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IV. ASPECTS OF ECONOMIC GROWTH AND DEVELOPMENT

RAISING THE RATE OF ECONOMIC GROWTH IN LOW-INCOME ECONOMIES BY INCREASING PROVISION OF 'NEWER' FACTORS OF PRODUCTION

L. E. VIRONE

Italy

INCOME *per capita* in India in 1964–5 $90, population engaged in agriculture 73 per cent of the total active population; in Nigeria income *per capita* $100, population engaged in agriculture 75 per cent; in Colombia income *per capita* $270, population engaged in agriculture 54 per cent.

It is not my intention, nor is it within the scope of this paper, to discuss the relation of cause and effect between these two statistics that I have selected for three significant countries in the low-inacome brcket, not to elaborate on the relative value of these two rather crude and often misleading indices.

The reason for presenting them here, one beside the other, is merely to point out once again, if there is any need to do so, that low income coincides with a very large, predominant group of rural people in the country. It is with this vast group of people that national development sooner or later, directly or indirectly, must come to terms. It is on their social and economic progress that the entire national progress depends.

The rural community

Let us then consider briefly some of the common features, characteristics, and problems, relevant to development, of the low-income rural community. I must put first in my list a psychological factor—the *motivation* for improvement. This, we can be sure, is present in all rural people, nowadays we can say that they are economically motivated practically everywhere; but the intensity of this motivation can vary considerably from place to place—to be more precise, from family to family, in different social groups. Furthermore, it is very useful to see behind their economic motivation the final purpose, which may vary from the education of the children in Nigeria, to the roofing of the house with corrugated iron in Uganda, from the acquisition of more land in Italy to the purchase of a taxi-cab in Trinidad. Or, indeed, it could well be a combination of

more than one of these tangible aims. However, it must be borne in mind that other motives, of which the subsistence one is the most typical, tend to compete with the economic motivation of the peasants and affect the productivity of their farms.

The peasant's *farms are small* (often very small) and fragmented on account of demographic pressure or lack of power other than human labour. The rights to the land vary from simple squatter occupation to all kinds of tenancy, sharecropping, leasehold, group ownership, and freehold—a range of possibilities which could well be taken to describe the various possible requirements of farming, in relative terms, of land, capital, and labour, and the local availability of these factors.

The *land improvements* have, in general, made little impact in bending the natural environment towards better tillage, limited as they are by the power of human labour which alone, or with the occasional help of domesticated animals, produced them. Nevertheless, the peasantry of the world is responsible for some impressive efforts in irrigation work and terracing, for stone clearing, and for much bad deforestation. However, the most important fixed asset brought by the small farmers to the land is his family dwelling and one may take this as an indication that this type of agriculture is more a way of life than a productive activity.

Labour is by far the most important contribution man makes to this type of farming and it is often handicapped by bad health, malnutrition, lack of elementary comfort, uneven distribution during the year, inadequate tools. Physical fatigue in many cases leaves little energy for applying managerial skill to farming, for which decisions are taken on the good solid ground of intimate and long-lasting knowledge of the local conditions, but, alas, for the most part, because of lack of technological understanding and means of appraisal, fantastically interpreted.

Probably, the subsistence and autarchical motive and tradition of the smallholding is mainly to be blamed for not encouraging the diversification and specialization of activities within the village. Every rural family does all the farming and processing, marketing and purchasing, building and transporting they need or can afford in what would appear to be the most time and labour consuming, the most inefficient way. The few crafts and trades are generally part-time jobs for the farmer thus producing the trader cum farmer, the tailor cum farmer, the mid-wife or witch-doctor cum farmer.

The *cash* flow is modest, in many cases overspent, largely on non-productive investment. It derives in some cases from a specialized cash crop (oil palm, cocoa, coffee, etc.) but, more frequently, from the sale of little amounts of produce which exceed, or are made to exceed, the family requirements, or from wages earned by temporary employment when the opportunity arises. This produce and labour is offered most of the time in quantities, qualities, times, places, and for reasons which conspire to weaken the bargaining position of the peasants and depress the prices. This, obviously, adds to the resistance of the subsistence farmers to moving decisively towards a marketing economy.

The *village* is for rural people not only the confined world in which they produce and live but also their social and cultural cosmos. Contacts with the outside world are occasional and unsatisfactory: the exchanges with it seem to be practically one-way: the rural community providing a wealth of men and produce for very little useful return. The village *leadership* is frequently incapable, and sometimes unwilling to improve the lot of its people.

