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*Sessional Paper No. 4 of 1981*

ON

NATIONAL FOOD POLICY

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*Sessional Paper No. 4 of 1981*

ON

NATIONAL FOOD POLICY

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## SECTION 1

### OBJECTIVES, CONSTRAINTS AND STRATEGY

- 1.1. One of the major objectives of Kenya's development policy during the course of the next decade will be to meet an ever increasing demand for food, stemming from a rapidly expanding population and rising per caput income. The agricultural sector must continue to play the leading role in Kenya's development and nearly all the nation's food requirements will need to be met from domestic production. In addition, the agricultural sector must continue to generate foreign exchange earnings to pay for oil, capital equipment and other imports and, at the same time, it must be the major source of new jobs for the rapidly growing labour force.
- 1.2. To meet these needs, Kenya's agricultural development strategy is aimed at the continued expansion of productive investment, with the primary objective of the provision of basic needs and the alleviation of poverty through growth in agricultural output. The need to conserve national resources is now well recognized as an essential part of this strategy.
- 1.3. Over the past two decades much has been achieved by the agricultural sector. Agricultural production as a whole has doubled, growing at an average rate of 3.5 per cent per annum. During the late 1960's and early 1970's, considerable progress in the expansion of food production was achieved through the introduction of hybrid maize and an increase in the number of improved cattle. Tea production has grown from 13,000 tons in 1960 to some 86,000 tons in 1980, making Kenya the world's third largest exporter. Coffee production has more than doubled to 80,000 tons. Both Kenya tea and coffee are renowned for their quality and frequently trade on world markets at prices above those achieved by other major exporting countries. The production of other major crops such as sugar, rice and pyrethrum, has also increased. Much of the expansion of agricultural output has come from an increase in smallholder production, as new land has been incorporated into smallholdings and large farms subdivided.
- 1.4. Despite these successes, serious problems have emerged, particularly in more recent years. The expansion of production has been achieved at the expense of widespread soil erosion,

depletion of the nutrient content of the soil and the destruction of indigenous forests. The terms of trade between agricultural exports and imports, particularly oil, have deteriorated, reducing the real benefits to the nation of the expanded agricultural production. Most importantly, the population has grown rapidly and at an accelerating rate, absorbing the increases in food production and preventing a marked improvement in per caput nutritional intake. Although Kenya has retained a capacity to be broadly self-sufficient in foodstuffs throughout the past two decades, certain sectors of the population remain malnourished as a result of income inequalities, problems of distribution between geographical zones, seasonal fluctuations in supply and a lack of nutritional education among certain groups.

1.5. The rapid expansion of the population and a shortage of unexploited arable land in the main high potential areas are beginning to expose a potentially dangerous imbalance in the relationship between the national supply of and demand for food. The nation no longer enjoys the advantage of regular surpluses of foodstuffs to cushion the impact of a fall in production in years of crop failure. Whereas present levels of domestic food production would have been broadly sufficient to satisfy demand in the mid-1970's, Kenya today faces shortages of maize, wheat, rice and milk.

1.6. In these circumstances, there is a clear need for a national food policy which will set guidelines for decision-making on all major issues related to food production and distribution. The overall objectives of this policy will be to:

- maintain a position of broad self-sufficiency in the main foodstuffs in order to enable the nation to be fed without using scarce foreign exchange on food imports;
- achieve a calculated degree of security of food supply for each area of the country;
- ensure that these foodstuffs are distributed in such a manner that every member of the population has a nutritionally adequate diet.

- 1.7. It is essential that the food policy be consistent, both internally and with the broad objectives of national development. This is important because it has implications for the attainment of other national objectives, such as high levels of employment, a more equitable distribution of income, optimal resource allocation and the maintenance of a sound balance of payments.
- 1.8. The food policy will need to be sufficiently flexible to adjust to policy decisions taken in other sectors of the economy and to changes in the domestic and international economic environment. For example, the findings, recommendations and actions of the recently appointed Soil and Water Conservation Commission will be of particular relevance to the development of food policy.
- 1.9. The Ministries of Agriculture and of Livestock Development will co-ordinate the implementation of the food policy, working closely with other relevant ministries and government agencies. Attention is drawn to the national Livestock Development Policy published by the Ministry of Livestock Development in June 1980.
- 1.10. Certain domestic resources are owned, controlled and managed by Government, others by individuals and private institutions. Responsibility for feeding the nation must therefore be shared between the public and private sectors. The role of Government is to define and formulate policies which are in the best interests of the nation and to create an environment favourable to their implementation. Realization of the goals of these policies requires the commitment and the active participation of the private sector as producers, land-owners, distributors and consumers.
- 1.11. At the present stage of policy development and in the uncertain international economic environment, it is impossible to forecast with any accuracy either the resource requirements of the policies and programmes outlined in the paper or the impact which they will have on the national capacity to produce and market food. No attempt is made in the paper, therefore, to forecast either future food production

or the resources to be committed to the production and marketing of foodstuffs. The aim of the paper is to examine the future food production and marketing capacity required to meet national objectives and to provide a broad framework within which detailed policies and programmes can be developed.

1.12. Successful attainment of the objectives of a national food policy will be dependent upon the efficiency with which detailed policies are prepared and the appropriateness of investment programmes designed to utilize the limited resources available to agriculture. In addition, there is a need to incorporate food policy within the framework of overall national development policies. Recognizing this, the Government intends to establish five Food Policy Committees. The role of the first four will be to develop further and to help implement the policies and programmes outlined in this paper. The fifth Committee will carry out a detailed examination of major mid and long-term policy options. The membership of these Committees will be composed of individuals from both the public and private sectors and will represent a wide range of responsibilities and interests. The Committees will prepare detailed policy papers on specific issues for consideration by Government and will develop action programmes for immediate implementation.

1.13. The paper is structured as follows:

Section 2 commences with an examination of the present food supply situation. Projections are made of future demand for the main foodstuffs and the nutritional adequacy of the implied diet is discussed. The projections are then employed to derive the rates of growth in domestic production necessary to achieve self-sufficiency. These required growth rates are compared with the corresponding rates in the current Development Plan and the urgent need for an acceleration of these rates is stressed. The possible means by which production can be increased are then considered and the required expansion in marketing capacity is estimated.

1.14. In Section 3, a policy framework is developed for each of the major areas of food production and distribution, encompassing pricing, agricultural inputs, research and extension, food security, processing, marketing, trade, nutrition and resource development.

1.15. Section 4 commences with a description of the areas to be covered by each of the five Food Policy Committees. Fifteen programmes developed within the broad policy framework are then outlined and the financial implications of selected programmes are estimated. The section ends with a description of an appropriate framework for government decision-making concerning production, marketing and pricing.



## SECTION 2

# THE FOOD SUPPLY SITUATION AND POLICY IMPLICATIONS

### The Present Situation

- 2.1. During 1980, Kenya was confronted with food shortages and forced to import maize, wheat and milk in substantial quantities to make good shortfalls in domestic production. These shortages will continue in 1981. To maintain food supplies at adequate levels, it will be necessary to import 350,000 tons of maize, 118,000 tons of wheat and 13,000 tons of milk powder during 1981.
- 2.2. The shortfall in maize supplies in 1980 resulted from a series of events beginning with the heavy crops of 1976 and 1977. Delay in the export of surpluses left the NCPB with full stores and unable to purchase all that farmers supplied. The private trade was unable to absorb fully the surpluses remaining on farms due to restrictions on the private movement of maize. In response, farmers reduced the area planted. The consequent decline in production was reinforced by a shortage of fertilizer. Discontinuation of the GMR seasonal credit system in early 1979 together with a lowering of the NCPB purchase price further discouraged farmers from planting maize. This, coupled with adverse growing conditions in the 1979/80 crop year, led to an exceptionally low harvest, estimated at 18 million bags.
- 2.3. During 1980, the NCPB purchase price for maize was increased, a new system of seasonal credit was established and new buying centres were introduced. Farmers responded to these incentives and to the food shortages encountered by planting a record area under maize for the long rains. Unfortunately, this response was largely offset by unfavourable growing conditions. The 1980/81 long rains harvest is now estimated at 14.8 million bags, similar to that of the previous year, but well below the levels of the mid 1970's. The 1981 short rains harvest has also been reduced by near

drought conditions in Eastern and Central Provinces and is now estimated at 2.5 million bags, which would give a total harvest for the 1980/81 crop year of 17.3 million bags.

- 2.4. Wheat yields have increased substantially in recent years, but the total area planted has declined, reflecting the fragmentation of large wheat farms. In 1979/80 wheat production was only 155,000 tons compared with the record 1967/68 level of 241,000 tons. Production in 1980/81 is forecast to rise to 189,000 tons. KCC's milk purchases fell sharply to 173 million litres in 1979/80 as a result of adverse climatic conditions; in 1981 these purchases are expected to recover to around 200 million litres, still well below the level of 273 million litres recorded in 1977/78.

### **Future food requirements**

- 2.5. The rapid pace of expansion in the demand for food will continue throughout the next decade and beyond, primarily as a result of rapid expansion in the population which is growing at a rate of 4 per cent per annum. By 1983, the end of the present plan period, the population will have reached an estimated 18.3 million, some 12 per cent above the 1980 level of 16.3 million. By the end of the decade it will have expanded by a further 4.8 million to 23.1 million, or 42 per cent above the 1980 level.
- 2.6. The implications for food crop requirements in 1983 and 1989 of the growth in population and of the expected increases in real per caput disposable income are highlighted in Table 1. The estimated amounts of each of the nine most important foodstuffs consumed in Kenya required to satisfy domestic demand in 1983 and in 1989 are shown in columns (2) and (3) of the table. In addition to the requirements for human consumption, the estimates include a provision for post-harvest losses and also take into account requirements for seed, livestock use, industrial use and, in the case of milk, consumption by calves. The estimates of requirements for human consumption are based on 1976 per caput consumption levels, forecasts of growth in real per caput disposable income and the assumption of constant relative prices.

