of production of our poor farmers.

Objective of the Study

Overuse of toxic chemical pesticide should be limited for better environment, human health, protection from growing resistance to pesticide, crop production cost. This limiting or minimizing process against injudicious usage of pesticide to be holistic approach, not a single initiative. Imposing more tax on pesticide is one of the easiest tactics of control the supply and demand chain by price regulating. But it an instance measure for certain period. Because if all others situation remain unchanged at the long run competition, profitability and existence of farming leads the farmer to more use of pesticide. So, simultaneously we have to consider the formulation and promulgation of a national pesticide policy which not yet promulgated in Bangladesh even after 5 decades of liberation. The proposed national pesticide policy should include awareness building program for farmers and consumers of agricultural produce, guidelines for dealers and end users, direction on intellectual resource investment like, human resource development, research on pesticide area both govt. and public sector. Finally, as a long term solution, environment and human health friendly IPM method should be strengthened. All of this short term, midterm and long term measure may result a desirable output in pesticide using arena in Bangladesh.

Increased use or overuse of pesticides adversely affects health of farm workers and consumers of produced food. Simultaneously environments (water, air, soil etc.) are polluted by overusing of pesticide. This study can open the opportunity to reduce the pesticide or agrochemical in farmers' field. This study will also specifically look problem of this burning issue. So, the specific objectives of the research are:

(i) to assess the adverse effect of injudicious usage of pesticide in Bangladesh;
(ii) to aware about importance of reduction the overuse or misuse of pesticide;
(iii) to motivate the stakeholder on introduction of environment and health friendly IPM method

Rationale/ Justifications of the Study:

The effective and responsible usage of pesticides may bring significant positive contributions to the crop production, human health and environment. The assessment of proper and wise uses of pesticide may be very beneficial for farmer, consumers of agricultural product, policy maker of country also. So if we can find out the effect of injudicious and harmful uses of pesticide, it will be helpful for us to mitigate those problems. This study will give an overall scenario on adverse effect of pesticide. More over many researchers agreed in their relevant publications that more studies are needed in this area, especially in Bangladesh. For this reason this study has been undertaken.

Literature Review

The research findings published by the BARC, says that due to the diminished impact of the pesticides, farmers now have to use pesticides 10-15 times the prescribed amount for producing fruits and 5-10 times for growing vegetables. The injudicious of pesticides, may create a series of problems related to both loss of their effectiveness in the long run and certain externalities like pollution and health hazards. Rola and Pingali (1993) recognized that indiscriminate pesticide use, frequent application and use of very toxic chemicals increased risk of farmer health damage. To reduce crop losses due to pest attack, farmers in parts of Asia are spraying as much as 800 times the original recommended dosage of pesticides (Farah, 1994). Hazards magazine 18 January, 2010 published an annual government health survey report. This report revealed that pesticide-related poisoning caused thousand deaths each year in Bangladesh. It is assumed that excessive use of chemicals decreases soil nutrients like sodium, potassium, nitrogen and creates imbalances in soil fertility, (By Banani Mallick The Daily Observer)

Some socio-economic-scientific variables like- variation in misperception, level of income of farmer, type of farm ownership, toxicity of chemical used, crop rotation, geographical location and environmental requirement of cultivation, availability of agricultural credit etc significantly regulates the overuse of pesticide. Regional variation in uses of pesticide is observed. Another perspective is legal approving systems At present the legal systems for approving pesticides are much more demanding. A committee of independent experts is very much needed like Norway.

With the progressive modernization of agriculture in Bangladesh, the role of pesticides has become critically important. Modernization of agriculture implies increased use of modern inputs such as chemical fertilizer, irrigation and HYV of crop which provide a favorable climate for rapid growth of pests (*Bangladesh J. Agric. Econs. XXII, 2(1999): 57-78*). Moreover, modern seeds are more susceptible to insect pests and diseases.