To sum up, the peasants' world is a complex one in which social, technical, psychological, and economic factors combine to form intricate patterns, differing from place to place, seemingly motionless, but in continuous slow evolution. The still rare cases where surveys have been carried out in depth have often involved only one of the various disciplines (sociology, economics, agronomy, etc.) necessary to appreciate that reality. The information available is therefore most of the time piecemeal and, in particular, insufficient to constitute a valid instrument for rural development. Moreover, the magnitude of that world and the need to improve it have too often led to the superficial information available being used as a basis for facile, dangerous generalizations. In fact, they can suggest partial, haphazard interventions, bound to cause long and expensive periods of readjustment or, worst of all, to uproot masses of people in the peasant world in which, among the converging forces of needs and aspirations, human and natural limitations and resources, the rural community has at least found its equilibrium.

Nevertheless, this equilibrium, which we are learning to recognize in the rural world, has been recently shaken practically everywhere with unprecedented intensity by two factors; the demographic explosion, which reduces the natural resources available, and the greatly expanded facilities for communication which have enhanced the aspirations and frustrations of the rural people.

These two factors are principally responsible for having brought a sense of urgency to the problem of improvement and emancipation of the rural people, and have given impetus to national and international programmes of development assistance.

The land factor

It is not surprising that in a number of countries in the recent past the complexity and urge of rural development have inspired rather drastic schemes, capable in theory of providing a fresh start— a 'tabula rasa'— on which to build development free from the complexities of the rural community in its traditional environment. I refer here to schemes of the type of *farm settlement*. They have been sponsored for a variety of local reasons; in Nigeria to by-pass the tribal land tenure system, in Tanzania to create a focus for a sparse drifting rural population, in Kenya to farm with small family farms the evacuated European estates, in Malaya to exploit uncultivated land with newly settled families of farm labourers or unemployed. These various reasons may prove in the long term more or less capable of inspiring a successful programme. Nevertheless, they have all

in common the prerequisite of land available for the new settlement and the capital in the form of land preparation, plantation, and subsistence to families before production. These two elements alone limit the application of these schemes on a large scale. Lack of incentive for the settlers, unrealistic planning, shortage of experienced management all add to the difficulties and risks of this type of operation.

However, probably the most important common feature in land settlement schemes is the provision of a right to the land for the peasant folk. This right is now more and more widely recognized as an incentive to better farming and rural development. *Land reform* acts therefore as one of the constructive actions towards rural development and emancipation, in places where the concentration of land ownership contrasts with the high number of peasants tilling the soil. But the incentive of possessing land is shortlived if it is not followed by an increase of return for the farmers and an improved standard of living. Land redistribution is only the beginning of a more complex and long-lasting operation aimed at assisting the farmers to readjust themselves to newly acquired responsibilities and possibilities by means of credit, extension, management and research programmes, production, and marketing organizations. Lack of determined effort in this assistance has been responsible for giving to the land reform in many places the image of a fruitless political expedient.

The large number of rural people in absolute and in relative national terms, with their small farms and obsolete agricultural methods, seems to indicate that a definite solution for a decisive improvement in the national economy is reduction of the demographic pressure on the land. The solution of this problem is seen both in family planning and migration from the countryside.

Family planning will only be effective when it reaches the village, not as an isolated concept, but together with better education, agricultural extension, improved economic conditions, better hope for the rural family.

Diversification of the rural community

The *migration* of the rural people from the land has always been too easily identified with the industrialization of the country and it has brought up to now more frustration than dramatic results. The difficulties of creating new industry in a low-income, prevalently agricultural country are well known; shortage of viable projects in relation to the limited demand of the home market or competition on the international market, limited managerial skill, high capital investment per unit of labour. It seems that development thinking and programming of the last twenty years has built up two opposite approaches, seemingly irreconcilable, alternately popular in one or other of the developing countries: industrial development or agricultural development.

The reality of facts is apparently not so simple and experience now gained seems to suggest that the most fruitful field for over-all development lies somewhere in between these two extremes in what one may call rural

development. In a project of rural development in a village of Tuscany in Italy the 4,500 labour units employed or under-employed in agriculture in 1954 diminished to 1,800 fully employed units in 1964. This may not be surprising for a country which in the same period saw its agricultural force drop from 41 per cent to 23 per cent of the active population. But what is a matter for consideration is that in that village, called Borgo a Mozzano, few people left the community itself and most of the labour units released from agriculture found occupation locally in trade, transport, crafts, and services, flourishing mostly in consequence of the local development of agriculture which doubled its output in the ten years in question. So, if rural development means the development of communities basically dependent upon agricultural production, it should contemplate the possibility of assisting at village level the establishment and development of services and crafts required to serve a progressing agriculture and an improving standard of living of the rural people. Here the undifferentiated rural community offers an enormous scope for development which, germinated at village level, could represent the embryo, as has been the case in many now developed countries, of a considerable part of national industry and trade. This will help to disseminate entrepreneurship now lacking in many developing countries. Greater consideration has been given to this field in the recent past and the development of small industry seen in this way could well belong to the field now called intermediate technology. Little has yet been done in assisting development in this direction, but I feel it is worthwhile to recall here, for example, the still young but successful activity of the Industrial Development Centre set up with foreign aid in Owerri, Eastern Nigeria, to develop various existing and new sectors of crafts into industry.

