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UNIVERSITY OF CALIFORNIA, DAVIS

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Mohamed A. El-Shennawy, Alan Treffeisen, and Sylvia Lane

We asked 249 fellahin, interviewed during the Food Consumption Activity of the Economics Subproject of the Agricultural Development Systems-University of California Project survey in 1981-82,[1] questions designed to elicit information on what they perceived as measures that would serve to (1) increase their incomes, (2) increase output on their farms, and (3) improve the nutritional status of family members in their households. Questions asked were open-ended questions, and answers were not constrained in any way.[2] Respondents answered in their own words and could give as many answers as they wished. Replies were tabulated under 14 categories for the set concerning incomes, 12 for the set concerning output, and 7 for the set concerning nutritional status. The suggested measures were as follows (percentage of household heads who proffered each answer appear in Table 1):

Measures That Would Serve to Increase Income

1. Establish cooperative societies for the marketing of vegetables.
2. Eliminate the obligatory delivery system for some crops.
3. Forgive past debts enabling overindebted farmers to resume borrowing from cooperative societies.
4. Establish processing plants for agricultural products.
5. Supply the cooperative societies with suitable agricultural equipment and train farmers to use this equipment.

6. Establish women's clubs and train women and girls.

7. Increase farm gate prices of different crops to keep pace with the ever-increasing crop production costs.

8. Reduce land taxes.

9. Reduce prices of farm inputs and food commodities.

10. Reduce pest control costs.

11. Improve health services.

12. Provide farmers with chicks and calves to raise.

13. Distribute 2-3 feddans of reclaimed land to each farmer with landholdings below a certain limit.

14. Build a mill to grind grain.

Measures That Would Serve to Increase Farm Output

To increase plant production:

15. Increase fertilizer quotas and reduce fertilizer prices using subsidies.

16. Make improved seeds more readily available.

17. Improve the drainage system and use covered or tile drainage on a wide scale.

18. Increase agricultural mechanization.

19. Free the agricultural economy.

20. Distribute fertilizer free to small landholders.

To increase animal production:

21. Increase the cottonseed meal quota for dairy and other cattle.

22. Improve veterinary care.

23. Provide small landholders with Frezian cattle.

24. Distribute new varieties of one-day-old chicks to be raised.

25. Substitute new and improved varieties of cattle for native cattle and increase insurance coverage for cattle.

26. Increase the number of animal and fish farms.

Measures That Would Serve to Improve Nutritional Levels

27. Establish more retail cooperative societies (stores) and supply the stores with ample quantities of meat, fish, and other food items.

28. Encourage the breeding of livestock for home consumption.

29. Tighter application of price controls on food commodities in rural areas.

30. Increase monthly quotas for scarce rationed food commodities.

31. Make flour available at controlled prices.

32. Increase the number of food security projects.

33. Increase the availability of safe water supplies.

As indicated in Table 1, the suggestion favored by the highest percentage was the establishment of more retail cooperative society stores and the supplying of stores with ample quantities of meat, fish, and other food items. It is a better food distribution system that is wanted in the rural area rather than just more food, and the cooperative stores have better prices than the small grocer.

The second ranking suggestion was the building of mills to grind grain in the villages. Many villages do not have mills and need them.

The third in ranking among the suggestions was increasing the cottonseed cake quota for dairy and other cattle. There is a drastic shortage of cattle feed and this is reflected in this response.

The fourth in the ranking was to make improved seeds more readily available.

TABLE 1--continued.

Village	Suggestion											
	Land distribution	Flour mill	Fertilizer subsidies	Seeds	Drainage	Mechanization	Free market	Free fertilizer	Increase cottonseed meal quota	Improve veterinary care	Provide cattle	Distribute chicks
	13	14	15	16	17	18	19	20	21	22	23	24
1-1	0	.371	.057	.686	.029	.029	0	0	.029	0	.114	.171
1-2	0	.733	.467	0	0	0	0	0	.733	.200	.133	.067
1-3	0	.200	0	.520	.680	.080	0	0	.800	.120	0	0
1-4	0	.080	0	.640	.880	.280	0	0	.440	.040	0	.080
2-5	0	.333	.042	.208	0	.417	0	0	.583	0	.292	0
2-6	0	.581	.129	.258	0	.032	0	0	.194	0	0	.032
3-7	0	.810	.333	.476	.095	0	0	0	.905	0	.286	0
3-8	.071	.964	.464	.607	.071	.107	.036	.036	.071	0	.036	.071
4-9	0	.500	0	.100	.100	.700	0	0	.533	0	0	0
5-10	0	.933	0	0	0	0	0	0	.800	.067	0	0
Total	.071	5.505	1.492	3.495	1.855	1.645	.036	.036	5.088	.427	.861	.421

(Continued on next page.)