The injudicious use of pesticides lose its effectiveness in the long run and show some externalities like pollution and health hazards. Rola and Pingali (1993) recognized that frequent application and use of very toxic chemicals increased risk of farmer health damage. Sometimes chemical exposure and indiscriminate pesticide use leads to larger pest related yield losses than not applying pesticides at all. (58 *The Bangladesh Journal of Agricultural Economics)*

In Bangladesh from mid 1960s. Green Revolution package was introduced. Its target was to increase production of rice and other cereal crops by the introduction of HYV seeds, using chemical fertilizer, pesticide and irrigation. Cultivation of HYVs crop has played a great role on self sufficiency in food. On the contrary environmental degradation has been occurred due to the intensive and excessive use of agrochemical and other modern technology. The use of pesticide has been increased 400% per acre and its cost increased 600% during the last Three consecutive decades. Farmers often spray hazardous insecticides like organophosphates and organocarbamate up to five to six times in one cropping season while only two applications may be sufficient. This rapid increase of pesticide use is causing

detrimental effect on environment and health users and consumers. Pesticides are contaminating ground and surface water which is affecting inland fishing resources and ecosystem.

Pesticide use in crop production has been suspected of being a major contribution to environmental pollution. There are widespread and growing concerns of pesticide over-use, relating to a number of dimensions such as contamination of ground water, surface water, soils and food, and the consequent impacts on wildlife and human health (McLaughlin and Mineau, 1996). Farmers often spray hazardous insecticides like organophosphates and organochlorine up to five to six times in one cropping season while only two applications may be sufficient.

In 1974, when the 50% subsidy was reduced then uses of pesticide declined and in 1979 when the subsidy completely was withdrawn from government then same decreasing trend was observed (Islam, 2000). After that other factors has influenced the use of pesticide and again gradually increased. In 1999 this increased amount pesticide reached 15000 metric tons.Farmers use a wide range of pesticides to prevent crop loss from pest attack. Use of pesticides in crop production has spread rapidly worldwide since the 1950s with an estimated annual compound growth rate of 4.4% during the period 1993–1998 in the Asia/Oceania region (Yudelman et al., 1998).

The main determinants of pesticide use are cultivation of potatoes, spices, vegetables and modern rice varieties. Some times It is observed that farmers considered the pesticide is the substitute of fertilizer as because of visible green leafy color. Sometimes increasing demand of crop may correlate with the increased application of pesticide. Different review of literature indicates that legal framework and effective implementation of up-to-date pesticide rules, increasing farmers' awareness about harm of injudicious use of pesticide and extension of IPM practices may be weapons to combat with harm of pesticide.

Methodology

Study Area:

In this Covid-19 situation it was very difficult to conduct such type of research work especially on this subject. So, this research work was mainly based on literature study and analysis of the issues related to effect of injudicious use (overuse, misuse, abuse etc) of pesticide in Bangladesh.

Different agricultural cultivated area within the territory of Bangladesh has been selected for searching of secondary source of research data. Therefore, this area has been selected purposively conducted those pesticides study.

Methods of Data Collection and Analysis:

All data has been collected from secondary sources as because of covid-19 situation is not suitable for primary data. Secondary data has been collected from Periodical, Annual reports, relevant files of BBS, FAO, BCPA, BARC, DAE, BARI. Materials such as newspapers and reviews of different authors will be also used. Relevant other data has been explored from the websites of the different statistical year book of Bangladesh, BBS; journal & books related to injudicious use of pesticide. Data are both qualitative and quantitative.

A research work for assessing the effect of pesticides toxicity on the health of farmers and vegetable consumers has been conducted by Dr. Arifur Rahman etal, Scientist of BARI in Burichong upazilla , Bangladesh; a primary investigation was conducted from May, 2012 to August-2012 . Data were collected from a total of 120 respondents of Bharella, Mokam and Rajapur union of Burichong upazilla through survey questionnaires containing both structured and non structured questions about duration of cultivations, type of pesticide use, precautionary measures practices, waiting period of vegetable collection, experiences of sufferings from diseases during and after application of pesticide as well as consumption of vegetables, diseases that have been suffering etc. In addition face to face key informant interviews were conducted by the researcher among 10 consultants and specialist doctors of skin, eye, medicine, urology, cardiology, neurology and cancer to understand potential effects of the pesticide on farmers and vegetable consumers' health within the region.