Further migration from the land or reduction of demographic pressure will undoubtedly help economic growth in too densely populated rural areas, but nevertheless one should not fail to mention the contribution to economic growth derived from immigration in certain countries. The history of development of countries such as the United States and, more recently, Australia and Venezuela, are there to confirm this view. However, in mentioning the contribution to economic growth made by migration of people one is bound to note the increasing number of obstacles—political, economic, regional, even tribal—which in these days limit the free movement of people and the incentive to settle elsewhere.

Infrastructure

There are fewer and fewer regions, fewer and fewer acres of land which can be put under new cultivation and contribute in this way to the economic growth. Improvement will then mostly depend on better use of factors other than land to expand agricultural production. *Water* for irrigation comes first among these factors, particularly since many of the low-income agricultures have in water the most limiting factor of production. National and international efforts have in the recent past fulfilled a very ambitious programme of water catchment and reservoirs for irrigation purposes in

developing countries. These now make an impressive sight in such countries as Ghana, Egypt, Iran, and India. The economic use of the precious factor which can step up most needed agricultural production is, however, slow to come. When, for the first time, water reaches an agriculture and farmers not used to the intensity of cultivation of modern irrigated farming, the period of adjustment to irrigation is long, frustrating, and expensive. The engineering work and investment to make water available is only the beginning of a long, painstaking operation before full advantage is obtained from this new and important resource. Here, too, accurate investigation, planning, and management should come together with, or even before, water.

Apart from the vast, expensive irrigation projects in which much hope is invested for changing the entire economy of large regions, much can be done in improving the supply of water, once again at village level where local water resources from underground or surface are frequently wasted or misused. The same could be said in other important sectors of infrastructure, such as *roads*, the value of which in an expanding rural economy can never be over-emphasized; but the expensive national road net-work can only be efficiently used when the less-expensive capillary system of communication with villages is improved. The creation of infrastructure such as dams and roads provide a unique opportunity for *regional development* programming and implementing, still imperfectly used, which has proved so successful, not only in cases of developed countries, for example, the Tennessee Valley Authority in the United States and the recent Bas Rhone Languedoc development in the South of France, but also in developing countries with such schemes as the one at Gezira in the Sudan, and there is plenty of reason to hope that this may well prove to be the case in the Mekong Project.

Agricultural input and output

Agricultural production has now available in unprecedented number and quality *new factors* which have been responsible for the dramatic increase in the production of the developed countries over the last fifty years. These are selected seeding and animal breeding, fertilizers, machines, concentrated feedstuffs, pesticides, and weedkillers. These factors, which have practically freed agricultural production from natural hazards and limitations, have also brought to farming the stimulus of an expanding industry which is contributing to agricultural development with a continuously increasing range, not only of products for agriculture, but also of specialized research and extension. The transfer of these factors to the farming of developing countries seems to be the obvious answer for stepping up their agricultural production in a decisive way.

There is still much *research* to be done in adapting these new factors to various natural environments, particularly tropical. One may look back with some pride to the consistent international effort made in the recent past to assist agricultural research in developing countries. This has been implemented by means of secondment of experts from international

organizations and donor countries, by the training of research personnel, by the creation of agricultural research centres in practically all the developing countries. Moreover, there have been interesting signs of expanding research from a few tropical export crops into the wider range of staple food crops and animals. The International Rice Institute at Los Banos is an important step in this direction. Nevertheless, it seems that, in general, agricultural research in developing countries operates and lives in a different stratum far apart from the practical problems of the national agriculture it has to serve and this delays the research pay-off in terms of increased agricultural productivity. The reasons for this could well be found in the process of training research personnel who are more prone towards an academic career than to the solution of immediate national problems, and in the lack of the pressure from agriculture towards the research institutions that could be expected from a good agricultural extension service.

Manufacturing and marketing of fertilizers, pesticides, and machines depend in many developing countries on imports, foreign know-how, and capital. This increases the problems connected with the introduction of these factors into the agriculture of such countries, partly due to concern for the balance-of-payments situation and also to the need for a better understanding between developing countries and foreign private business. Nevertheless, a constant effort has been made by private, public, national, and international funds and organizations to step up supplies for this difficult, slowly expanding market.

Once again, however, the main obstacle to the rapid introduction of these new factors of production in low-income economies is to be found in the structure of the peasant agriculture. The incentive, for example, for buying fertilizers is minimal since the cash the small subsistence farmer will pay for this input has to return from the little quantities of produce he sells on a very imperfect and insufficiently rewarding market. The land fragmentation, among other obstacles, precludes the introduction of a tractor until the groundwork has been prepared for a group of farmers or, probably better still, a little contractor to make efficient use of this important new tool. The subsistence farm's production fragmented into numerous modest quantities of various crops, does not help the proper application of all these new factors, which are fully effective when used in combination.

