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By-Walker, W. Hugh

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The arid areas of the world, especially the Middle East and North Africa, need to develop an educational system that is attuned to the needs of the people in order to improve human and institutional competencies required to solve social and economic problems. Since arid areas have special characteristics, it is necessary to find applicable solutions. For example, many of these countries have many villages that are isolated from urban centers. Teachers, who usually want to work and live in the cities, have no desire to go to isolated areas. Therefore, radio could be used as an effective instrument, especially for adult education. In the field of institutions, 2-year technical institutes are more practical in developing countries than 4-year schools. More engineers are not needed, but rather more technicians to apply the theories. Agriculture will be the base for many years to come for most of the arid areas. Consequently, agricultural and vocational schools that teach practical skills are greatly needed. It is not enough to simply have the knowledge available, instead it is the useful application of knowledge that is important. (RH)

ORGANIZING FOR EDUCATION

W. Hugh Walker
The Ford Foundation
P.O. Box 2379
Beirut, Lebanon

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Organizing for Education

In addressing this conference on the subject of Organizing for Education, I want to emphasize that I am not a professional in the field of education and my remarks will be based primarily on my experience with educational systems and institutions in the Middle East and North Africa. I would also point out that I do not pretend to be an authority even on these systems, much less those of the arid world. However, by both direct and associated relationship with a number of the educational programs, systems and institutions of the area, I have developed certain concerns and ideas which I would like to share with you. I say this because I do not pretend to have the solution to many of these problems and I know that much work remains to be done if education is to make its maximum impact on the rapidly changing world.

The most important natural resource of any country is its people. The basic objective of any educational system ought to be the improvement of the human and institutional competence required to deal effectively and realistically with emerging social and economic problems of the society. A system of education, properly attuned to the needs and aspirations of a people, can be the most potent instrument

for development. A system that is not based on the needs of the society can, and likely will, be a major impediment to progress. The world today, with its rapidly expanding population, needs to and, in fact, must exploit to the fullest extent possible the resources of the arid areas.

Throughout history man has both adapted his way of life to his environment and adapted the environment to his needs. Within the extremes of his environment he has developed various patterns of life which have required constant adjustments to social and economic pressures. For example, while education in its formal sense was unknown, a primary objective of the nomadic people of Arabia was to give their children a knowledge of the desert and the society to which they belonged. At an early age, they thus become productive and constructive elements within their family and tribal groups. This primitive and informal educational system permitted children to experiment freely with the nature of their environment and to observe the role of each member of the society around them. Through this process they learned how to survive in the physical environment and adjusted naturally to the prevailing social and cultural relationships. In the world of today we not only continue to face the problem of helping man to adjust to his physical environment, but also to a very complex

world society. No corner of the world has escaped the shadow of the jet airplane; man-made satellites appear as newborn stars in the twilight on the desert. Rapid developments in communications, especially since World War II, have given even the remotest areas direct access to international events. Man is no longer a captive of isolation, and his concern for change is increasing with the passing of each day.

If education is in fact man's most effective instrument for change, the problem of establishing educational objectives and programs, which are consistent with nationally accepted political, economic and social goals, is common to all areas of the world regardless of the physical or climatic conditions. However, for education to be an effective avenue for change, it must provide man with a better understanding and appreciation of the environment and of the economic and social structure in which he lives. It must provide a systematic and continuous evaluation and understanding of physical, climatic, economic, social and cultural conditions if there is to be an orderly and effective application of present day technology.

Recent history has shown that there is no substitute for social and economic progress. In a number of the so-called developing countries,

attempts have been made to substitute large physical projects, with delayed economic and social returns, for more basic, and in many ways more difficult, programs in agriculture and education. In most instances these attempts have failed to capture public support and have either led to political change or to a rapid shift of investment emphasis into programs of more direct benefit to the people. It has also become clear that financial resources, industrialization and sophisticated development plans in and of themselves are not enough to promote development or, in fact, to satisfy economic and social pressures. The critical component in the modernization process is a hard corps of professionally trained men and women capable of developing the human and institutional resources of a country.

