AGRICULTURE AND FORESTRY IN ZAMBIA

PRESENT SITUATION AND ISSUES FOR DEVELOPMENT

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AGRICULTURE AND FORESTRY IN ZAMBIA: PRESENT SITUATION AND ISSUES FOR DEVELOPMENT

JAPAN ASSOCIATION FOR INTERNATIONAL COLLABORATION OF AGRICULTURE AND FORESTRY

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PREFACE

This study report is the Zambian version of the series of “country studies” published by the Association.

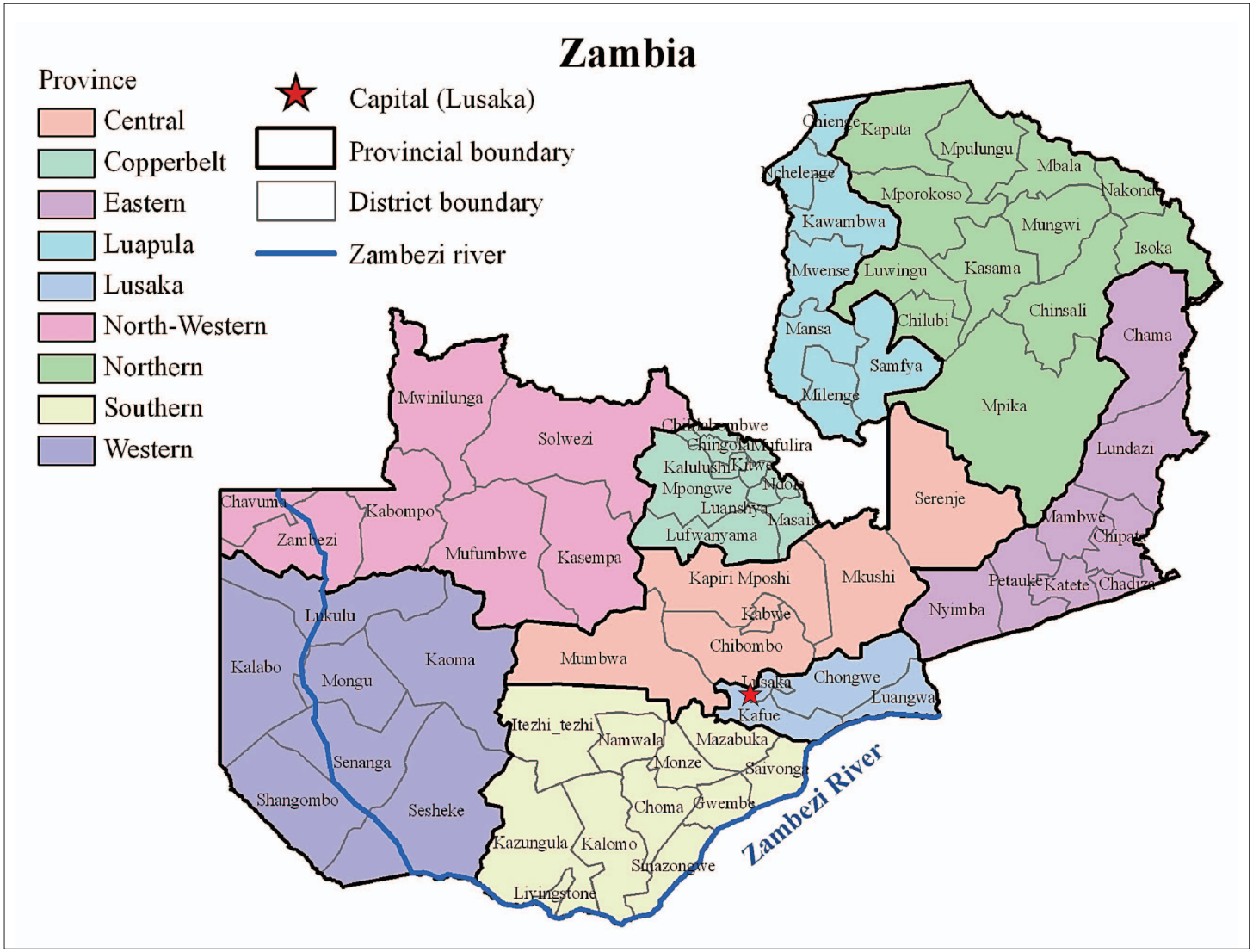
In order to effectively implement the agricultural and forestry development overseas, when various cooperation projects are planned and formulated, it is indispensable to precisely acknowledge the politics, economy, society, nature and culture of the country concerned, and needed to correctly understand the issues for economic and social development of the country.

The current series of studies intend, in sorting out the present situation of economy and society of developing countries, and their issues agricultural forestry and food situation, to specify the role of Japan in cooperation and its future direction concerning the subject countries.

In this version, among the African countries, which have increasingly become important as the target to the official development assistance of Japan, the Republic of Zambia is selected and studied. Zambia is one of the least developing countries where agriculture is the major industry, the poverty ratio as high as 70% and the ratio of population of under-nutrition as high as 50%, thus requires a priority effort from onward. In undertaking this study project, the Association dispatched a survey team to the country for purposes of collecting more precise and up-to-date information and materials, and in Japan, in establishing a research committee within the Association, examined the study details from the expertise points of view.

This report much owes to contributions of the authors led by Prof. Kazuo Hanzawa (The Nippon University) and efforts of the members of research committee. I wish to express my sincere thanks for them. I also extend my appreciation to all officials concerned in the Government of Zambia, the Ministry of Agriculture, Forestry and Fisheries of Japan, the Ministry of Foreign Affairs of Japan, and the Japan International Cooperation Agency.

March 2008
Hidero Maki
President
Japan Association for International Collaboration
of Agriculture and Forestry



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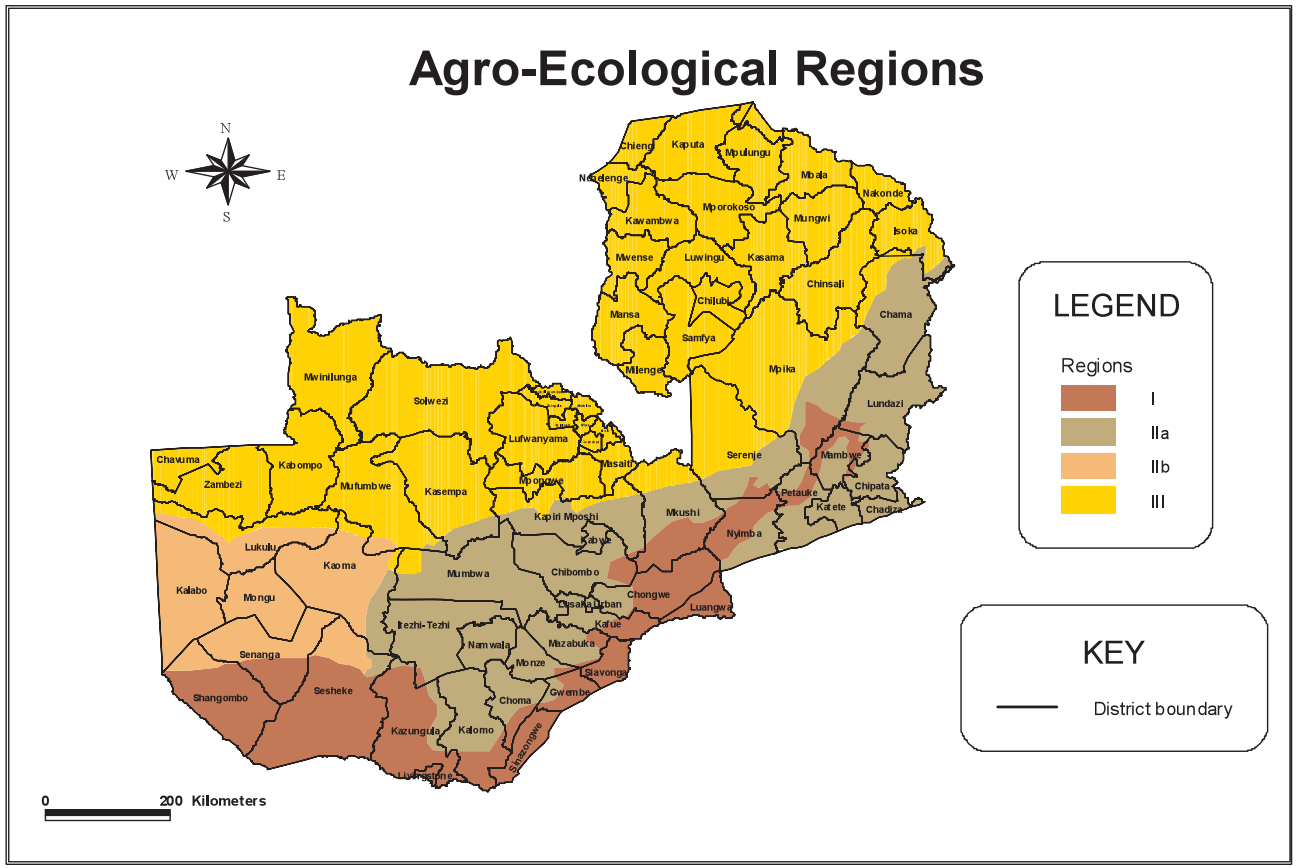
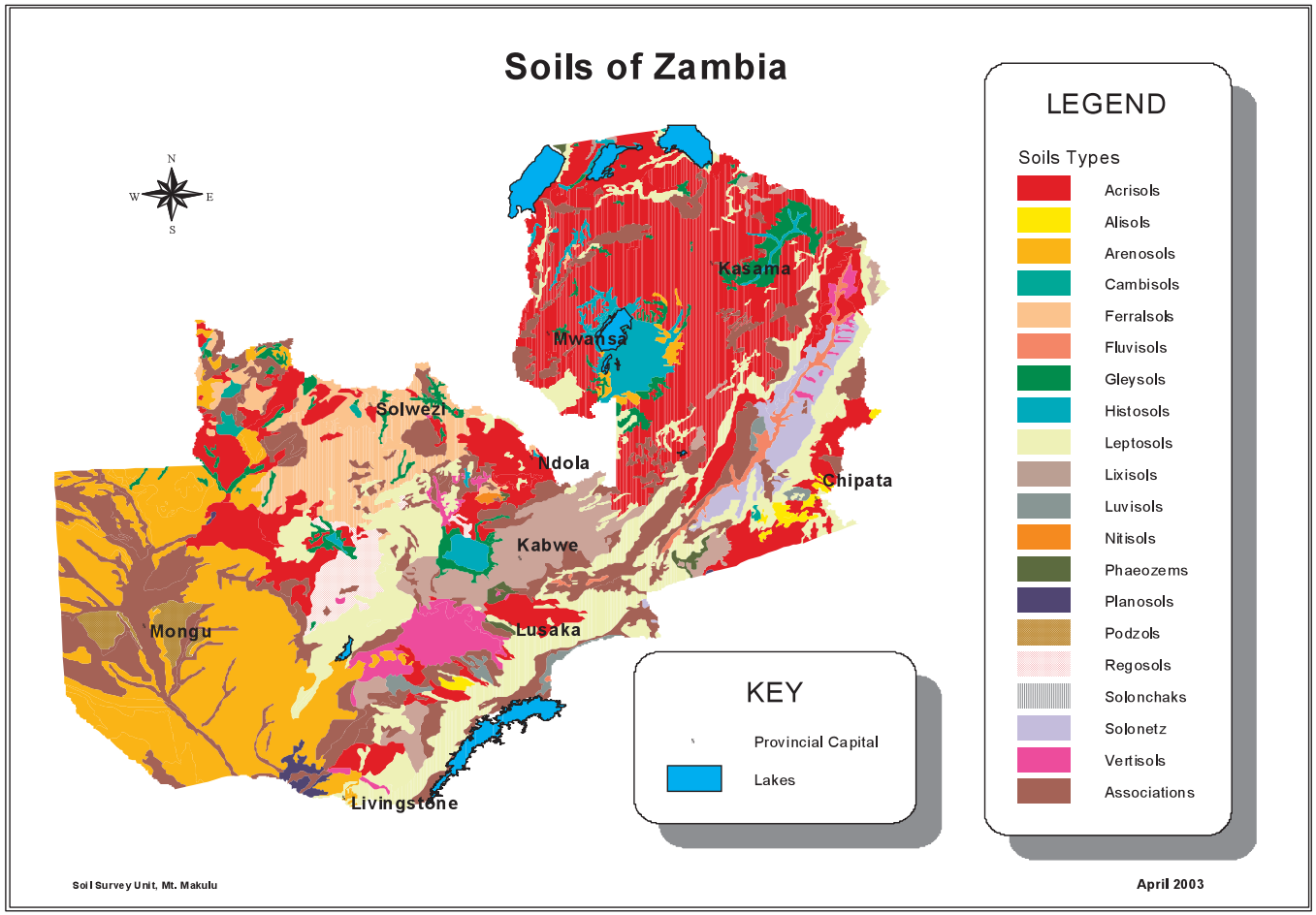


Source: Compiled by Soil Survey Unit, Mount Makulu Central Research Station

Fig.1 Agro-Ecological Regions of Zambia



Source: Compiled by Soil Survey Unit, Mount Makulu Central Research Station

Fig.2 Soil Types of Zambia.