TABLE 1--continued.

Village	Suggestion									
	New cattle and cattle insurance	Animal and fish farms	More cooperative stores	Livestock and home consumption	Enforce price controls	Increase rations	More and cheaper flour	Obligatory quotas	Food security	Safe quota
	25	26	27	28	29	30	31	32	33	34
1-1	.086	0	.886	0	0	.114	0	0	0	0
1-2	0	.067	.800	.133	.467	.200	.200	0	0	0
1-3	0	.120	.240	0	.560	.120	0	0	.520	.040
1-4	.040	.080	.640	.240	.440	.480	0	0	.120	0
2-5	.083	0	.333	.375	0	0	0	0	0	0
2-6	.161	0	.452	.419	0	.483	0	0	0	.052
3-7	0	0	.905	.095	.667	0	0	0	0	0
3-8	.036	0	.821	.107	0	.036	0	0	.036	0
4-9	0	.033	.867	0	.733	.267	0	0	0	0
5-10	0	0	1.000	0	0	0	.200	0	0	0
Total	.406	.300	6.944	1.369	2.867	1.700	.400	0	.676	.072

The fifth ranking suggestion was the establishment of women's clubs and training girls and women. In the rural areas a very high percentage of the women are uneducated and illiterate.

The sixth was the suggestion that there be tighter application of price controls on food commodities in rural areas. Price controls are more strictly enforced in urban areas.

The seventh was the establishment of processing plants for agricultural products.

None of the other suggestions garnered as many as 2 percent of the total responses.

Results of a regression analysis (Table 2 and Appendix A) showed that the village in which the respondent resided was a significant influence on which measures were suggested in the case of suggestions concerning: (1) inputs and food prices for all 10 villages; (2) pest control in the case of Mazoura; (3) health services in the case of Balaaks; (4) the provision of chicks and calves for farmers to raise in the case of Damhoug; (5) the distribution of land from the reclaimed areas in the case of Balaaks; (6) the need for a flour mill in the case of Mazoura; (7) the establishment of food processing plants in the case of Mazoura; (8) the provision of more mechanical equipment in the case of Balaaks; (9) the establishment of women's clubs and the training of women in the case of Shenou, Damhoug, Kanteer, Balaaks, and Mazoura; (10) increasing farm prices in the case of Kamha and Shenou; (11) increased fertilizer subsidies in the case of Kamha, El-Salheia, and Balaaks; (12) making improved seeds more available in the case of Manshaat El-Gamal, Shenou, [illegible], Kanteer, El-Salheia, Balaaks, and Mazoura; (13) improving the

TABLE 2

Coefficients for Regressions on Villages: Farmers' Suggestions for Specific Measures to Increase Income[a]
(t values in parentheses for most significant coefficients of each equation)

Village	Suggestion						
	Vegetable cooperatives	Ind quotas	Forgive debts	Processing plants	Equipment	Women's clubs	Increase farm prices
	1	2	3	4	5	6	7
M. El-Gamal	- .222E - 17	.571E - 01	.253E - 17	.171	- .463E - 17	- .133	.395E - 17
Kamha	- .226E - 17	.667E - 01	.267 (5.73)***	.200 (2.19)**	- .452E - 17	.200	.133 (2.12)**
Shenou	- .206E - 17	.400E - 01	.261E - 17	.280 (4.68)***	- .489E - 17	.427 (3.80)***	.120 (2.14)**
El-Arimon	- .206E - 17	.240 (3.18)***	.275E - 17	.600	- .431E - 17	- .933E - 01	.415E - 17
Damhoug	.042 (1.99)**	- .696E - 17	.275E - 17	.833E - 01	.417E - 01 (1.17)	- .533 (-4.71)***	.395E - 17
Kanteer	- .209E - 17	.645E - 01	.251E - 17	.226	- .465E - 17	- .533 (-4.93)***	.349E - 17
El-Salheia	- .180E - 17	.143	.476E - 01	- .155E - 16	- .473E - 17	.276 (2.38)**	.472E - 17
Balaks	- .219E - 17	- .531E - 17	.265E - 17	.250	.714E - 01 (2.06)**	- .498 (-4.52)***	.334E - 17
Mazoura	- .208E - 17	- .555E - 17	.278E - 17	.267 (2.15)**	- .416E - 17	- .467 (-4.29)***	.100 (1.84)*
Intercept	.210E - 17	.669E - 17	- .215E - 17	.191E - 16	.462E - 17	.533	- .412E - 17
Proportion suggesting measure (all villages)	.004	.060	.020	.221	.012	.353	.032

(Continued on next page.)