- 2.7. The estimated average annual rates of growth of production necessary for the attainment of self-sufficiency in each of the major food items by 1983 and 1989 are shown in Columns (4) and (5). These rates are derived directly from Columns (2) and (3) and from the estimated 1980 production levels shown in Column (1). For seven of the nine foodstuffs, the average annual rates of growth required to attain self-sufficiency by 1983 are generally substantially higher than those required to reach this goal by 1989. This is due to production shortfalls in 1980 which necessitate higher growth rates over the shorter time period.
- 2.8. The 1980 maize harvest was affected severely by adverse growing conditions. Use of the 1980 level of production in estimating the rate of growth of maize output required to reach self-sufficiency consequently leads to estimates which tend to overstate the rate of increase required in production capacity. Estimated required rates of growth are therefore shown in rows 1b and 1c for two higher hypothetical 1980 production levels. The first is equal to production in 1976, a year during which growing conditions were particularly favourable. The second is the average of production in 1976 and 1980.
- 2.9. To return to a position of self-sufficiency in maize by 1989, production capacity will need to expand by at least 4.9 per cent per annum and probably at a rate considerably in excess of this. Rates of growth of this magnitude have in the past only been achieved in Kenya during the brief period of rapid adoption of hybrid maize. There are few examples of countries sustaining such rates of growth in the production of their staple foodstuffs over extended periods.
- 2.10. The rates of growth required over the next two years to return to self-sufficiency in maize by 1983 are shown in column (4) of the table. Although very high, it should be noted that they exclude provision both for rebuilding working stocks from their present depleted level and for the accumulation of a strategic reserve. Accumulation of a reserve of 4 million bags from domestic supplies by 1984 would require production of a further 110,000 tons in each of the next four years.

- 2.11. The high rates of growth required in the production of wheat flour, milk and rice reflect both the fact that the nation was well short of self-sufficiency in 1980 and that, at current relative prices, per caput demand is expected to grow over time, leading to production requirements increasing at a rate greater than of population growth. Similarly, rising per caput demand for both beef and beans at present relative prices will require a high rate of production growth if self-sufficiency is to be maintained.
- 2.12. Kenya is developing an export capacity in sugar. Sufficient sugar is already being produced annually to satisfy forecast demand in 1983. The domestic requirement, however, is expected to rise to 570,000 tons by 1989, 42 per cent above the level of production in 1980.
- 2.13. In summary, Table 1 shows the high rate of overall expansion in the production of foodstuffs required to eliminate present shortfalls and meet growing domestic demand. It further highlights the two major problems which must be resolved if self-sufficiency is to be re-attained. The first is the urgent, short-term necessity to boost the production of food over the next two to three years and the second is the more difficult, longer-term task of ensuring that rapid expansion in production is sustained through the remainder of the decade and, unless the population growth rate can be rapidly curbed, continued well into the next century. Few countries have been able to sustain such growth in food production and the need to do so presents Kenya with a formidable challenge.

### **Nutritional Considerations**

- 2.14. The above forecasts of food requirements are based on market demand and take no account of the nutritional requirements of the population.
- 2.15. In 1976, the national food intake embodied an average daily per caput intake of 2,084 calories and 56 grams of protein. This was, on average, sufficient with respect to calories but fell short of the average national daily per caput requirement of protein by 3.5 grams.

- 2.16. In 1980, the minimum per caput nutritional requirement was an estimated 2,024 calories and 59.5 grams of protein. Changes in the structure of the population will reduce this requirement to 2,011 calories and 59.5 grams of protein by 1989.
- 2.17. The total projected demand for the nine major foodstuffs in 1989 would result in an average daily per caput intake of 2,460 calories and 64.6 grams of protein, if the per caput consumption of all other crops were to remain at 1976 levels. This is slightly above the estimated average per caput requirement in this year.
- 2.18. The fact that the average per caput nutritional intake would be adequate does not imply, however, that all members of the population would be able to purchase sufficient foodstuffs to be sure of a nutritionally adequate diet. Inequalities in income distribution will mean that, as today, some sectors of the population will consume considerably more than the minimum requirement while others will remain malnourished. Under such circumstances, and given policies aimed specifically at increasing the nutritional intake of low income groups, considerably more food must be supplied than that required just to meet the national average per caput nutritional requirement if the entire population is to be fed adequately.
- 2.19. The fact that the projected demand in 1989 gives a basic per caput intake only marginally above the minimum required, suggests that the high required rates of growth shown in Table 1 may well understate, particularly for protein rich foods, the rate of increase in food production necessary to meet national nutritional requirements fully from domestic production.

### **The need to revise food production targets**

- 2.20. For the main food commodities other than beef, wheat, potatoes and rice, the production targets in the 1979-83 Development Plan are approximately equal to, or above, the levels required for national self-sufficiency. This can be seen from the figures of planned and required production

in 1983 shown respectively in columns (4) and (5) of Table 2. However, during the first two years of the 1979-83 Development Plan period, the production of foodstuffs fell well short of the levels planned. For many crops, including maize, production in 1980 was well below the 1976 level used in the Plan as the base for projecting production. From columns (1) and (2) of Table 2 it will be seen that in 1980, for the nine most important foodstuffs, only the production of sugar exceeded the target production level set in the Plan. The production of maize reached only 62 per cent of the target, falling short by 978,000 tons (10.9 million bags).

- 2.21. Furthermore, at the time the current Five Year Development Plan was under preparation, it was thought that the population was growing at 3.5 per cent per annum. More recent evidence drawn from the 1979 population census and from research findings of the Population Studies and Research Institute of the University of Nairobi indicates that the actual rate of growth is now approximately 4 per cent per annum. Consequently, the demand for food is growing more rapidly than envisaged in the Plan. The demand for maize, for example, is increasing at present by well in excess of one million bags per annum.
- 2.23. The higher rates of growth needed to attain a position of broad self-sufficiency in food, coupled with the ground lost since 1976, mean that, should growth in production only recover to the average rates employed in the 1979-83 Development Plan, there would be large and increasing food deficits throughout the present decade.
- 2.24. This is demonstrated in columns (3), (5), (6) and (7) of Table 2. Columns (3) and (6) show the production of the nine major foodstuffs which would be achieved in 1983 and 1989, respectively, should production grow from its 1980 level at the annual rates contained in the present Plan. Columns (5) and (7) show the 1983 and 1989 production required for self-sufficiency.
- 2.25. For maize, wheat, rice, beans and milk, production in both 1983 and 1989 would be well short of the amounts required for self-sufficiency.

- 2.26. For maize, the projections of production in columns (3) and (6) are based on a hypothetical 1980 production level of 1,942,000 tons (*see* paragraph 2.8), rather than on the actual 1980 production of approximately 1,620,000 tons. These projections show that maize production would fall short of the domestic requirement by 867,000 tons (9.6 million bags) in 1989.
- 2.27. Table 3 compares the average production growth rates implicit in the Development Plan with the production growth rates which must be achieved if the nation is to be self-sufficient by either 1983 or 1989. Major increases in growth rates over and above the Development Plan targets are required for maize, wheat, beans, rice and beef and, for the short term, milk. Some of these rates obviously cannot be achieved, and imports will be required if demand is to be met fully. To minimize these imports, steps must be taken both to modify the pattern of demand for food and to strengthen and re-orient policies aimed at increasing production. This will require a substantial increase in the proportion of government resources devoted to agriculture.
- 2.28. Without such modifications to the growth of national food production, the nation would face the prospect of a continuing and increasing food import bill. For example, for maize alone, the import bill at present world market prices would be K.Sh. 2,500 million for the period 1981 to 1983 and K.Sh. 9,500 million for the decade as a whole, excluding the cost of rebuilding working stocks and of accumulating a national grain reserve. Should the rates of growth of production only be equal to the planned rates, the total foreign exchange cost of importing food would amount, over the present decade, to more than K.Sh. 15,000 million at current prices. This underlines the critical importance of rapid implementation of the proposed policies and programmes outlined in Sections 3 and 4.

#### **Potential for increasing production**

- 2.29. At present average yields on pure stand and intercropped maize, approximately 940,000 additional hectares would be required to produce sufficient maize to meet domestic re-

quirements in 1989. To satisfy fully the requirement for wheat, and on the basis of average yields over the last five years, some 120,000 hectares more than were planted in 1976 would be required. For sorghum and millet, an increase of well over 100,000 hectares of pure stand and interplanted land would be needed. Thus, to meet the increase in requirements for the major grains in 1989 through expansion in crop area alone, considerably in excess of one million additional hectares would need to be planted. Much of this land could be inter-planted or double-cropped with pulses and root crops and, in consequence, little or no additional land would be needed to cater for the increased production of the other major food crops required by 1989. However, large additional tracts of land would be needed for grazing, if the increase in the production of milk and beef required by 1989 were to be based on expansion in area alone using the relatively land extensive methods which are employed at present.