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CHAPTER 1 TREND OF AGRICULTURE AND FORESTRY DEVELOPMENT

1. Current Situation of Agricultural Production

(1) Natural conditions

While Zambia is located in the tropical climatic zone, the area in high above sea level (in the range of 900-1500 meters), excluding the basins of the Zambezi, Luangwa and Kafue Rivers, and the area around Lake Tanganyika, Lake Mweru and Lake Bangwelu, is relatively cool. Droughts caused by low rainfall and, vice versa, floods by high rainfall take place. The season with the highest temperature is the month of October. The rainy season spreads from November/December to around April, and the dry season from around May to around November. The average annual rainfall amounts to around 1,000 mm, but varies by regions. The rainfall in the south and southwest regions is around 900 mm, but in the north and northwest regions it exceeds over 1,400 mm. After the cool season from May to mid-August, the temperature rises. In the capital Lusaka, the minimum and maximum average temperatures in July are respectively 9℃ and 23℃, those in January respectively 17℃ and 26℃, and the annual average rainfall in the normal year is 810 mm.

Within 75 million hectares of the total land area, some 42 million hectares with the annual rainfall ranging from 800 to 1,400 mm have the medium to high potentials for agriculture. Yet the actual acreage under utilization at present is limited to only 14 %[1)]. However within the unused area a reduction of forest area would lead to destroy the natural environment, thus the extent of its transformation to farmland should be carefully examined.

The total population in 2000 was 9.9 million, in which urban population accounted for 35 %. According to the World Bank, the estimated population in 2006 accounts to 11.9 million. In the context of Zambian agriculture, such elements as a low population density (14 persons per square km), a relatively high ratio of urban population and the mining biased economy since the colonial era are important.

(2) Agro-ecological regions

The agro-ecology of Zambia is roughly divided into three regions according to the rainfall and soil characters (reference: Fig.1 of the frontispiece). The following is the general features of these three regions. Details of soil characters are explained in the later section.

A. Region I

The Region with less than 800 mm of annual rainfall accounts for 12 % of the total land area. The total acreage amounts to 17.3 million hectares, the smallest among the three regions. The region includes: the arid zone covering South Province, East Province, the Gwembe Valley of Central Province, and the semi-arid zone of West and South Provinces. The planting season of crops is short

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[1)] Ministry of Agriculture and Cooperatives, National Agriculture Policy 2004-2015, 2004, p.1

normally in the range of 80-120 days. Accordingly it is suitable for growing such the drought resisting crops as millet[1], sorghum[2], sesame and cotton. With irrigation, however, maize can be cultivated even in dry season. The region is also suitable for raising cattle, while the cultivation of cassava is limited. The valley area along the Zambezi River is lowland, consequently the temperature and humidity are high. Due to the habitat of tsetse flies, cattle raising is not feasible.

B. Region II

The Region is located at the center of the country, and includes Western Province, Central Province and Eastern Province and a part of Northern Province. Total acreage amounts to about 27.4 million hectares, accounting for 42 % of the total national acreage, ranking at the second among the three regions. From the aspect of agricultural uses, the soil appears most fertile. The annual rainfall is 800-1000 mm and no freezing even during the low temperature season. The crop planting period is for 100-140 days.

Region II is further divided into II-a and II-b Sub-Regions. The II-a Sub-Region is located in the fertile plateau covering the four provinces of Central, Lusaka, Southern and Eastern, generally with the original fertile soil. There the sedentary agriculture develops, and such various crops as maize, cotton, tobacco, sunflower, soybean, groundnut and wheat by irrigation are planted. The area is also suitable for flowers and vegetable production like paprika.

The Sub-Region II-b is included in Western Province, where sandy soil is predominant. The area is suitable for the production of cashew nut, rice, cassava, millet, vegetables, timbers, and livestock production like beef, dairy and poultry.

C. Region III

The Region is one of the highest rainfall areas with the average annual rainfall of 1,000-1,500 mm. The period suitable for crop production is 120-150 days. The region accounts for 46 % of the whole national acreage, and covers Northern Province, Luapula Province, Copperbelt Province, the most part of Northwest Province, and a part of Central Province. Except Copperbelt Province, the soil in the Region is in an advanced stage of leaching and acidification, yet in applying the lime it can be used as farmland. It is suitable for the production of millet, cassava, sorghum, beans and groundnut. Coffee, sugarcane, rice and pineapple are also planted. The stream water without interruption throughout the year can be utilized for small-scale irrigation. Development of freshwater fish and aquaculture are also expected.

(3) Soils distribution and their relations to agro-ecological regions

In this section, soils distribution in Zambia, their relations to geology (parent materials), the agro-ecological regions are described. Also, their properties, geographical distribution and various

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[1] Millet is general term of the grass family (Poaceae) plants, similar to common millet (Panicum Miliaceum), including such as pearl millet and finger millet.

[2] Sorghum is a generic term of the African millet genus of the grass family, called as African millet, kaoliang and others.

crops suitability are described and finally the area of each soil type is shown and soil fertility information at present using the GIS (Geographic Information Systems) technology is briefly reviewed.

A. Major soil properties and their distribution related to agro-ecological regions

Soils in Zambia have been formed from a great diversity of parent materials. However, the characteristics and distribution of the soils are largely influenced by climate particularly rainfall.

Zambia lies roughly between latitudes 8°and 18°south of the equator. Zambia experiences strongly clear rainy and dry seasons, the rainy season starts October in the north and November in the south and lasts to April and March respectively. Mean annual rainfall exceeds 1100mm in the western part of Northern and the northern part of North-Western Provinces, decreasing southward to Southern Province, only 700mm in southeastern margin of the country. Mean annual temperatures range between 19－22℃ except in the major river valleys of Zambezi, Luangwa and Luapula.

Zambia ranges roughly between 600m and 2000m in the elevation, and it consists of level to gently undulating plateau except the escarpments zones which divide the middle Zambezi and Luangwa valleys. Geomorphology of Zambia has shown the first four legends as Montane Zone, Central African Plateau, Escarpment Zone and Rift Trough[1)], respectively. The latter two topographical features show the elevation from transitional to lower one.

Zambia is underlain by a wide range of rock types. Except the Kalahari system that has been formed from the Tertiary to recent period and has covered the west and north-west side of the country, such igneous rocks as granite, gabbro and others in various ages probably older than the Pre-Cambrian period, and the Basement complex which consisted of ancient crystalline rocks like schist, gneiss, quartzite and migmatite in the Pre-Cambrian period formed the Central African Plateau in the north, east and south-east side of the country. In the south-west, west and north-west side of the country, such sedimentary rocks as shale, sandstone, mudstone and limestone in the Katanga system, and in the east, south-east side of the country, lava (basalt), marl, sandstone and others in the Karroo system both from the Lower Paleozoic to the Mesozoic periods also formed the stable land blocks overlying the Basement Complex. These systems and the Complex accompanied by repeated folding and metamorphism through the geological ages have altered the original of the rocks, followed by their slow protrusion, erosion and weathering, various types of soils were formed.

Having these climatic, topographical and geological background factors, Agro-Ecological Region of Zambia is shown in Fig. 1 of the frontispiece.

The agro-ecological region is divided into three regions (Ⅰ to Ⅲ) by different amounts of rainfall and region Ⅱ is subdivided into Ⅱa and Ⅱb by differences of soils. The soil types appearing in this sub-section are described later in the next sub-section for their characteristics and distribution.

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1) Rift Trough is distinguished from the Great Rift Valley. According to D.B.Dalal-Clayton *et al*. (1985), the rift trough is observed in the Luangwa valley and middle Zambezi valley. These are not considered to be true rift valley since they are hinged along their south-eastern escarpments. The escarpments at north-western side are much more precipitous than those to the south east. However, the south eastern flank of Luangwa valley, although not obviously a faulted boundary, does sharply demarcates the boundary between the Basement Complex rocks of the Central African Plateau and much younger Karroo sediments of the valley floor.

In region Ⅲ, the annual rainfall exceeds 1000mm and the soils are highly weathered and strongly leached. In the medium rainfall area (800-1000mm), the central and eastern parts of Zambia, such fertile soils as Luvisols, Acrisols and Vertisols cover the region Ⅱa, while in the western parts infertile Arenosols and seasonally water logged Gleysols cover the region Ⅱb.

Although the parent materials are similar, soils in region Ⅱ show moderate weathering and leaching as compared to soils in region Ⅲ. For example, limestones, dolomites and mudstones in the Paleozoic period in region Ⅲ generally form well drained, deep red, clayey soils (Ferralsols), while in region Ⅱ they develop into Lixisols and Luvisols. Similarly, acidic rocks form highly leached soils with lower pH and lower mineral contents in region Ⅲ, while in region Ⅱ moderately leached soils with medium mineral contents are formed.

In the low rainfall zone (400-800mm), region Ⅰ, the soils are slightly weathered and moderately to non-leached. Generally, influences of rainfall on soil formation become less in region Ⅰ, however, Kalahari sands, unconsolidated sandstones or limestone formed since the Tertiary period and covering widely the western part, are strongly leached and acidic soils. Soils profiles are less developed.

B. Zambian soil classification system

Soils Map of Zambia on the scale of 1: 5million was published in 1983 and it was correlated to the Soil Taxonomy (Soil Survey Staff, 1975). At the same time, more than 350 soil series were recognized although their numbers are expected to increase hereafter by further soil survey. However, it is not correlated yet with the Revised Soil Taxonomy (Soil Survey Staff, 1999).

Soil Survey Unit of Mt. Makulu had published an Exploratory Soil Map of Zambia on the scale of 1:1,000,000 in 1991 which was printed in 1999, and this is referred to the National Soil Map. In its soil classification system, the revised soil map of world legend (FAO-Unesco 1988) was used to describe the soil units. Furthermore, the map was digitized in order to establish the geographic information systems, GIS. However, the classification is not fully correlated yet with World Reference Base (ISSS/ISRIC/FAO 1998).

In this article, soils are described according to the revised soil map of world legend in 1988 and some reference lists regarding the soil classification system are omitted.

Main soil types distributed in Zambia expressed as soil units by the legend of FAO/Unesco are shown in Fig.2 of the frontispiece. Overviews of main soil types, their characteristics, crop suitability and geographical distribution are given in this sub-section.

(i) Acrisols, Ferralsols

The major part of the country is covered with Acrisols and Ferralsols. These soils are highly weathered and strongly leached and are thus infertile soils, characterized by weakly structured, loamy top soils, clayey sub soils. Ferralsols are easy to form stable structures due to the clay properties. The major difference between the two soils is that Ferralsols generally tend to have a uniform texture throughout the profile while Acrisols display a marked clay increase with depth. Top soil textures of Acrisols show loamy sand or sandy loam while Ferralsols show clayey textures.

The cation exchange capacity (CEC) of Acrisols is less than 24 meq / 100g clay (the weight unit,

100g clay is abbreviated hereafter) and the base saturation is less than 50%[1]. Soil pH ($CaCl_2$) ranges 4－4.5, moderately to strongly acid ($CaCl_2$ is abbreviated hereafter). Soils are unsuitable to most crops largely due to low soil nutrients levels. However with regular liming and careful fertilization the soils are moderately suitable for maize, sorghum, groundnuts, cassava, sunflower, millet and coffee.

Ferralsols are less fertile than Acrisols. The CEC is less than 16meq and base saturation is low. Soil pH is strongly acid with values less than 4.5. Phosphorous deficiency and Al toxicity of crops are prominent.

These soils occur widely in region Ⅲ occupying large parts of Northern, Luapula, Copperbelt and North-Western Provinces.

Acrisols in region Ⅱ cover large parts of the plateau in Central and Eastern Provinces and Tonga plateau in Southern Province, however, reduced rainfall in this region may adversely affect their suitability to agriculture.

(ii) Lixisols, Luvisols, Alisols

The second important soils are Lixisols, Luvisols and Alisols. These soils are also infertile and highly weathered, strongly leached like Acrisols, however, they differ from Ferralsols and Acrisols in their chemical properties. This group of soil is generally gravelly and usually overlying an ironstone layer.

Lixisols are highly weathered and moderately leached but with base saturation of more than 50%. Having a better nutrient supply, they are important maize and tobacco soils of Central Province. Luvisols are slightly weathered and moderately leached and thus fertile soils with higher CEC (＞24meq) and higher base saturation(＞50%). These soils are better suited to most crops. Alisols are moderately weathered and strongly leached with higher CEC (＞24meq) and thus fertile.

These three soils predominate in region Ⅱa. Acrisols, together with some Lixisols that display abrupt clay increase between A-horizon and B-horizon have been referred to “sandveldt” soils. In Eastern Province, Acrisols extend from Petauke east to Lundazi. Occupying a large tract of land in Central Province they occur in the Kafue national park south-west of Mumbwa. Occurrences in Southern Province were described before. Lixisols widely occur both in Mumbwa and Kafue districts of Central Province. Luvisols occupy the plateau areas of Southern and Eastern Provinces. They are found in Mazabuka, Magoye and Macha areas in Southern Province. In Eastern Province the soils are Ukwimi area of Petauke district, Kalichero and Chiparamba area of Chipata district. Alisols are common in the plateau areas of Chipata, Katete and Chadiza districts of Eastern Province.