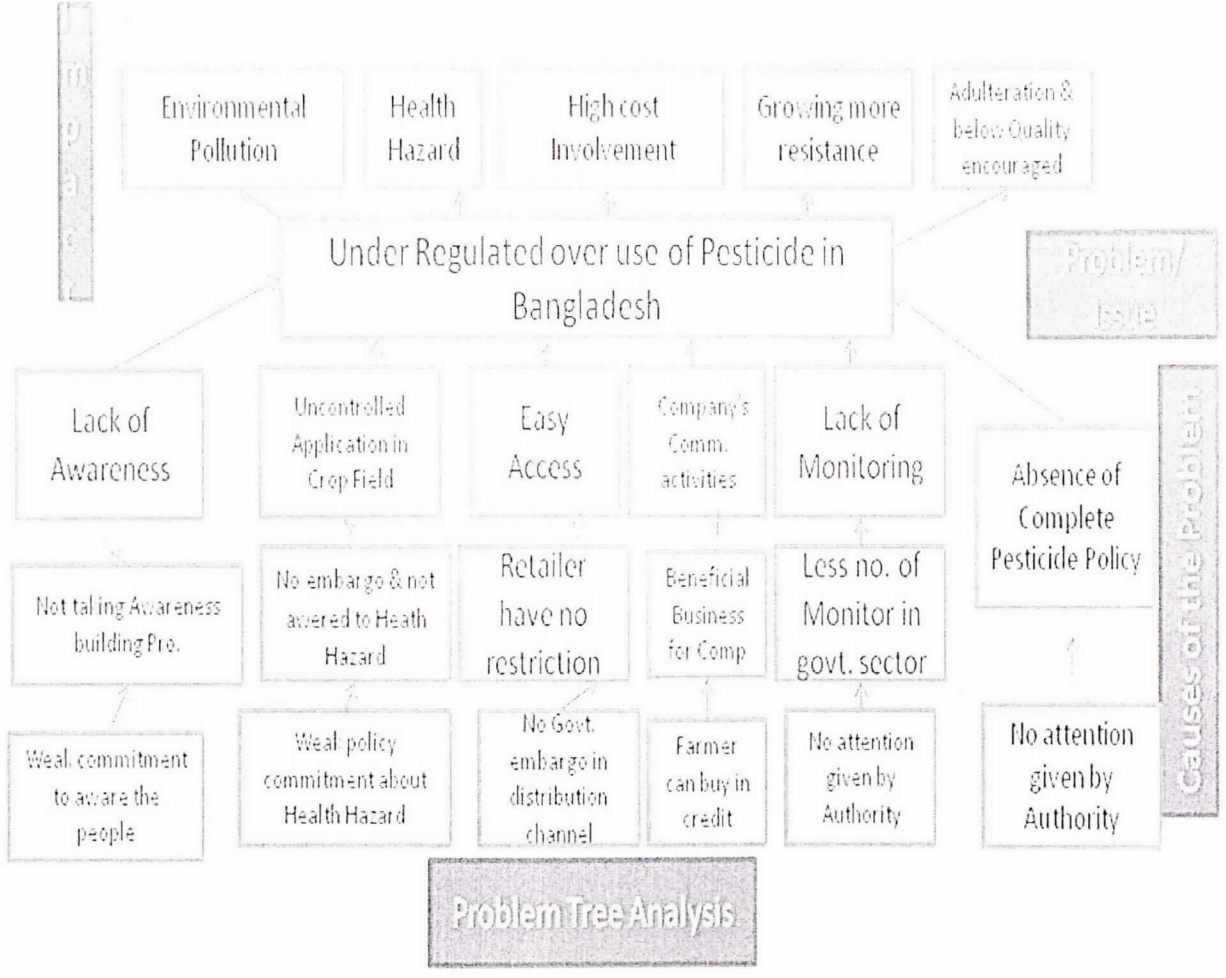
Another research work on "Pesticide demand among hybrid vegetable and cereal seed producers in Bangladesh: a simultaneous equation analysis", has been conducted by Rahman, S. This research was based on a survey conducted among the BRAC supported farmers field, which produces vegetable & cereals. A pretested structured questionnaire was utilized.