Many of the countries in the arid zone achieved their present political status since the turn of the century and most of them gained complete independence only after World War II. In most instances, little attention had been given to the creation of human and institutional structures capable of generating the constant flow of creative ideas which can provide continuing leadership for growth. In many countries political leaders, educational planners and administrators are still engaged in trying to determine the dimensions of the educational pyramid

and the appropriate national investment at the various levels. Yet, constant social and political pressure has forced many of them to rapidly expand existing educational programs without any real consideration of how they could be made to contribute more effectively to the process of development. As a result, many countries are finding it increasingly difficult to meet growing financial commitments for educational expansion and, at the same time, to pursue an active development program constantly requiring more effectively trained manpower.

In contrast with the temperate and tropical areas, the arid lands contain vast areas which are sparsely populated. In the Near East and North Africa one finds a major concentration of the population in the large cities and larger urban centers, but much of the country is made up of small villages and isolated settlements which are great distances apart. The problem of administering educational programs is quite different from areas with a more uniform settlement pattern. There is always the question of incentive since salaries are unusually low in relation to other vocations. Why should a teacher go and live in a remote isolated area where professional contact, to say the least, is quite limited and where living conditions are often quite primitive? In many countries the avenue to promotion leads directly to the central

administrative structure and, generally speaking, advancement comes to those who are known and not necessarily to those who have demonstrated outstanding performance. Therefore, many teachers refuse to accept employment in isolated areas and, if they do, their primary concern is in getting a transfer which will enable them to get nearer the city.

Traditional systems of education are often the result of superimposed programs designed to produce a limited number of fairly well-trained people to staff the minimum administrative structure required to maintain security. Little, if any, attempt was made to stimulate thought processes or to develop an enquiring mentality. In many countries today the entire educational program is geared to the examination system which is generally centrally controlled and often rigidly designed to get a specific answer in a specific form. It is seldom designed to stimulate the intellectual inquiry or rational thinking.

Two major problems, the development of a meaningful curriculum and the training of teachers, confront many countries in the arid zone. For many years to come a lot of people in the arid areas will probably get no more than an elementary education. Many, especially in the rural areas, will get even less. Is it logical to continue to concentrate on the traditional subjects of reading, writing

and arithmetic? Or would it be better to emphasize such things as nature study, hygiene and social science? How can this be done without seriously handicapping those students who continue the educational ladder? Is it essential for all students to go through the same educational stream at the primary level or can alternative routes be developed? The application of science and technology requires a substantial number of people who have been given a solid foundation in science and mathematics at the secondary level. Is it reasonable to specialize in these subjects in a few selected secondary schools where limited manpower can be concentrated? If so, what kind of science program should be given the students who are not privileged to attend such schools? What about vocational and technical training? At what level should these begin and how should they be focused? Many teachers at the elementary and secondary levels are poorly prepared. They often have limited education themselves and little or no training in teaching methods. As indicated earlier, there is usually little, if any, professional contact for most teachers. Only a few countries have initiated in-service programs, short courses and seminars for teacher improvement. Can some of the communication devices, such as television and radio, be used to remedy these deficiencies in the arid areas? Australia has used the radio very effectively as a supplementary teaching device for isolated ranches

and settlements where adequate educational facilities are not available and teachers are in short supply. Shouldn't greater consideration be given to the use of radio in other countries? Now that the transistor has come along, radio is no longer a prestige instrument found only in homes of the more wealthy members of society. It is found in the most remote areas of the most underdeveloped countries. Can it become an effective instrument in both formal and informal and especially adult education?

In this day of advanced technology every nation needs, and must have, a pipeline to higher education. The national university has become an emblem of prestige and symbol of development, regardless of whether it is turning out the kind of graduate who can be most effective in his own country. Far too much emphasis is put on higher degrees when the greatest need is for middle-level persons with specialized skills. About a year ago I was requested by one of the governments in the area to provide advice on the improvement of a two-year diploma granting technical institute. When I mentioned this request to the president of the university, who was also responsible for the institute, he told me that there had been great pressure to elevate the institute to a four-year college and that he was resisting because the country needed technicians much more than it needed additional engineers.