This is why agricultural *credit*, *subsidies*, and even a policy of sustained *prices* for agricultural products cannot have a decisive effect in improving that type of agriculture until some progress has been made in management at farm level and orientating production more towards the market.

All this is particularly true for the various food crops grown by subsistence agriculture, whilst for export crops (cocoa, coffee, sugar, and so on) the introduction of better seedlings, fertilizers and pesticides has been, in general, easier—sometimes too easy—even in the small semi-subsistence farms. Reasons for this could well be attributed to the existence for these crops of a well-established private or public (Marketing Board) organization which reflects on farming the advantages of specialized research,

extension, sometimes credit, a more efficient marketing system and definite prices. That is why the establishment of a *processing industry* for agricultural products, with its concern for the right quality and quantity of supplies, on the one hand, and its knowledge and ability to bring the final products to the market, on the other, has been rightly seen as a decisive factor in bringing better productivity in agriculture. Unfortunately, to establish itself and flourish in developing countries, this type of industry not only shares the difficulties of industrial development, but also has to contend with the subsistence habits of production and consumption.

The human factor

Infrastructure, land reform, introduction of new technical factors, credit, research, and training are all requisites for agricultural improvement and they will all prove, in due course, to have contributed in some way towards development. But the return for the effort expended on each of these factors does not seem to be the consistent, sustained, widespread improvement which might be expected. In fact, the effort made in all these directions appears to have failed, in general, to *mobilize the rural community* towards its own betterment. It is not very long ago that in agricultural development we started to consider, more and more, the human factor which has gradually emerged as representing, probably, the key factor in development. This human factor is not only the prevalent resource with its physical and psychological contribution to agricultural production in rural countries, but also should be the principal objective of any development process.

Considering this factor for a moment from the physical point of view, one is bound to accept that among the peasants of the world ill health and malnutrition are fairly widespread. Assistance towards improvement of *hygienic conditions*, better agricultural production, and *balanced diet* will, in due course, contribute towards national economic growth, by releasing more intensive and better human energy. The exceptional case, of which we are now more aware or which seems to become more frequent, is when a rural population reaches the stage of starvation. Something must have gone terribly wrong for people, rural by definition, to have lost the ability to feed themselves. First aid in the form of food supplies, is obviously essential in such cases, but should be given in a way which can also act as a spur to the improvement of local agricultural production. The recent decision of the major food-donor country, the U.S.A., to link their food aid to a commitment on the part of the recipient country to a policy of agricultural development appears to be a step in the right direction, because the first requirement for a country's development is to produce cheap food for its people. If this is beyond the power of a developing country, the only alternative is to embark on the slow, painstaking, and more expensive process of adjustment of the entire economy by such means as emigration and the export of manufactured goods, in order to achieve even the possibility of buying food for its people.

Probably the largest potential for the contribution of the rural people

towards their own and their national development is to be found in their psychological attitude towards improvement. This is where assistance has found some of its most difficult tasks in what is now usually called the *investment in the human factor*. Sometimes, too easily, this has been identified with *formal education* only and has brought to the rural community an increasing number of primary schools, more or less based on the system experienced in developed countries. This has built up an expanded base of young literate people, but has left us at the same time with the problem of the school leavers which has now to be faced by developing countries in Latin America, Africa, and Asia. But if the expanding formal education has created some new problems and not solved some of the old ones, it will undoubtedly represent an important first step, the fruits of which will be increasingly enjoyed by future generations.

The rural development approach

Apart from formal education, the immediate need to bring to the rural population the better knowledge required for their own development and emancipation has produced various forms of assistance programme which have brought adult educators, social workers, community development workers, and agricultural extensions closer to the villagers in many countries. A considerable amount of experience through trial, failure, and success has been gained in this field in the last twenty years, and this fund of knowledge should no longer be ignored, but should be put into full use in bringing about the development of the rural economies with the improvement of the human factor. The complexities of the rural world have proved that any process of development assistance should of necessity start with a *detailed investigation* of the social, economic, and technical conditions. Not only does this represent a contribution towards a better knowledge of the peasant world, but it should represent the base on which to found the development programme. The depth of this type of investigation excludes the possibility of having it carried out nation-wide and therefore it should be initially prepared for a few selected rural communities representative of the main agricultural regions of the country. The preparation of data collected in the process of the survey should be done, as far as possible, by local research institutions, possibly universities, and this would involve them more closely with the solution of the peasant's problems. The agricultural economist will have here a leading function in co-ordinating the contributions of various other specialists such as the agronomist, the sociologist, the nutritionist, and so on. But the collection of the data in the community should be done by the same personnel who, later will implement the development programme, From the various experiences of social workers, community development workers, and agricultural extensionists it would appear that, when operating alone, the lack of agricultural technical experience in the social type of worker and the lack of sociological and psychological experience in the agricultural worker have limited their impact on the development of rural communities. The field-worker therefore should be trained to combine a technical