(iii) Phaeozems, Nitisols, Cambisols

Closely related to the above mentioned group of soils are Phaeozems, Nitisols and Cambisols. The former two soils are relatively fertile and occur in a small area of region Ⅱa and Ⅰ.

Phaeozems have dark coloured top soils associated with high contents of organic carbon, and

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[1] FAO fixes the boundary lines for such luvic soils with agric horizons as Alisols, Acrisols, Luvisols and Lixisols; 24meq for CEC and 50% for base saturation.

relatively strong structures that are not both massive and hard or very hard when dry. The soils are found in Nyimba area of Eastern Province and Chisamba area in Central Province.

Nitisols are characterized by texture of more than 30% clay throughout the profile and moderate structures that show shiny ped surfaces. Such locally minor occurrences are in Makeni area of Lusaka Province.

Cambisols are slightly weathered soils with a weak or medium profile development without any argic horizons and are generally shallower and gravelly. The soils occupy large tracts of land in the Luangwa valley in region Ⅰ. The soils are suited to drought resistant crops such as sorghum and cassava.

(iv) Arenosols, Podozols

The fourth important group of soils is Arenosols and Podozols. These soils are very infertile and have sandy textures with little or no profile development associated with the Kalahari sand deposits. Soil pH is less than 4.0, strongly acid reaction. The nutrient retention capacity is very low and this also makes the land very low agricultural potential. Soils are marginally suitable for cassava.

With regular liming and fertilizer application, the soils may support maize, sorghum, beans, groundnuts, cassava and millet. Podozols are also sandy and strongly acid soils with sub-horizons continuously cemented by combinations of organic matter with iron or aluminum or both. These soils are confined to Western Province and some parts of North-Western Province.

(v) Leptosols, Regosols

Leptsols include shallow soils less than 50cm deep. The main characteristic is the limited soil depth. These occur as resistant hills and ridges on the plateau while they appear as escarpments in a transition zone between the plateau (region Ⅱa) and the Rift Trough of Luangwa, Zambezi and Gwembe valleys (region Ⅰ). Also the soils occur in region Ⅲ like in every southern parts of Luapula, North-Western and Copperbelt Provinces. The soils are unsuitable for most agricultural crops due to severe limitations which include rootability and high aluminum toxicity. The soils may be used for ranching if slopes are not very steep. However, the soils occur in a large area of the country and shown later.

Regosols are fine textured soils formed from unconsolidated materials and with very little soil development. These soils occupy large tracts of land in the central parts of the Kafue National Park. Their suitability to agriculture, like that of Leptosols is very poor.

(vi) Wetland soils

In this article, other soils are summarized as wetland soils for discussion.

Low-wetland includes floodplains, swamps, marshes, lakes littoral and so-called dambos. It is assumed that the wetland habitat areas cover approximately 14% of the country surface area.

The wetland soils in Zambia differ greatly in their chemical properties as well as textural characteristics; this being a function of the rock type from which the alluvium is presumed to have formed. The most important group comprises **Gleysols** which are very poorly to poorly drained soils

mostly occurring in the dambos and some floodplains. Soils occur in region Ⅱb.

These soils occur along the Chanbeshi plains, Lake Bangweulu, Lukanga swamps and the Busanga plains both in Luapla and Nortern Provinces. In North-Western Province, they occur in southern Kasempa district and large parts of Zambezi district.

Some of these soils have sand clay loam topsoil and moderately high organic matter content (1－2%). They can have a high nutrient retention capacity and are moderately to slightly acid, pH 4.5－5.5. Those found in floodplains of rivers may even have ＞50% base saturation, and CEC＞24meq. The agricultural potential is low due to poor drainage. They are suited to vegetable cultivation especially just after the rain season.

Vertisols occur in region Ⅱa and Ⅰ, being secondly important wetland soils. The soils have high amounts of cracking clay (＞30%), their chemical fertility is very high. Their main problem lies in poor physical properties. They are water logged at sometime during the year and are difficult to work. They are usually associated with low lying areas. In region Ⅱa, these soils occupy large tracts of land in Kafue flats (floodplain) in Central Province and isolated areas of upper Kafue river in Copperbelt Province. In region Ⅰ, large tracts of land in Luangwa and Gwembe valleys are also covered with the soils, however, in this region they assume an important place because of their good ability to hold soil moisture. Consequently these are soils for small scale farmers in this region. They are used to grow sorghum in the valley areas.

Fluvisols occur in region Ⅰ and they are stratified soils without or with little profile development and receiving fresh alluvial deposits regularly. These soils become important soils in the broad levees of tributary rivers in the Luangwa valley. The agricultural potential is medium due to poor drainage condition.

Solonetz occur in region Ⅰ and are characterized by the presence of high salt contents in the soil and by dense subsurface horizon with higher clay content than overlying layers. Exchangeable sodium saturation exceeds more than 15%, forming strongly alkaline soils. These soils occupy large tracts of land in the Luangwa and Gwembe valleys. These soils have low to moderate agricultural potential due to high exchangeable sodium.

Solonchaks are imperfectly to poorly drained, highly saline, strongly structured clayey soils. They occur in Kaputa area of Northern Province.

Planosols are soils with a coarse textured upper part abruptly overlying slowly permeable subsoil, and they become important in the Machila river area on the boundary between Southern and Western Province.

Histosols are soils having a mucky or surface layer of fresh or decomposed organic matter more than 20cm but less than 40cm thick. These are common in Western Province. These are often characterized by periodic flooding and/or water logging which are hindrance to agricultural development. The above two types of soils are similarly characterized by periodic flooding.

(vii) Associations

Although some areas of the associations in Fig.2, ‘Soil types of Zambia’ are less distinguishable, appreciably a large numbers of area are actually counted. The associations indicate that more than

two types of soils, which follow the definite law, are distributed within any dominant soil type area; however, these are not mapped due to their small areas and the limited scale of map.

C. Area of each soil type and the present soil fertility information system

Recently the GIS technology accomplished to calculate the area of each soil type in the map. First, the results were shown in Table Ⅰ-1. The area rate of each soil type was also evaluated.

The Acrisols areas occupy about half of whole areas of the country soils and the Ferralsols area covered only about one tenth of the Acrisols area. Areas of Lixisols, fertile soils, occupy about the same as Ferralsols. Areas of Leptosols in the Escarpment Zone and some parts of region Ⅲ show about two times as large as the area of Arenosols, the Kalahari sand origin.

Second, it can be said that the GIS technology has progressed enough to apply it to the area distribution of fertility, that is, at present such factors affecting the soil fertility as soil chemical properties are incorporated into every soil mapping unit. For example, the soil pH map which divided soil pH of all the country soils into 5 classes was recently developed. This system enabled people to work out quickly the soil pH at any site within those classes.

It is well known that large tracts of agricultural land, especially soils in region Ⅲ, are deficient in phosphorous to cultivate the main crops like maize. Zinc deficiency of maize is also very common. However, these constraints of plant nutrition are experienced without any systematic measures programme.

Table Ⅰ-1 Area and area rate of each soil type

Soil Unit	Area (km^2)	Area %
Acrisols	366908.1	48.73
Alisols	787.6	0.10
Arenosols	74027.9	9.83
Association	51997.2	6.91
Cambisols	474.8	0.06
Ferralsols	31775.4	4.22
Fluvisols	5292.8	0.70
Gleysols	6044.3	0.80
Histosols	14586.0	1.94
Leptosols	143132.5	19.01
Lixisols	28239.3	3.75
Luvisols	1390.0	0.18
Nitisols	61.5	0.01
Phaeozems	521.3	0.07
Planosols	528.4	0.07
Podzols	2694.5	0.36
Regosols	5212.8	0.69
Solonchaks	43.4	0.01
Solonetz	6371.1	0.85
Vertisols	12779.2	1.70
Total	752868.1	100.0

Source: Compiled by Soil Survey Unit, Mount Makulu Central Research Station

In the early 1960's sulphur problem was given rise to conduct many field trials nationwide. Soon

the results of fields trials legislated for the inclusion of suphur into the compound fertiliser. However, there have been few reports on sulphur until the author *et al*. studied soil sulphur distribution of Zambia by using GIS method. We evaluated the total soil sulphur as well as available soil sulphur for the maize nutrition, dividing them into 3 classes of sulphur, however, wetland soils were not assessed. As a result, two kinds of sulphur map were presented. For other elements to be drawn their national distribution maps, the methodology taken for sulphur will be improved so that the maps would be available for the efficient and reasonable fertilizer application technology.

(4) Land utilization and agricultural production situation

A. Production structure of agriculture

The agriculture of Zambia is largely classified into: (a) traditional agriculture mainly for producing subsistent food; and (b) commercial agriculture basically for commercial production. This dual structure of agriculture has to be taken in the context of the economic structure formulated during the colonial era. At that time, the mining industry was the center of the economy, while agriculture played the secondary role for simply providing the food to mine workers and urban residents. A small number of large-scale farms managed by settled whites supplied food like maize to the consumers, while a great number of Africans produced food for their own consumption. Although smallholder agriculture has developed for last 30 years after the independence, the dual structure, though it has changed, still remains. On the other hand, the government has recently been encouraging smallholder farmers to become the outgrowers. This type of agriculture is attracting an attention as a means to resolve the conventional dual structure of agriculture, which is explained in a later section.

Numbers of farms by size in 1990 and 2001 are shown in Table I-2. Moreover, according to the agricultural census held in 1990, among the large-scale farms above 20 hectare, enterprises and government owned (or related) farms accounted for respectively 69 and 419[1)].

Table I-2 Number of farms by province and by size

Province	1990				2001		
	Small-scale less than 5ha	Medium- 5-20ha	Large-scale Above 20ha	Total	Small-scale less than 5ha	Medium- 5-20ha	Total
Central	41,733	7,091	859	49,683	66,026	2,511	68,537
Copperbelt	22,680	1,365	241	24,108	33,420	1,233	34,653
Eastern	124,862	6,699	63	131,802	184,680	3,898	188,578
Luapula	66,409	1,745	52	68,206	106,195	321	106,516
Lusaka	12,493	696	116	13,305	18,604	326	18,930
Northern	81,661	6,388	137	88,186	129,371	4,302	133,673
North-Western	38,898	849	41	39,788	49,792	213	50,005
Southern	47,298	9,740	453	57,491	101,744	7,601	109,345
Western	43,683	4,178	90	47,951	102,380	323	102,703
Whole country	497,717	38,751	2,052	520,520	792,212	20,728	812,940

Source：Central Statistical Office

According to the 2000 Census, the total number of farms was about 1.3 million, yet those

[1)] According to "2002/03 Post Harvest Report for Large-Scale Agricultural Holdings, Central Statistical Office", the large-scale holdings were 929.

planting crops every year[1] are estimated to be a half of them.

Though different from the grouping as shown in Table I-2, small-scale farms (0.5-9 hectares) are estimated to be 500 to 800 thousand households. These farms apply less external inputs like chemical fertilizer thus remain at a lower productivity. They also tend to sell the surplus agricultural products only when cash incomes are required.

Approximately 120,000 emergent farmers and 25,000 medium-scale farms (20-60 hectares) appear to exist. Large-scale farmers above 60 hectares and enterprise farms altogether account for 2,000. These farms utilize modern inputs, and enjoy a high productivity.

Table I-3 shows the number of farms by province. In terms of farm numbers, Eastern Province and Northern Province show a relatively high ratio. Except Lusaka Province and Cupperbelt Province, from the aspect of poverty reduction, it is particularly important to develop agriculture in the remote areas from consumption centers.

Table I-3 Number of farms by urban and rural areas (2000)

Province	Rural		Urban		Total	
	No.	%	No.	%	No.	%
Central	114,322	85.9	18,787	14.1	133,109	10.2
Copperbelt	55,730	35.4	101,840	64.6	157,570	12.1
Eastern	221,683	95.9	9,437	4.1	231,120	17.7
Luapula	121,316	88.8	15,238	11.2	136,554	10.5
Lusaka	30,691	51.4	28,993	48.6	59,684	4.5
Northern	200,657	91.6	18,458	8.4	219,115	16.8
North-Western	86,880	91.1	8,454	8.9	95,334	7.3
Southern	130,535	90.5	13,666	9.5	144,201	11.0
Western	122,859	95.2	6,237	4.8	129,096	9.9
Whole country	1,084,673	83.1	221,110	16.9	1,305,783	100.0

Source：2000 Census of Population and Housing

B. Land utilization

With the increase in population, in other provinces than of Lusaka Province, the state capital, and Copperbelt Province largely of mining cities, the population density has been gradually increasing (Table I-4). Yet in Northern, North-Western and Western Provinces, the population density remains less than half of the national average.