In this study, information of chemical use and handling practices was collected at random from a total 85 contract hybrid vegetable and cereal (maize, rice & wheat) seed growers from 29 villages of 6 upazilas of Dinajpur and Bogura. Data collection was conducted for a period of two weeks during March, 27- April 10, 2000.

After collection of information, it has been complied. Then Content analysis has been done. The data has been analyzed with help of Problem tree analysis, statistical analysis, graphically by using MS Excel.

Results and Discussion

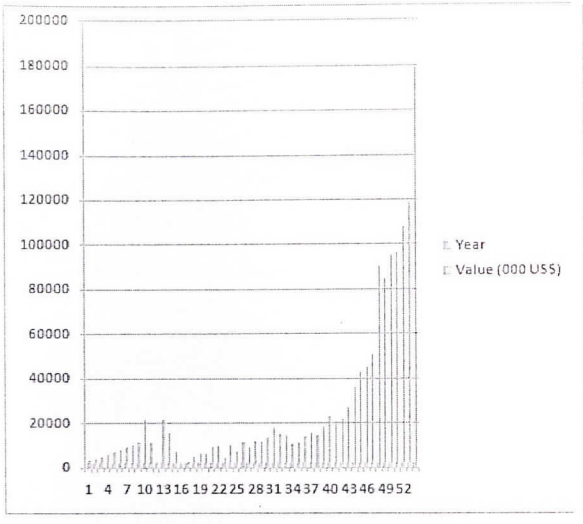
Problem Tree Analysis



Effects of current situation: Overuse of pesticide has mainly five effects, such as environmental hazard, health hazard, ecological imbalance, growing resistance of pesticide to pest, increased production cost.

Statistical Analysis

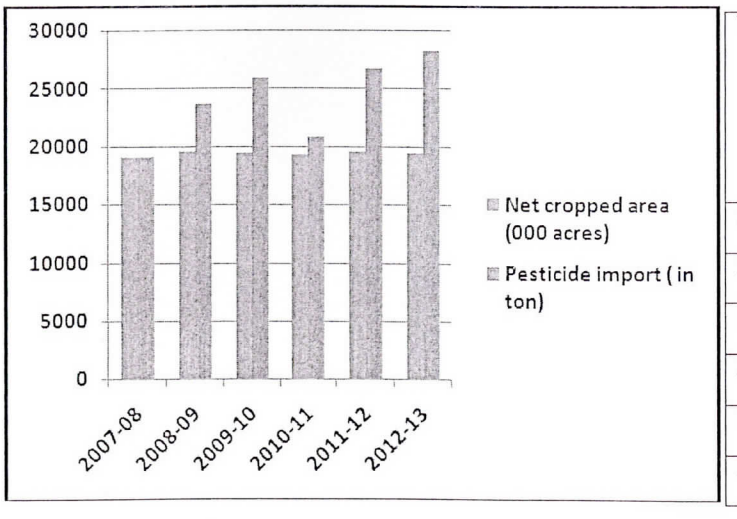
Overuse of pesticide has different dimension and indicator, Such as (1) Continuous increasing rate of using pesticide. (2) Per unit area basis increasing rate of pesticide like use of pesticide in per unit net cultivated land (3) Frequency of application increased. Farmers often spray hazardous insecticides like organophosphates and organochlorine up to five to six times in one cropping season while only two applications may be sufficient.



Year	Value (000 US$)	Year	Value (000 US$)	Year	Value (000 US$)
1961	3000	1981	9319	2001	20610
1962	4000	1982	9794	2002	22121
1963	5000	1983	4503	2003	26997
1964	6000	1984	10019	2004	35613
1965	7000	1985	7342	2005	42835
1966	8000	1986	11055	2006	45464
1967	9000	1987	8878	2007	50710
1968	10000	1988	11672	2008	90395
1969	11108	1989	11741	2009	84308
1970	21434	1990	13293	2010	95056
1971	11394	1991	17435	2011	96115
1972	2657	1992	14822	2012	108082
1973	21564	1993	14408	2013	118886
1974	15577	1994	10723	2015	179320
1975	7000	1995	11025		
1976	1647	1996	13927		
1977	2455	1997	15716		
1978	5125	1998	14196		
1979	6161	1999	18014		
1980	6640	2000	23034		

Fig-1 :- Pesticide Import Trend in Bangladesh (Source: FAO)

This study which conducted on the basis of secondary data reveal that in all aspect Bangladesh are facing the threats from overuse of pesticide. Some time tragic misuse are occurred in the form of suicide using pesticide. Fig-1 shows that from 1961 to 2015, over 55 years use of pesticide has been increased continuously.