TABLE 2--continued

Village	Suggestion: Reduce taxes	Input and food price	Pest control	Health services	Chicks and calves	Land distribution	Flour mill
	8	9	10	11	12	13	14
M. El-Gamal	- .571E - 01 (1.70)*	- .733 (-9.98)***	.157E - 16	.286E - 01	.286E - 01	- .157E - 17	- .562 (-4.11)***
Kamha	- .348E - 18	- .600 (-6.90)***	.133	.133 (1.72)*	- .318E - 17	- .153E - 17	- .200
Shenou	.400E - 01	- .733 (-9.43)***	.167E - 16	- .538E - 17	- .345E - 17	- .172E - 17	- .733 (-5.07)***
El-Arimon	- .549E - 18	- .733 (-9.43)***	.160 (2.16)**	- .631E - 17	- .337E - 17	- .146E - 17	- .453 (-3.13)***
Damhoug	- .514E - 18	- .733 (9.36)***	.150E - 16	- .483E - 17	.125 (2.53)**	- .219E - 17	- .600 (-4.12)***
Kanteer	- .393E - 18	- .669 (-8.93)***	.132E - 16	.323E - 01	- .323E - 17	- .173E - 17	- .352 (-2.53)**
El-Salheia	- .425E - 18	- .733 (-9.11)***	.154E - 16	- .344E - 17	.952E - 01 (1.87)*	- .129E - 17	- .124
Balaks	.000	- .233 (-3.06)***	.134E - 16	.321 (4.74)***	- .265E - 17	.714E - 01 (2.53)**	.310E - 01
Mazoura	.000	- .733 (-9.74)***	.600 (8.37)***	.333E - 01	- .278E - 17	- .139E - 17	- .433 (-3.09)***
Intercept	.406E - 18	.733	- .156E - 16	.542E - 17	.324E - 17	.169E - 17	.933
Proportion suggesting measure (all villages)	.012	.116	.096	.056	.024	.008	.562

(Continued on next page.)

TABLE 2--continued.

Village	Suggestion						
	Fertilizer subsidies	Seeds	Drainage	Mechanization	Free market	Free fertilizer	Increase cotton-seed meal quota
	15	16	17	18	19	20	21
M. El-Gamal	.571E - 01	.686 (5.34)***	.286E - 01	.286E - 01	- .787E - 18	- .787E - 18	- .771 (-6.25)***
Kamha	.467 (4.24)***	- .288E - 16	- .186E - 17	- .255E - 16	- .766E - 18	- .766E - 18	- .667E - 01
Shenou	- .153E - 16	.520 (3.83)***	.680 (8.20)***	.800E - 01	- .858E - 18	- .858E - 18	.957E - 16
El-Arimon	- .122E - 16	.640 (4.71)***	.880 (10.61)***	.28 (2.73)***	- .728E - 18	- .728E - 18	- .360 (-2.75)***
Damhoug	.417E - 01	.208	- .280E - 17	.417 (4.03)***	- .110E - 17	- .110E - 17	- .217 (-1.65)*
Kanteer	.129	.258 (1.97)**	- .359E - 18	.323E - 01	- .863E - 18	- .863E - 18	- .606 (-4.82)***
El-Salheia	.333 (3.27)***	.476 (3.39)***	.952E - 01	- .258E - 16	- .644E - 18	- .644E - 18	.105
Balaks	.464 (4.82)***	.607 (4.56)***	.714E - 01	.107	.357E - 01 (1.76)*	.357E - 01 (1.76)*	- .729 (-5.69)***
Mazoura	- .111E - 16	1.000 (7.60)***	.100	.700 (7.04)***	- .694E - 18	.694E - 18	- .267 (-2.11)**
Intercept	.135	.226E - 16	.672E - 17	.226E - 16	.843E - 18	.843E - 18	.800
Proportion suggesting measure (all villages)	.137	.494	.189	.181	.004	.004	.450

(Continued on next page.)

TABLE 2--continued.