agricultural background, particularly based on small farm management with an understanding of social and psychological implications. This type of field-worker, whom we now call a *rural extensionist* is what is required for assisting the rural community to establish contact with the outside world of research, administration, industry, and markets. Training and employment of this type of field-worker is now the first requisite to accelerate agricultural development in low-income economies. His training and eight to ten months' data collecting work in the pilot community should give him the objectivity and intimate knowledge of the local conditions and people required for tackling the advisory function for rural development. The pilot project which derives from this approach could well represent a training ground for further field-workers to apply the same methods widely in the country and the research laboratory for rural development. This approach to the rural community has proved not only to be effective in increasing the economic return from peasant farming in a fairly short time and without heavy expenditure, but also in mobilizing the rural community towards its own betterment. It has been proved in projects of this kind in countries as far apart as Italy, Nigeria, and Thailand that in this way many of the bottlenecks of rural development can gradually be widened, and moreover that the case for investing in this type of rural extension makes, economically speaking, very good sense when compared to the increase of net income it produces in the rural community.

The last twenty years have shown that there is the will and the ability in national, international, private and public organizations to assist development. In the process a lot has been learned and the germ for assisting development has been brought into practically all developing countries. But what has mostly baffled assistance, and caused frequent discouragement, has been the rural sector, which has emerged as the hard core of development, not only on account of its size and difficulties, but also because of its influence on the entire process of national social and economic growth. To accelerate its evolution we have learned that there are no short cuts or single magic factor which can change it in a flash: it is to be tackled from the grassroots with objectivity and dedication and this is primarily the function of the country concerned. The national effort invested in studying the problems and assisting the people in the rural communities will be amply repaid by the new wealth this will provide in a few years in the rural world. The training of rural extensionists and the creation of an efficient rural extension network is a top priority in most of the low-income economies. When the rural world starts to progress it will make the application of all other factors of development and national and international assistance increasingly more effective.

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Given that I am a L.D.C. native and one of the few L.D.C. economists who continues to live in his L.D.C. country, I hope that my comments

will help in giving an insider's view of some issues relating to agricultural development.

As Mr. Virone explained very well, the 'equilibrium' which we have learned to recognize in the rural world has been shaken by the population explosion and enhanced aspirations of the rural people. I completely agree with Mr. Virone when he asserts that 'there is dramatic sense of urgency to the problem of improvement and emancipation of the rural people'. Unfortunately, this problem occurs in situations where the relevant information to guide intelligent action is dangerously insufficient. Urgency and ignorance represent very negative elements for scientific reasoning. Furthermore, in our L.D.C. we often suffer from excessive ideological 'intrusions' into economic logic, with the end result that they do not act as complements but instead they become substitutes.

A number of Mr. Virone's issues really represent, I believe, questions of fact, and it was not his intention to present them, nor can it be mine to clear them up, on this occasion.

The paper describes one type of agricultural economy in L.D.C., namely, that of peasants on very small-scale farms, with little or no cash income at all. He calls it subsistence agriculture. I am sure Mr. Virone would agree that agriculture in low-income countries does not always mean peasant subsistence farming. What we very often find is a dual economy within agriculture or, in other countries, almost 100 per cent commercial agriculture. Peru, Ecuador, and Mexico would be examples of the first case. My own country has very few areas of peasant agriculture and they are almost non-existent in Argentina and Uruguay.

In the countries mentioned, and this seems typical at least in Latin America, the highest fraction of output and growth comes from medium-sized commercial farms.

None the less, a high fraction of the world's population does live in small subsistence farms and so their problem deserves priority. The author places before us a very relevant central question and then arrives at certain recommendations. I quote 'the obstacles to the rapid introduction of newer factors of production in L.D.C. countries is to be found in the structure of peasant agriculture'. Subsistence farms do not help the proper application of newer factors because the incentives do not exist. Minimal cash flow, imperfect markets, and other factors make inapplicable the use of agricultural credit, subsidies, and prices of products incentives.

Then Mr. Virone arrives at the conclusion that the largest potential for the contribution of the rural people towards their own development is to be found in their psychological attitude towards improvement, what he identifies with 'investment in the human factor'. From here he concludes that a Rural Development Approach is what is needed, with emphasis on the training of rural extensionists and the creation of an efficient rural extension network. This represents, in his opinion, the first requisite to accelerate agricultural development in low-income countries.