If the countries within the arid zone are to be successful in making more rapid and effective use of the technical and scientific knowledge available to them, they cannot afford to let education become static. More teachers (even if better trained), more buildings, more courses and more colleges or faculties will not change a static condition. The critical component is going to be the men and women who are responsible for the educational program and their attitude toward self-examination and criticism of their product. Since many of the countries are in the early stages of development there is no existing apprentice system. Therefore a new performance base must be established. This is a difficult task. Many of the best people who have been trained abroad find it very difficult to adjust, even in their professional field, when they return home. A few years ago a young man returned to his home country with his Ph. D. in statistics and joined a program in which I was directly involved. He had made an outstanding record in his university and received several offers to remain abroad and teach. His first assignment called for him to prepare certain preliminary national forecasts. After he had been on the job a few weeks he came to me and said he could not do the work outlined because there were insufficient statistics and it would take years to develop a series to provide the kind of information required. When I explained that we urgently required the most

reliable estimates possible and that he would have to develop certain short cuts as a stop-gap measure he simply gave up. His sophisticated training had prepared him to work in a setting where sophisticated statistical information was available. It had not prepared him to work in his own country, where it will take years to accumulate statistical data. I use this example simply to indicate that knowledge is not necessarily useful; it is the useful application of knowledge that is important.

For many years to come, agriculture will be the base for the economy in most of the countries in the Middle East and North Africa. It would be totally unrealistic to think that an elementary or secondary school program could produce the leadership for modern day agriculture. It is not unrealistic to expect schools to provide the student with a greater appreciation of his surroundings and a better understanding of nature, science and rural problems. This is important for all students, but especially so for those who will go into agriculture at either the vocational or college level. Few people stop to realize that students of the area, even most of those who come from an agricultural background, are weaned from the land at an early age, or just about the time they begin to understand some of the problems. In most instances, secondary education is available only in the cities or larger urban centers.

Because of the distances involved and the lack of adequate roads and transportation facilities most students either board at or near the school. Agricultural production, dependent on the rainfall pattern, except in the limited irrigated areas, begins about the time school starts. Since most of the crops are harvested by the time school closes for the summer the students are therefore isolated from the farm during the growing season for the duration of their school years. In addition to their lack of contact with the farm enterprises very few students ever have the opportunity to come in contact with any type of mechanical device. A discarded tire is often the envy of a neighborhood. There are no red wagons to repair or destroy, or dad's tool box to investigate. Nor are there any tinker toys, building blocks or erector sets to stir young imaginations and help to develop manipulative skills. Unfortunately, many teachers, the people we expect to bring change in the thought patterns of their students, have the same or similar background, and start their professional career with only a limited theoretical knowledge of the subjects they teach. Very few schools have any classroom or laboratory equipment and what does exist is generally for demonstration purposes. In many instances it is not used because the teacher does not know how to use it.

The student who enters vocational agriculture seldom gets any real practical training. If he does it is often under the direction of a hired laborer who follows traditional methods. A few years ago

I visited a new vocational school quite by accident. The principal was quite embarrassed about a warehouse full of modern farm machinery and equipment which was lying in complete disarray. It had been given to the school by a foreign agency, and except for two tractors and a trailer, it had come unassembled. The principal indicated that he had repeatedly asked the donor agency and his own government to help his people put the equipment in working order. Several experts had tried, but had either failed to make the machines work or reported that too many parts were missing. The principal and his staff were sincere and dedicated men, but they had never used a piece of modern farm equipment. They were aware that farmers of the area were beginning to buy some pieces of equipment, such as grain drills, and they were anxious for their students to learn how these machines worked. With the enthusiastic consent of the principal, and the personal assurance of a senior government official that the matter would be kept in confidence, I sent a skilled machinery man, who was a former vocational teacher in the U. S., to the school. In two days he had assembled and field demonstrated all but two pieces of equipment, and for these pieces he had identified the missing parts. I mention this simply to indicate that things haven't really changed since the days of Columbus. If you know how to stand an egg on end it's easy to do it.

A few years ago a young man returned to his country after completing his Ph. D. and within two weeks he was appointed Dean of a new Faculty of Agriculture. The first question he asked when I saw him was "What is the Dean's job?" As we discussed the program of the faculty, and the need to train skilled as well as educated people, he suddenly said, "I don't even know how to drive a pair of animals, let alone drive a tractor, so how can I expect my staff to engage in the kind of practical activities you are describing?" A few days later the Dean was driving a tractor on the college farm. I use this example to indicate that there is generally a big gap in the learning process. If we expect a more rapid application of technology in many of the arid areas we must find means to fill the important gaps in education.

