

## THE DDT-BAN PROGRAM ON TOBACCO IN THE PHILIPPINES

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The DDT-Ban Program on tobacco was started during the crop season 1975-1976 with the Bureau of Plant Industry as the main implementing agency. This action program was prompted by the threat that Philippine tobacco will lose its competitiveness in the international markets because of high DDT residue content.

Results of the 2-year campaign program (1975-1976 and 1976-1977) indicate that the DDT residue of Philippine tobacco has to be brought down further to the level acceptable to importing countries. Although the program has resulted in a generally declining trend on the DDT residue of leaf tobacco, many tobacco areas are still sporadically showing excessive residue levels. This is specially common in malaria infected areas.

Analysis of leaf samples collected at random in the different provinces within the program areas shows that for 1975-1976 crop season, the average DDT residue of leaf tobacco grown in Ilocos Region and Cagayan Valley is 0.53 and 2.64 mg/kg, respectively. For 1976-1977 crop season the analysis for the same regions indicates an average DDT residue of 0.75 and 1.80 mg/kg, respectively.

While these levels are still high, they are much lower than the 19.0 and 44.0 mg/kg residues found in our tobacco during the 1974-1975 pre-program year by analysts in England and Germany, respectively.

The tobacco industry is a major cog of the Philippine economy, it being one of the leading sources of foreign exchange and revenues to finance the country's economic development program. However, recent developments in the international market pose a serious problem to the industry. Several importing countries have recently prohibited the entry of tobacco and tobacco products containing hazardous levels of DDT residues and that of other organochlorine insecticides. The threat to the tobacco industry is obvious from the high DDT residue levels of 19.0 and 44.0 mg/kg for leaf tobacco and cigars, respectively, as analyzed in London, England in 1975. Similarly, analysis conducted in Germany on the same year showed 44.98 and 28.03 mg/kg for Cagayan Valley tobacco and Philippine made cigars, respectively.

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The leading importers of Philippine tobacco such as the U.S., Germany, England and other European countries, are among those imposing this stringent residue level requirement.

Despite the breakthrough in some major fields of tobacco technology, our leaf tobacco, notably the cigar-leaf type still contain very high DDT residues compared to tobacco products from other countries. By sheer coincidence or perhaps not, it has been observed that the DDT content of tobacco grown in malaria-infested provinces, like Cagayan Valley, where sustained malaria vector control is being undertaken with DDT, is higher than tobacco grown in non-malaria provinces. It is very possible that the DDT intended for malaria control in the Cagayan Valley region has found its way into tobacco fields in view of its being a cheap and effective material for the control of a wide variety of insect pests.

A rejection in a number of shipments of Philippine tobacco abroad has consequently prompted the Philippine Tobacco Board (PTB) to undertake measures necessary to maintain and further promote the competitive position of Philippine tobacco in foreign markets and at the same time, protect the health of Filipino smokers from the hazardous effects of DDT.

Thus, in the 1975-1976 crop season, the Bureau of Plant Industry was given the main task to implement an action program directed against the use of prohibited pesticides on tobacco. The program also involved the other concerned agencies. The program did not only cover a campaign to ban DDT but emphasis was equally given to the educational process of imparting the technology and economics on the use and application of other alternative pesticides.

#### OBJECTIVES

The program aims to make a progressive tobacco industry and maintain its competitiveness in the foreign markets by reducing the DDT residue level through the following objectives:

To stop or minimize the use of DDT and other prohibited pesticides by establishing an extensive network of informational campaign including demonstration on the use of alternate pesticides.

To educate farmers on the hazardous effect of using DDT and other prohibited insecticides.

To collect leaf samples in program areas, analyze the same for residues of DDT and other prohibited pesticides, assess its importance, and establish an effective pesticide residues monitoring system that will identify problem areas and at the same time serve as basic guide and information for the traders, manufacturers, and exporters.