So much for the summary of Mr. Virone's paper; in discussing it, I

would first like to raise for discussion the real possibilities of sustained economic growth via provision of newer factors of production in the type of agriculture that Mr. Virone describes. Let us accept that what we want is to raise the level of family income of those subsistence farmers to reach at least some 'acceptable' minimum. We can ask ourselves, first, if it is technically feasible; second, if it is economically convenient, and third, if it is financially feasible.

First, from the technical point of view, many economists have serious doubts whether very small units, say one to three hectares, are open to change and sustained growth. Unless located in areas near big markets with a well-developed infra-structure of roads and storage facilities, or on very good soils, the presence of indivisibilities and restrictions in the relevant production function with respect to changes in factor proportions, after a certain level of output, severely hampers the expansion of output sufficiently to reach this 'acceptable minimum'. In this situation, extension does not seem very profitable at all. Here we are faced with a social and maybe a political problem but not an agricultural production problem. The only economic solution is to remove some people out of the region.

Alternatively, this one to three hectares unit might have technical possibilities of generating the acceptable level of income, but from the private and social cost and benefits angle it might not be economical to do it. Here again we may have a social but not an economic problem to solve with the extension programmes.

Thirdly, if technically and economically it is feasible to generate economic growth under subsistence farming, the farmer could face financial limitations in doing so. If farmers are out of the market economy, their cash flow is not enough to purchase new inputs which usually require some monetary expense. This is one type of situation where the farmer could expand and generate a growing marketable surplus through credit programmes. Here, for the first time, a long-run solution is compatible with keeping the farmers on their land and, perhaps, extension could then be a recommended ingredient. In the first two cases, unless the community wants to subsidize permanently those farmers, we should put our energies into finding employment elsewhere instead of investing in an impossible situation.

I do not want to defend my figure of one to three hectares, as it is just an example, but I believe that for the different regions we can calculate what is the minimum size in terms of land, capital, and value of output and, given certain family income targets, we could go through this technical, economic, and financial test.

We should be very careful before launching extension programmes if all we can achieve is to raise the annual income of the farmer from say, $80 to a level of $100 per year and there we reach a plateau which is still completely unsatisfactory and probably lower than what he can obtain in the urban sector.

Mr. Virone mentioned in his paper (and I completely agree with him) that the checking of demand by family planning is needed, and I guess we

should say inevitable! Annual rates of population growth of 3 per cent or more make a rapid increase in *per capita* income an impossibility. More resources should be allocated to this family-planning problem and I believe that the receptivity for this type of programme has increased very rapidly, at least in Latin America.

The first obvious question we should ask concerning newer factors of production is about their availability.

Mr. Virone believes that research is being done but not into the practical problems of the national agriculture it has to serve. This, he explains, is because research personnel are more prone towards an academic career than to the solution of practical problems. I would argue that very little research is done at all, and that programmes of international relevance such as those in Mexico or in the Phillipines are exceptions very far from the rule.

I regret that I have no competence to speak about Africa and East Asia, but if we evaluate the research results on important problems of agricultural production in Latin America, we would find that in areas such as management of pastures and animal nutrition, weed control, irrigation practices, soil fertility, and improved varieties for many crops, the stock of research results is extremely low. And it is bound to be low because we lack teams of well-trained researchers; a lot of money has been wasted in poorly designed research programmes. I would completely agree with Professor Schultz when he argues that we should treat science as an organized activity subject to costs and returns instead of the hit or miss inefficient activity that is so common in L.D.C.s. We should consider quite explicitly the transferability of research results, the purchase of new inputs abroad, looking at all this as a process requiring efficiency in the allocation of resources.

We should keep on investing in research training and, to a limited degree, in extension in order to bring the research into touch with real production problems. The shaky results of the well-known Package Programme in India, based primarily on extension, should alert us against over-emphasizing extension.

We observe that, at least in temperate zones, certain types of crop or animal production are subject to a rapid technical change. It seems to me that this tends to coincide with commodities where adaptive research is possible, where many new inputs can be imported with only the need for some minor adaptations to local conditions. Whether imported or locally reproduced (by private firms, co-operatives, or government agencies) L.D.C.s are getting a high proportion of their newer factors and knowledge from the developed countries. For example, hybrid corn seed and new lines of broilers and laying hens from the U.S., pasture seeds from Australia and New Zealand, pesticides, farm machinery, and equipment from Europe and the U.S. From the technical point of view I understand that a lot more could be imported or locally made by foreign investors.

Often we protect our industry supplying agriculture in such a way that it remains a 'permanent infant' with the result that farmers pay dearly

for inputs. Our governments try to save foreign exchange in the purchase of foreign inputs but not always is a careful estimate made of the output loss due to high input prices. This whole area within international trade deserves a much deeper analysis from economy policy advisors.

Countries with tropical agriculture seem to be forced to face their agricultural production with less complementarity from developed countries.