Table I-4 Population density by province

Province	Acreage (㎢)	1969		1980		1990		2000	
		Population (1,000)	Pop. Density	Population (1,000)	Pop. Density	Population (1,000)	Pop. Density	Population (1,000)	Pop. Density
Central	94,394	359	5.4	512	5.4	721	7.6	1,007	10.1
Copperbelt	31,328	816	26.1	1,251	39.9	1,427	45.6	1,658	48.8
Eastern	69,106	509	7.4	651	9.4	966	13.9	1,301	17.8
Luapula	50,567	336	6.6	421	8.3	525	10.4	785	14.4
Lusaka	21,896	354	16.2	691	31.6	987	45.1	1,432	61.3
Northern	147,826	545	3.7	675	4.6	855	5.8	1,407	5.8
North-Western	125,826	232	1.8	303	2.4	388	3.1	611	4.3
Southern	85,282	496	5.6	672	7.9	907	10.6	1,303	13.3
Western	126,386	410	3.3	486	3.9	607	4.8	782	5.3
Whole country	752,612	4,057	5.4	5,662	7.5	7,383	9.8	10,285	12.4

Source：Central Statistical Office

[1] Such farmers are called “professional farmers”.

Main crops of Zambia include maize, cassava, groundnut, millet, sorghum, cotton, sugarcane, sunflower, soybean, wheat, rice and tobacco. Table I-5 shows the planting acreages of major cereal crops. Dependence on maize as the staple food crop has been high. As stated later, it is likely to be affected by the government policies biased in favor of maize during the 1970s and the 1980s. In fact, since the economic reform of 1991, the relative importance of maize has been declining.

Table I-5 Planting acreage of major cereal (ha)

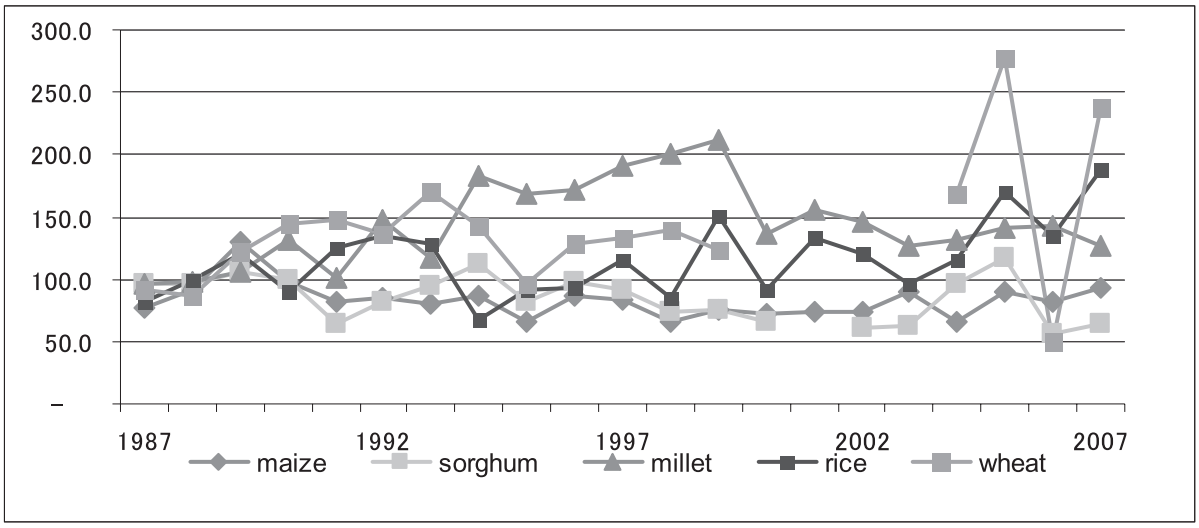
Year	Maize	Sorghum	Millet	Rice	Wheat
1987	609,529	47,484	43,569	8,689	7,387
1988	723,087	47,448	44,073	10,593	6,925
1989	1,020,574	52,008	47,416	12,809	9,878
1990	763,258	48,466	58,869	9,627	11,595
1991	639,390	31,790	45,270	13,450	11,849
1992	661,305	40,323	66,598	14,369	10,964
1993	633,326	46,563	52,654	13,802	13,656
1994	679,356	55,245	82,302	7,177	11,566
1995	520,165	40,365	75,809	9,746	7,806
1996	675,565	47,839	76,930	9,888	10,327
1997	649,039	44,684	85,731	12,412	10,693
1998	510,372	35,864	90,047	9,065	11,278
1999	597,454	36,657	95,530	16,121	9,921
2000	561,491	32,504	61,073	9,804	—
2001	583,855	note 1	70,129	14,321	—
2002	575,686	30,033	66,045	12,927	—
2003	699,276	30,337	56,750	10,305	—
2004	512,469	47,390	59,081	12,379	13,543
2005	704,850	57,432	63,411	18,243	22,323
2006	636,609	27,836	64,222	14,359	4,060
2007	729,050	31,596	56,817	20,067	19,188

Source: Agricultural Statistics Bulletin
Notes: 1. Deleted as considered as abnormal figures.
2. —: No data

Figure I-1 shows the change in the planting acreages of major cereal. Maize acreage decreased after the peak in the late 1980s, afterward since the mid-2000s it has been moderately recovering. The acreage of millet, in the expense of maize, expanded, but it leveled off after 2000. The planting acreages of rice and wheat are in an increasing trend. These changes are regarded as a sign of the agricultural diversification since the economic liberalization. It may be affected by the improved economy caused by the price rises of resources like copper.

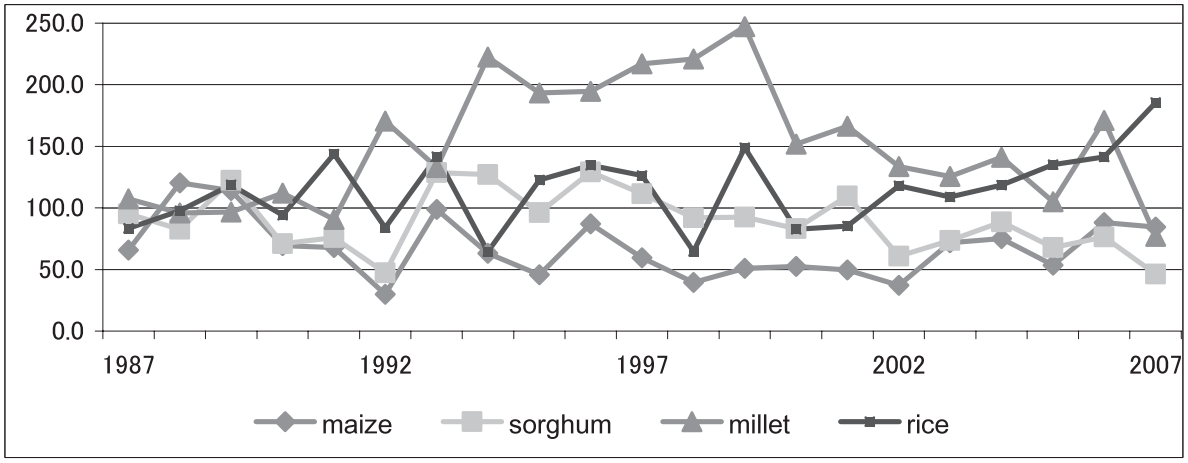
Figure I-2 shows the changes in the production of major cereal. While similar changes as for the planting acreages are observed, the increase in rice production is prominent.

Yields per hectares are low throughout all cereal crops (Figure I-3). In the main, the agriculture of Zambia is directly and strongly affected by the climatic conditions such as drought and heavy rainfall, thus characterized by the considerable annual variation of production. The yield of maize is recognized to be in a declining trend until the end of 1990s. Afterward it tends to recover, which is regarded to be affected by the government policies. It is an important issue for future how to improve the yield of cereal from technical and policy points of view.



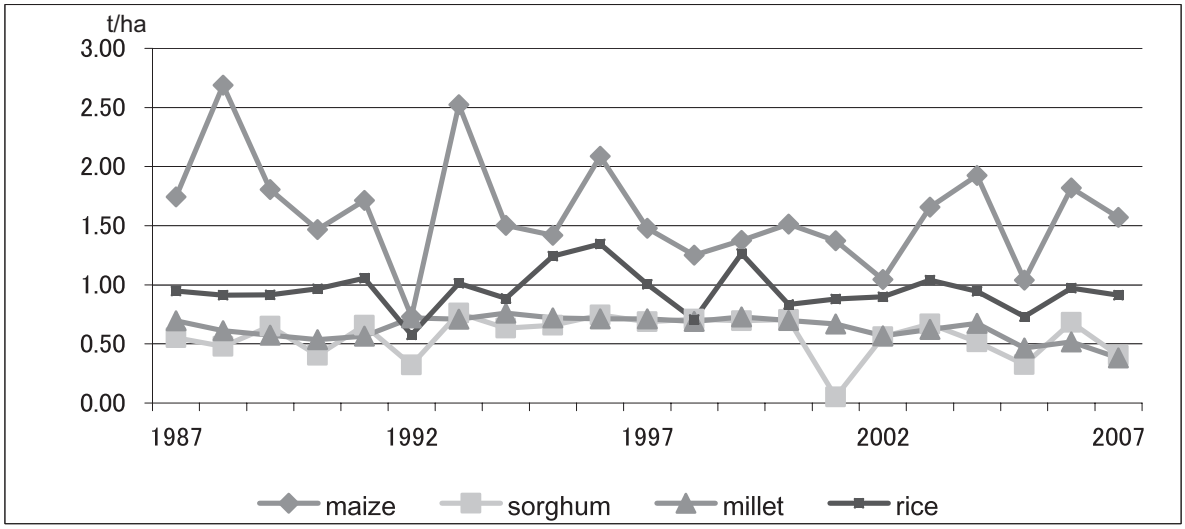
Source: Agricultural Statistics Bulletin

Figure I-1 Change in planting acreage of cereal (average 1987-89=100)



Source: Agricultural Statistics Bulletin

Figure I-2 Production indices of major cereal (average 1987/89＝100)



Source: Agricultural Statistics Bulletin

Note: The sorghum yield of 2001 of 0.05t/ha is considered to be an abnormal figure, but is left as shown in the source.

Figure I-3 Yield of major cereal

C. Policies for increasing production of maize

In order to understand the agricultural production, food and the diet pattern of Zambia, this section explains the history of maize production and the policies for increasing its production[1)]. The staple food made from maize flour is called "Nshima" in Zambia. Its evolution cannot be explained without such background as the copper industry and development of cities during the colonial period, then the settlement farms of whites, and the dual structure of agriculture.

(i) Changes in varieties and production techniques

Maize is the staple food crop for a number of people in the Eastern and Southern African countries (from Kenya in the north to South Africa in the south), and in Zambia it is no exaggeration to say that the government had made strenuous efforts for disseminating maize, increasing its production and improving the level of production techniques until the end of 1980s. In the beginning of the 1920s, as the demand for maize as the food of mining workers increased, the white dent type, high yielding and naturally crossbred varieties, imported from South Africa and America was widely planted, consequently the traditional varieties of flint type decreased. Maize production of Zambia had increased four times from the early 1960s to the end of 1980s. The increase is attributed to such factors as: (a) abundant land resources; (b) variety improvement suitable for the production of smallholder farmers; (c) input prices favorable to farmers; and (d) development of distribution system of input materials and products. At the end of 1980s, the government spent 19% of its fiscal expenses for increasing the maize production. In the 1990s, the Chiluba government on a full-scale basis implemented the structural adjustment policies, then due to the liberalization of distribution channels and reduction of fiscal expense so far borne by the government, the planting area and production of maize had considerably decreased.

Maize was reportedly introduced into the Southern Africa by the Portuguese merchants in the 16th century. At that time, maize was the flint type in various colors, and the yield was low. Maize was also planted in mixing with sorghum, millet, pumpkin and groundnut. In Zambia, while the flint type maize had turned into one of staple food crops by the late 18th century, it became more important as the staple food crop after the European settlers arrived at the beginning of 20th century. Today maize accounts for 70 % of both the cereal planting acreage and the total calorie intake of the country.

Maize became the essential wage goods supporting the life of mining workers early in the 1920s. The colonial government established the Mazabuka Experimental Garden in 1913, carried out planting tests of maize varieties imported from America, South Africa and Zimbabwe. At the settlement farms of whites along railways located in the favorable situation, high yielding varieties of white flint type like Hickory King were at first planted. Gradually these varieties disseminated among Africans and in the 1920s it replaced the traditional varieties of flint type.

[1)] Reference to the foregoing section: Howard, J. and C. Mungoma, Zambia's Stop-and-Go Maize Revolution, 45-61, in Byerlee D. and C. Eicher, Africa's Emerging Maize Revolution, Rienner, 1997

Table I-6 Technology and policies of maize

	1500-1700	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
Technology	Flinty, variable color OPVs introduced by Portuguese traders. Maize becomes important in African farming systems.		Testing of imported white dent OPVs at Mazabuka Experimental Gardens.				Federation established; many agricultural research activities transferred to Zimbabwe.	SR52 rapidly adopted by large farmers, yield doubles. Federation dissolved, 1963. Zambia receives SR52 parent lines.	First Zambian hybrid released. First Zambian joins maize program. Breeder discontinuity leads to SR52 contamination.	Donors increase support to maize program. 10 hybrids and 2 improved OPV varieties released by Research Branch, 1984-1992.	
Policy/ Organizational Environment		Arrival of European colonizers. Railways line built connecting Zimbabwe with Zambian copper belt. British South Africa (BSA) secures prime agricultural land for European	Copper industry develops. Maize Becomes an important wage good.	Maize Control Act restricts grain movement, establishes monopoly state buying stations in commercial areas, establishes dual pricing structure for European and African maize.			Most commercial maize processed into refined maize meal by large-scale mills because of controls on sales, milling.	Independence, 1964. Zambia Seed Producers Association (ZSPA) produces hybrid maize seed, 1968.	Price subsidies on fertilizer. Outlets for credit, seed, fertilizer, maize marketing expanded. Zamseed established, 1978.	Lima Program trains farmers in hybrid seed, fertilizer use. Fertilizer use quadruples, 1960s-1980s. Maize subsidies total 19% of Zambian budget. Fertilizer price subsidies end.	Great drought, 1991-1992. Marketing processing fully liberalized. Input distribution partially liberalized, multinational seed company enterprise. Maize area, seed, fertilizer

Source: Byerlee D. and C. Eicher, Africa's Emerging Maize Revolution, Rienner, 1997, p.47.

