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**Use of Pesticides By Gezira Vegetable Growers and Workers and The Alleged Health Effects**

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**Abstract**

The main objective of this study is to investigate and establish the relationship between some socio-cultural and work conditions of pesticides use and some human health problems. Field visits were conducted as survey methods. Ninety vegetable tenants or agricultural workers were randomly taken from four villages, dispersed over three regions in the Gezira Scheme, where such villages are traditionally known for their engagement in vegetable production. A questionnaire covering some work conditions of pesticides use and some areas of human healthy problems, was developed as a tool to collect the required data. The collected data was analyzed using the analytical aid programme (SPSS). The chi-square tests were used to measure the level of significance. A confidence level of 0.05 was adopted as significant for all analyses performed. The major findings of the study were the following:

1. The test of significance showed that there was insignificant association between the acute pesticides poisoning and the skin diseases risk.
2. The test of significance showed that there was a significant association between the use of protective measures, the method of pesticides application and the personal hygiene.

**الخلاصة:**

هدفت هذه الدراسة بشكل رئيسي إلى إيجاد العلاقة بين بعض الظروف الثقافية – الاجتماعية مع بعض ظروف العمل المصاحبة لاستخدامات مبيدات الآفات الزراعية وبين بعض المشاكل الصحية للعاملين في هذا المجال. وقد توجهت الدراسة نحو تقييم هذه الظروف الثقافية – الاجتماعية وظروف العمل المصاحبة لاستخدامات المبيدات بهدف تحديد المشاكل الصحية التي سوف تنتج عن هذه الظروف وسط المزارعين.

ولقد تم القيام بزيارات ميدانية كوسيلة لهذه الدراسة ومن ثم تم اختيار عشوائي لعدد 90 من مزارعي الخضر في أربع قرى في ثلاثة من أقسام مشروع الجزيرة ولتحقيق أهداف الدراسة فقد تم تصميم استبيان غطى بعض الظروف الثقافية – الاجتماعية وبعض ظروف العمل المصاحبة لاستخدام المبيدات إضافة لبعض المشاكل الصحية المتعلقة باستخدام هذه المبيدات. بعد جمع المعلومات المطلوبة تم تحليلها باستخدام الاختبار الإحصائي (مربع كاي) لقياس مستوى الدلالة حيث تم تحديد مستوى دلالي عند 0.05 لكافة التحليلات التي أجريت ولقد خلصت الدراسة للنتائج التالية: أوضح اختبار الدلالة عدم وجود علاقة بين الوعي بالمخاطر الصحية المصاحبة لاستخدام المبيدات وبين كل من تسمم المبيدات الحاد ومخاطر الإصابة بالأمراض الجلدية – كشف اختبار الدلالة عن وجود علاقة أو ارتباط بين استخدام الإجراءات الوقائية وطريقة رش المبيدات والنظافة الشخصية وبين كل من تسمم المبيدات الحاد ومخاطر الإصابة بالأمراض الجلدية وعلى ضوء هذه النتائج أقرحت بعض التوصيات.

**Introduction:**

Humanity is facing great challenges in providing adequate food for the 6 billion people in the world at a time which cultivated areas are increasingly being lost because of soil erosion and urbanistaion (Luong, 1999) especially in developing countries. As a matter of fact, the greatest challenge, which faces the developing countries today, is how to provide sufficient food to their population, which comprises more than 75% of the total world population. These developing countries with tropical climate prevailing, there

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is a little industrial development and agriculture is currently considered as the main source of subsistence. The use of fertilizers and pesticides has become wide spread (Maronic, 1999).

Technological advances in agriculture, such as new crop cultivars, intensive farming, mechanization and the use of pesticides, have increased productivity and to some extent improved the living standards of farmers in the rural areas of developing countries (Luong, 1999). The technological advances in agriculture called "Green Revolution" is aimed to increase the yield of food to solve the humanity problem of enough food production.