Village	Suggestion						
	Improve veterinary care	Provide cattle	Distribute chicks	New cattle and cattle insurance	Animal and fish farms	More cooperative stores	Livestock and home consumption
	22	23	24	25	26	27	28
M. El-Gamal	- .667E - 01	.114	.171 (2.64)***	.857E - 01	- .237E - 18	- .857E - 01	- .351E - 16
Kamha	.133 (2.14)**	.133	.667E - 01	- .813E - 17	.667E - 01	- .200	.133
Shenou	.533E - 01	- .553E - 17	- .352E - 17	- .928E - 17	.120 (2.25)**	- .760 (-5.85)***	- .319E - 16
El-Arimon	- .267E - 01	- .750E - 17	.800E - 01 (1.16)	.400E - 01	.800E - 01	- .360 (-2.77)***	.240 (2.32)**
Damhoug	- .667E - 01	.292 (3.48)***	- .406E - 17	.833E - 01	.628E - 18	- .667 (-5.09)***	.375 (3.60)***
Kanteer	- .667E - 01	- .719E - 17	.323E - 01	.161 (2.42)**	.480E - 19	- .548 (-4.38)***	.419 (4.21)***
El-Salheia	- .667E - 01	.286 (3.32)***	- .344E - 17	- .967E - 17	.215E - 18	- .095	.952E - 01
Balaks	- .667E - 01	.357E - 01	.714E - 01	.357E - 01	.000	- .179	.107
Mazoura	- .667E - 01	- .555E - 17	- .278E - 17	- .833E - 17	.333E - 01	- .133	- .333E - 16
Intercept	.667E - 01	.848E - 17	.337E - 17	.946E - 17	.108E - 18	1.000	.324E - 16
Proportion suggesting measure (all villages)	.032	.080	.048	.048	.028	.687	.141

(Continued on next page.)

TABLE 2--continued.

Village	Suggestion					
	Enforce price controls	Increase rations	More and cheaper flour	Obligatory quotas	Food security	Safe quota
	29	30	31	32	33	34
M. El-Gamal	- .323E - 16	.114	- .200 (-4.57)***			.831E - 17
Kamha	- .467 (3.83)***	.200	.316E - 16			.102E - 16
Shenou	.560 (5.14)***	.120	- .200 (-4.32)***			.520 (7.85)***
El-Arimon	.440 (4.04)***	.480 (4.19)***	- .200 (-4.32)***			.120 (1.81)*
Damhoug	- .264E - 16	- .309E - 16	- .200 (-4.29)***			.103E - 17
Kanteer	- .316E - 16	.484 (4.39)***	- .200 (-4.49)***			.973E - 17
El-Salheia	.667 (5.91)***	- .284E - 16	- .200 (-4.17)***			.114E - 16
Balaks	- .401E - 16	.357E - 01	- .200 (-4.41)***			.357E - 01
Mazoura	.733 (6.95)***	.267 (2.40)**	- .200 (-4.46)***			.111E - 16
Intercept	.382E - 16	.321E - 16	.200			- .806E - 17
Proportion suggesting measure (all villages)	.273	.185	.024		.000	.068

[a]Each column refers to a regression equation with the suggestion that a dummy-dependent variable equals one, when mentioned by a farmer, and zero when not. The villages are dummy independent variables; thus, the regressions measure the influence of the villages on the suggestions by farmers for ways to improve nutritional levels.

*Significant at the .10 level. **Significant at the .05 level. ***Significant at the .01 level.

Source: Ministry of Agriculture, Arab Republic of Egypt, Farm Household Survey, 1981-1982.

drainage system in the case of Shenou and El-Arimon; (14) increasing mechanization in the case of El-Arimon, Kanteer, and Mazoura; (15) providing more cattle feed (cottonseed cakes) in the case of Manshaat-El-Gamal, El-Arimon, Kanteer, Balaaks, and Mazoura; (16) providing Frezian cattle in the case of Damhoug; (17) providing chicks for raising in the case of Manshaat El-Gamal; (18) providing cattle insurance in the case of Kanteer; (19) establishing animal and fish farms in the case of Shenou; (20) the establishment of cooperative stores with available food stocks in the case of Shenou, El-Arimon, Damhoug and Kanteer; (21) encouraging the breeding of livestock for home consumption in the case of El-Arimon, Damhoug, and Kanteer; (22) enforcing price controls in the case of Kamha, Shenou, El-Arimon, El-Salheia, and Mazoura; (23) increasing monthly quotas for rationed foods in the case of El-Arimon, Kanteer, and Mazoura; (24) making flour available at controlled prices in the case of all 10 villages; and (25) increasing the availability of safe water supplies in the case of Shenou.

The villages from which a significant percentage of the suggestions come are the villages in which these problems are felt.

We, also, did a cluster analysis to ascertain if there were differences between different regional groups and different income groups (Appendix 2). We divided the sample into five clusters corresponding to the five regions in which the villages are located and calculated whether the differences between the means was significant. They were not. Villages, not regions, make a difference in which suggestions are proffered.