But these new inputs will only be adopted if their use is profitable and here we come to another crucial element. We need a supply and price policy for inputs and products, including exports, that makes profitable the adoption of new techniques.

However, our concern should not only be with the level of relative prices for inputs and outputs but also with the uncertainty about them and its effect on the adoption of newer factors of production.

In addition to a usually high degree of natural yield uncertainty and some level uncertainty, the presence of inflation tends to cause tight controls of food prices, foreign exchange, and export quotas. These could be necessary measures, but often they are applied without a long run and coherent price policy, and the farmer faces a very high degree of uncertainty with respect to the supply of foreign imports and with respect to the price of his products. If to this we add poor infrastructure, particularly roads and storage, these conditions are enough to make farm management the work of a magician. A natural consequence of these conditions is a high degree of diversification. A farmer producing a small amount of several products will be in a very difficult position to acquire the know-how characteristic of modern agriculture.

If the country as a whole is very unspecialized, agriculture is usually a rather inefficient agriculture in the long run. These conclusions are not the fashionable thinking in development, and do not represent at all new thinking for the economists. However D.C. experts tend to overlook the effect of the uncertainty element even though in their countries this is usually a rather old and to a great extent solved issue of agricultural policy.

Very briefly, I want to comment on the use of irrigation projects for as a means of expanding output and modernizing agriculture, irrigation, together with development of improved varieties, fertilizers, and pesticides, have usually been considered the key elements in the non-tropical agricultural development. I have no bias against irrigation projects, but I have seen too many extraordinary expensive projects that demand a very generous treatment in order to make them profitable from a social cost–benefit type of analysis.

Irrigation projects, just as many other social investment decisions, are usually subject to a project evaluation. Too often, though, the evaluation is poorly done, unfortunately the agricultural economist is not often trained enough in the special problems of project evaluation, and faces special difficulties considering the descrepancies between market and shadow prices, of seeing external effects and so on. I believe that this

area is one of the most promising fields within agricultural development, and should deserve a much higher priority than at the present in the training of agricultural economists for the L.D.C.s.

My last comment is about perhaps the most important factor, the human factor. It seems unnecessary to insist on the need for raising the educational level of farmers. Primary education is, I assume, recognized already as a necessary condition for modern agriculture in the L.D.C.s. Research has shown that the rate of return on this type of education in many countries is higher than returns from most forms of physical capital. The only point I would make here is that because the student probably does not capture all of the benefits of primary education and because even very small boys and girls represent a help in the small farm, the private rate of return might be much lower than the social rate of return, and so the incentive of the farmer to send the children to school is lowered. It would be economic, I would believe, not only to have free tuition but probably to pay the student some or all of his opportunity costs by way of free lunches, free clothing, medicine, etc. so long as he is a student. This may represent an economic way of improving the human factor in agriculture.

M. SHAFI-NIAZ, *Pakistan*

Mr. Virone has given us a very impressive account of the factors which contribute, or should contribute, to the acceleration of the rate of economic growth and development of the low-income countries. However, it appears that he has left out, by omission or intentionally, one of the important factors which is not only a prerequisite but also a contributor to economic growth. This is the political stability in the under-developed countries, or for that matter in any country of the world. However sound and impressive other features may be, be it the marketing system or credit and price policy, unless the country enjoys political stability, these factors are adversely affected and the rate of economic growth is retarded. Equally important is the stability at the level of the policy makers. We have seen in some countries that a certain policy decision is taken at a time when one set of policy makers is at the helm of affairs but as soon as they move and a new set of people step in with quite different ideas the previous programmes are either abandoned or so considerably slowed down that they lose their impact. The rate of growth is impaired under this 'trial and error' exercise. Community development programmes in some of the developing countries, provide a case in point, introduced by one set of policy makers convinced of their value and abandoned overnight by their successors. We must realize, and recognize that agricultural development is a slow process as compared with other sectors (e.g. industry) and therefore should be treated as such. Much more patience is needed to await the results of development programmes before these are condemned or drastically modified.

Another point which Mr. Virone mentioned relates to the dispersion of resources in implementing big projects and lack of concentration of

efforts in localized areas for the realization of the rate of economic growth. I would agree with him in principle, but I may point out that under political or local pressures more often than not, it becomes extremely difficult to restrict the activities to certain given areas. Sometimes, this pressure is exerted on the plea that localized efforts to achieve maximum economic benefit in the areas best suited for the purpose would create economic disparities between areas which might bring political instability. At other times, the pressures are applied by politicians to get certain activities developed in their areas, also, on the lines being followed in other areas. Under these pressures the administrators have often to yield which is likely to result in the dispersion of efforts, thus jeopardizing the rate of economic growth.