- 2.30. As a general principle, there should be no diversification of land under export crops, the earnings from which are essential for national development, nor should there be further destruction of forests, which must be retained for ecological reasons. Given these constraints, there is little potential in Central and Eastern Provinces for an expansion in the area of good quality land devoted to food production. Of the high and medium potential land in these provinces not under forest, all but an estimated 7 and 32 per cent, respectively, is being cropped (*see* Table 4). The remaining land already supports livestock populations which are too large to be sustained efficiently from the grazing available. Any major increase in food production in these areas must come from increases in crop yields and from the adoption of more intensive techniques of animal husbandry, the use of improved stock and the introduction of better livestock management. In addition, in Eastern Province there are large areas of semi-arid lands which are, at present, unused. Some of these could support food crops, such as millet and sorghum, and offer potential for expanding food production.



- 2.31. Although in Nyanza and Western Provinces there is more scope for expansion in the area devoted to the production of food, land availability is also rapidly becoming a constraint. As in Central and Eastern Provinces, increases in food production must rely largely on intensification and increased yields.
- 2.32. There is a greater, although not unlimited, potential for expansion in Rift Valley and Coast Provinces, where considerable tracts of land are either idle or under-utilized. Expansion of the area devoted to intensive food production, as well as increases in yields, will be an important means of expanding food supply in these provinces. Measures need to be taken and programmes adopted to ensure that these sources are exploited to the full.
- 2.33. Over the long term, some increase in the areas able to support the intensive production of food may be achieved by means of irrigation and drainage.
- 2.34. During the next decade, however, expansion of food production will need to be based primarily on increases in yields. These may be achieved by:
- increased intercropping;
  - increased multiple cropping;
  - increases in the volume and efficiency of fertilizer and other input use;
  - the progressive introduction of improved seeds and livestock; and
  - other improvements in cultural practices.
- Measures to facilitate each of these are given emphasis in the programmes outlined in Section 4.
- 2.35. In addition to yield increases, the supply of food actually available for consumption can be increased substantially through a reduction in storage and handling losses. These are thought to be as high as 16 per cent for maize, and will be reduced by improved extension advice and investment in on-farm storage facilities.

## Expansion in Marketing

2.36. The total tonnage of food consumed in Kenya will continue to increase at approximately 4 per cent per annum. The required expansion of transport, storage and other marketing facilities for food crops and livestock products will, however, exceed this rate for the following reasons:

- over the next decade the population of urban areas is forecast to expand at 9.6 per cent, but that of rural areas by only 2.5 per cent. Rural-urban trade and the associated marketing facilities will therefore need to expand rapidly;
- the increase in the share of foodstuffs produced in the relatively sparsely populated Rift Valley will increase the need for inter-regional trade and associated facilities; and
- the proposed expansion of the strategic reserve will require storage capacity over and above that needed for normal commercial supply.

2.37. By 1983/84, NCPB will require storage capacity for an estimated 11.5 million bags (1.04 million tons), including storage for the 4 million bag (360,000 tons) strategic grain reserve. By 1989, the total NCPB storage capacity required will have risen to 16 million bags (1.4 million tons).

2.38. The demand for certain foodstuffs, such as horticultural products, will grow more rapidly than the demand for foods in general and particular attention will need to be paid in such cases to the expansion of marketing facilities.

## SECTION 3

### A POLICY FRAMEWORK FOR THE FUTURE

#### Price Policy

- 3.1. Policy decisions on the pricing of the major food commodities will be among the most important factors determining whether the nation achieves the rates of growth in food production necessary to recover to and maintain a position of broad self-sufficiency. To achieve this goal, government policy will be to provide incentives for the production of foodstuffs by relating producer prices at the farm-gate to import parity. Recognizing the increasingly unstable nature of world grain markets, domestic producer prices will not be adjusted to reflect transitory world price movements, but will be based on longer-term parities. In order to provide a price incentive for increased production of drought-resistant food crops in arid and semi-arid areas for both human consumption and livestock feed, guaranteed minimum prices will be established for sorghum and finger millet and reviewed regularly as part of the Ministry of Agriculture's Annual Price Review.
- 3.2. Consumer prices will generally be set at levels which cover the domestic producer prices plus processing and distribution costs.
- 3.3. In the case of maize, the producer price will be based on the import parity price for yellow maize. When the nation is forced to import maize at prices above long-term import parity, the retail price will be subsidized in order to protect consumers.
- 3.4. Given the erratic nature of the world market for powdered milk and consumer preference for fresh liquid milk, import parity pricing may be inappropriate. While the present substantial milk deficit remains, the aim of price policy will be to set producer prices at levels which will encourage the production of sufficient quantities of milk to meet consumption requirements for liquid milk throughout the year. To encourage greater production during the dry season, a seasonal pricing policy will be followed.

- 3.5. The grading formula for meat will be simplified and producer prices set at levels which reflect the market value of the product. Price controls will be phased out for high quality cuts, but retained for lower grades in order to protect lower income consumers.

### **Agricultural Inputs Policy**

- 3.6. The central objective of the Government's agricultural and livestock inputs policy is to ensure that adequate inputs are made available at the lowest possible prices at the farm-gate and that, to the greatest extent possible, they are used at the right time and in the correct quantities.
- 3.7. Fertilizer policy will be focused on achieving efficient and timely importation and distribution. Subsidies will be used, when the availability of Government financial resources permit, to maintain profitable input-output price ratios thereby encouraging wider usage. The system of fertilizer importation and distribution will be reviewed. Attention will be focused on ways and means of distributing fertilizer in good time and at the lowest possible cost to the farmer and to the nation's foreign exchange reserves. In recognition of the need to increase food production through intensification of land use and of the importance of fertilizer in this process, the Government will take immediate steps to increase fertilizer use on food crops by 20 per cent per year between now and 1983.
- 3.8. Measures will also be taken to ensure the adequate provision and optimum utilization of other agricultural chemicals. Stricter supervision will be exercised to ensure that ineffective chemicals are not imported.
- 3.9. The main aim of policy for seeds will be to ensure a steady increase in the supply of improved varieties and to keep their prices to the farmer at a minimum. The Kenya Seed Company, in which the Agricultural Development Corporation has a majority shareholding, will continue as the main supplier. The Ministry of Agriculture will participate more closely in the forward planning and pricing decisions of this company.

- 3.10 Steps will be taken to increase the availability and the quality of concentrates, compound feeds and minerals required for increased livestock and poultry production. The Government will support the development of co-operative and private manufacture of animal feeds in the rural areas to reduce unnecessary transport and distribution costs.
- 3.11. For agricultural machinery, the main aim of policy will be the development and wider usage of more appropriate technology to increase labour productivity and to reduce the present emphasis on imported capital-intensive equipment. The availability of agricultural machinery, particularly that required for land preparation and seeding, will be increased through programmes to supply mechanized, ox-drawn and hand equipment. In the long term, the Government will support the development of an effective farm machinery manufacturing, distribution and servicing system.
- 3.12. If farmers are to make effective use of the improved supply of agricultural and livestock inputs, it is essential that they be provided with adequate financial resources. These resources will be provided by expanding seasonal and long-term credit programmes. Particular emphasis will be placed on timely disbursement of seasonal credit for land preparation and for the purchase of seed, fertilizer and other inputs. The present systems will be restructured to meet this goal. Where possible, seasonal credit will be paid in kind rather than in cash. In the longer term, policies will be developed to strengthen the institutional framework with the aim of mobilizing rural savings and providing increased agricultural finance. The policy of the Government will be to move towards a decentralized agricultural finance system.

### **Research and Extension Policy**

- 3.13. The objective of foodcrop research will be to continue the search for more productive crop varieties, while increased emphasis will be placed on breeding programmes aimed at continuous increases in the yields of already established strains. Attention will also be focused on the improvement

of crop and livestock management systems. Livestock research will be directed towards improvement of the genetic potential of animals suitable for arid and semi-arid areas and for zero and near-zero grazing systems.

- 3.14. To improve the flow of information to farmers, the extension services of the Ministries of Agriculture and of Livestock Development will be strengthened through the expansion of programmes for staff training and through dissemination of research station findings to extension officers and more effective demonstration of approved management systems. Greater attention will be given to more effective and widespread group extension techniques involving demonstration farms and field days. Emphasis will also be given to on-the-spot training of farmers in the basic principles of crop husbandry, the use of fertilizer and other inputs, crop rotation, on-farm storage for subsistence crops, record keeping and financial management.

### **Food Security Policy**

- 3.15. The central objective of national food security policy is to ensure that an adequate supply of nutritionally balanced foods is available in all parts of the country at all times. Given current resource constraints, the immediate aims of food security policy will be to obtain a calculated degree of security at the lowest cost. This will be achieved through:
- increasing food production in all areas of the country;
  - emphasizing drought-resistant crops such as sorghum and millet in the dryland areas;
  - the establishment of a food commodity monitoring and reporting system;
  - improved monitoring and forecasting of weather conditions in the main agricultural zones, and wider dissemination of information on expected weather trends;
  - regulation of food exports to maintain domestic supplies and importation of food as necessary to meet nutritional requirements; and
  - accumulation of a multi-commodity strategic food

reserve from domestic surpluses and grain supplied on concessional terms to be used during periods of crop failure or other emergency situations.

### **Processing and Marketing**

3.16. The aim of food processing and marketing policy for the coming decade will be to provide all regions of the country with an assured supply of the food required at the lowest possible cost. Where necessary, facilities will be expanded to keep pace with increased production, consumption and interregional movement of food. To meet this objective, government policy will be to:

- provide farmers with reliable and remunerative outlets;
- expand storage capacities at the farm, co-operative and national levels;
- expand commercial grain milling capacities to meet the increasing consumption requirements in urban areas;
- encourage an increase in the number of hammer mills for crushing maize in the rural areas;
- develop co-operative and private dairies to compete alongside KCC in the rural areas and improve milk collection facilities;
- re-establish the KMC as a financially viable institution;
- fix marketing margins at levels which provide adequate incentives for nationwide distribution; and
- improve marketing information services.