## AREA COVERAGE

The program covered the two major tobacco producing regions in northern Luzon where the bulk of the leaf tobacco produced goes to the export market. The provinces covered with the corresponding estimated area are:

## Ilocos Region

|                       |             |
|-----------------------|-------------|
| 1. Abra .....         | 2,300 has.  |
| 2. Ilocos Sur .....   | 15,700 has. |
| 3. Ilocos Norte ..... | 9,500 has.  |
| 4. La Union .....     | 6,600 has.  |
| 5. Pangasinan .....   | 1,000 has.  |

|                 |            |
|-----------------|------------|
| Sub-total ..... | 35,100 has |
|-----------------|------------|

## Cagayan Valley

|                  |             |
|------------------|-------------|
| 1. Isabela ..... | 18,500 has. |
| 2. Cagayan ..... | 4,400 has.  |
| 3. Quirino ..... | 600 has.    |

|                 |            |
|-----------------|------------|
| Sub-total ..... | 23,500 hs. |
|-----------------|------------|

|                   |             |
|-------------------|-------------|
| GRAND TOTAL ..... | 58,600 has. |
|-------------------|-------------|

## AGENCIES INVOLVED, THEIR ROLES AND FUNCTIONS

The program, although mainly implemented and coordinated by the Bureau of Plant Industry, is participated in by a number of agencies whose involvement are vital to the success of the program. Among the agencies cooperating with BPI and their respective roles are:

1. Philippine Tobacco Board — Provides financial support and policy guidelines for the program.
2. Malaria Control Bureau — Regulates the movement and use of DDT in its malaria spraying work to prevent the possible diversion of DDT to tobacco farmers.
3. Philippine Tobacco Administration, Philippine Virginia Tobacco Administration, and Bureau of Agricultural Extension — Assist in the over-all field campaign against the use of DDT through their field extension network.
4. Agricultural Pesticide Institute of the Philippines (APIP) — Undertakes spraying demonstration of recommended pesticides and imposes restriction on the movement and sale of prohibited pesticides among pesticide dealers.



c. Distribution of posters and leaflets — Leaflets listing the prohibited chemicals as well as the recommended ones were distributed to farmers in the different barrios. At the same time, posters and billboards containing the same information were posted in conspicuous places like barangay centers, market places and municipal buildings.

d. Farmer Contact — Technicians undertook periodic follow-up and supervision of farmers within their areas of coverage during the duration of the tobacco season. This activity was closely coordinated with the personnel of other agencies, principally the Malaria Control Bureau in order to institute proper safeguards in their vector control spraying program and to minimize the diversion of DDT into farmers' fields.

e. Spraying demonstration — Pesticide caravans as a joint undertaking with pesticide companies were organized to conduct spraying demonstration of recommended pesticides. These were usually held in farm centers where farmers congregate.

f. Field sampling — Leaf samples were randomly collected by field technicians in their respective areas of coverage. Cigar-filler tobacco was sampled in farmers' curing shed after air drying while Virginia tobacco samples were collected after flue-curing. Usually, one sample was submitted for every 250-300 hectares of coverage.

*Residue analysis and monitoring.* A total of 155 leaf samples coming from 87 municipalities of Regions I and II were analyzed for DDT residues in the Pesticide Residue and Formulation Control Laboratory of the BPI. The results were disseminated to all concerned sectors in the industry. This activity was considered most important especially to tobacco traders, exporters and manufacturers as it will provide them with reliable information on the residue status of leaf tobacco being traded. Moreover, the activity could provide information useful in pinpointing problem areas and thus serve as a good basis of intensifying the campaign efforts in areas where DDT and other prohibited pesticides remain a serious problem.

*Analysis methodology.* Residues of DDT were extracted from a three-layered chromatographic column. The lowest layer consisted of 20 g aluminum oxide deactivated with six percent of water. The middle layer was a mixture of 10 g of Florisil deactivated with five percent water and one g of activated charcoal while the top layer was made up of five to 10 g of finely ground tobacco samples and 20 g of deactivated Florisil. The residues were eluted with 600 ml of 4:1 petroleum ether-ethyl acetate.

The extract was concentrated, dried in a stream of nitrogen and the residues were redissolved in 10 ml of cyclohexane. Aliquots were shaken with concentrated sulfuric acid and chromatographed using an electron capture detector.

The conditions for gas chromatographic analysis are as follows:

|                   |   |  |
|-------------------|---|--|
| Column            | : | glass, 2 m x 3 mm I.D. packed with 1.5% SP 2250 + 1.95% SP 2401 in 80/100 Supelcon AW DMCS |
| Temperatures (°C) | : | Column-210<br>Injector-260<br>Detector-260   |
| Nitrogen          | : | 20 ml/min  |

#### CAMPAIGN RESULT FOR TWO CROP YEARS

The result of the two year DDT-Ban Program indicates that most of the tobacco grown in Ilocos and Cagayan Valley regions contain DDT residues beyond tolerances set by other countries. Germany, for example, has a tolerance of 0.1 mg/kg. Although there was generally a gradual decline of residue levels, it is still apparent that the level has to be brought down further in order to make the industry more viable as one major source of foreign exchange. This decline is more prominent in Cagayan Valley where leaf tobacco contained excessively high DDT residue prior to the program year. From 19.0 and 44.0 mg/kg as analyzed in foreign laboratories in 1975, there was a recorded decline to 2.64 and 1.80 mg/kg in 1976 and 1977, respectively.