Year	Net cropped area (000 acres)	Pesticide import (in ton)
2007-08	19187	19185
2008-09	19621	23708
2009-10	19484	25937
2010-11	19368	20934
2011-12	19594	26823
2012-13	19543	28386

Fig- 2 : Pesticide Application Trend in Net Cropped Area of Bangladesh (Source : Agricultural Yearbook 2012 and Agricultural Yearbook 2016)

Fig-2 Show that from 2007-08 to 2012-13, net cropped areas are remained unchanged but at the same time quantity of importing pesticide increased. So we can easily draw a conclusion that injudicious use or over use of pesticide is dominant in Bangladesh.

Frequency of application of Pesticide:

Table –1: Number of applications of Pesticide in a crop season.

Number of Application of Pesticide	Farmers (%)		
	vegetable	cereals	All Crops
Farmers Applying Pesticides	92.7	70.0	87.0
One time	3.6	50.0	21.0
Two times	12.7	6.7	11.1
Three times	7.5	0.0	4.9
Four times	16.4	0.0	11.1
Five times	505	3.3	3.7
Farmers not applying	7.3	30.0	13.3
Total	100	100	100
Mean No. of application	6.15	2..03	4.41
Total no. of farmers	55	30	85

[Source: Rahman, S. titled "Pesticide demand among hybrid vegetable and cereal seed producers in Bangladesh: a simultaneous equation analysis"; on 29 villages of 6 upazilas of Dinajpur and Bogura. Data collection was conducted from March, 27 to April 10, 2000]

Table-1 reveals that Overall, 87% of all farmers and 92.7% of vegetables farmers applied pesticides at least once. Significantly, 50.5% vegetable grower applying pesticide more than five time where optimal application frequency (one to two times) maitain only 16.3%. So, This study reveal that tendency of Banladeshi farmers to apply more and more pesticide. It indicates the injudicious use of pesticide without fowlloing philosophy of organic agriculture.

Table -2: Harmful effect of pesticides used as opined by the farmers.

Harmful effects of pesticide used as opined by the farmers	Response (%)
(A) Has harmful effects	37.3
Affects human health	8.7
Damage crop & flowering if used in excess	7.8
Damage soil fertility and/or leading to increase in fertilizer doses	7.4
Poisons food	1.2
Increase crop pest attacks	1.2
Causes stomach pain if inhaled	1.2
Kills useful insects & animals (e.g. Honey bee, frogs, earthworm)	9.9
Reduce fish catch	1.2
Kills birds	4.9
Affect the environment and/or damages environment and/ or damages environmental balance	3.7
(B) No harmful effects	49.4
(C) Did not examine whether have any harmful effects	8.6
(D) Non response	3.7

[Source: Rahman, S. titled "Pesticide demand among hybrid vegetable and cereal seed producers in Bangladesh: a simultaneous equation analysis"; 29 villages of 6 upazilas of Dinajpur and Bogura. Data collection was conducted for a period of two weeks during March, 27- April 10, 2000]

Farmers' perception on effect of pesticide use:

When farmers were asked to give opinion on the harmful effects of pesticide use, 37.3% of them agreed with adverse effect of pesticide. From Table- 2 we know 49.4% farmers said that there were no harmful effects or effects or no visible effect of pesticide use. 8.7% farmers did not give any comment on whether or not pesticides had harmful effect. Among the harmful effects, 9.9% of farmer thought that pesticides kill useful insects and animals, such as, earth worm, honeybee and frogs that are good for crop production. Adverse effect on human health (8.7%) emerged as the second important harmful effect of the pesticide use. Some respondents (4.9%) said that pesticides also kill birds that come into contact the crops. Damages to crop (8%) as well as the reduction of soil fertility (7.4%).