In conclusion, it appears farmers approve of the present system with its input and food subsidies. They simply want more access to retail food [illegible], more cattle feed and improved seeds (areas in which there are

shortages), convenient mills and processing plants, the enforcement of price controls in rural areas, and training and education for women. What they are saying is that the present agricultural and food price policies should be better implemented, rural development (the establishment of mills and processing plants) should proceed at a more rapid pace, and the educational system for women improved. The conditions in the particular villages are a significant influence on the suggestions emanating from each village.

FOOTNOTES

[1]Afaf Abdel Aziz Mohamed and Mohamed Abdel Razik El-Shennawy, "The Selection of the Sample For the Food Consumption Activity Survey of 1981-82," Agricultural Development Systems: Egypt Project, Economics Working Paper Series No. 88. University of California, Davis (August, 1982). The survey procedures are described in Mohamed A. El-Shennawy, "Seminar on Food Consumption and Economic Development in Rural Communities," Agricultural Development Systems: Egypt Project. Economics Working Paper Series No. 61. University of California, Davis (September 1982).

[2]See Robert E. Kauffman, "The Open-Ended and Closed Question: Some Basic Considerations," New Scholar, Vol. 2, No. 1 (Spring, 1970), pp. 101-118. The conclusion from this study was the open-ended question may be the most useful for discovery.

APPENDIX A

Regression Analysis of Farmers' Suggestions of Measures to Improve Income, Production, and Nutritional Levels

A regression analysis was performed to determine the influence of individual villages on suggestions to improve income, production, and nutritional levels. Dummy variables with values of 0 or 1 were used. The dependent variable was the particular suggestion, and the independent variables were the first nine villages excluding El Haradna. To include all 10 villages would have caused a statistical problem, i.e., linear dependence, which is explained below.

We have the following form for the regression equations:

$$A_i = a_0 + a_{1i}V_1 + a_{2i}V_2 + a_{3i}V_3 + a_{4i}V_4 + a_{5i}V_5 + a_{6i}V_6 + a_{7i}V_7 + a_{8i}V_8 + a_{9i}V_9,$$

where A_i represents suggestion $\underline{i}$ (a total of 33) and V_1 through V_9 represent the first nine villages. There are a total of 249 observations (farmers interviewed) in the data set. One regression equation was estimated for each suggestion. When the farmer mentions a particular suggestion i, A_i takes a value of 1; otherwise, the value is 0. The variable V, corresponding to the village in which the farmer resides, takes a value of 1; the other Vs are 0. Thus, for any given suggestion, we are estimating a regression based on 249 observations, and both the dependent and independent variables have values of 0 or 1.

Once the values of V_1 through V_9 have been determined, we automatically know the value of V_{10}. If one of the first nine Vs is 1, the tenth must be 0 (i.e., the observation cannot be from village 10). Alternatively, if all nine

Vs are 0, the tenth must be equal to 1. It is for this reason that we include only the first nine villages in the regression equation.

The regression coefficients may be explained best as showing the deviations of the nine individual villages from the tenth in terms of the proportion of farmers giving a particular suggestion. As with almost any statistical analysis of an empirical relationship, there is not a perfect fit. Nevertheless, many of the regression coefficients were statistically highly significant (see Table 2).

APPENDIX B

Cluster Analysis of Farmers' Suggestions of Measures to Improve Income, Production, and Nutritional Levels

A cluster analysis was performed to determine which villages were similar in their responses to questions concerning measures to increase income, production, and nutritional levels. The procedure for the analysis was to calculate the proportion of the surveyed farmers in each village who suggested a particular measure. The proportion varied from 0 to 1. A total of 34 suggestions was made, and these comprised the characteristics of each of the 10 villages (observations). Through cluster analysis, it was possible to group the villages according to the similarity in their responses. The computer program utilized groups in the n (in this case, 10) observations into one to n clusters. Obviously, when there is only one cluster, all observations belong to it; when there are n clusters, each observation forms a separate group. The computer program provides additional information for a prespecified number of clusters. We chose the number five--identical to the number of regions in the survey. If the region to which a village belongs were an important determinant of the suggestions of its farmers, we would expect the villages to form five groups along regional lines. In fact, as we shall see, this was not the case.