When the Federation of Rhodesia and Nyasaland[1)] was established in 1954, most of agricultural research activities moved to Zimbabwe. The hybrid research in Zimbabwe started in 1932 and the first hybrid variety SR1 was released in 1949. This variety led to the development of SR52 in 1960. Seeds of this late maturity and high yielding variety of dent type gave a great profit to the large-scale commercial farms in Zambia, consequently the yield reportedly doubled. However since this variety required a longer growing period and an earlier sowing, it was not suitable for arid area with a short rain season and smallholder farmers[2)].

Since the independence in 1964, while Zambia actively tackled with the maize research, the research much depended on the short-term expatriate researchers, and further there was an argument among experts whether the emphasis should be placed on yield increase or quality improvement, which resulted in a lack of continuity regarding the research strategy.

In the latter half of the 1970s, many donor governments and international organizations one after the other assisted the maize development programmes of Zambia. At that time, while smallholder famers had already introduced SR52, there was a controversy whether hybrid varieties are suitable for smallholder farmers as they were not assured to obtain seeds and fertilizer. For this reason, the research of maize variety improvement was divided into two lines, i.e., the naturally bred varieties and the hybrid varieties. The research development of hybrid varieties was led by the Swedish International Development Agency (SIDA, the current Sida), and its achievement was MM752 in 1984.

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1) The Federation was established in giving a priority to the interests of colonial governments of three nations- Southern Rhodesia (Zimbabwe), Northern Rhodesia (Zambia) and Nyasaland (Malawi)-, the white settlers, and their home country- the UK. However due to discrepancies among their interests and the rise of independence movement in Africa, the Federation was dissolved in 1963.

2) The releases in 1984 included seven hybrid varieties: MM501, 502, 504, 601, 603 and 604, and two naturally bred varieties: MMV612 and 441. Afterward, the hybrid ones: MM612 (1988). MM441 and MM62 (both in 1992) were released.

Afterward, nine hybrid varieties and two naturally bred varieties, all being the dent type, were successively developed and released[1].

The yields of these hybrid varieties were 60 % higher than traditional varieties, and 20 % than SR52. Their characteristics were: (a) disease resistance and early planting; (b) high yielding; (c) stable yield of the third generation seeds by means of double or triple breeding; and (d) in spite that the yield is high even in seed multiplication, the production cost is low. The potential yield was as high as 5-8 tons per hectare. The planting acreage of smallholder farmers out of the total maize planting acreage had increased from 30 % in the mid-1980s to 60 % in the early 1990s. Further, from the latter half of 1970s to the former half of 1980s, maize production increased 137 %, the proportion produced by smallholder farmers from 60 % to 80 %.

(ii) Political background of expansion policy of maize

Development of variety improvement and planting techniques of maize in Zambia was strongly supported by the pricing and distribution policies. In the early 1920s, with a rapid expansion of copper mines, maize became the important wage goods of urban workers. In order to maintain low wages, cheap food was required.

Since the independence, the Kaunda government and its government party UNIP (The United National Independence Party), in an attempt to expand its supporting base among urban residents and remote farmers, who did not receive benefits of economic development during the colonial era, actively promoted the development policies of maize. For making the African farmers to participate in commercial agriculture and to increase the income in rural area, it needed to weaken the dependence on the large-scale agriculture managed by Europeans. Moreover by means of the market participation of remote farmers under unfavorable agricultural conditions who had been left behind from the economic development during the colonial era, the regional gap should be alleviated or resolved. It is for this reason why maize is called economically as “wage goods” and politically as “political goods”.

During the 1930s, the colonial government started the price control and subsidy scheme for securing the command of distribution. In order to stably provide food to the mining cities, the colonial government protected large-scale farms of whites, which accounted for most of the circulating amount of maize. After the independence, the government controlled the maize distribution as well as carried out the subsidy scheme, at first through the National Agricultural Marketing Board (Namboard), and then through the Zambia Cooperative Federation and its members. The unified prices were respectively applied for the producer and consumer prices of maize and for the input prices like seeds and fertilizer all over the country in every fiscal year. As a consequence, by the early 1990s about 60 % of maize production was circulated through the public institutions.

As a result of these policies and caused by the overly appreciated local currency, the domestic price of maize was lower than the frontier price, therefore the production of large-scale farms located at convenient places accessible to market along railways became disadvantaged. On the other hand, in

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[1] Prior to the rainy season the soil is hard and difficult to cultivate by hand hoes. Moreover in case of early sowing, it needs to weed twice, which causes the problem of securing labor force. Moreover since the priority is placed on the planting of subsistence crops, the maize planting for commercial purpose tends to delay.

remote rural areas maize production increased. In Northern Province widely known as the practicing area of the Citemene farming method, a kind of shifting cultivation, an expansion of maize production using chemical fertilizer was realized[1].

Such policies for increasing maize production, in a sense, can be said to result in a decline of the food security as a whole. Precisely, it is meant the stagnation of maize circulation in local markets, reduction of agricultural production other than maize, and reduced storage at farm level take place. In fact, if the price and procurement are assured, it is a reasonable economic behavior that producers tend to increase the marketing amount of maize, while consumers tend to increase to purchase the cheaper maize flour with subsidies, and at the same time the incentive for storing reduces. The maize production being vulnerable to droughts expanded, while the production of such drought resisting crops as sorghum and millet reduced.

In the early 1980s, with the capital assistance of SIDA, Zamseed, a semi-state seed company was established. As explained earlier, as SIDA launched the development of hybrid maize seeds, in establishing the company, the system from research development to seed production/sales was built. The sales amount of maize seeds had rapidly increased from 2,000 tons in 1970 to 15,000 tons in 1989.

As the financing scheme of the government through the depots of cooperatives had expanded, use of chemical fertilizer had increased even among smallholder farmers. By the early 1990s, about one-fourth of small- and medium-scale farmers obtained credits every year. During the period between the 1970s and the early 1980s, the prices of chemical fertilizer were approximately 30 % - 60 % of the imported prices due to the direct subsidies. As a result, the amount of fertilizer use expanded by four times from the 1960s to the end of 1980s, and the amount of use in remote area out of the total national use increased from 15 % to 39 %. At the end of 1980s, the amount of fertilizer applied to maize ranked at second place among African countries. Sixty-four percent of smallholder farmers sold maize, and 47 % received the visits of extension workers. Eighty-two percent of farmers cultivating hybrid varieties obtained fertilizer at the nearby depots, 86% sold maize, and 80% purchased seeds.

As such, the maize production expansion measures of the government made great achievements. It can be said to be a “green revolution” induced by policy measures. Thanks for a series of maize expansion measures, the production expanded from large-scale to smallholder farmers, and from the area along railways to the remote area, thus a certain result to alleviate the sectional and regional gaps was realized. However by the mid-1980s, the increasing policies became unable to continue for fiscal reasons. Then, as explained earlier, in the 1990s Zambia entered into a period of reform.

D. Situation of agricultural production

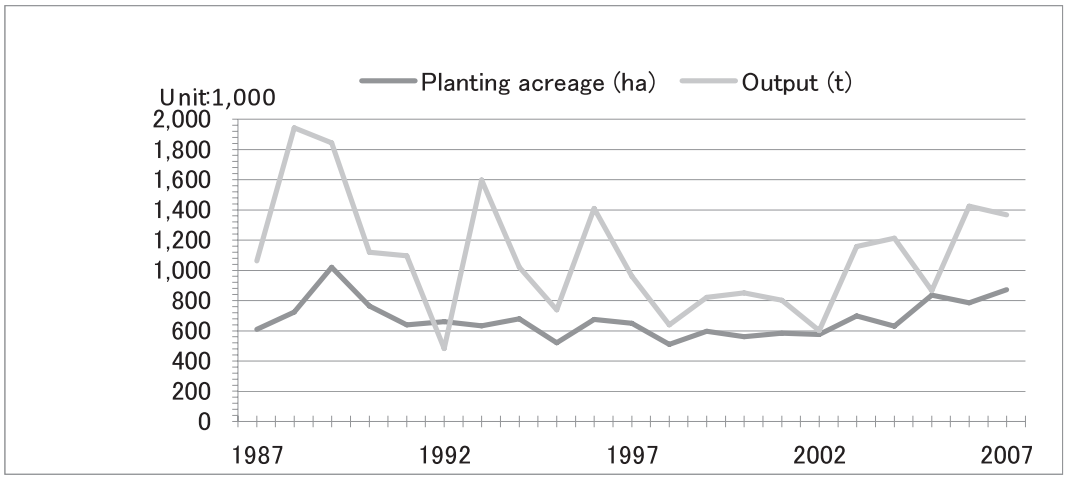
(i) Food crops

(a) Maize

As stated, maize is one of the most widely grown crops in Zambia. At the end of 1980s, the planting acreage reached at 1,020 thousand hectares and the output at 1,800 thousand tons. In the

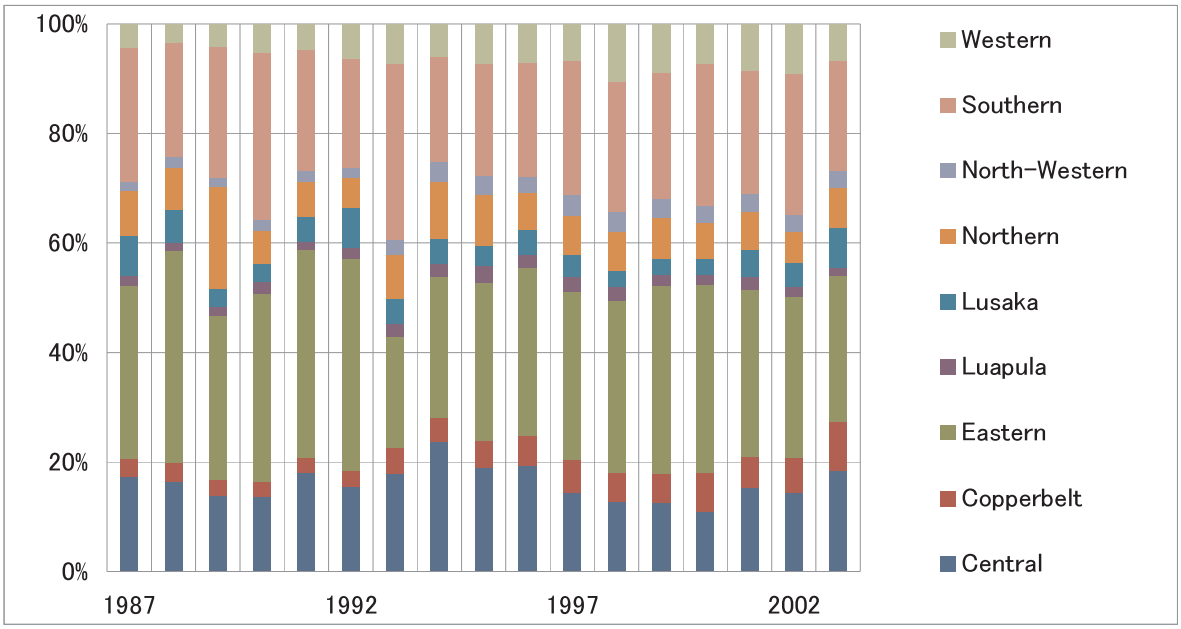
[1] Ohyama, S., 1998, Where Loans Vanish – Maize Cultivation in the Northern Part of Zambia, The Africa Report, 26: 38-41.

1990s, both the planting acreage and output decreased, but they have been recovering in recent years (Fig. I-4). Regarding the planting acreage by province, the ratios of Eastern Province (30 %), Southern Province (20 %) and Central Province (some 10 %) are high. In recent years, the ratio of Copperbelt Province has been rising (Fig. I-5).