C. I. A. BEALE, *Australia*

I have not been to any of the less-developed countries that we are speaking about; any comments that I make are on purely theoretical grounds. It strikes me that so far in this Conference we have said very little about involving the rural people themselves in the definition of their problems initially and subsequently in providing solutions to them. What attempts have been made at finding a community solution to community problems? Have those in developing countries ever considered the techniques which have been employed in some Western countries of bringing farm people together in small groups, and getting them to think what their community problems are, listing them and thinking what the solutions might be, what they might do to find solutions, and where and from whom they might secure some aid in meeting those problems. It seems to me that this kind of technique would not only aid the rural extensionist described by Mr. Virone in carrying out his social research, but it would also be a useful extension device too.

G. GAETANI-D'ARAGONA, *Italy*

Among the many points which have been suggested by Mr. Virone, there is one relevant to the impact that processing industries can have on the improvement of farm products which might be further emphasized. Beside the stepping in of processing industries which are external to the farm sector, the farmers themselves could be brought to work in some kind of marketing co-operative programme so as to improve their bargaining conditions in the market and to create some of the incentives—in this case profit incentives—for the improvement of their business. In many of these countries the marketing system seems to work very badly, and therefore there is a very wide scope for this type of intervention.

D. G. R. BELSHAW, *Uganda*

It seems to me that the remarks that Dr. Valdes has made can be reconciled with those expressed by Mr. Virone in his paper. Dr. Valdes's doubts about the efficacy of what we call the 'improvement approach', i.e. the improvement of agricultural productivity within the existing

framework of small-scale peasant agriculture, can be resolved partly in the paper that Professor Joy has written. We have a few very striking examples of the returns to this 'improvement approach'. Peasant agriculture in Central Kenya is a notable example, whilst the rapid development of high-value cash crops such as cocoa in West Africa in previous decades is another. The main advantage of this approach is that it is *not* expensive; it is much cheaper than creating employment in industry or in large-scale irrigation or settlement schemes, or in large farms using 'modern' techniques. The problem is that whilst one has examples of the success of this kind of approach all too often one also finds a complete or partial failure to exploit the potential advantage of this low-cost strategy. The explanation often lies in the field of implementation, especially mistakes which are made in terms of (*a*) the appropriate short-run allocation of resources, and (*b*) the design of the approach to the farmer himself. This latter aspect may often involve the point that Mr. Beale had made i.e. there is often a dirigiste approach designed at the centre, and imposed on the farmer without getting either his comments or his consent. So that implementation, I think, is often the critical factor a point central to Professor Joy's paper.

On the question of benefit-cost appraisals of the 'improvement approach', as far as Africa is concerned, we have had two recent pioneer attempts to calculate benefit-cost ratios, calculations by Davis Fogg for Eastern Nigeria and by Professor Ruthenberg for Kenya. These indicate strong advantages to the improvement approach where it is implemented satisfactorily.

My final remark concerns the problem that agriculture may only be moved to an income plateau. It may not make for any long-term transformation of the peasant farmer's position if one can only raise his income by perhaps 20 per cent to find that one has then exhausted, at least for the time being, the potential for further advance. However, a macro-economic approach to economic development tells us that even a short-run gain in agricultural productivity, leading to either increased export earnings or reduced costs of food supplies to urban centres, can make a major contribution to the development of the rest of the economy. In other words, it will then be easier and cheaper to create non-agricultural employment if we have a short burst of increased productivity in the agricultural sector.

I suggest, then, that the criterion of the farm-incomes growth-rate is only a partial one, and must be relegated to a less-important position compared to the immediate contribution of the agricultural sector to national economic development as a whole.

L. E. VIRONE, *in reply*

I cannot do more than thank the colleagues who have spoken on the subject of my paper, thank them for having added something very pertinent to what has been, necessarily, a very limited paper on a very broad subject. I practically agree with them all.

If there is an apparent disagreement with me in what Dr. Valdes said,

this can be cleared if I admit that not all L.D.C. agricultural communities are of the peasant type I described and, therefore, the set of priorities for approaching their development could differ. I dealt in my paper specifically with subsistence and semi-subsistence farming not only because this represents the widest aspect of L.D.C. around the world but also because it is, in a way, the lowest condition from which to start development, the furthest away from our concepts of agricultural productivity and economic development models. From that extreme we can obviously imagine infinite upward grades of agricultural conditions, increasingly more responsive to interventions from outside such as agricultural credit, supply of agricultural input, price policy, and so on. Before these interventions can become fully effective in a community such as the one I described in my paper, a gap of understanding and objective approach has to be filled. This is why I give to the rural development and rural extension activity a priority value in tackling L.D.C. development. Only an objective approach to the peasant community can establish the cooperation, so essential for progress, between the rural people with their psychological and technological limitations and possibilities and the extension worker with his backing of modern techniques and rational approach towards development.