Cluster analysis involves creating a vector (column) for each observation in which the numbers in the vector represent the values of the characteristics of that observation. In the present case, we refer to our data by the symbol X_i^j, the proportion of farmers in village i who made suggestion j. Because we have 10 villages and 33 suggestions, our data may be visualized in the following manner:

$$\begin{bmatrix} X_1^1 \\ X_1^2 \\ \vdots \\ X_1^{33} \end{bmatrix} \quad \begin{bmatrix} X_2^1 \\ X_2^2 \\ \vdots \\ X_2^{33} \end{bmatrix} \quad \cdots \quad \begin{bmatrix} X_{10}^1 \\ X_{10}^2 \\ \vdots \\ X_{10}^{33} \end{bmatrix} .$$

Let us call the vector corresponding to village i, X_i. The distance between any two vectors (say, X_3 and X_6) is then defined as $(X_3 - X_6)^1 (X_3 - X_6)$, where we are using element-by-element subtraction and then vector multiplication.

To illustrate further, we have:

$$\underset{1 \times 33}{\begin{bmatrix} X_3^1 - X_6^1 & X_3^2 - X_6^2 & \cdots & X_3^{33} - X_6^{33} \end{bmatrix}} \quad \underset{33 \times 1}{\begin{bmatrix} X_3^1 - X_6^1 \\ X_3^2 - X_6^2 \\ \vdots \\ X_3^{33} - X_6^{33} \end{bmatrix}}$$

$$= (X_3^1 - X_6^1)^2 + (X_3^2 - X_6^2)^2 + \cdots (X_3^{33} - X_6^{33})^2.$$

The product of a 1 x 33 vector multiplied by a 33 x 1 vector is a scalar (a single number).

The cluster-analysis program calculates a distance for each pairing of villages. From probability theory, the number of pairs possible from n observations is:

$$\frac{n\,!}{(n-2)\,!\,2\,!} = \frac{n(n-1)}{2}.$$

If n = 10, there are 45 pairs whose distances must be calculated. The criterion for clustering is that the observations with the shortest distance between them should be together. If we are dealing with only two observations and two clusters, the vector and cluster distances are synonymous. However, if we have more than two observations and two or more clusters, the distance between the clusters is defined as the maximum distance between an observation in one group and an observation in another group.

Appendix table B1 lists the percentage of farmers in each village who offer the different suggestions for increasing income, production, and nutritional levels. This is the information used to group the villages in clusters. A graphical representation of the cluster analysis results is found in Appendix figures B1 through B4. There is one diagram for all questions combined and one for each of the three types of questions. The numbers across the top of the chart refer to villages, and the numbers on the side are the numbers of clusters. When two or more villages are joined by printed stars, it means that they are similar enough to be considered in the same group, given the number of clusters indicated. The mean distance between the clusters appears in Appendix table B2.

Referring to all suggestions combined and using as a reference point the first village to appear on the left-hand side of the chart, as we move farther to the right, the villages are increasingly different in their responses. Thus, village 2 (Kamha) is the village that stands out the most in its answers.

As mentioned previously, an issue that interested us considerably was whether dividing the villages into five groups would give a rough correspondence with the regions. Even a cursory glance at the results indicates that this was not the case. Villages within a given region were far from

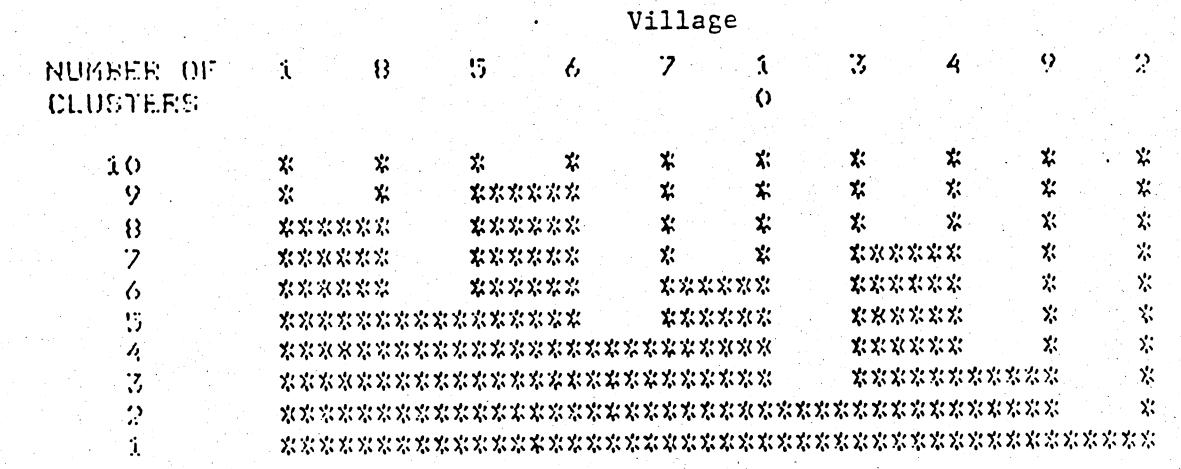
homogeneous. Taking all 33 suggestions combined, neighbors Manshaat El-Gamal and Kamha (Region I) displayed the greatest difference of any pair of villages. Only in the cases of Shenou and El-Arimon (Region I) and Damhoug and Kanteer (Region II) were two villages from the same region side-by-side.