### **Agricultural Trade Policy**

3.17. Kenya will face difficulties over the coming decade in producing the wide range of food commodities required by a rapidly expanding population. In these circumstances, priority will be given to the realization and maintenance of a position of broad self-sufficiency in a wide range of essential foodstuffs. Programmes to produce foodstuffs specifically for export will only be undertaken when such programmes are financially viable under the system of parity pricing to be introduced.

- 3.18. The Government's basic objective will be self-sufficiency in maize. Strategic reserves will eventually be built up to 4 million bags. When consumption requirements cannot be met from this reserve, imports of white and yellow maize will be permitted.
- 3.19. National demand for wheat has increased rapidly in the past decade and is expected to continue to grow at a fast pace. Domestic production currently only meets approximately 65 per cent of national consumption requirements. Given the limited potential for expansion of production, demand will continue to exceed supply. Recognizing the importance of wheat and bread as components of the diet of lower income urban dwellers, the policy of the Government will be to supplement local wheat production with imports.
- 3.20. Although the demand for rice will continue to exceed the supply in the foreseeable future, importation of rice will depend on the prevailing balance of payments situation and the availability of supplies on concessional terms.
- 3.21. Recognizing the need to safeguard domestic food supplies at all times, government policy will be to control carefully all food exports and only allow shipments when domestic supplies are assured for the foreseeable future. At the same time, the Government recognizes the need to protect the interests of the farming community and will only sanction food imports to meet confirmed deficits of staple foods which cannot be met from domestic stocks. Notwithstanding this, the Government recognizes the vital role played by tea, coffee and other export crops in providing the country with the capability to import essential foodstuffs during times of scarcity.

### **Nutritional Policy**

- 3.22. A significant proportion of the population, particularly pre-school age children, is malnourished as a consequence of inequalities in the distribution of purchasing power, seasonal localized food shortages and lack of nutritional education. The overall objective of nutritional policy is to overcome this situation. Recognizing that increasing production



- alone will not resolve this problem effectively, government policy is aimed at increasing the production and consumption of the more nutritious foods, improving the distribution of purchasing power and implementing specific market intervention programmes as and when necessary. Priority will be given to the collection and analysis of information on the nutritional status of the population as a basis for determining the programmes which will eliminate specific nutritional deficiencies most effectively.
- 3.23. The production of certain highly nutritious crops will be particularly encouraged. Beans, peas and groundnuts provide both more protein and calories per kilogram and, in the high and medium potential areas, per hectare than do beef and other meats. These crops are inexpensive to produce and well suited to smallholder production. Government policy will be to encourage the production and consumption of protein in these forms.
  - 3.24. Recognizing the higher nutritional value of granulated maize meal, the policy will be to reverse the present trend towards the increased consumption of sifted maize meal by encouraging an increase in the number of hammer mills in the main maize growing areas.
  - 3.25. Fish, although relatively unimportant in the overall national diet, is an important source of protein in specific regions and Government programmes will be introduced to boost production to meet fully these regional demands.
  - 3.26. The Government's policies aimed at reducing inequalities in the distribution of income will have the effect of mitigating the nutritional problem. The nutritional effects of these policies will be reinforced by the expansion of specific nutrition intervention programmes, including those for school milk, for pre-school feeding, for pregnant mothers and for the Family Life Training Centre. The Famine Relief Programme will be expanded as and when necessary to meet temporary food shortages. Priority will be given at all times to those programmes which improve the nutritional status

of children. Particular attention will also be given to safeguarding the family diet of small-holders who switch from food crop to cash crop production.

### **Resource Development Policy**

- 3.27. The central objective of government land-use policy is to ensure that all land is efficiently utilized and developed to meet national food needs while making a growing contribution to foreign exchange earnings. Priority will also be given to measures aimed at increasing rural employment and income and alleviating poverty.
- 3.28. District Development Committees will be made responsible for co-ordinating and overseeing activities related to key aspects of land tenure and use. Government will assess the efficiency of the existing land tenure systems and of the laws and regulations governing the transfer and adjudication of land. The process of land adjudication will be accelerated and special attention will be paid to solving the problems created by the *de facto* subdivision of group-owned large farms to ensure that these farms are not subdivided into uneconomic units.
- 3.29. In addition to formulating and implementing appropriate land ownership and transfer systems, measures will be introduced to foster land management practices that will maintain soil fertility, prevent soil erosion and silting and protect water catchment areas. To achieve this objective, a National Commission for Soil and Water Conservation has already been appointed with overall executive responsibility to initiate, co-ordinate and implement plans, laws and programmes in the area of soil and water conservation. This Commission will become fully operational by the end of 1981.
- 3.30. Measures will be taken to discourage land speculation, since this can reduce land's productive use and its future productive potential. Policies will be introduced to encourage the production of drought-resistant crops such as sorghum, millet and cassava in marginal and semi-arid areas. Even in high potential areas, rotational growing of these crops will be encouraged as sources of animal feed. Priority will be given to valley drainage and the expansion of small scale

irrigation projects. Large scale irrigation projects will continue where found to be economically viable.

- 3.31. Recognizing the high cost of imported energy and the likelihood of further increases in fuel prices, priority will be given to the development of energy-efficient technologies and practices. Local sources of energy, particularly those based on by-products, will be developed whenever possible.

### **Employment Policy**

- 3.32. Despite substantial rural-urban migration, there is still considerable unemployment in rural areas. Increased employment in the agricultural sector will, however, need to be the major source of new jobs for the rapidly expanding labour force until at least the end of this century.
- 3.33. The basic aims of manpower development policy are to increase the willingness of the population to participate in agricultural development and to equip the agricultural workforce with appropriate technical and managerial skills. To meet this objective, the Government will place increased emphasis on vocational training for agriculture and will expand the existing agricultural training institutions. An overriding consideration in the formulation of policies on resource allocation and development will be the need to generate greater employment opportunities, particularly in the rural areas. Within the programmes to expand food production, labour intensive techniques will be emphasized wherever situations of labour surplus are envisaged.
- 3.34. The seasonal nature of much of agricultural employment means that labour shortages occur at certain times of the year despite the general surplus of labour. As the rural population will be growing more slowly over the next decade than the aggregate demand for food, seasonal labour shortages could well become progressively more of a constraint to meeting this demand unless corrective measures are taken. Programmes to increase labour mobility and labour productivity at times of labour shortage will be undertaken to ease this constraint.

## SECTION 4

### PROGRAMMES TO ACHIEVE THE POLICY

#### OBJECTIVES

- 4.1. Working within the policy framework outlined above, the Ministries of Agriculture and of Livestock Development will undertake a comprehensive range of programmes.
- 4.2. These programmes will focus on promoting increases in national food production to keep pace with population and income growth and to maintain a position of broad self-sufficiency in food for the remainder of the decade. Others will be aimed at improving processing and marketing efficiency to cope with the growth in supply. As part of a comprehensive programme to ensure the security of food supplies without resorting to the use of scarce foreign exchange on imports in years of crop failure, a national grain reserve of 4 million bags will be established together with appropriate control mechanisms for its management. Specific measures will also be introduced to ensure that the increased and more secure supply of food will result in an adequate nutritional intake for the entire population.
- 4.3. For these programmes to be implemented successfully and to have maximum impact, it is important that they are mutually reinforcing and consistent with the main aims of both food policy and development policies in general. To this end, five Food Policy Committees will be established, each of which will be responsible for formulating, developing and co-ordinating policies and programmes in the main areas of food supply. Four of these Committees will be concerned primarily with the development of detailed action programmes. The fifth will examine, in detail, the major mid and long-term policy options.

The areas covered by each Committee will be as follows :

Committee I: *Increasing food production*

- the intensification of land utilization for food and livestock production;
- research on food production;

- the extension services; and
  - weather monitoring and information systems.
- Committee II: *Agricultural inputs*
- credit facilities;
  - the supply of seeds;
  - land preparation services;
  - supply and utilization of fertilizers;
  - labour supply and mobility; and
  - other agricultural inputs.
- Committee III: *Processing and marketing*
- food processing facilities;
  - food marketing and distribution; and
  - national food security.
- Committee IV: *Nutrition*
- collection and processing of data on nutrition;
  - nutrition monitoring systems; and
  - nutrition improvement and food fortification programmes.
- Committee V: *Mid and long-term policy issues*
- the optimal land use pattern for food crops;
  - the optimum mix of food and export crops and measures for their realization;
  - the relative advantages of the intensification of production on rain-fed land and the extension of irrigated land;
  - the extent to which nutritional output per hectare, rather than short-term market forces should be used to determine which foodstuffs should be produced;
  - market versus administered pricing; the use of base point pricing; price intervention to encourage the production and consumption of non-luxury and nutritionally efficient foodstuffs;
  - the extent to which Government should intervene in the marketing of foodstuffs; and
  - the changes in consumption patterns necessary to accommodate food availability and nutritional efficiency.

- 4.4. The Committees will begin their work immediately. Members will be drawn from all relevant ministries, parastatals and other organizations. The first responsibility of Committees I to IV will be to determine a priority ranking for each component of the action programmes and then to propose how the financial, manpower and other programmes should be phased. Care will be taken to ensure that there is consistent application of policies throughout the country.
- 4.5. The work of Committee V will be closely integrated with the preparation of the next Development Plan.