The development of an educational system and program is a continuing process; it is often painfully slow but extremely expensive. Therefore, we ought to use every available resource at our command to make it effective. In this connection I think many countries have left too many decisions to the producer. Education ought to have its hand on the heart beat of the country. It should strive to generate a two-way flow of information, which on the one hand would help to formulate new policy and program directions, and on the other help the public - the consumer - better understand what it might expect as an end product.

It is also important to know what the product thinks of itself. I wonder how many people have ever been asked what they think of the education they received.

I believe that many countries, and perhaps not only those in the early stages of development, need to create a system for constant review and evaluation of educational programs in order to assure that these programs fit the society and its needs. This is not to imply that education is only a tool for development. Education is desirable if it contributes nothing to material output, and certainly there are many who go through the systems that never enter their country's work force. They too probably have some thoughts about the education they received. Yet, on the other hand, education is important for development and it should be subjected to constant examination from a developmental point of view.

I have seen reports which indicate that arid land research is fifty years ahead of its application. I'd turn this statement around and say that we are fifty years behind in the application of known arid land technology. If this is true, and I have no reason to doubt that it is, should we ask ourselves how we can catch up. Is it possible that some of the scientists, who have helped stockpile this research, could spear-

head an action program and speed up its application? I'm sure all of you are familiar with the agricultural revolution which is taking place in West Pakistan and India. The key people in these efforts have been scientists who took their research to the field and made it useful. I'm convinced that this kind of revolution could not have happened had these countries depended on the agricultural colleges to do the entire job. On the other hand these countries would not have been able to carry out these programs without the backing of the colleges and the trained manpower they have produced. I am certain that the colleges of agriculture in both Pakistan and India will be greatly improved as a result of this experience.

We obviously need to develop the right kind of mix in our educational and research organizations. One of the best ways I know to do this is to provide for a continuing system of examination in which all interested parties are full participants. Educational commissions charged with responsibility for examining educational programs have been very popular in recent years. I might add that they have also been very effective in a number of instances. I suggest that organizing education, in the arid lands or elsewhere, needs continuing guidance and assistance if it is to serve man most effectively.

In summary let me make several specific recommendations. Basic and necessary ingredients for the efficient resource utilization and increased production in the arid zones of the world are the development of educational systems that will: (1) enable and encourage scientists, agricultural producers and those who serve agriculture to experiment freely, accept new ideas readily and adjust to changes quickly and (2) train human resources to understand the processes of planning, organization, and management of institutions that will bring about desirable changes in agricultural output. The same is true for business and industry.

For the arid areas of the developing countries of the world we must develop vocational and technical training institutions where increased attention is given to: (1) the on-the-job skills of modern agriculture production; (2) the principles of simple decision-making; (3) management and supervisory techniques necessary for exploitation of economic resources; and (4) maximum use of modern communication media and local demonstrations and techniques to facilitate this level of practical education.

The national universities of developing countries, and the universities of the more developed countries which train young scientists from the developing areas, must place more emphasis on: (1) specialized

but practical modern skills; (2) applied courses which are production oriented; and (3) the economics of decision making, management, and administration. These activities can be facilitated by the use of improved, locally oriented teaching materials and programs of practical training on well-managed modern farms as part of university facilities.

The content of graduate training, particularly at the Master's degree level, should include emphasis on: (1) broad subject orientation; (2) basic but not too highly specialized research methodology aimed at problem solving; (3) understanding of the development process; (4) knowledge of administration and management; and (5) development of leadership and supervisory skills. The use of internships in local situations would be a valuable innovation in graduate programs. A desirable post-graduate training experience for young scientists could be the type developed by the International Maize and Wheat Improvement Center in Mexico. This experience should be aimed at teaching the young scientist the art of using his newly acquired theoretical knowledge to solve practical problems. These principles also apply to business and industry.

We are involved with an agrarian revolution in many parts of the world. The arid zones will become increasingly important in this revolution. If education does not become a major force in bringing about the necessary changes we have lost the battle for "freedom from hunger" in the race with population.