Table-3: Pesticide use pattern and precautionary measures taken by user

Variable		% of respondents
Following instrution		
	According to packet / bottle label	23.3
	More doses than instruction	34.2
	Less doses than instruction	3.3
	According to pesticide dealers suggestions	39.2
Interval of pesticide spraying		
	Every day	4.2
	Alternative day	19.2
	One time in a week	18.3
	Two times in a week	57.5
Pre-harvest Interval of vegetable after using pesticide		
	That day	3.0
	Next day	8.0
	Two days	11.7
	Three days	46.7
	One week	30.0
Follow PHI		
	Know about PHI & follows	1.7
	Don't know	71.7
	Don't follow	26.7
Protective measures taken during and after using pesticide		
	Partial protective clothing	19.2
	Washing hand and face by soap	1.7
	Both measures taken	72.5
	No protective measures taken	6.7
Smoking, drinking or consuming during pesticide use		61.0
	Cigarette	79.0
	Water	15.0
	Other (betel leaf, fruit, rice)	5.0

[Source: Dr. Arifur Rahman etal, in Burichong upazilla, Bangladesh; a primary investigation was conducted from May, 2012 to August-2012]

Status of following instruction and interval of pesticide application:

Following Label Instruction: This study found that 39% of applicators follow the oral direction of pesticide traders depending on the criteria of the field described by the farmers. Generally, pesticide sellers are not properly trained up, they learn about pesticide from the representative of the company orally. Though, some 3% farmers use lower dosages due to shortage of cash, 34% farmers use higher dosages than recommended level as because of

inadequate knowledge of appropriate dosages and as well as ignorance about pesticide toxicology. only 23.3 follow the label instruction. (Table-3).

Interval: This study reveals that on an average 4%, 19%, 18% and 58% respondents spray pesticide over their vegetable fields in each day, alternative day, two and one in a week respectively (Table – 3).

Regulation about PHI and collection of vegetable after using pesticide:

There are available three chemical groups of pesticide whice used in the country,these are organophosphorus, organocarbamate and synthetic pyrithroid. Among them level of harm caused by synthetic pyrithoid is low and vegetable should be collected at least four days after its application. Similarly, after using organophosphate and organocarbamate group of chemical respectively 11 days & 13 days should be left to go before harvesting vegetables. 47% of the farmers usually collect vegetables after three days of using pesticides though harvesting times varies with vegetable types; 3%, 8%, 12% and 30% of farmers have been marketing vegetables on the same day, the next day, two days later and three days later after using pesticides, respectively (Table--3).

Very few farmers (2%) know & follows PHI. About three-fourth (72%) of the total respondents do not know about the regulation of vegetable collection while 27% of them do not follow the instruction of PHI (Table-3).

Adoption of Protective measures

Physical measures:-

The study reveals that pesticide users are almost unaware about protective equipments at the time of handling, transporting, storing & spraying. Maximum users avoid following proper methods of application, although 93% users take partially preliminary safety measures (wearing shirt and loin or trousers) during and after using pesticide, Nearly 72% use to wear cloths (shirt of T-shirt) partially as a pre protective measure before going to spray and cleanse hands and face with soap after finishing. They also take bath after pesticide use for getting rid of odor. On the other hand, 7% of the users do not take any safely measure which is a matter of concern regarding farmer's health. It is also shocking to observe that nobody uses mask, eye glass and gumboot, which are to be considered as indispensable safety measures (Table--3).

Smoking, drinking and consuming food during pesticide application:

About 61% of respondents said that they consume something during pesticide application in the fields. Among them the highest proportion of respondents said that they often smoke cigarette (80%) ,drink water (15%) and other foods (5%) during the period of pesticide application which makes them more vulnerable in terms of users health (Table--3).

Impact of pesticides on users' health

In this study reveal that almost all (98%) respondents think that human health is endangered by pesticide application in the vegetable fields as well as consumption of contaminated.