#### **Programme to improve the supply of seeds**

- 4.6. The Kenya Seed Company (KSC) has already been directed to ensure that adequate supplies of seed, particularly maize and wheat, are available at the beginning of each crop season. A target rate of growth of sales of improved maize and wheat seed has been established for the company at 10 per cent per annum. The Government will use its majority shareholding in the KSC to ensure that these goals are met.
- 4.7 So that the policies of the KSC are geared closely to national requirements, the Ministry of Agriculture will maintain close liaison with the company and participate in major decisions on investment and prices. In the main grain growing areas the KFA already has distribution centres and these will be extended as necessary. Co-operative unions and societies will also be encouraged to expand their seed distribution activities, as will private agents.
- 4.8. In view of the need to increase the productivity of livestock in high and medium potential areas, a programme will be developed by the KSC to improve the quality and supply of seed for pasture and forage crops. A project to produce Napier and Bana grass seed has already been started and will be expanded.
- 4.9. To encourage more farmers to use improved seeds, the Ministry of Agriculture will ensure that their price is kept at the lowest possible level consistent with reasonable returns to the farms producing seeds, to the KSC and to distributors.

The price for seeds will be reviewed as an integral part of the Annual Review of Agricultural Prices and announced well in advance of the planting season.

- 4.10. Sales of improved maize and wheat seed will need to increase by more than 150 per cent over the coming decade. This will necessitate a parallel increase in the area of land under seed production. As a priority, measures will be taken to ensure that sufficient land is available for this purpose.

#### **Programme to improve land preparation services**

- 4.11. The Ministry of Agriculture will introduce a wide ranging programme to improve the availability of land preparation services. The overall objective will be to improve the capacity of farmers for timely, thorough land preparation and to provide farmers, particularly smallholders, with an improved capacity to cultivate their main food crops.
- 4.12. The efficiency of the Ministry of Agriculture's Tractor Hire Service is extremely low and very few farmers actually benefit. The service will be improved and the role of farming groups and the private sector expanded. Enlargement of the Tractor Hire Service will be conditional on an increase in its efficiency. The service will be broadened to include the use of tractors for soil conservation and land improvement. Credit facilities will be extended to co-operatives and individual farmers for the purchase of tractors, and Co-operative Extension Officers will encourage co-operative societies to purchase tractors for use by members, particularly in those areas where the services provided by the private sector are inadequate.
- 4.13. The programme will emphasize the development, dissemination and efficient use of more appropriate forms of mechanization, such as ox-drawn toolbars, traditional ox-ploughs and ox-drawn carts. The Agricultural Machinery Testing Unit will develop machinery appropriate to Kenyan conditions and arrangements will be made to expand the commercial production of such machinery. Distribution will be undertaken through the KFA, co-operatives and private

outlets. To support this programme, the Ministry of Agriculture extension services will arrange for the proper demonstration of such machinery and for the provision of continuing advice on its use. Credit will be provided for setting up small-scale workshops for machinery maintenance and repair. The capacity of the Farmer Training Centres to demonstrate the proper use of such machinery will be increased.

#### **Programme to improve the supply and utilization of fertilizers**

- 4.14. The aim of the Ministry of Agriculture's fertilizer programme will be to encourage the timely use by farmers of optimal fertilizer types and quantities. As a prerequisite, the Government will initiate a project to assess fertilizer use and productivity. A nationwide extension programme will be launched to demonstrate the economic benefits of fertilizer and to provide farmers with accurate information on its use. An updated fertilizer handbook will be distributed through the extension service.
- 4.15. The seasonal credit programme presently in operation will be strengthened to enable farmers to purchase increased quantities of fertilizer. A direct fertilizer subsidy will be introduced as and when national financial resources permit. This subsidy will apply to all fertilizer groups to avoid creating price distortions leading to inefficient use. To reduce the costs of administration, it will apply at the point of import.
- 4.16. The Ministry of Agriculture will ensure that adequate quantities of fertilizer are imported and distributed on time. This will be co-ordinated by the Fertilizer Monitoring and Advisory Committee, which will continue to forecast requirements and approve import permits.
- 4.17. With the aim of increasing fertilizer use on food crops by 20 per cent per annum between now and 1983, a major demonstration programme will be undertaken during the next long rains season. This will be supported by the supply of fertilizers to selected smallholders on concessional terms in a concerted effort to demonstrate the impact on food production of timely crop management and fertilizer application.



### **Programme to improve the supply and utilization of other inputs**

4.18. A programme will be instituted to increase the supply and improve the distribution of agricultural chemicals for disease and pest control. Distribution will continue to be undertaken by the private sector, with Government intervention to ensure reasonable prices. An extension campaign will be mounted to provide farmers with adequate information on suitable types and application rates.

The Ministry of Livestock Development will improve the supply and distribution of the drugs, minerals, salts and other inputs required by livestock producers. This programme will be supported by a number of disease control projects, including the :

- Rinderpest/CSPP Eradication Project;
- Foot-and-Mouth Disease Control Project;
- Tick Control Project;
- Cattle Dip Construction and Operation Project, Coast Province;
- General Veterinary Services in Pastoral Areas; and
- Wildlife Disease Control Project.

### **Programme to improve credit facilities for food production**

4.19. The Ministry of Agriculture proposes to expand the seasonal credit scheme so that, by 1985, credit is provided for 1.5 million acres of maize and 250,000 acres of wheat. In 1981/82 the scheme will be extended to cover all commercially viable food crops. The disbursement procedures of co-operatives will be simplified and streamlined to facilitate a more rapid issue of credit.

4.20. The Ministry of Livestock Development has identified availability of credit as a serious constraint in the livestock industry. The AFC at present provides limited credit for the purchase of dairy cattle and for the provision of water and fencing, but this is inadequate. The funds available to the AFC will be increased to enable it to expand the supply of credit to livestock producers, including producers of pigs, poultry and rabbits. The main processing institutions in the livestock sector, KMC, KCC and UBF, will also expand their supply of credit to contract producers.

- 4.21. Another major source of credit for smallholders is the Integrated Agricultural Development Programme. In order to increase the amount of credit provided for food crops under this programme, the Ministry of Agriculture will:
- increase the food crop component in the IADP package which is eligible for loans;
  - make credit available under IADP for food crops planted during the short rains; and
  - increase the volume of inputs available through IADP on credit terms.
- 4.22. The overall aim of credit policy for food crops and livestock for the remainder of the decade will be to steadily expand the supply of credit in order to provide a financial base for the more intensive production necessary to meet consumption requirements. Over the long term, the Government aims to broaden the institutional base for credit disbursement through a programme of decentralization.
- 4.23. Consideration will be given to introducing crop insurance into the credit programme. The most appropriate means of doing this and the cost will be investigated by the Ministries of Agriculture, Livestock Development, Co-operative Development, Economic Planning and Finance before the end of 1981, in consultation with the insurance community.

#### **Programme to improve extension services**

- 4.24. The success of the programmes outlined above to improve the supply of inputs, credit and land preparation services will depend to a considerable extent on their proper utilization by farmers. To this end the Ministry of Agriculture will implement a programme to improve its extension services.

The main components of this programme will be:

- simplification of reporting procedures;
- provision of additional transport facilities;
- improvement in the training of extension staff;
- development of more demonstration plots to illustrate the effectiveness and profitability of improved production techniques; and
- improvement in the dissemination of farming guides

and other materials to farmers and producer co-operatives.

- 4.25. An important means of improving food crop yields will be the increased and more efficient use of double cropping and intercropping. Extension staff will be required to pay particular attention to making farmers aware of the advantages of these practices.
- 4.26. It has been estimated that approximately 16 per cent of small-holder maize production is lost during the post-harvest period, either through insect and rodent damage or mould. A start has been made on a programme to encourage better handling and storage of crops, at the farm level. The aim of the programme will be to reduce these losses by 50 per cent by 1990. If successful this will increase the volume of maize available for consumption by some two million bags.
- 4.27. An extension programme will be introduced to make farmers aware of the advantages of more efficient methods, combining traditional and modern materials and techniques of constructing on-farm stores. Farmers will be encouraged to use admixtures of insecticides with their grain.
- 4.28. Short training courses in storage methods will be conducted for the Ministry of Agriculture extension staff by the Crop Storage Unit of the Ministry. The work of the staff will be supported by a pamphlet which outlines the most cost-effective methods of drying and storing grain.
- 4.29. The Ministry of Livestock Development will improve and expand its livestock extension activities, giving priority to extension and demonstration designed to improve management practices and to encourage the introduction of high-quality stock.

#### **Programme to intensify research on food production**

- 4.30. One of the constraints to agricultural growth identified by the current Development Plan is a lack of new technology available for immediate adoption. The major research breakthroughs of the 1960's, such as hybrid maize development, have been largely utilized and are unlikely to be repeated in the foreseeable future.

4.31. Recognizing the need to intensify maize research, the Ministry of Agriculture will co-ordinate a research and breeding programme which will give priority to increasing yields through genetic improvement, with a target of at least 4 per cent per annum growth.

Particular attention will be paid to increasing the yield of short-maturing varieties suited to double-cropping systems and to developing crop combinations suitable for inter-cropping.

4.32. Attention will also be given to the development of efficient crop production systems for semi-arid lands. The national wheat research and breeding programme will focus on minimum cultivation techniques and development of production methods suited to smallholders. Research on triticale production and utilization will continue. The paddy breeding programme will be extended to cover the development of varieties for use under rain-fed conditions.

