THE EGYPTIAN FARMING PRACTICES TECHNOLOGICAL DEVELOPMENT AND ITS DETERMINANTS

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ABSTRACT:

Tendency toward application of advanced technology in farming practices has been accelerated in Egypt since the mid Seventies of the last century. Both domestic technology generation and foreign technology transfer were encouraged. High-quality cultivars, mechanized farming operations, and modern agricultural systems, such as protected agriculture and organic farming were strongly introduced. As such, this study tended to assess the Egyptian experience in farming modernization, areas of success, points of weakness and drawbacks, determinants and measures of improvement. Based on field data, the study revealed a generally low percent of modern techniques adoption, especially for costly innovations or integrated technological packages, dropping to nearly 2% of total farmers. Agricultural infrastructure unfavorable conditions withheld a great deal of the modernized practices benefits. Governmental support, both extensional and financial, is vitally required to enable expansion of convenient modern farming practices and maximize the benefits fulfilled.

Although foreign technology transfer and domestic research have been accelerated since the mid seventies of the last century, modernization of the Egyptian farming practices is extremely slow. Capital shortage, poor extension, lack of coordination, conflicts and overlap among introduced techniques and dominant infrastructure problems are the main factors hindering development. The government should carry on with programs of agricultural infrastructure improvement and pay more coordination efforts to overcome farmers' confusion with respect to choice of the most appropriate technologies.

INTRODUCTION:

Till the mid seventies, the Egyptian agriculture was experiencing under governmental intervention a slow but monotonic progress in production. Foreign technology transfer was hardly active, and domestic research suffered short funding. But with adoption of the Open-door economic policies in the mid seventies foreign technology transfer was accelerated and bilateral research projects financed by international corps were activated. A flow of research findings was received by farmers. Remarkable yields improvement was achieved for many major crops and pest control advantaged many successful cases. Nevertheless, achievements were far below aspirations. And despite scattered areas of success, overall sustainable development is still far from reach.

In view of these respects, the study tends to explore the prevailing conditions of technological advancement in Egyptian farming practices, investigate its determinants and suggest measures of treatment for the hindering conditions.

METHODOLOGY:

The study reviews and monitors development of farming practices determining the status of modernization. Analyzed data is derived from a farmers' field survey in several rural regions subject to active actions of technology transfer. Methods of analysis included "t" and "F" statistical tests for group comparison beside criteria of economic efficiency, e.g. net revenues and benefit-cost ratios, whenever applicable.

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RESULTS:

The present situation of farming practices technological development:

Despite the waves of technology transfer flowing since the mid seventies, farmers' positive response is far below targets. Fig.(1) shows percentages of adoption for various innovations in production of certain major crops in different production regions. As shown in fig.(1-b), laser land leveling, as a sophisticated technique, was adopted by a maximum of 15.5% of either wheat or cotton growers in "Almenia" governorate, dropping to a range of 2-7% of producers of the same crops in other regions. As for mechanized harvest, fig(1-d) shows that users reached one third of wheat producers in "Dakahlia" governorate, dropping to nearly 17% of producers in "Fayoum" and no more than 1-3% in other areas, while users of rice producers in "Dakahlia" mounted up to almost 72%. The situation seems worse for implementation of integrated technological packages. As examples, percent of users of deep plough plus laser leveling fell in range of 2-5%of producers of either wheat, maize or cotton, and was no more than 3% for a package of laser leveling, ammonium injection and gypsum soil enrichment.