Pesticides are used world wide to control pests that destroy crops and transmit diseases to plant, people and animals. Pesticides are responsible for enormous increases in agricultural yields and for control of wide disease (Brown, 1990). Although, mankind has benefited considerably the use of pesticides, in terms of economic benefits increased agricultural output and through prevention and control of many disease, the use of pesticides faces a number of inherent problems (Liezaivy, 1994).

In this context, Pinstруп-Andersen (1982) stated that "Pesticides greatly reduce pest problems in agriculture, they are unfortunately, also responsible for serious environmental and health problems. Some of these undesirable effects include poisoning of humans, animals and fish. Along similar lines, Saiyed (1999) argued that "The use of such chemicals in agriculture has much greater health and environmental consequences than originally believed".

In the Sudan, pesticides are playing a major role in protecting many crops and the number of registered active ingredients in Sudan counts to 124 ingredients or combined materials which reach a total of 400 items.

The Gezira Scheme constitutes a major consumer of pesticides in Sudan, but the use of pesticides cause harm both to humans and environment. As a result of the highly and an uncontrolled use of pesticides, a contaminated ecology and an unhealthy environment has come into being leading to the emergence of serious health hazards among those who are working or living within the vicinity of these agricultural schemes.

The objective of this study are is to assess some socio-cultural and work conditions of pesticides use among vegetables tenants and to study the relationship linkage between some pesticides use conditions and some human health problems that Gezira Scheme vegetable tenants and workers may suffer from.

### **Materials and Methods:**

The Gezira Scheme has been selected to conduct this research work for many reasons, these were the following:

- Gezira Scheme is considered as one of the most important areas for production of different types of vegetables (Tomato, Onion, Egg-plant, Okra, Cucumber etc.)
- Almost all types of pesticides are applied in the area.
- The area under vegetable production will increase leading to an increase of pesticide use.

The Gezira Scheme is geographically divided from the perspective and scope of the study into three separate regions: Northern, Centre and Southern groups. A stratified random sampling technique is used to select representative samples. As such, three strata, each of which denotes specific region, from each region or group a block or (tafteesh) is chosen as a representative area of that particular region. Then a

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village, which is known to have been more engaged in vegetable production and lies within the boundaries of that particular block, is selected as a representative of the whole region.

**Table 1: The structure of study area will be represented as follows:**

1. Northern region	Abu Gin Block	El Ketair village
2. Central region	Medina block	Kitra Hamdan village
3. Southern region	Remitab block	Remitab village

In order to determine the sample size from each village, a disproportionate stratified sampling is used. No consideration is being given to the total number of tenants and agricultural workers involved in vegetable production within that particular village, since the number chosen is a prototype of the whole strata. Nevertheless, a total size of 90 vegetable tenants and agricultural workers, each set of 30 tenants representing a region has been selected.

Though, small the number may seem to be, but in light of the homogeneity of the characteristics involved and the existence of similar cultural and social background that are typical of the Gezira inhabitants, this population size of the study is thought to be a "true to type" representation of the three regions and above all, reflects how pesticides are dealt with by the people down the line in Gezira Scheme.

The regional data was collected by using a questionnaire consisting of 3 groups of questions:

1. Basic information relevant to the tenants and agricultural workers.
2. The conditions of pesticides use (independent variables).
3. The specific health problems (dependant variables).

The data was collected through personally-conducted field interviews primarily to ensure that questions given are well-understood and that answers given are precisely accommodated in the questionnaire. The collected data were analyzed using the chi-square test to study association/linkage between the independent variables (pesticides use conditions) and the dependant variables (health problems) which the tenants or agricultural workers may suffer from.

**Results and Discussion:**

Two methods of analysis have been used; the frequency of distribution and Chi-square Test known as "Contingency table".

Summary of findings:

**DESCRIPTIVE ANALYSIS:**

Pesticides use condition (independent variable).

**a. Source of pesticide used**

The investigation reveals that 92% of the respondents had obtained their purchased pesticides from the open market and local dealers compared to only 8% who purchased their requirement from the Plant Protection Administration.