4.33. At present, most meat and milk is produced on high and medium potential land. But this is becoming more and more uneconomic due to the high and rising opportunity cost in terms of food crops which could be grown. For the future, animal production in these areas will be based increasingly on zero and near-zero grazing systems. To this end, the Ministry of Livestock Development will co-ordinate the implementation of a comprehensive and integrated national animal production research programme which will give priority to:

- identifying production constraints on both small and large farms, and of strategies for their solution;
- improving the genetic potential of beef and dairy animals;
- increasing forage productivity in high and medium potential areas through selective breeding and improved agronomy;
- developing forage crops produced on-farm to replace grain-based purchased feeds;
- integrating small stock into farming systems in dry-

- land areas to increase output and to provide insurance against crop failure; and  
—improving animal productivity per unit of land.

### **Other measures to boost livestock production**

- 4.34. A number of measures have already been outlined to improve research, marketing, processing and pricing arrangements, the supply of credit and the availability of pasture and forage seeds in the livestock sector. These will be supplemented by further programmes specifically aimed at expanding the production of meat and milk.
- 4.35. Production in high and medium potential areas will be developed through investment proposals, now being prepared, which emphasize zero and near-zero grazing.
- 4.36. Production of livestock on rangelands will be intensified through a programme to establish large scale ranches, for which detailed investment proposals have already been prepared. Complementary, but longer-term, programmes of disease control, genetic improvement, improved artificial insemination and herd and pasture management will be instituted and veterinary services will be improved.
- 4.37. A programme will be introduced to improve the supply and minimize the cost of animal feeds, partly based on the use of non-traditional, domestically produced raw materials, such as sisal waste. Animal feed milling capacities will be expanded. This will serve to encourage the expansion of intensively produced livestock, such as pigs and poultry. Priority will also be given to the production of rabbits as a source of low-cost protein.
- 4.38. To increase the offtake of meat from the present national livestock herd, a programme will be initiated to revive and expand beef feedlots, the output of which has declined sharply in recent years. The AFC and KMC will be encouraged to expand into this area and the animal feed/ beef price ratio will be revised to make beef fattening profitable.

- 4.39. In order to upgrade the national dairy herd and improve its productivity, a programme to import high-grade breeding stock will be introduced and the slaughter and export of breeding dairy stock will be banned. The feasibility of increasing the milk supply from the national goat herd will also be reviewed.

#### **Programme to increase the production of fish**

- 4.40. The current annual catch is 52,000 tons. This is well below the sustainable yield from coastal waters and fresh water sources. On-going programmes will be strengthened with the aim of achieving these sustainable yields. A programme has already been introduced to provide fishermen with improved equipment on credit terms and to up-grade existing equipment. This programme will be extended, placing emphasis on the role of fishing co-operatives. The expanded production of fish will require improvements in processing, storing and marketing fish from both fresh water and marine sources. Programmes will be introduced to provide the necessary infrastructure. Finally, the Ministry of Livestock Development will embark upon the establishment of fish farming centres, using fingerlings supplied by the Fisheries Department.

#### **Programme to improve and expand food processing facilities**

- 4.41. Recognizing the need to improve and expand food processing facilities to keep pace with production and consumption requirements, arrangements will be made to—
- expand grain milling capacities in urban and rural areas;
  - develop co-operatives and private dairies to process and distribute milk outside the main urban areas;
  - expand the supply of meat to KMC and improve its efficiency;
  - develop further horticultural processing facilities; and
  - establish facilities for the iodization of salt.
- 4.42. Expansion of maize, wheat and rice milling capacity to cater for the growing urban demand will be undertaken by the commercial milling sector. Priority will also be given to the

establishment of more small-scale hammer mills in the main maize producing areas themselves, with the aim of reversing the trend towards the consumption of sifted maize meal in these areas. Hammer mills produce granulated maize, which is superior to refined maize from both a nutritional and an economic standpoint.

- 4.43. There is need to boost the production and commercial off-take of milk. KCC's intake, which represents approximately half the total national marketed volume, has not increased significantly in the last 10 years, whereas sales of liquid milk have increased steadily and shortages of liquid milk have now arisen. Producer co-operatives and private dairies will be encouraged and issued with licences to process and distribute milk, competing alongside KCC. This will serve to increase production and offtake and minimize processing and distribution costs and, hence, consumer prices.
- 4.44. KMC is an important instrument for the implementation of national meat production programmes and must be maintained as a financially viable institution. Measures will be taken to—
- finance the purchase by KMC of drought-stricken cattle whenever necessary;
  - finance processing losses on canned beef;
  - reschedule KMC's debt repayments;
  - amend the livestock and meat control formulae, so that the differences between grades and costs truly reflect market values; and
  - improve KMC's operational efficiency.
- 4.45 Horticultural processing facilities will be developed further to cater for domestic and export markets. Detailed feasibility studies will be undertaken of the establishment of processing facilities alongside the Horticultural Production and Marketing Centres to be set up during Phase 1 of the National Horticultural Development Programme.
- 4.46. Recognizing the need to improve food processing standards, the Kenya Bureau of Standards will devise and implement more comprehensive quality controls, which will apply to

all food processing operations. Measures will also be taken to prevent misleading advertising and promotional campaigns which exaggerate the nutritional qualities of processed food products.

### **Programme to improve the marketing and distribution of food**

- 4.47. The planned rapid expansion of food production, together with the increase in inter-regional movement from surplus to deficit areas which will occur in the coming decade, will impose a severe strain on the marketing and distribution systems. The expansion of facilities required will be more closely related to the expected growth in urban population of 9.6 per cent per annum than to the overall population growth of 4.0 per cent per annum. A comprehensive programme will be implemented to expand marketing facilities and modify certain policies to improve the efficiency of the system in order to meet this challenge.
- 4.48. Measures to improve the efficiency of grain storage by small-holders have been described above. There is also a need for a programme to develop sufficient grain storage facilities to cope with the additional volume that will pass through commercial channels. The Ministry of Agriculture will prepare a national grain storage plan, which identifies—
- future grain production, consumption, inter-regional trade, exports and imports;
  - the size and location of grain reserves required to meet national food security objectives; and
  - the storage, drying, handling and distribution facilities required.
- 4.49. The existing restrictions on inter-district and inter-regional movements of maize and other produce impede efficient nationwide distribution by private traders and add to marketing costs and consumer prices. Simultaneous shortages and gluts have occurred in different parts of the country, and the restrictions are widely abused. The long-term aim, as defined in the current Development Plan, is to simplify the marketing system by removing these artificial movement restrictions and employing the NCPB as a buyer and seller of last resort.



- 4.50. As soon as the maize supply situation improves, NCPB commercial stocks are replenished and a national strategic grain reserve is established, the internal market restrictions will be phased out. For certain minor products, where NCPB accounts for a small proportion of the total market, these restrictions will be withdrawn.
- 4.51. At present, farmers and traders lack adequate information on prices prevailing in other markets and are aware only of the NCPB purchase price which is announced annually. This lack of knowledge renders the farmers liable to exploitation and increases the risks borne by traders and hence their required margin. To overcome this problem, the Ministry of Agriculture has started collecting grain and horticultural prices every day in the markets at Mombasa, Kisumu, Nakuru, Limuru, Thika, Eldoret, Nyeri, Karatina and Machakos. These will continue to be broadcast on the radio, daily for horticultural products and weekly for grains. The livestock market information system which has been introduced for Nairobi and Eldoret will be expanded.
- 4.52. The programme to expand the role of co-operatives in maize and milk processing and distribution and to re-establish KMC as a financially viable institution have been described above. To increase the total supply of meat, the Ministry of Livestock Development will improve the marketing arrangements for sheep and goats. The Ministry of Agriculture will undertake a programme to strengthen HCDA, while the Ministry of Co-operative Development will co-ordinate a programme to restructure and improve the operational efficiency of the HCU.
- 4.53. The price mechanism plays a crucial role in ensuring that domestic food production is adequate to meet consumption requirements. The producer and consumer prices of the main staple foods are fixed by Government and this control will continue. The producer prices of food crops will continue to be reviewed annually by the Ministry of Agriculture and will be fixed at levels which are sufficiently attractive to farmers to stimulate domestic production to achieve a level of broad self-sufficiency. Marketing margins

and retail prices will be fixed at levels which cover domestic costs. Subsidies will only be used to meet the losses incurred on imports made to cover deficits arising from occasional crop failures. A programme to improve the decision-making framework for price policy is described separately below.

### **Programme to establish an information system**

- 4.54. The critical importance of accurately monitoring the overall food supply position is well recognized by the Ministries of Agriculture and Livestock Development which will develop a comprehensive food information and reporting system. This will provide—
- early warning to Government, the private sector and parastatals on emerging crop or livestock conditions which could result in either shortages or excess supply of major food commodities; and
  - reliable and timely information on the availability and use of major agricultural inputs, including fertilizer, seed chemicals, credit and land preparation services.
- 4.55. The programme will be implemented by the extension service of the Ministry of Agriculture, the Central Bureau of Statistics (CBS) and the inter-ministerial Crop Forecasting Committee already established to monitor the food supply situation.
- 4.56. Early estimates of areas planted will be made by the Ministry of Agriculture extension staff, who will make regular surveys of the farms included in the CBS sample.
- 4.57. Extension staff will also provide periodic reports on—
- input availability, use and distributional difficulties;
  - land preparation and planting;
  - the monthly weather and crop situation;
  - the progress of harvesting, marketing and stock accumulation; and
  - the local food supply situation and the farm-gate and market prices of the main food crops.