Looking at only the suggestions on measures to increase income, Shenou and El-Arimon are still together as are Damhoug and Kanteer. The same phenomenon occurs with suggestions to improve output and nutritional levels. In no case do Manshaat El-Gamal and Kamha (Region I) or El-Salheia and Balaaks (Region III) appear together. However, the two region I villages mentioned are consider- ably closer in their suggestions for measures to improve nutritional levels than for the other suggestions.

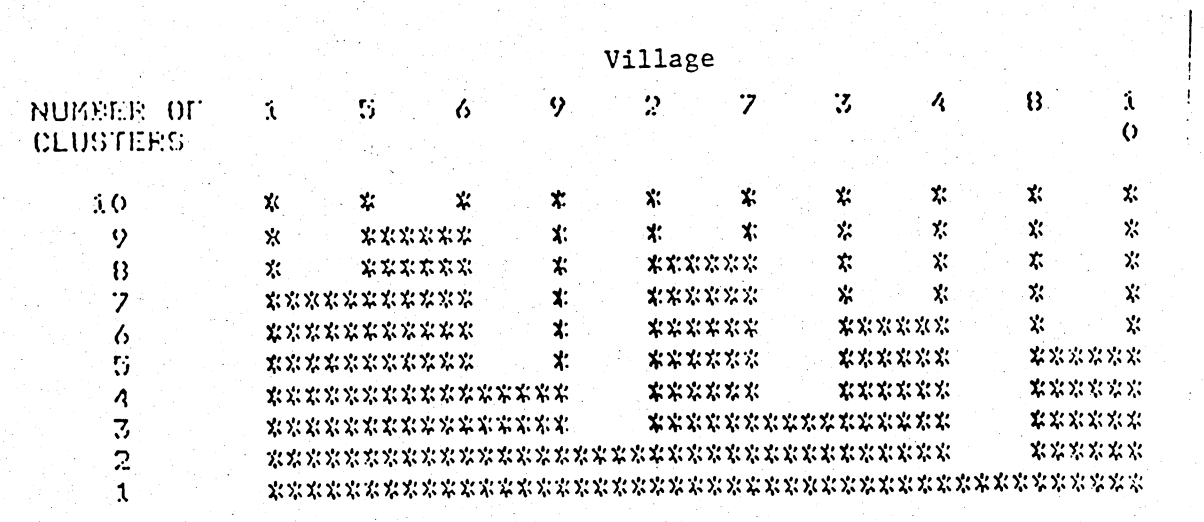
APPENDIX TABLE B1

Placing of Villages Into Five Regions According to Suggestions Made for Improving Production, Income, and Nutritional Levels, and as Determined by Cluster Analysis

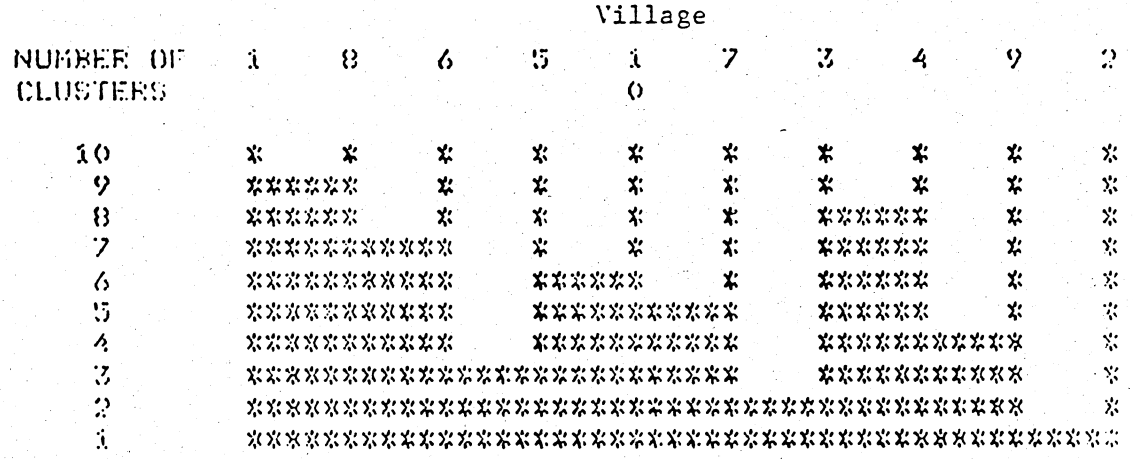
Region					Region				
I	II	III	IV	V	I	II	III	IV	V
All Suggestions					**Suggestions to Improve Production**				
M. El-Gamal	El-Salheia	Shenou	Mazoura	Kamha	M. El-Gamal	Damhoug	Shenou	Mazoura	Kamha
Balaks	El-Haradna	El-Arimon			Balaks	El-Haradna	El-Arimon		
Damhoug					Kanteer	El-Salheia			
Kanteer									
Suggestions to Improve Income Levels					**Suggestions to Improve Nutritional Levels**				
M. El-Gamal	Mazoura	Kamha	Shenou	Balaks	M. El-Gamal	Kamha	El-Arimon	Shenou	Damhoug
Damhoug		El-Salheia	El-Arimon	El-Haradna	Balaks	El-Salheia			Kanteer
Kanteer					El-Haradna	Mazoura			