Table 1 shows the comparison of results of DDT residue analysis of leaf samples by program year.

TABLE 1. Comparative DDT residue levels of leaf tobacco by program year.

| Region/Province                   | Pre-Program year <sup>1</sup><br>1974-1975 | 1975-1976 CROP<br>No. of Samples Analyzed | Ave. DDT Residue (mg/kg) | 1976-1977 CROP<br>No. of Samples Analyzed | Ave. DDT Residue (mg/kg) |
|-----------------------------------|--|---|--------------------------|---|--------------------------|
| <b>ILOCOS REGION<sup>2</sup></b>  |  |   |                          |   |                          |
| 1. Abra                           |  | 8   | 0.82                     | 8   | 2.02                     |
| 2. Ilocos Norte                   |  | 15  | 0.50                     | 19  | .23                      |
| 3. Ilocos Sur                     |  | 24  | 0.26                     | 11  | .78                      |
| 4. La Union                       |  | 23  | 0.53                     | 15  | .48                      |
| 5. Pangasinan                     |  | 7   | 1.21                     | 22  | .90                      |
| REGIONAL AVERAGE                  |  | 77  | 0.53                     | 75  | .75                      |
| <b>CAGAYAN VALLEY<sup>3</sup></b> |  |   |                          |   |                          |
| 1. Isabela                        | 19.0                                       | 31  | 2.62                     | 68  | 1.51                     |
| 2. Cagayan                        | 44.0                                       | 9   | 2.26                     | 10  | 4.05                     |
| 3. Quirino & N. Viscaya           |  | 2   | 4.68                     | 2   | .52                      |
| REGIONAL AVERAGE                  |  | 42  | 2.64                     | 80  | 1.80                     |

<sup>1</sup> Result of analysis conducted in England and Germany for Cagayan Valley leaf tobacco.

<sup>2</sup> Samples collected represent about 85% flue-cured; the rest are of other types.

<sup>3</sup> Samples collected are of Cigar tobacco types.

## PROGRAM ASSESSMENT

1. As indicated by laboratory analysis, the campaign yielded reasonable breakthrough in terms of reducing residue levels especially in Cagayan Valley where DDT residue showed a marked decline.

2. Of the municipalities where tobacco samples were obtained, 20 municipalities or 32 percent show an increasing trend on DDT residue while 41 municipalities or 68 percent show a decreasing trend (Table 2). However, most of the variations are well within sampling and analytical limits. Also, 15 municipalities have been pinpointed as having grown tobacco with excessive residue level in 1977 (Table 3); these municipalities are now subject of more intensified efforts to further reduce the residue levels.

3. Despite concerted campaign efforts, the smuggling of DDT from the Malaria Control Bureau the only source of DDT, to the farmer-users continue to hamper the implementation of the program. This observation is corroborated by the fact that tobacco grown in malaria infected areas contain higher residues than those grown in non-malaria infected areas. The continued use of DDT is due to its being cheap and effective in controlling a wide variety of insect pests.

TABLE 2. Comparison of average DDT level of leaf tobacco grown by municipalities (1976 and 1977)

|                      | 1976 | 1977 | REMARKS |
|----------------------|------|------|---------|
| <b>A. PANGASINAN</b> |      |      |         |
| 1. Alcala            | 1.01 | 0.36 | —       |
| 2. Manaoag           | 0.28 | 0.19 | —       |
| 3. Pozorrubio        | 0.28 | 0.65 | +       |
| 4. Mapandan          | 0.28 | —    | —       |
| 5. Sison             | 0.28 | 0.88 | +       |
| 6. Asingan           | —    | 0.65 | —       |
| 7. Balagao           | —    | 0.57 | —       |
| 8. Tayug             | —    | 0.36 | —       |
| 9. Rosales           | —    | 1.51 | —       |
| 10. San Jacinto      | —    | 0.46 | —       |
| 11. Sta. Maria       | 2.32 | 0.33 | —       |
| 12. Sto. Tomas       | —    | 0.89 | —       |
| 13. Villasis         | 1.28 | 1.03 | —       |
| <b>B. LA UNION</b>   |      |      |         |
| 14. Aringay          | 0.48 | —    | —       |
| 15. Bacnotan         | 0.34 | 0.23 | —       |
| 16. Balaoan          | —    | 1.66 | —       |
| 17. Bangar           | 0.52 | 0.14 | —       |
| 18. Batoocan         | 0.06 | —    | —       |
| 19. Bauang           | 0.93 | 0.03 | —       |
| 20. Caba             | 0.27 | 0.96 | +       |