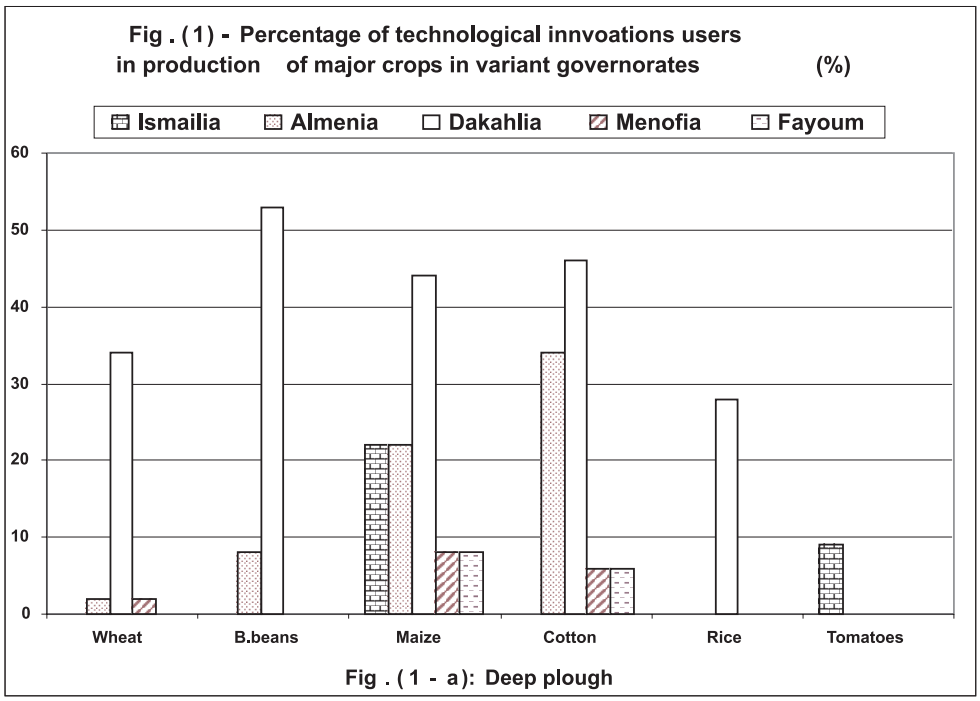

Fig . (1 - a): Deep plough

Yields and revenues response to innovations adoption:

As for yield improvement, actual implementation rendered results far below the experimental accomplishments which advantaged controlled conditions. Most of the realized improvement, reaching a maximum of 40% in some areas, was found due to the new cultivars adopted, while other innovations were responsible for only 4-12% of increase. That is where experimental improvement results due to innovations other than new cultivars reached an average of 20%.

As for financial evaluation, a general remarkable profitability rise was revealed in many cases, especially for integrated technological packages. However, profits dropped in some cases with specific techniques, especially the most expensive. As presented in fig.(2), innovations