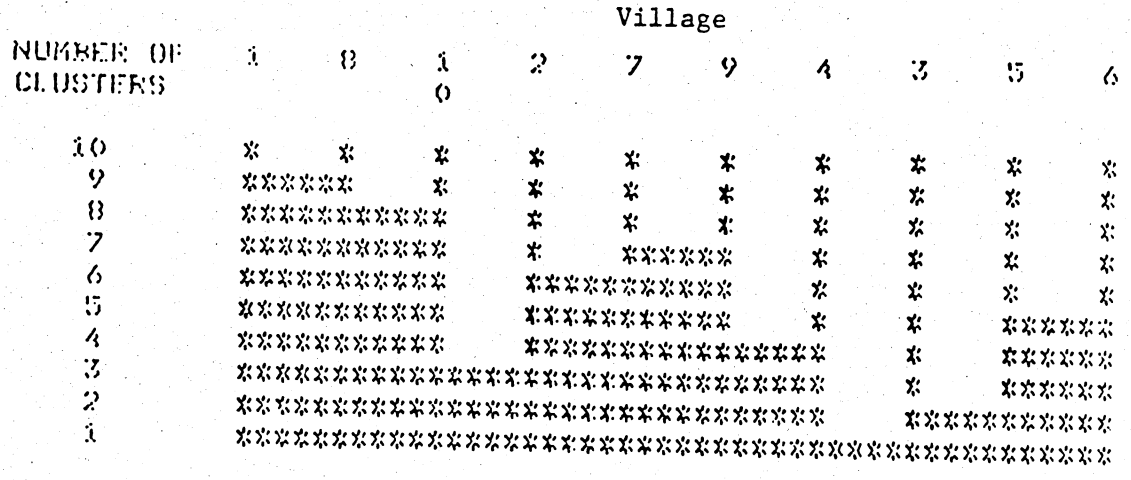
Appendix Figure B1. All suggestions.



Appendix Figure B2. Income.



Appendix Figure B3. Production.



Appendix Figure B4. Nutritional levels.

APPENDIX TABLE B2

Mean Distances Between Clusters

Region[a]	Village 1	2	3	4	5
All Suggestions					
I	0	2.129	2.636	2.304	5.863
II	2.129	0	2.892	2.966	4.772
III	2.636	2.892	0	2.446	6.037
IV	2.304	2.966	2.446	0	6.744
V	5.863	4.772	6.037	6.744	0
Suggestions for Increasing Income					
I	0	.454	.675	.681	.851
II	.454	0	.974	.971	1.157
III	.675	.974	0	.721	.796
IV	.681	.971	.721	0	1.601
V	.851	1.157	.796	1.601	0

Region	Village 1	2	3	4	5
Suggestions for Increasing Production					
I	0	.796	1.066	.992	4.841
II	.796	0	.973	1.163	4.254
III	1.066	.973	0	.990	4.974
IV	.992	1.163	.990	0	5.781
V	4.841	4.254	4.974	5.781	0
Suggestions for Improving Nutritional Levels					
I	0	.461	.525	1.042	.514
II	.461	0	.271	.708	.821
III	.525	.271	0	.523	.414
IV	1.042	.708	.523	0	.843
V	.514	.821	.414	.843	0

[a]The distance between regions IV and I is an anomaly. Group IV consists of only one village with many 0 observations.