TABLE 2. cont'd.

|                        | 1976  | 1977   | REMARKS |
|------------------------|-------|--------|---------|
| 21. Luna               | 0.67  | —      |         |
| 22. Naguilian          | 0.63  | —      |         |
| 23. Rosario            | 0.89  | —      |         |
| 24. San Fernando       | 0.05  | 0.74   | +       |
| 25. Sto. Tomas         | 0.93  | 0.17   | —       |
| 26. Tubao              | 0.43  | 0.09   | —       |
| <b>C. ILOCOS SUR</b>   |       |        |         |
| 27. Bantay             | —     | 0.31   |         |
| 28. Burgos             | 0.44  | —      |         |
| 29. Cabugao            | 0.11  | 0.04   | —       |
| 30. Candon             | 0.60  | —      |         |
| 31. Galimuyod          | 0.07  | —      |         |
| 32. Magsingal          | 0.03  | 6.06   | +       |
| 33. Salcedo            | —     | 0.06   |         |
| 34. San Juan           | 0.16  | 0.26   | +       |
| 35. Sto. Domingo       | 1.16  | 0.67   | —       |
| 36. San Esteban        | 0.04  | —      |         |
| 37. San Ildefonso      | 0.09  | —      |         |
| 38. Santiago           | 0.15  | Traces | —       |
| 39. Sta. Cruz          | 0.16  | 0.15   | —       |
| 40. Sta. Lucia         | 0.18  | —      |         |
| 41. Sta. Maria         | 0.07  | —      |         |
| 42. Tagudin            | 0.27  | —      |         |
| <b>D. ILOCOS NORTE</b> |       |        |         |
| 43. Bacarra            | 1.08  | 0.04   | —       |
| 44. Badoc              | 0.19  | 0.67   | +       |
| 45. Batac              | 0.81  | 0.20   | —       |
| 46. Dingras            | —     | 0.18   |         |
| 47. Espiritu           | 0.20  | 0.18   | —       |
| 48. Laoag              | 0.47  | 0.21   | —       |
| 49. Marcos-Salsona     | 0.07  | 0.38   | +       |
| 50. Paoay              | 0.18  | 0.15   | —       |
| 51. Pasuquin           | 0.61  | 0.33   | —       |
| 52. Piddig             | —     | 0.31   |         |
| 53. Pinili             | 0.17  | 0.15   | —       |
| 54. San Nicolas        | 0.38  | 0.33   | —       |
| <b>E. ABRA</b>         |       |        |         |
| 55. Bangued            | 0.53  | 0.95   | +       |
| 56. Dolores            | 0.52  | —      |         |
| 57. Langangilang       | —     | 3.39   |         |
| 58. Langiden           | 2.30  | 1.75   | —       |
| 59. Pidigan            | —     | 0.67   |         |
| 60. Pilar              | 0.72  | —      |         |
| 61. San Isidro         | Trace | 0.37   | +       |
| 62. San Quintin        | 1.36  | 5.67   | +       |
| 63. Tayum              | 1.07  | 1.55   | +       |
| 64. Villaviciosa       | —     | 1.80   |         |