- 4.58. The CBS will continue its integrated rural surveys, which include a twice yearly survey of areas planted and yields. The timing of this survey will be modified to ensure that each district is covered at the most appropriate time. The sample has been expanded to cover 15,000 holdings in 648 clusters and this will facilitate the preparation of crop forecasts at the district level. The same sample frame will also be used as a basis for *ad hoc* surveys as and when required.
- 4.59. In co-operation with the CBS, the NCPB will continue its surveys of maize yields, using the CBS sample of farms, as a basis for estimating the quantity of maize to be purchased by the Board.
- 4.60. The programme being implemented by the Ministry of Agriculture to collect and disseminate accurate market information on food crops and livestock is described above. Market prices and their movements will be used, in conjunction with the crop and yield data obtained by the Ministry of Agriculture's extension services, the CBS and the NCPB, in its assessment of the food supply situation.
- 4.61. These components of the programme will be co-ordinated through the Crop Forecasting Committee, which will monitor the food supply situation closely. The group will evaluate regularly the overall supply prospects and provide timely warnings of any impending shortages to senior Government decision makers.

**Programme to improve weather monitoring and dissemination of weather information**

- 4.62. In order to accumulate meteorological data for present and future use in agricultural planning, the Meteorological Department will continue to monitor, through an expanded station network, meteorological parameters critical for crop development, including rainfall, evaporation, soil temperatures and surface winds.
- 4.63. The monitoring capacity of the Department will be strengthened by the establishment of agro-meteorological stations at the rate of five per year, as envisaged in the current Development Plan. These will be established at agricultural research stations and Farmers' Training Centres.

4.64. General weather developments likely to affect Kenya will be carefully monitored in the Regional Meteorological Centre in Nairobi and information on adverse weather movements will be disseminated in time to help forecast crop failure. An early-warning system on potential weather hazards will be evolved within the Meteorological Department. This will include forecasts of agriculturally significant weather conditions, such as:

- prolonged wet spells during harvest periods which could lead to high moisture content in grains; and
- prolonged dry spells during the stages of crop growth when water requirements are high.

4.65. A large body of information already exists on the weather and climate of Kenya in the form of annual and monthly summaries published by the Meteorological Department. It is clear, however, that this information is not reaching the farmer. The Meteorological Department, the Ministry of Agriculture and the Ministry of Information and Broadcasting will develop improved means of disseminating this information.

#### **Programme to improve national food security**

4.66. Kenya is committed to the maintenance of a national grain reserve to safeguard food security. This was first set at one million bags in the early 1960's and increased to 2 million bags in 1972. When this reserve was required in late 1979 and early 1980 it had been depleted.

4.67. The immediate need is to rebuild the reserve and develop a system of control which will ensure that strategic stocks are available when required and are released at the most appropriate time and rate. The reserve will initially comprise 2 million bags of maize, to be stored in selected existing NCPB cyprus bins and go-downs. Subsequently, it will be built up to a level of 4 million bags of maize plus other staple foods. This will necessitate the construction of additional storage capacity specifically for the reserve, as described above in the outline of the national storage plan.

4.68. To ensure that the reserve is only used to supply the domestic market and that maize is only released from it at times of genuine shortage, ownership of the stock will be vested in the Ministry of Agriculture. Day to day management will be delegated to the NCPB which will act as an agent of the Ministry, but all major decisions and, in particular, those concerning release from the reserve, will be made by the Minister for Agriculture. These decisions will, in turn, be closely controlled by regulations setting out conditions under which purchases for and sales from the stock are made.

4.69. In addition to the storage needed for its commercial operations, the NCPB has sufficient capacity to store a reserve of 2 million bags. The cyprus bins at Kitale and Nakuru can hold one million bags, and these will be used exclusively for the reserve. The remaining 1 million bags will be stored in the following locations:

| <i>Locations</i>   | <i>Capacity<br/>(90 kg bags)</i> |
|--------------------|----------------------------------|
| Nairobi            | 400,000                          |
| Nakuru             | 150,000                          |
| Kisumu             | 50,000                           |
| Eldoret            | 100,000                          |
| Sagana             | 50,000                           |
| Konza              | 50,000                           |
| Nanyuki            | 50,000                           |
| Bungoma and Webuye | 150,000                          |

4.70. Should the strategic reserve be built up entirely from domestically produced maize purchased at the current producer price, the long-term establishment cost of the 4 million bags of grain for the reserve would be Sh. 427 million. This figure would be reduced to the extent that the accumulation of the reserve were based on grain supplied on aid or concessional terms.

4.71. The immediate establishment cost in 1981/82 of a reserve of 2 million bags of maize will be Sh. 253 million. There will be no immediate storage construction costs.

4.72. The estimated cost of storing the reserve including the costs of recycling, losses and maintenance, is Sh. 11.50 per bag per annum, or a total cost of Sh. 23.0 million per annum for a reserve of 2 million bags, rising to Sh. 46.0 million per annum for a reserve of 4 million bags.

### **Programme to improve nutrition**

4.73. The programmes outlined elsewhere in this paper aim at increasing food production and improving its distribution. As such, they will contribute to an improvement in the nutritional intake of the population.

4.74. However, these programmes alone will be insufficient to eradicate malnutrition completely. Recognizing this, the Government has established a Food and Nutrition Planning Unit and an Inter-Ministerial Co-ordinating Committee on Nutrition within the Ministry of Economic Planning and Development, which will co-ordinate the activities of the various organizations and agencies involved in nutrition.

4.75. The following intervention programmes and measures will be undertaken to improve the nutritional status of the low income groups and those most at risk :

- an evaluation of the cost effectiveness of the School Milk Programme and identification of measures to improve the nutritional status of children;
- expansion of the Government's relief programme to cover the large number of rural and urban families adversely affected by food shortages;
- expansion of the national nutrition education programme, by increasing the number of nutrition teachers and enlarging the Karen College of Nutrition;
- expansion of the Nutrition Intervention Programme in excess of the K£4.5 million expenditure visualized in the Development Plan for the period 1979-1983;
- design and implementation of appropriate government sponsored programmes for food fortification;
- close monitoring of the quality of prepacked and processed foods by the Ministry of Health and the Ministry of Commerce;
- improvement of the Home Economics Service of the

- Ministry of Agriculture, which will lay more emphasis on nutritional education; and  
—detailed survey and analysis of the nutritional status of the population and the establishment of a monitoring system to strengthen project design, selection and evaluation.

**The implications for additional government expenditure on selected programmes**

- 4.76. The programmes outlined above have financial implications for both the private sector and the Government. Detailed cost estimates and, where appropriate, projected cash flows for each programme will be prepared by the appropriate Food Policy Committee. The incremental costs to the Government are outlined below for those programmes for which approximate estimates can be made at present. All cost estimates are in 1981 prices.

**Storage facilities:**

- 4.77. Presently, NCPB owns storage facilities for 7.5 million bags of food crops. By financial year 1983/84, storage will be required for some 11.5 million bags, including the grain reserve. At an average cost of K.Sh. 40 per bag for the construction of godowns, this additional capacity will cost K.Sh. 160 million. To ensure that additional storage capacity is built on time, expenditure will be at the rate of K.Sh. 80 million per year in financial years 1981/82 and 1982/83. In the subsequent six financial years, K.Sh. 30 million will need to be spent annually to reach the required capacity of 16 million bags by 1989.

**The national grain reserve:**

- 4.78. The costs of acquiring the 4 million bags of maize for the strategic reserve will be K.Sh. 506 million at current prices. The maintenance costs of this reserve, at K.Sh. 11.5 per bag per annum would amount to K.Sh. 23 million in 1981/82, K.Sh. 34.5 million in 1982/83 and K.Sh. 46 million in 1983/84, should the reserve be built up to 2 million bags at the start of 1981/82, and by a further one million bags in each of the two subsequent years. These

annual costs exclude interest charges on money invested since, although such interest charges are economic costs, they will not entail any change in government cash flows.

#### **Fertilizer subsidy:**

- 4.79. The Government has authorized the importation of 260,000 metric tons of fertilizer for financial year 1980/81. At present prices, the c&f cost of this fertilizer would be some K£24.5 million. In addition to commercial imports, some 54,000 tons of fertilizer is expected as aid for the March 1981 planting season. At an annual rate of increase for all crops of 10 per cent, 314,600 tons would need to be imported in 1983/84. At present prices this would cost K£32 million. With the rising cost of fertilizers, the Government will determine from time to time the level of subsidy required to cushion the farmer.

#### **Agricultural and livestock credit:**

- 4.80. Expanding the AFC funds to meet the increase required in the provision of credit to livestock producers will result in an initial cost to the Government of an estimated K.Sh. 230 million in financial year 1981/82.
- 4.81. The new seasonal crop credit scheme introduced in 1980 will continue until replaced by a more permanent scheme and will be funded by Government through the Cereals and Sugar Finance Corporation.

#### **Beef and dairy marketing:**

- 4.82. Prior to the establishment of an improved beef marketing system as proposed above, a price information system will be established. This will include a project to set up Livestock Marketing Information Units in four locations at a cost of K.Sh. 6.1 million.
- 4.83. The first four rural dairies to be constructed under the programme aimed at increasing the offtake of milk will cost K.Sh. 17 to 23 million to establish.