Moreover, farmers particularly who are exposed to pesticides, suffering from at least one health problem such as- skin diseases, eye diseases, gastro-intestinal diseases, urine and sex related diseases and other short term diseases which has link with pesticide poisoning. Current study found that 61%, 63%, 85%, and 53.0having experience of health hazards i.e., Skin disease, Eye disease, Gastro-intestinal disease, Urine and sexual disease respectively of users of pesticide (Table-4)

Other diseases :

Our data show that, almost all pesticides used by the farmers are of organophosphate chemical group found in different trade names and have been suffering at least one disease while some of them exhibited multi diseases categorized under short term diseases such as physical weakness, nausea, dizziness, chest pain, Muscle Twitching, Uneasiness and long term diseases such as breathing problem, excessive sweating and fatigue. Moreover, 47% report that physical weakness and uneasiness is experienced during or after their applying pesticides even for a short period of time (Table-4).

Table-4: Effect of Pesticides on user's health.

Disease Pattern		% of respondents
Skin disease		61.0
	Body itching	33.78
	Body irritation	66.21
Eye disease		63.0
	Eye pain	9.2
	Eye itching	6.57
	Eye irritation	17.09
	Cataract	22.37
	Little Vision	36.83
	Pupil Problem	7.88
Cancer & Ulcer		
	Cancer	98.3
	ulcer	35.8
Gastro-intestinal disease		85.0
	Stomach-ace	11.76
	Digestion problem	12.74
	Vomiting	1.96
Urine and sexual disease		53.0
	Kidney problem	2.0
	Urine control problem	66.0
	Reduction of sexual urge	32.0
Other diseases		
	Physical weakness	47.4
	Vomiting Tendency / Nausea	10.0
	Dizziness	21.7
	Chest pain / tightness	20.8
	Muscle Twitching	26.7
	Breathing problem	9.2
	Tiredness / Fatigue	38.3
	Excessive Sweating	17.5
	Uneasiness	46.7

[Source: Dr. Arifur Rahman etal, in Burichong upazilla, Bangladesh; a primary investigation was conducted from May, 2012 to August-2012]

Impact of pesticides on vegetable consumers' health

It is a fundamental right of people is to get safe food for consumption but food materials, particularly agricultural commodities, get contaminated by growers in the name of protection from pests and preservation before they reach consumers. About 85% of surveyed farmers believe that pesticide-contaminated vegetables will badly affect consumer's health and people may suffer from various types of acute and chronic health problems. Maximum 65% and minimum 7.5% of the respondents state that pesticide contaminated vegetables may also be responsible for cancer and muscle contraction respectively (Table-5).

Table-5: Effect of Pesticides on vegetable consumer health.

Disease Pattern	% of respondents (cultivation period in year)
Skin disease	15.0
Eye Problem	28.3
Headache	16.0
Stomach-ace	54.2
Digestion problem	50.8
Loss of appetite	51.7
Vomiting	37.5
Kidney problem	21.7
Reduction of sexual urge	11.7
Urine control problem	14.2
Body irritation	20.8
Physical weakness	42.5
Dizziness	13.3
Chest pain / tightness	12.0
Muscle Twitching	7.5
Breathing problem	19.2
Uneasiness	60.0
Cancer	65.0
Ulcer	50.0

[Source: Dr. Arifur Rahman etal, in Burichong upazilla, Bangladesh; a primary investigation was conducted from May, 2012 to August-2012]

Findings, Conclusion and Recommendations:

Findings

This study which conducted on the basis of secondary data reveal that in all aspect Bangladesh are facing the threats from injudicious use of pesticide. Injudicious use of pesticide has mainly five effects, such as environmental hazard, health hazard, ecological imbalance, growing resistance of pesticide to pest, increased production cost.

The present study revealed that lowering of price of pesticides will significantly increase their use. The increased use of pesticides creates many hazards. About 85% of surveyed farmers believe that pesticide-contaminated agricultural produces will badly affect users consumer's health and people may suffer from various types of acute and chronic health problems.

Pesticide kills useful insects & animals (e.g. Honey bee, frogs, earthworm) Birds, Natural Fish is reducing day by day. Natural pollination of crop is being hampered. Over use of pesticide affects the environment and damages environmental balance.