**b. Awareness of pesticides health hazards:**

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The study indicates that 86% of all respondents were aware of the pesticides health hazards compared to 14% who were not aware of the same.

### **c. Source of awareness of pesticides health hazards.**

The results revealed that 34% of the respondents had used the instrument/caution labels as their main source of information about pesticide health hazards.

### **d. The use of protective measures:**

The results showed that the use of protective by the Gezira vegetables tenants is still far behind the acceptable level. The protective measures have been designed to reduce the potential risk of higher exposure to pesticides through prolonged use, in order to avoid their acute and a chronic effects. The protective measures act as a barrier prohibiting the pesticides from entering the body during mixing or spraying operations because. It is known (WHO, 1982) that a pesticide can only cause illness or death through entering the body (WHO, 1982).

### **e. Methods of pesticides spraying:**

The result indicates that 75% of the interviewed vegetable tenants use a knapsack sprayer equipment to apply pesticides, while 25% use primitive local methods is such as brooms, brushes, rags, empty cans to twigs. Although the knapsack sprayer is more safe than those primitive means of application, but still it has its limitations in the absence of protective clothing and therefore, it may become a direct tool of exposure to pesticides for the tenants who seldomly consider wearing a protective clothing's while carrying this sprayer on his back especially when it is leaking. Schwab (1998) argued that, the condition of the sprayer can play an important role in developing countries by increasing the degree of workers exposure to pesticides when it is often carried directly on the body in the absence of protective clothing and therefore, becomes dangerous when it is leaking.

### **f. The tenants personal hygiene:**

Cleaning of the skin with soap and water immediately after spraying is considered as one of the important aspects of the tenant personal hygiene. This will reduce the chances of absorption of pesticides through the dermal route and eventually will reduce the risk associated with pesticides absorption. Schwab (1995) reported that, the skin is the most common route through which pesticides are absorbed. The results showed that 33% of the tenants were inconsiderate of washing their bodies immediately after spraying. The negligence of personal hygiene coupled with not wearing of protective clothing during mixing or spraying will certainly inflict greater damage on the part of the user tenant.

### **g. Acute pesticide poisoning:**

The results reveal a dramatic percentage of 58% of our sample who suffered from poisoning as a result of their substandard application of pesticides on their crops due to the negligence of wearing the protective clothing.

### **h. Skin diseases incidences:**

The results shows that, 36% of all tenants in the three regions covered by our study, suffer from skin diseases. This high level of incidence confirms that prolonged exposure to pesticides can lead to the emergence of skin problems in humans as argued by Schwab (1995).

## **TEST OF SIGNIFICANCE:**

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Chi-square is a very popular form of hypothesis testing based on the difference between observed and expected frequencies (Wonnacott, 1990). In this study, chi-square serves as a measure to detect the relationship between some pesticides use conditions and some human health problems.

**1. Association between socio-cultural condition (awareness of pesticide health hazards and the acute pesticide poisoning risk.**

Chi-square test shows that, there is no relationship between the awareness of pesticides health hazards and the acute pesticides poisoning risk. This means that the awareness of pesticides health hazards has no influence on the acute pesticides poisoning risk, because most of the poisoned tenants were aware of the pesticides health hazards involved (Table1)

**Table 1: Awareness of pesticide health hazards and the acute pesticide poisoning risk:**

Acute poisoning risk	Awareness of pesticides health hazards		Total
	Aware	Unaware	
Poisoned	47	5	52
Not poisoned	31	7	38
Total	78	12	90

**1. Association between the use of protective measures and the acute pesticides poisoning risk:**

Chi-square test shows that, there is a strong relationship between the use of protective measures and the acute pesticides poisoning risk (Table 2). This means that, the use of the protective measures have influence on the acute pesticides poisoning risk, because it is well known that the use of measures reduces the risk of acute pesticides poisoning.