## The decision-making framework

- 4.84. One of the factors contributing to the periodic food deficit with which Kenya has been confronted since Independence has been the lack of appropriate and timely decisions on producer and consumer prices and on import and export programmes to cater for deficits and surpluses. The decision-making framework in these two critical areas needs to be more clearly defined to prevent repetition of the food shortages of 1980 and 1981.
- 4.87. Decision-making for producer and consumer prices for the main staple food commodities is centred on the Annual Agricultural Price Review. The Ministries of Agriculture and Livestock Development are required by law to announce producer prices in advance of the crop season for all scheduled crops and commodities. The review has been extended to cover a wider range of crops and commodities than specified in the schedule. Consumer prices are also considered and are announced by the Minister for Finance.
- 4.88. The Ministries of Agriculture and Livestock Development will continue to prepare the basic analysis of production, processing and distribution costs and movements in international market prices as a basis for determining import and export parities. Consultations will be held with the Office of the President, and the Ministries of Finance and Planning and Development. Finally, a paper will be submitted to Government for approval.
- 4.89. The majority of the price problems which have occurred stem from decisions on producer and consumer prices which have not reflected the Review's findings. In future, all decisions on producer and consumer prices will be made within the framework of the Review. In the event that there is a need for *ad hoc* price revisions within the year to reflect changed circumstances, such revision will follow the same review procedure.
- 4.90. In order to improve national food security, steps will be taken to define more clearly the reporting and decision-making procedures for the supply of the main staple foods.

Overall responsibility for maintaining adequate supplies rests with the Ministries of Agriculture and Livestock Development. These ministries will collect background information on the food supply situation, working in close co-operation with the Ministry of Planning and Development, the Central Bureau of Statistics and the inter-ministerial Food Monitoring Committee.

- 4.91. The Permanent Secretary of the Ministry of Agriculture will submit quarterly reports on the food supply situation to the Office of the President. These reports will summarize:
- the present stock position;
  - production prospects and consumption requirements for the next 6 months;
  - import and export programmes already scheduled; and
  - additional imports or exports required during this period, their timing and financial implications.
- 4.92. It will be the responsibility of the Office of the President to keep Cabinet informed of the national food supply situation and to ensure that timely decisions are taken and financial provision is made for whatever actions are required to safeguard national food supplies.
- 4.93. The day-to-day procedures for the operation of the strategic grain reserve have already been outlined above. Release of grain from the reserve, other than in the process of normal recycling, will be authorized by the Minister for Agriculture only, and then only after Government approval has been obtained.
- 4.94. In every District, including Nairobi, a Standing Food Security Committee will be established. Each Committee will meet monthly to monitor food production, supply, storage, marketing and distribution. The membership will be:
- District Commissioner—Chairman
  - District Agricultural Officer—Secretary
  - District Development Officer
  - Ministry of Livestock Development

Ministry of Health

Ministry of Commerce

Ministry of Information and Broadcasting

Ministry of Co-operative Development

Ministry of Culture and Social Services

Members of Parliament

KANU Chairman/Secretary

Maendeleo ya Wanawake

Local Council of Churches

Local Municipality and

County Council Representatives.

TABLE 1

**DOMESTIC REQUIREMENTS OF THE MAIN FOODSTUFFS IN 1983 AND 1989 AND THE RATES OF GROWTH OF PRODUCTION NECESSARY TO ACHIEVE SELF-SUFFICIENCY**

|  | Estimated Production<br>(000 tons) |        | Estimated Domestic Requirement<br>(000 tons) |       | Annual Production Growth Rate required for Self-sufficiency<br>(per cent) |         |
|--|------------------------------------|--------|--|-------|---|---------|
|  | 1980                               | 1983   | 1983   | 1989  | 1980-83   | 1980-89 |
|  | (1)                                | (2)    | (3)  | (3)   | (4)   | (5)     |
| 1. Maize:                                    |                                    |        |  |       |   |         |
| (a) 1980 production as base                  | 1,620                              | 2,777* | 3,514  | 3,514 | 19.7  | 9.0     |
| (b) 1976 production as base                  | (2,264)†                           | 2,777* | 3,514  | 3,514 | 7.0   | 4.9     |
| (c) Mean of 1976 and 1980 production as base | (1,942)‡                           | 2,777* | 3,514  | 3,514 | 12.7  | 6.8     |
| 2. Wheat Flour                               | 142                                | 292*   | 493  | 493   | 27.2  | 14.8    |
| 3. Sorghum/Millet                            | 369                                | 445*   | 563  | 563   | 6.4   | 4.8     |
| 4. Rice                                      | 23                                 | 66     | 90   | 90    | 42.1  | 16.4    |
| 5. Beans                                     | 140                                | 253    | 344  | 344   | 21.8  | 10.5    |
| 6. Potatoes                                  | 450                                | 655    | 828  | 828   | 13.3  | 7.0     |
| 7. Sugar                                     | 4,402                              | 342    | 571  | 571   | -5.2  | 4.0     |
| 8. Beef                                      | 147                                | 188    | 314  | 314   | 8.5   | 8.8     |
| 9. Milk‡                                     | 1,259                              | 1,615  | 2,058  | 2,058 | 8.7   | 5.6     |

\*The figure excludes the production required to rebuild the strategic reserve.

†Hypothetical level of production.

‡Liquid milk and milk products expressed in whole milk equivalent.

TABLE 2

**ESTIMATED AND PLANNED PRODUCTION IN 1980 AND PROJECTED PRODUCTION AND REQUIREMENTS  
FOR SELF-SUFFICIENCY IN 1983 AND 1989**

(000 tons)

|                       | 1980                    |                           | 1983                                    |                | 1989   |  |  |
|-----------------------|-------------------------|---------------------------|---|----------------|--|--|--|
|                       | Estimated<br>Production | Plan Target<br>Production | Production with Planned<br>Growth Rate* |                | Production<br>Level Required<br>for Self-<br>Sufficiency | Production<br>with Planned<br>Growth Rate* | Production<br>Level Required<br>for Self-<br>Sufficiency |
|                       |                         |                           | 1980 Base                               | 1976 Plan Base |  |  |  |
| Maize ..              | (1)<br>1,620            | (2)<br>2,598              | (3)<br>2,153†                           | (4)<br>3,139   | (5)<br>2,777   | (6)<br>2,447†                              | (7)<br>3,514   |
| Wheat                 |                         |                           |   |                |  |  |  |
| Flour ..              | 142                     | 135                       | 146                                     | 138            | 292  | 155  | 493  |
| Sorghum/<br>Millet .. | 369                     | 406                       | 423                                     | 467            | 445  | 557  | 563  |
| Rice ..               | 23                      | 34                        | 29                                      | 40             | 66   | 44   | 90   |
| Beans ..              | 140                     | 216                       | 162                                     | 250            | 253  | 217  | 344  |
| Potatoes ..           | 450                     | 483                       | 511                                     | 548            | 655  | 657  | 828  |
| Sugar ..              | 402                     | 297                       | 619                                     | 433            | 342  | 1,470                                      | 371  |
| Beef ..               | 147                     | 152                       | 157                                     | 164            | 188  | 179  | 314  |
| Milk ..               | 1,259                   | 1,447                     | 1,462                                   | 1,649          | 1,615  | 1,970                                      | 1,058  |

\*Estimated production using the target growth rates contained in the Development Plan.

†As the production of maize in 1980 was adversely affected by unfavourable growing conditions, an average of 1976 and 1980 production levels is used as the 1980 base for estimating production in 1983 and 1989.

TABLE 3

## A COMPARISON OF THE PLAN TARGET AND REQUIRED RATES OF GROWTH OF PRODUCTION

|                | Target Growth Rate in the Current Development Plan (%) | GROWTH RATE REQUIRED TO ACHIEVE SELF-SUFFICIENCY |             |
|----------------|--|--|-------------|
|                |  | in 1983 (%)                                      | in 1989 (%) |
| Maize          | 3.5  | 12.7   | 6.8         |
| Wheat Flour    | 1.0  | 27.2   | 14.8        |
| Sorghum/Millet | 4.7  | 6.4  | 4.8         |
| Rice           | 7.6  | 42.1   | 16.4        |
| Beans          | 5.0  | 21.8   | 10.5        |
| Potatoes       | 4.3  | 13.3   | 7.0         |
| Sugar          | 15.5   | 5.2  | 4.0         |
| Beef           | 2.2  | 8.5  | 8.8         |
| Milk           | 5.1  | 8.7  | 5.6         |

TABLE 4

## INTENSITY OF LAND USE BY PROVINCE, 1976

(thousand hectares)

|   | Central | Coast   | Eastern | Nyanza  | Rift Valley | Western | Total   |
|---|---------|---------|---------|---------|-------------|---------|---------|
| 1. Total agricultural land .. .. .  | 772.7   | 1,819.8 | 1,153.5 | 1,125.2 | 3,115.9     | 663.6   | 8,650.7 |
| 2. Land under forest .. .. .  | 167.2   | 122.6   | 189.2   | 19.1    | 615.0       | 42.8    | 1,155.9 |
| 3. Land available for agriculture (1)-(2) .. .. .                                       | 605.5   | 1,697.2 | 964.3   | 1,106.1 | 2,500.9     | 620.8   | 7,494.8 |
| 4. Land cropped .. .. .   | 563.6   | 254.9   | 638.6   | 501.2   | 533.5       | 364.5   | 2,876.3 |
| 5. Percentage of land available for agriculture, which is cropped (4)÷(3) × 100 .. .. . | 93.1    | 15.0    | 68.3    | 45.3    | 21.3        | 58.7    | 38.4    |

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