Conclusion:

The present study suggests that the government and other concerned authorities should ensure the judicious use of pesticide. Overuse of toxic chemical pesticide should be limited, for better environment, human health, protection from growing resistance to pesticide, crop production cost. This limiting or minimizing process of overusing pesticide to be holistic approach, not a single initiative. Imposing more tax on pesticide is one of the easiest tactic to control the supply and demand chain by price regulating. But it is an instance measure for certain period. Because if all others situation remain unchanged at the long run competition, profitability and existence of farming leads the farmer to more use of pesticide. So, simultaneously we have to consider the formulation and promulgation of a national pesticide policy which not yet promulgated in Bangladesh even after 5 decades of liberation. The proposed national pesticide policy should include awareness building program for farmers and consumers of agricultural produce, guidelines for dealers and end users, direction on intellectual resource investment like, human resource development, research on pesticide area both govt. and public sector. Therefore a combination of pesticide regulatory policies and effective implementation, thrust in promoting education among farmers and program to minimize the uses of pesticides, may safeguard the poor farmers in their pursuit of increasing income & better livelihood Finally, as a long term solution, environment and human health friendly IPM method should be strengthened To know the precise impact of pesticide on users and consumers health need biomedical long term study in nationwide. All of these short term, midterm and long term measure may result a desirable output in pesticide using arena in Bangladesh.

Recommendation

Short term initiative:

(1) To stop the use of band pesticide (dirty dozen).

(2) Impose more tax on pesticide:

In the short term (which can be effective within 3 to 6 months), the government can adopt the following initiatives for improving the existing under regulated overuse of pesticide:

Impose more tax on pesticide import. It will be easy for govt. as because the pesticide companies are getting tax rabbet for importing raw material of pesticide as agricultural goods. So, without obstacle govt. can impose more tax which may adversely affects on overuse and misuse of pesticide. As short term process it will be one of the effective solutions to some extent.

(3) Awareness program implementation:

Farmers, dealers and pesticide associated personnel training, Seminar, symposium, rally, propaganda with mass media likes, print and electronic media should be accelerated.

Medium term Initiative:

However, for the medium term (which can be effective within 1 to 2 years) initiative the government can take the following steps with a view to reduce use of chemical pesticide by deferent initiative likes-

(1). Decreasing more toxic Pesticide: Decreasing the number of Pesticides which are comparative more toxic pesticide used on certain Crops.

(2). Policy Formulation on Pesticide

Promulgating of Umbrella /National policy on Pesticide. That National Pesticide Policy must include the user level guideline (like awareness building program of farmer, retailer, dealer, consumer and common people) and implementation process. The new policy will include the following consideration

(i) Up-to-dated pesticide policy should include details of usage, PHI period and maximum residue limits (MRLs).

(ii) Proper and sufficient guidelines for handling and use of the pesticides by the users (traders and growers).

(iii) Plant doctor of Agriculture officers Prescription should be prerequisite for Pesticide sale instead of non technical pesticide shopkeeper's suggestion.

(iv)Presently, the laboratory does not provide commercial testing facility, for example, MRLs for the users/exporters. Considering the present concerns of pesticide residues in food, the existing laboratory may extend their service up to the level of analysis of MRLs. More over in our country there is no referral laboratory. Referral & accredited is our urgent necessity of our country.

(v) Suicidal issue using pesticide should be taken in this policy.

(vi) Govt. has no Pesticide factory of its own. So, govt. is now totally dependent on Private business man and Pesticide Company. So, Govt. should intervene in Pesticide production side by side of Private Pesticide factory. In other sector like Health administration Govt. has own factory named Essential Drug Ltd. And although trade is open in Bangladesh but maintain a market price in govt. hand. Government has own Institute named TCB. The existing act has no provision of govt. owing pesticide factory which meet the emergency in the situation of outbreak of disease, adulteration and below quality Pesticide.

Long Term Initiative:

Strengthening IPM method

(1) Use of bio-pesticide instead of chemical pesticide,
(2) Use pheromone traps to control the harmful pest,
(3) Use perching.
(4) Optimum use of pesticide as last weapon of pest control.
(5) Cultivation of disease resistant crop variety.

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