Source: Agricultural Statistics Bulletin

Figure I-4 Maize production

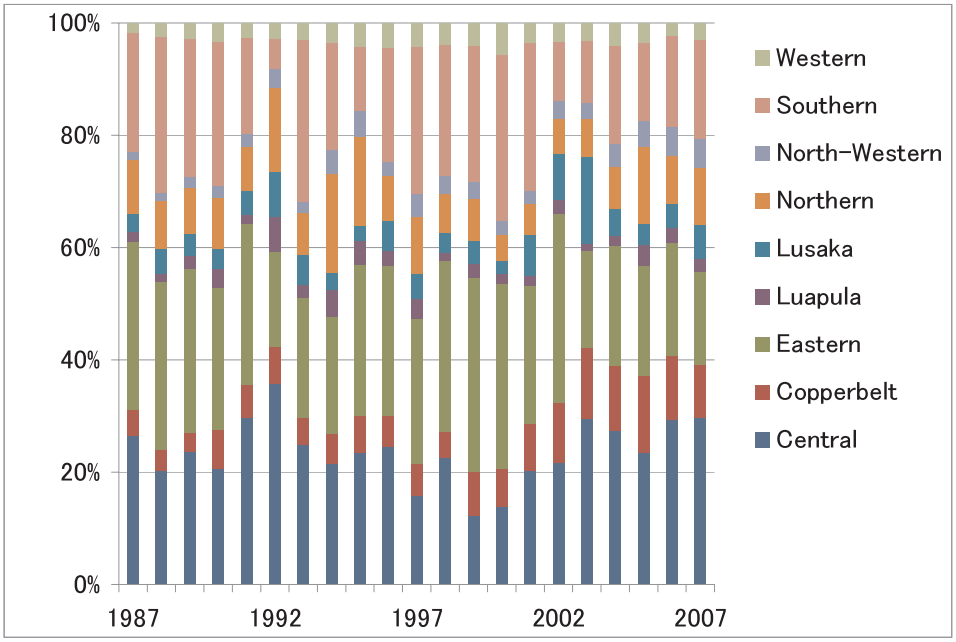


Source: Agricultural Statistics Bulletin

Figure I-5 Planting Acreage of Maize by Province

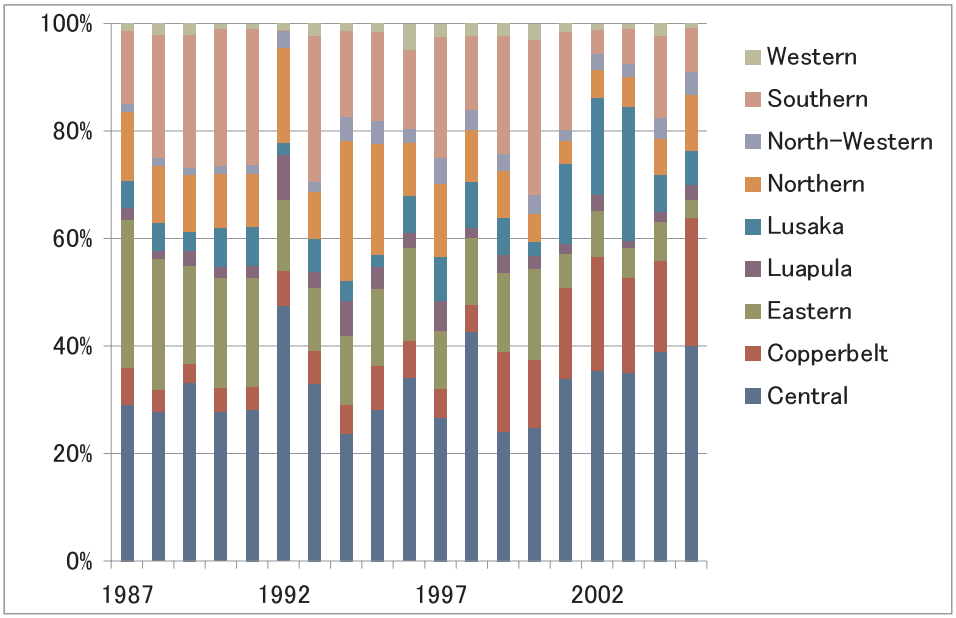
When looking into production (Fig. I-6) and sales amount (Fig. I-7), however, the ratios of Central Province have been high, and those of Copperbelt Province have recently been rising. In particular, in the latter province, the increase in the producing and marketing amounts might increase in the area close to consumption places affected by the liberalization. On the contrary, in Southern Province and Eastern Province, the traditional maize producing area, since they are unfavorably located far from large consumption places, their marketing amounts have recently decreasing. In these

provinces, it is hoped to increase the production of alternative sub-sectors or crops for replacing maize.



Source: Agricultural Statistics Bulletin

Figure I-6 Production of maize by province



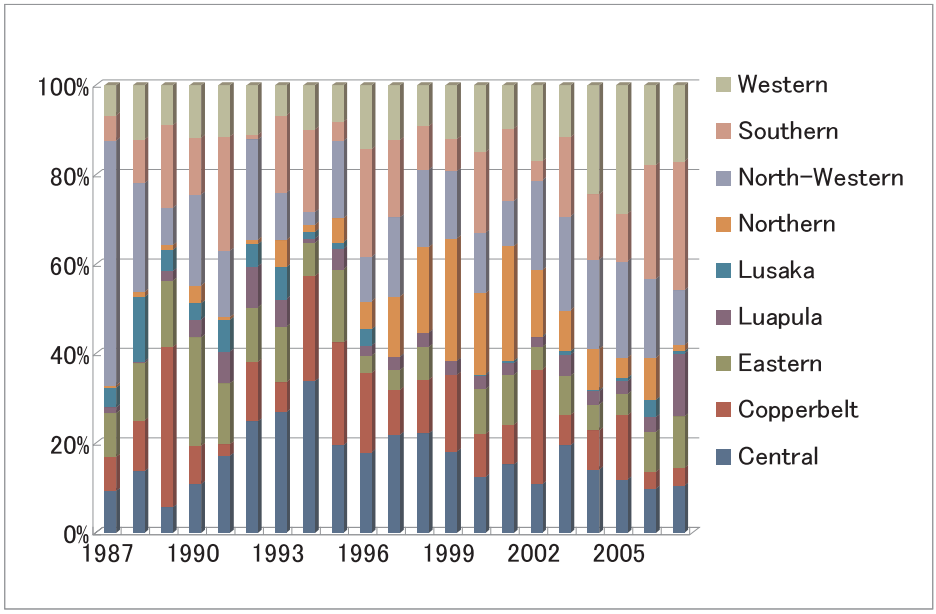
Source: Agricultural Statistics Bulletin

Figure I-7 Marketing ratios of maize by province

(b) Sorghum

Sorghum ranks at the third among major cereal in terms of planting acreage. All over the country, 40,000-50,000 hectares are planted. It is grown in Western Province and Southern Province to a relatively large extent, as one of drought resisting crops in dry area (Fig. I-8). Recent production of the whole country amounts to more or less 20,000 tons, and in a moderately declining trend. The amount

circulating into market is considered to be about 10 % of total production.



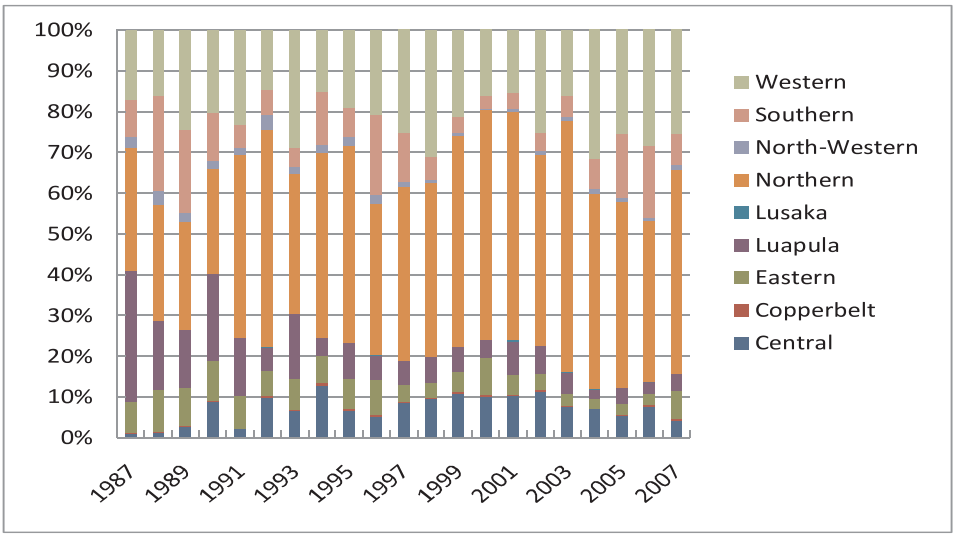
Source: Agricultural Statistics Bulletin

Figure I-8 Production of sorghum by province

(c) Millet

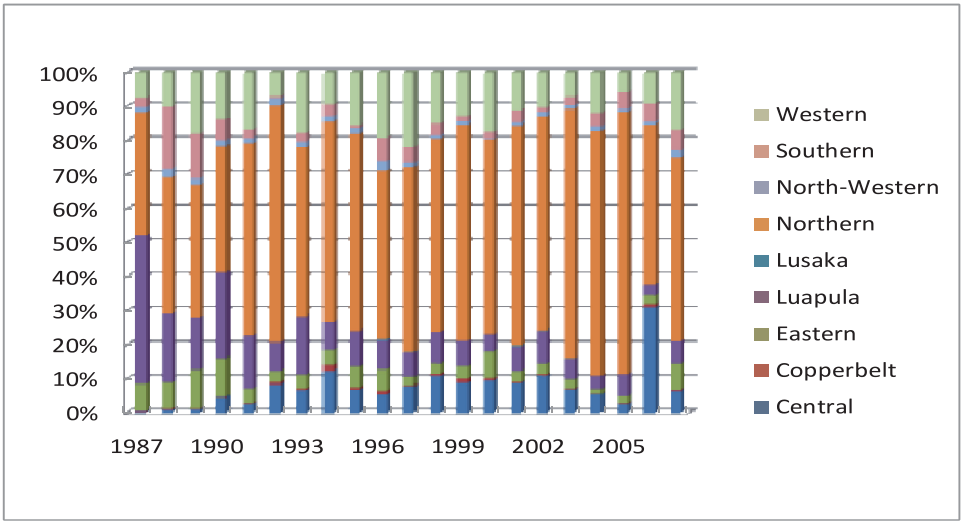
The planting acreage of millet amounts to 50,000-60,000 hectare all over the country, placing next to maize among cereal crops. After the serious drought of 1991/92, its planting area increased as a crop for famine relief. Moreover as a crop for production diversification affected by the agricultural reform, millet acreage expanded to closely 100,000 hectares and its output to 50,000-60,000 tons. Afterward, however, the output decreased to some 30,000-40,000 tons in recent years. It is relatively much produced in Northern Province and Western Province (Fig. I-9). Particularly Northern Province accounts for 40 to 50 % of the total planting area, and approximately 70 % of the total output (Figure I-10). The marketing amounts rapidly increased from several hundred tons in the 1980s to several thousand over 10,000 tons in the 1990s. While this statistical figure should be looked into with a caution, the increase would be largely attributed to the output expansion in Northern Province (Fig. I-11). As explained earlier, in Northern Province, as a result of the measures for increasing maize production, the planting acreage increased, and the "farming phenomenon"[1)] (the farmland successively used with input of chemical fertilizer) in the Citemene farming region took place. However as the change in measures created a difficulty in the maize marketing and the fertilizer purchase, farmers might have responded to increase in the millet production and its sales amount.

1) Kakeya, M., Present Situation of the Slash-and-Burn Agricultural Society, edited by Tanaka J. and Kakeya M., "Anthropology of Natural Society: Second Series", Academia Printing Company, 1996, pp. 244-269.



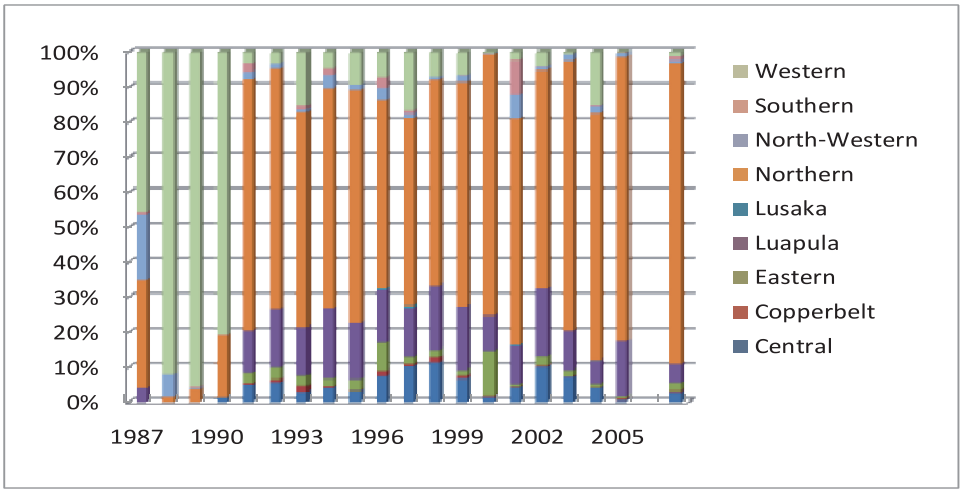
Source: Agricultural Statistics Bulletin