**Table 2: Relationship between the use of protective measures and the acute pesticides poisoning risk:**

Acute poisoning risk	The use of protective measures		Total
	Users	Non-users	

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Poisoned	9	43	52
Not poisoned	15	23	38
Total	24	66	90

**2. Association between pesticides methods of spraying and acute pesticides poisoning risk:**

The chi-square test shows that, there is a relationship between the method used for pesticides spraying on crops and the acute pesticides poisoning (Table 3).

**Table 3: Relationship between the method used for pesticides spraying and the acute pesticides poisoning:**

Acute poisoning risk	Methods of spraying		Total
	Sprayer	Traditional	
Poisoned	33	19	52
Not poisoned	35	3	38
Total	68	22	90

**3. Association between personal hygiene and the acute pesticides poisoning risk:**

Chi-square test depicts that, there is a relationship between the personal hygiene (cleaning of skin after spraying) and the acute pesticides poisoning risk. This signifies that the personal hygiene of tenants has an influence on the acute poisoning risk through reducing its magnitude (Table 4).

**Table 4: Relationship between the personal hygiene and the acute pesticides poisoning risk:**

Acute poisoning risk	Personal hygiene		Total
	Yes	No	
Poisoned	28	24	52
Not poisoned	32	6	38

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Total	60	30	90
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It can be noticed that, the percentage of poisoned tenants among the good hygiene was 46% which is by far less than that among the poisoned tenants of bad hygiene (80%). We can conclude that, the personal hygiene can play an important role in reducing the potential risk of acute poisoning to human through reducing the dermal absorption of pesticides through the skin. In this context, WHO (1995) argued that "studies did demonstrate that pendent worker can't ignore any aspect of personal hygiene".

**4. Association between the socio-cultural conditions (awareness of pesticides health hazards) and the skin diseases:**

Chi-square test indicates that, there is no relationship between the awareness of pesticides health hazards and the risk of skin diseases. This means that, the conditions of awareness has no influence on the skin diseases. It was expected that the awareness of pesticides health hazards will reduce the risk of the skin diseases through encouragement of tenants to use the recommended protective devices. But contrary to the expectation, it has been observed that 85% of the tenants who were suffering from skin diseases, were fully aware of the dangers of pesticides to their health.

**5. Association between the use of protective measures and the skin diseases risk:**

From the chi-square test, it has been observed that there is a relationship between the use of protective measures and skin diseases. It was found that protective measures has an influence on skin diseases through diminution of related risks (Table 5)

**Table 5: Relationship between the use of protective measures and skin diseases:**

Skin disease risk	Use of protective measure		Total
	Users	Non-user	
Suffering	4	28	32
Not suffering	20	38	58
Total	24	66	90

It was found that all of the tenants who suffer from skin diseases were not keen to give due consideration to protective measures while spraying.

**6. Association between the pesticide method of spraying and skin disease risk:**

Chi-square test indicates that, there is a relationship between pesticides methods of spraying and the risk of skin diseases. The sprayer equipment used has an influence to the skin diseases risk. It was found that 60% of the tenants who were observed to suffer from skin diseases, were customary users of sprayers equipment. Our explanation for this odd situation is that, the sprayers equipment used might not have been in good and sound conditions and as such poses a hazard and exposes the users to the risks of contact with sprayed pesticides (Table6).

**Table 6: Relationship between pesticides methods of spraying and the risk of skin diseases:**

Skin disease	Pesticides methods of	Total
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risk	spraying		
	Sprayer	Traditional	
Suffering	19	13	32
Not suffering	49	9	58
Total	68	22	90

**7. Association between the personal hygiene and the skin diseases risk:**

The chi-square test shows an existence of relationship between the personal hygiene and the skin disease. As a general rule, the personal hygiene is believed to have remarkable influence in reducing the risks associated with the skin contacts of pesticides. This belief has been confirmed by the data included in Table 7 which reveals that, only 23% out of the good hygiene tenants suffer from skin diseases compared to 60%.