|                         | 1976 | 1977 | REMARKS |
|-------------------------|------|------|---------|
| <b>F. NUEVA VISCAYA</b> |      |      |         |
| 65. Bagabag             | —    | 0.86 | —       |
| 66. Bugayong            | —    | 0.18 | —       |
| 67. Aglipay, Quirino    | 3.80 | 0.90 | —       |
| 68. Villaverde, Bagabag | 5.57 | 0.86 | —       |
| <b>G. ISABELA</b>       |      |      |         |
| 69. Angadanan           | 2.96 | 0.74 | —       |
| 70. Aurora              | 0.62 | 1.79 | +       |
| 71. Benito              | 3.39 | —    | —       |
| 72. Burgos              | 8.44 | 0.56 | —       |
| 73. Cabagan             | 4.52 | 1.07 | —       |
| 74. Cabatuan            | —    | 0.56 | —       |
| 75. Cauayan             | 1.33 | 2.46 | +       |
| 76. Echague             | 4.63 | 1.69 | —       |
| 77. Gamu                | 0.82 | 0.82 | —       |
| 78. Ilagan              | 2.74 | 1.65 | —       |
| 79. Jones               | 1.98 | 1.26 | —       |
| 80. Luna                | 3.53 | 0.87 | —       |
| 81. Magsaysay           | 5.75 | 1.11 | —       |
| 82. Milling             | 2.88 | 1.53 | —       |
| 83. Malono Norte        | —    | 2.44 | —       |
| 84. Naguilian           | 1.04 | 1.51 | +       |
| 85. Quirino             | 0.07 | 1.16 | +       |
| 86. R. Mercedes         | 2.25 | 1.36 | —       |
| 87. Roxas               | 1.46 | 3.73 | +       |
| 88. San Luis            | —    | 1.55 | —       |
| 89. San Pablo           | 1.06 | 1.17 | +       |
| 90. Santa Maria         | 2.18 | 2.02 | —       |
| 91. Sto. Tomas          | 1.62 | 0.19 | —       |
| 92. Tumauini            | 2.93 | 0.85 | —       |
| 93. Yeban Norte         | —    | 3.63 | —       |
| 94. Yeban Sur           | —    | 1.71 | —       |
| <b>H. CAGAYAN</b>       |      |      |         |
| 95. Alcala              | 2.72 | 0.27 | —       |
| 96. Amulung             | 7.60 | 5.93 | —       |
| 97. Baggao              | —    | 9.58 | —       |
| 98. Emilio              | —    | 4.80 | —       |
| 99. Enrile              | 0.84 | —    | —       |
| 100. Iguig              | 1.68 | —    | —       |
| 101. Gasi               | —    | 2.95 | —       |
| 102. Gattaran           | —    | 0.47 | —       |
| 103. Peñablanca         | 2.53 | 2.76 | +       |
| 104. Piat               | 0.71 | 6.42 | +       |
| 105. Solano             | 0.40 | —    | +       |
| 106. Sto. Niño          | —    | 6.41 | —       |
| 107. Tuguegarao         | 1.18 | —    | —       |

TABLE 3. Municipalities with leaf tobacco showing excessive DDT residue level in 1977.

|                          | DDT Level<br>(mg/kg) |
|--------------------------|----------------------|
| <i>Region No. 1</i>      |                      |
| 1. Magsingal, Ilocos Sur | 6.06                 |
| 2. Langangilang, Abra    | 3.39                 |
| 3. San Quintin, Abra     | 5.67                 |
| <i>Region No. 2</i>      |                      |
| 1. Cauayan, Isabela      | 2.46                 |
| 2. Molano Norte, Isabela | 2.44                 |
| 3. Roxas, Isabela        | 3.73                 |
| 4. Sta. Maria, Isabela   | 2.02                 |
| 5. Yeban Norte, Isabela  | 3.63                 |
| 6. Amulung, Cagayan      | 5.93                 |
| 7. Baggao, Cagayan       | 9.58                 |
| 8. Emilio, Cagayan       | 4.80                 |
| 9. Gasi, Cagayan         | 2.95                 |
| 10. Peñablanca, Cagayan  | 2.76                 |
| 11. Piat, Cagayan        | 6.42                 |
| 12. Sto. Niño, Cagayan   | 6.41                 |

## RECOMMENDATIONS

1. The Malaria Control Bureau has stated that DDT is still the cheapest and most effective way to control the malaria vector. Since this cannot be substituted with less hazardous chemicals, it may help minimize the illicit use of DDT on tobacco if DDT in powder form is replaced by DDT in liquid form. Liquid DDT, in a way, is more difficult to smuggle and it cannot be simply applied unless the farmer owns a sprayer, while DDT powder is widely applied as dusting chemical when mixed in the right proportion with ash.

2. One logical approach to effective campaign against DDT is to adopt a more stringent policy to make DDT residue level one of the criteria in the pricing of tobacco. Through an effective residue monitoring system, leaf tobacco grown in specific localities showing excessive residues should be rejected in the market.

3. The DDT residue monitoring program on tobacco should necessarily be a sustained and continuing activity in order to safeguard and promote the industry and allow it to stand competition in international markets.