Figure I-9 Planting acreage of millet by province



Source: Agricultural Statistics Bulletin

Figure I-10 Production ratio of millet by province

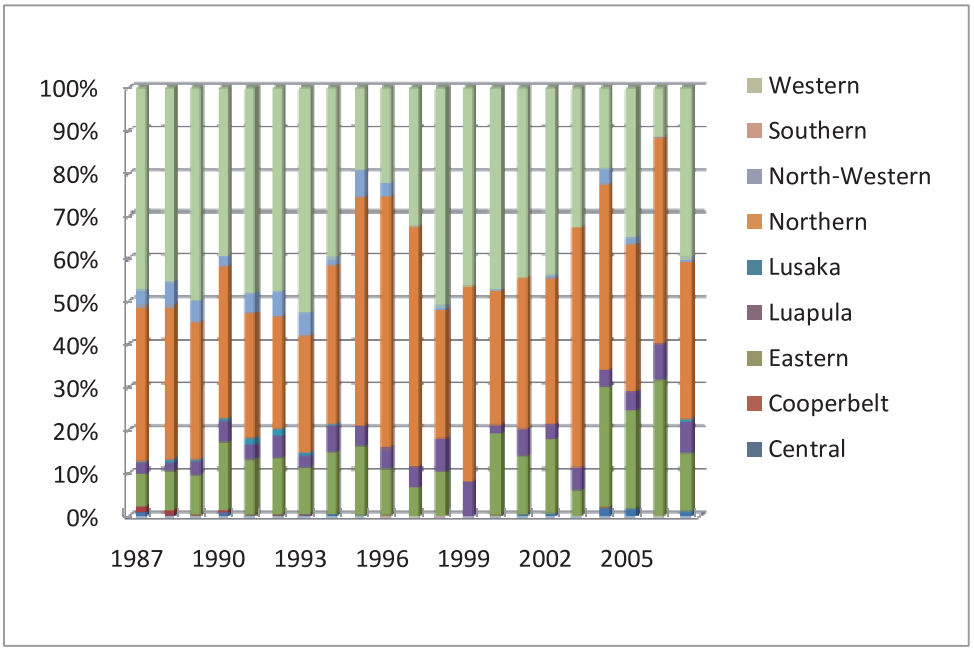


Source: Agricultural Statistics Bulletin

Figure I-11 Marketing amounts of millet by province

(d) Rice

The planting area of rice all over the country is several thousand over 10,000 hectares and the output is also several thousand over 10,000 tons. In recent years, they are in an increasing trend. Rice is much planted in Western Province and Northern Province, and the acreage in Eastern Province is recently in an increasing trend (Fig. I-12). In considerably varying one year to another, the marketing amounts according to statistics are 5,000-6,000 tons, and the ratios by province are in the similar trends as those of planting area and output.



Source: Agricultural Statistics Bulletin

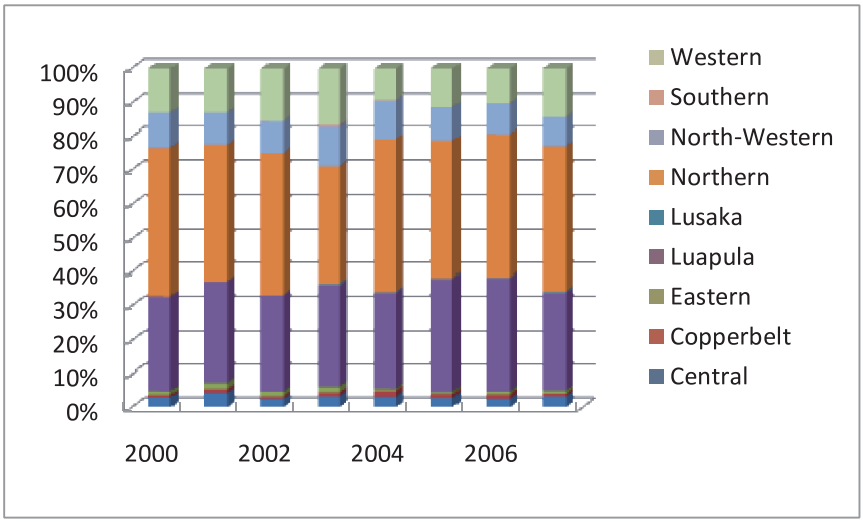
Figure I-12 Planting acreage of rice by province

(e) Wheat (with irrigation)

The planting area of wheat on irrigated land has been 10,000-20,000 hectares and its production has been increasing from 50,000-60,000 tons in the 1990s to several thousand over 100,000 tons in recent years. Main producing region spreads over Lusaka, Central, Copperbelt and Southern Provinces and in large-scale farms around main cities and along railways. Yield per hectare amounts to 5-6 tons. The center pivot irrigation system has been increasingly adopted in large-scale farms.

(f) Cassava

The planting area of cassava has expanded from several thousand over 100,000 hectares in the 1990s to close to 400,000 hectares recently. The ratios by provinces are 40 % of Northern Province, 30 % of Luapula Province and so forth (Fig. I-13). The total output of the country reaches over 1 million tons.

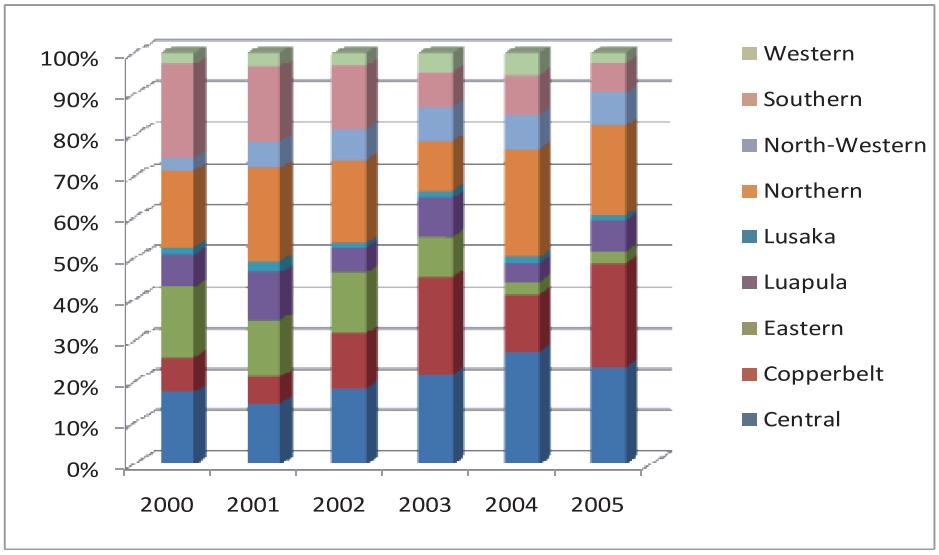


Source: Agricultural Statistics Bulletin

Figure I-13 Planting acreage of cassava by province

(g) Sweet potato

The planting acreage of sweet potato is around 30,000 hectares and the output around 60,000-70,000 tons. It is also one of the crops that the production has increased since the 1990s. Around 30,000 tons are sold in market. While the provincial ratios to the total acreage are high as of Central Province, Copperbelt Province and Northern Province, sweet potato is one of the crops widely cultivated over the whole country (Fig. I-14).

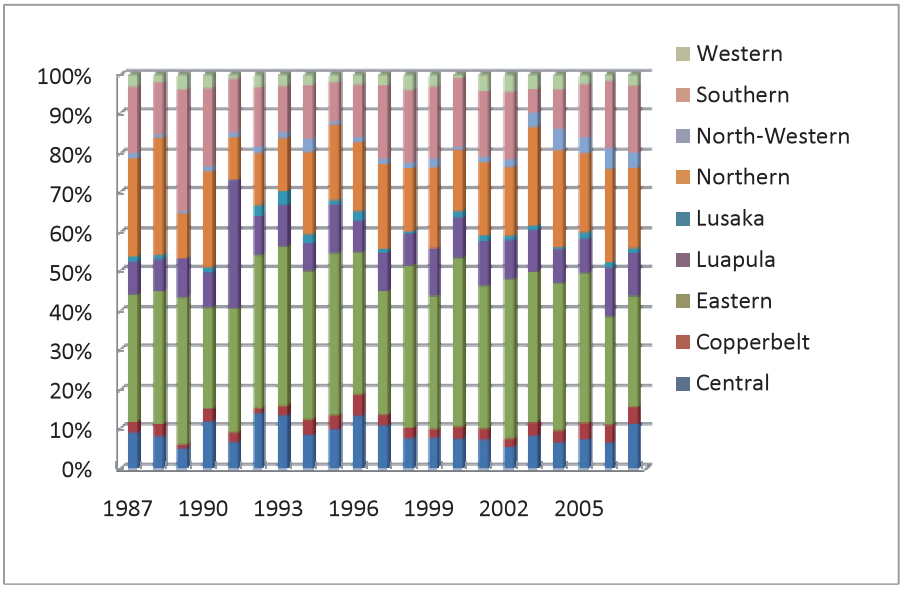


Source: Agricultural Statistics Bulletin

Figure I-14 Planting acreage of sweet potato by province

(h) Groundnut

The planting acreage groundnut in the whole country amounts to several thousand over 100,000 hectares, and its main producing area is Eastern Province accounting for about 30% of the total output (Fig. I-15). Proportions of Northern Province and Copperbelt Province are also relatively high. Annual production amounts to 70,000 tons, in which around 20,000 tons are marketed.

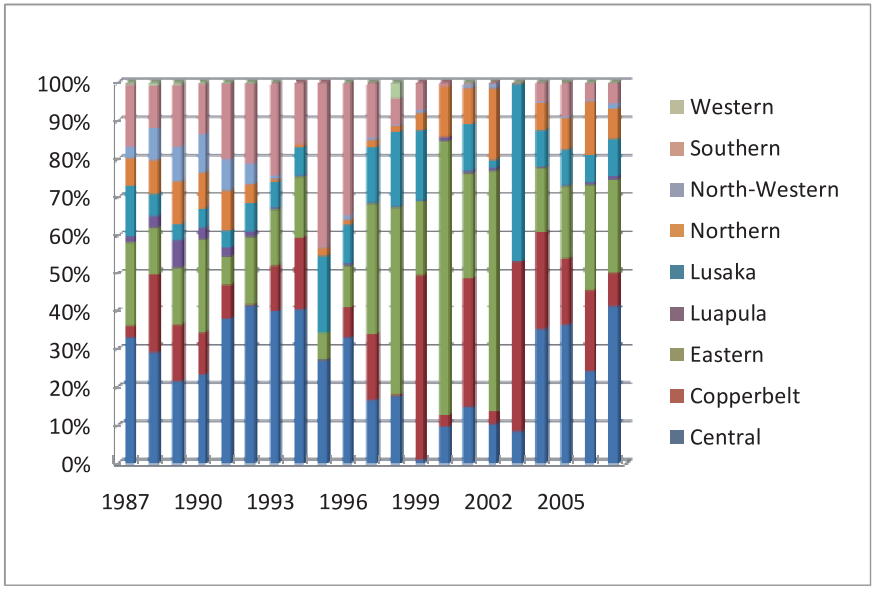


Source: Agricultural Statistics Bulletin

Figure I-15 Planting acreage of groundnut by province

(i) Soybean

The planting acreage in the whole country is 30,000-40,000 hectares and in an increasing trend. It is much planted in Central Province, Eastern Province and Copperbelt Province (Fig. I-16). The annual marketed amount is 40,000-50,000 tons.

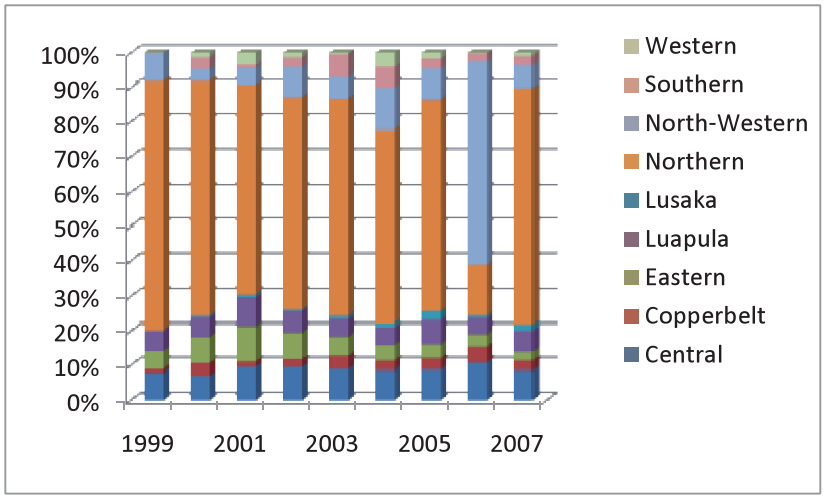


Source: Agricultural Statistics Bulletin

Figure I-16 Planting acreage of soybean by province

(j) Other beans

The acreage of the entire country amounts to around 50,000 hectares. The main producing area is Northern Province with the share of about 60 % of the total, followed by Central Province and North-Western Province, each accounting for about 10 % (Fig. I-17). The output is around several thousand above 20,000 tons, slightly over the half is traded in market.