**Table 7: Relationship between the personal hygiene and the skin disease:**

Skin disease risk	Cleaning of skin after spraying		Total
	Yes	No	
Suffering	14	18	32
Not suffering	46	12	58
Total	60	30	90

The explanation is that, the general cleanliness of the body with soap and water after spraying reduces the risk of skin contact with pesticides and consequently reduces the chance of skin diseases. It has been argued that skin contact with spray residues can produce irritation especially in people prone to allergies (Schawb, 1995).

**Conclusion:**

This study was an attempt to assess some socio-cultural and work conditions that prevail among Gezira tenants. The study was well has been carried out with a view to investigate the health hazards that are associated with pesticides applications. Moreover, the study is designed to look into the relationship between the pesticides use conditions and some health problems that exist among the vegetable tenants of the Gezira Scheme.

Depending on the findings of this study, the following conclusions have been reached:

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1. Over one half of the respondents suffered from some poisoning.
2. 35% of the respondents suffered at varying degree from skin diseases.
3. Poisoned tenants and those suffering from skin diseases were found to be illiterate and to have lengthy periods of work (more than eleven years) in the field of pesticides application. They were non-users of protective measures, users of knapsack sprayers and were not exposed to extension services.
4. There was no significant association between the tenant's awareness of pesticides health hazards and their suffering from poisoning and diseases risk.
5. There was a significant association between the use of protective measures, method of spraying, personal hygiene and pesticides poisoning and skin diseases risk.

### **Recommendations:**

In the light of the study findings, the following recommendations are given for review and scrutiny:

1. Pesticides spraying of relational gardens and vegetable fields in the Gezira Scheme is to be carried out under the supervision and guidance of the field technical staff.
2. Authorized vegetable pesticides dispensaries are to be detected at each Block where such pesticides are sold to the tenants by the Block staff at cost price in order to eliminate their dependence on the open market and local dealers.
3. Development of plans for the prevention of pesticides risks to the tenants and the environment by designing of extension programmes directed to enlighten the tenants of the risks associated with the use and application of pesticides.
4. The Extension Services Unit of the Gezira Scheme is to take a more positive role and a serious involvement in vegetable spraying.
5. Development of training programmes and demonstration sessions on the ideal methods of spraying.
6. Protective clothing is to be made available at affordable prices.
7. Stringent control over highly toxic pesticides should be exercised.

### **References**

1. Brown, A. (1990). Economic and social cost benefit analysis. Lecture notes, University of Khartoum, development Studies and Research Center (DSRC).
2. Lung, N, and Nam, D. Q. (1999). Safety and the sound use of pesticides in agriculture production. ILO/FINNDA Asian Pacific Regional Programme on occupational safety and health. Vol. 6, No, 3, Hanoi, Vietnam.
3. Maroni, M, Colosio, C and Visentin, S. (1999). Occupational exposure to pesticides in developing world: health effects and strategies for prevention. ILO/FINNDA Asian Pacific regional programmes on occupational safety and health, vol. 6, No3. Milan, Italy.
4. Pinstrup – Andersen, P. (1982). Agricultural Research and Technology in Economic Development. Longman, Inc. New York, U. S. A.
5. Saiyed, H, Bhatnagar, V. K. and Kashyap, R. (1999). Impact of pesticides use in India. ILO/FINNDA Asian Pacific regional programmes on occupational safety and health, vol. 6, No. 3. Ahmedabad, India .
6. Schwab, A., Schwab S. P., Gorgen R.( 1995). Pesticides in Tropical Agriculture: Hazards and Alternatives. PAN Germany and CTA Netherlands.
7. WHO. (1985). Environmental Pollution Control in relation to development. Technical report series. No. 718. WHO, Geneva.
8. WHO. (1985) Safe use of pesticides. Technical report series. No. 720. WHO, Geneva.

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9. WHO. (1992). Our Planet, our health: report of the WHO Commission on Health and Environment, Geneva.
10. WHO, UNEP. (1990). Public Health Impact of Pesticides used in agriculture, Geneva.
11. Wonnacott, T. H. and Wonnacott, R. J. (1990) Introductory statistics. Fifth edition. John Wiley and Sons, Toronto, Canada.