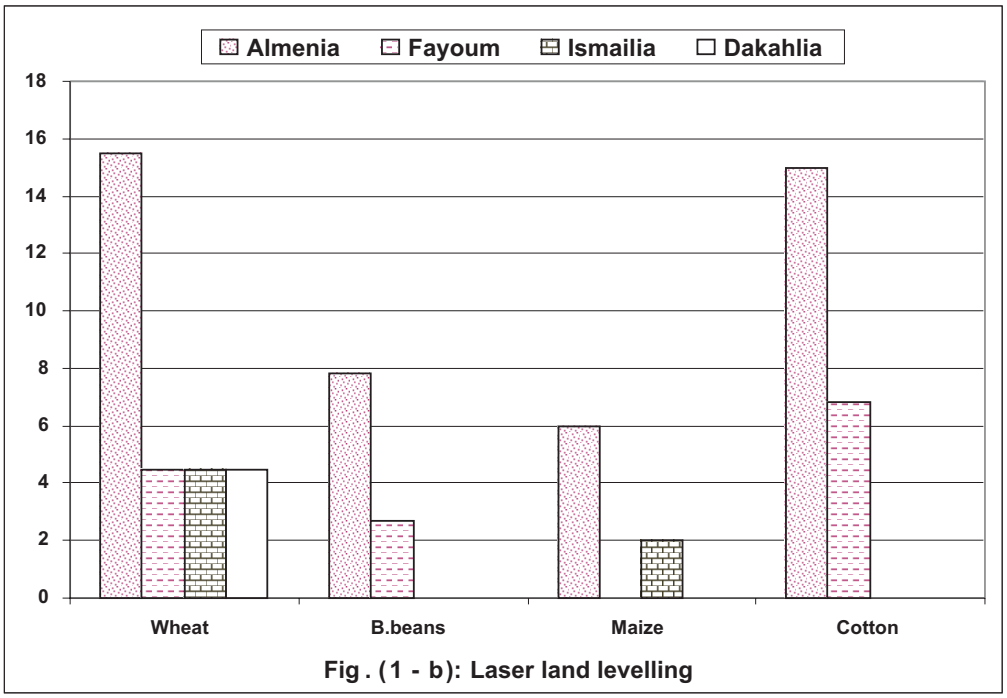

Fig . (1 - b): Laser land levelling

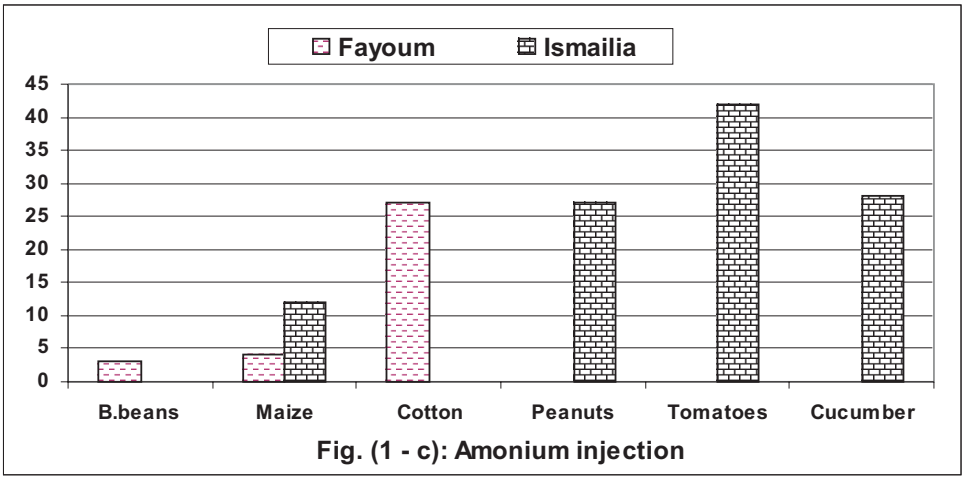

Fig. (1 - c): Amonium injection

seemed greatly fruitful for wheat production as the benefit-cost ratio more than doubled when adopting a package of tile drainage, laser leveling, mechanical ridging and ammonium injection in "Fayoum" governorate. On the other hand, a slight profit drop occurred when applying deep plough and ridging for maize, and tile drainage plus ammonium injection for cotton. But higher profits were restored when adding tile drainage to the first and laser leveling to he second. Moreover, regions variant conditions seemed influential, as cases of success in a particular region were reversed in another. As example, cotton profitability improved in both "Almenia" and "Fayoum" when applying either deep plough, laser leveling, tile drainage, ammonium injection or a mix of some while the opposite occurred for "Dakahlia" governorate.

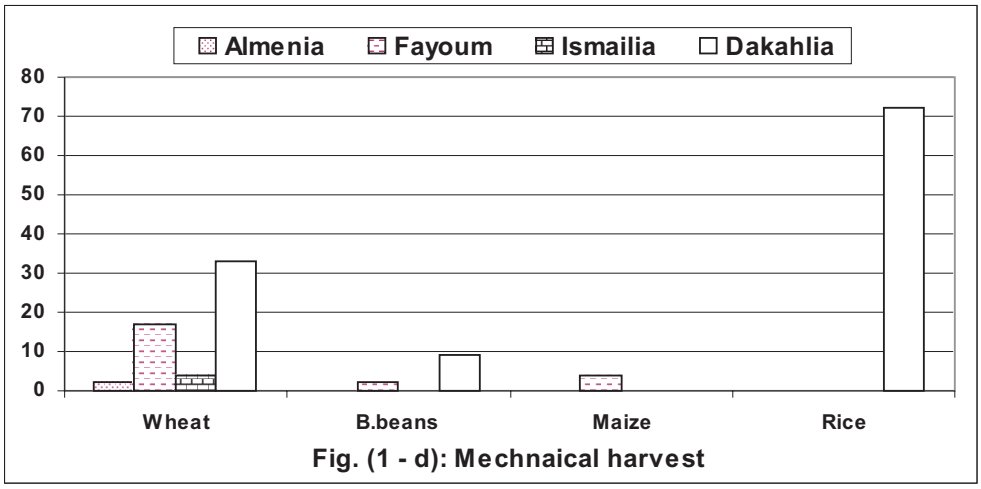

Fig. (1 - d): Mechnaical harvest

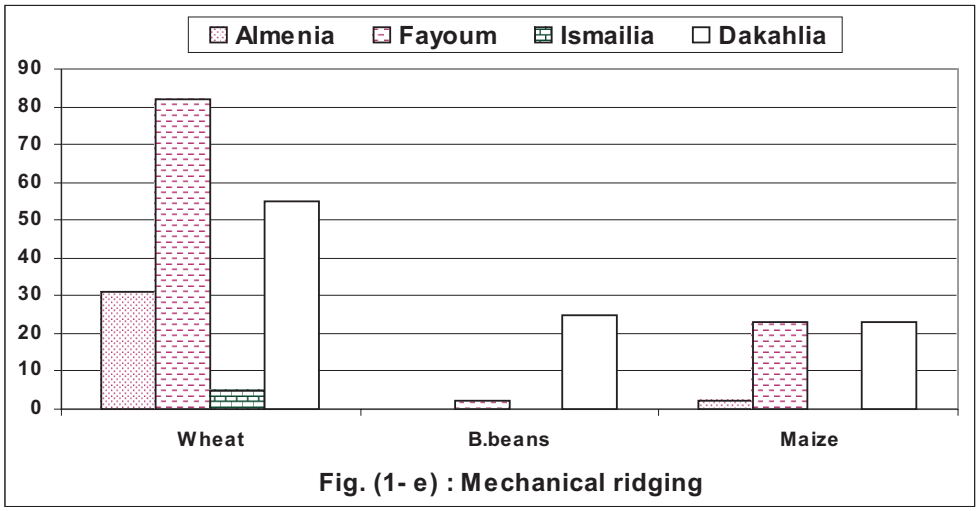

Fig. (1- e) : Mechanical ridging

Influential factors of technological development:

Doubtless, farmers' response toward innovations entirely depends on the effectiveness of such innovations in fulfillment of their targets, i.e. profit maximization and/or cost minimization. Effectiveness in turn is influenced by several factors beside the innovation quality, which are environmental, methods and efficiency of presentation, and the farmer's socioeconomic characteristics.

Environmental conditions: variant results observed among different regions, and even different farmers, were mostly due to variant conditions of the agricultural environment or infrastructure. Problems of salinity and high water table characterized most farmers who experienced less fruitful application of new technologies. Treatment of such infrastructure problems should precede farming practices development in order to attain the potential positive impacts.

Extension and technology transfer efficiency: present extension seems inefficient in confronting the farmers' confusion with respect to choice among competing and contradictive

technologies. Farmers lack the bases of selection as facing a wide range of varieties, kinds of fertilizers or pesticides and machinery. Competition between promoters of different brands of requisites, lack of coordination among research institutions and the passive role of the major extension corps affiliating to the ministry of agriculture are the main causes of such problem.

Farmers' socioeconomic characteristics: in addition to the farmer's economic status, mostly indicated by the size of his landholding, his education level, age and family size influence innovations adoption in some cases, but obscured by dominant economic conditions. In general, the financial ability enables the farmer to bear risk and adopt expensive sophisticated technological packages. For example, despite governmental aid, most of laser leveling users were relatively big landholders. On the other hand, the education impact was detected in cases of integrated packages adoption in production of wheat, tomatoes, sunflower and broad beans, as all the randomly selected producers of the sample were holders of at least high school degree. Controversial impacts were observed for the farmer's family size. Where small families were expected to adopt labor saving techniques to minimize costs of hired labor, large composite families, who were mostly big landholders, were able to adopt modern mechanized techniques, which are also labor saving. Likewise, the farmer's age impact was disturbed by interference of other factors. While young farmers were more responsive to new technologies, elder farmers were ready to accept such technologies if accompanied with financial support, or if they were big landholders. On the other hand, young farmers of no education were poorly responsive to new techniques, especially whenever skills development training was required. Accordingly, economic conditions seem to have the upper hand in area of modern techniques' adoption, obscuring as such impacts of other socioeconomic characteristics with exception of the level of education.

CONCLUSIONS:

In view of the earlier respects, it can be concluded that modernization of the Egyptian farming practices is partly affected by farmers' socioeconomic conditions but mostly governed by capital resources, extension efficiency and agricultural infrastructure status. Accordingly, the prevalent low response toward modern techniques may be remarkably treated through dealing with these influential factors. The government's role is highly required in this respect. That is where the government only can provide small farmers with subsidized interest credit to meet their financial problems. Likewise, only the government is expected to deal with the infrastructure and other environmental problems. Finally, the government should assume a coordination role and provide at minimum cost consistent extension, directing the farmers to the most appropriate methods of production and effective technological packages, taking into consideration that farmers of poor financial resources mostly prefer cost minimization rather than profit maximization techniques.

SUMMARY:

The study revealed the relatively low rates of adoption for modern farming practices of which introduction has been accelerated since the mid seventies of the last century. The major causes are most likely short capital characterizing about 90% of the Egyptian farmers, impotent extension service unable to alleviate the farmers' confusion with respect to selection among the wide range of variant suggested techniques, and finally the infrastructure problems offsetting a great part of the implementation potential gains. Impacts of other factors, such as the farmer's age or family size were obscured by influence of the said major factors, leaving a small limited part for the impact of the farmer's level of education. Subsequently, the fulfilled benefits, though promising, were subject to instability, and hence, discouraging adoption expansion. The remedy relies heavily on the government's shoulders.

Only the government may provide farmers with low interest credit to encourage adoption of costly techniques. Likewise, solid efficient extension leading the farmers to the best choices among competing techniques or kinds of requisites requires the government's resources and authority. Finally, the government alone is responsible for agricultural infrastructure maintenance, or is at least able to meet its massive costs.

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