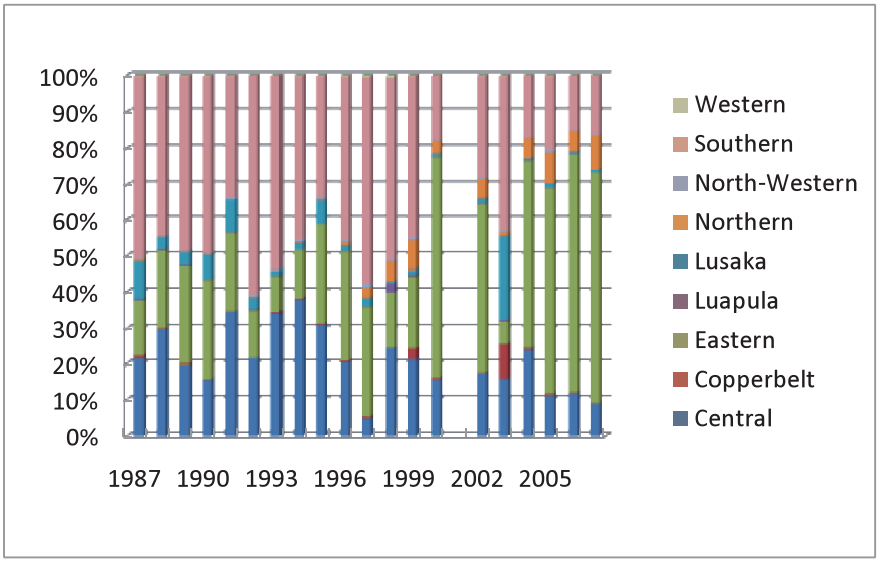


Source: Agricultural Statistics Bulletin

Figure II-17 Planting acreage of beans by province

(k) Sunflower

In recent years, more or less 30,000 hectares of sunflower is planted over the country, but it is in a decreasing trend. In the past, Southern Province and Central Province were the main producing area, but the ratio of Eastern Province has been rising (Fig. I-18). The planting area in Northern Province is also increasing. The total production of the country is around several thousand above 10,000 tons.



Source: Agricultural Statistics Bulletin

Figure I-18 Planting acreage of sunflower by province

(ii) Export crops

Zambia is a trade deficit country in the food and agriculture sector. The agricultural sector emphases on producing for domestic uses, thus exports of agricultural products remain almost none. Even at present, equipment and materials necessary to agricultural production such as chemical fertilizer, pesticide and agricultural machinery are imported, in addition such products as rice, milk, wheat and fruits, the demands of which cannot fully met by the domestic production, are also imported.

In 1991, against the agricultural exports amounting to USD 30 million, the imports of agriculture related goods (agricultural products and equipment/materials) amounted to USD 62 million. As a result of liberalization, foreign investment increased, and for the period of 1990-94 agricultural exports doubled to about USD 50 million. As shown in Table I-7, the exports reached USD 146 million in 1997 caused by increase in agricultural exports and the diversification.

Table I-7 Export Value of agricultural products (USD million)

	1995	1996	1997	1998	1999	2000	2001	2002
Sugar	24.7	30.8	26.4	33.2	23.1	22.8	37.0	-
Vegetables	2.4	5.3	8.1	10.5	12.6	12.0	21.5	44.9
Cutting flowers	6.8	9.1	10.6	16.4	21.3	16.9	17.0	30.3
Cotton	7.0	9.0	49.1	26.4	39.7	11.2	29.6	35.1
Coffee	3.8	4.8	8.1	8.9	5.1	8.6	9.0	9.2
Tobacco	5.1	9.1	15.0	17.7	13.2	8.5	10.6	21.7
Livestock products	1.4	1.7	3.4	5.0	4.6	6.3	6.5	4.9
Paprika	0.2	0.7	2.4	5.0	2.8	1.8	3.6	-
Others	8.7	18.0	23.3	18.7	13.9	19.5	14.9	-
Total	60.1	88.5	146.4	138.3	136.3	107.6	149.7	146.1

－: data not available
Source: Agricultural Statistics Bulletin

This increase of exports was much owed to cotton, vegetables, cutting flowers, coffee and tobacco. Since 1997 however the exports tended to slow down caused by sluggish international prices and unfavorable weather.

Since the mid-1990s, as one of the movements for alleviating the dual structure of agriculture, the outgrower scheme attracted an attention, which is undertaken through the collaboration between smallholder farmers and commercial farms/agricultural enterprises. The scheme is a system that commercial farms or agricultural enterprises provide by contract techniques and input goods to smallholder farmers and in return purchase the products from smallholder farmers. The contract farming, except cotton and honey (collected in the woodland area), has been rapidly expanding in the area nearby railways with convenient access (Table I-8).

Table I-8 Out-grower scheme (2003/04 estimates)

Crops	Total planting acreage (ha)	Out-grower acreage (ha)	No. of out-grower farms (No)	Government support program Number of participating farms	Government support program acreage (ha)
Cotton	150-170,000	150-170,000	170,000	4,200	5,200
Paprika	2,700	2,500	4,000	2,800	1,700
Soybean & oilseeds	30,000	4,000	3,500	-	-
Vegetables for exports	3,000	150	300	60	110
Tobacco leaf	12,000	1,500	1,000	870	1,150
Coffee	5,000	200	400	120	130

Source: FAO 2004 p.12.

There are several types of the outgrower scheme. In the “nucleus estate type”, commercial farms and/or agricultural enterprises provide production techniques and input goods to smallholder farmers, while the smallholder farmers are sometimes hired as the workers of nucleus estates. The

"agri-business operator type" is one in which individual farmers are organized and their products are purchased for processing and exports. In the "settlement type[1)]" is one that all settled farmers in a particular area participate in a contract farming project in terms of farmers groups or cooperatives. In the "organized producers" of this system, other individual farmers and farmers groups may be included. Crops handled with by these contract farming organizations have been increasing, spreading over castor bean, coffee, cotton, flowers, fresh vegetables, groundnut, honey, maize, milk, paprika, tobacco leaf, sugarcane and sunflower.

(a) Cotton

In the Zambian agriculture, cotton takes an important position among industrial crops, and its production has expanded mainly by smallholder farmers with less than 5 hectares. Cotton is planted in Southern Province, Central Province and Eastern Province, the main producing area being Eastern Province. The yield of cotton planted by smallholder farmers varies among them. While yields of many farmers are below 800 kg per hectare, a considerable number of farmers achieve those over 1,200 kg per hectare. As cotton is manually harvested, its quality has a high reputation.

(b) Tobacco

Tobacco is a traditional export crop of Zambia, but after the 1980s due to the government intervention, the output declined. Then, due to economic liberalization, an increasing trend has been observed. Geographically divided by the Luangwa River, in its eastern part like Easter Province, the Barley variety of tobacco, while in the western part such as Southern Province and Central Province, the Virginia variety are planted. The Virginia variety is mostly produced in large-scale farms. Smallholder farmers and emerging farms mainly plant the Burley variety, while the Virginia variety account for only 10% of the total tobacco planting area.

(c) Sugarcane

The planting acreage of sugarcane has been in an increasing trend (Table I-9). The Nakambala Zambia Sugar Company in Southern Province is planting sugarcane on a large scale basis using irrigation. Moreover the nearby commercial farms and smallholder farms also plant sugarcane to sell it to the Company. The Company plans to expand the sugar output from 260,000 tons in 2007 to 440,000 tons in 2010, and is also expected to produce ethanol.

Table I-9 Production of sugarcane

	Planting acreage (ha)	Sugarcane output (1,000t)	Sugar output (1,000t)
1990	11,596	1,136	253
1995	12,664	1,307	145
2000	15,047	1,472	188

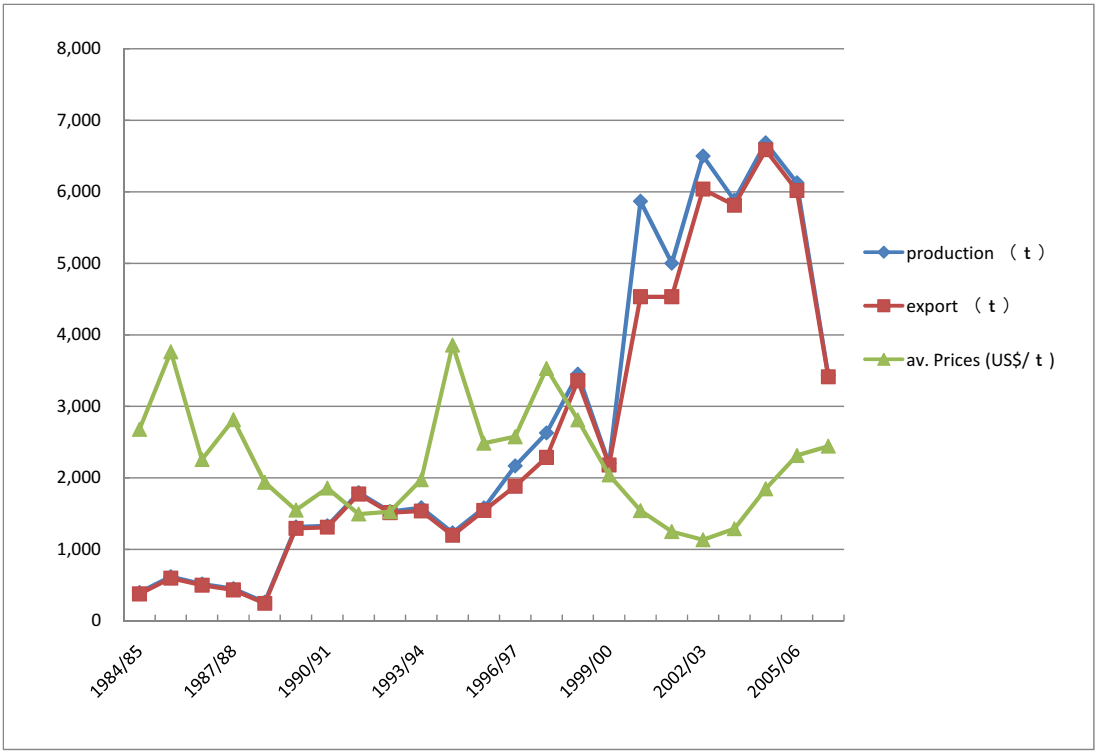
Source: Agricultural Statistics Bulletin

1) The "settlement type" is originated from the settlement on state owned land, and then most of the land has been redistributed to smallholder farmers.

(d) Coffee

Coffee in Zambia has been rapidly growing in recent years (Figure I-19). Both produced and exporting amounts exceed 6,000 tons. Coffee in Zambia is all the Arabica variety of high quality. The coffee sector of Zambia is under the control of the Coffee Board of Zambia (CBZ). The Zambia Coffee Growers Association (ZCGA), the private organization of coffee growers, is the sole certified organization of coffee marketing, and controls the quality and exporting amount. Most of coffee is produced in 70 commercial farms in Northern Province, Luapula Province, Central Province, Lusaka Province and Copperbelt Province, using irrigation facilities. CBZ together with ZCGA plan to increase the production area to 10,000 hectares and the output to 20,000 tons by 2010. At the time of 2004, smallholder farmers accounted for only 1 % of total production, most of them depended on rainfed water, but some in Northern Province and Copperbelt Province complementarily used irrigation.

In the coffee sector, the contract growing system subject to smallholder farmers has already developed. The suitable area for coffee production is regarded as Kasama, Mbala and Isoka Districts in Northern Province, Kawambwa and Mwense Districts in Luapula Province, Mpongwe District in Copperbelt Province, and Kabwe District in Central Province.

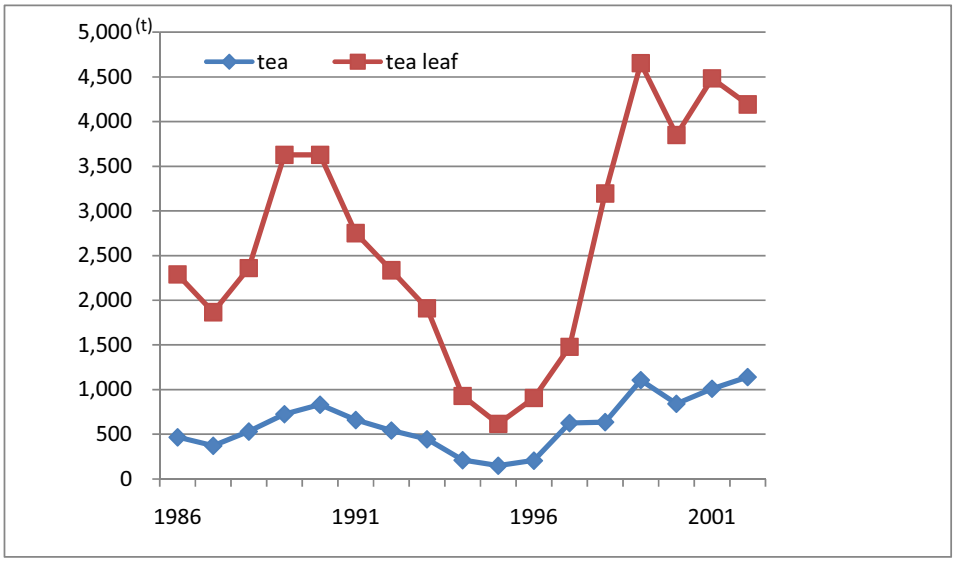


Source: Agricultural Statistics Bulletin

Figure I-19 Coffee production

(e) Tea

At the end of 1980s, tea leaf production increased up to 3,600 tons, afterward reduced to some 600 tons. However after then it recovered and recorded a remarkable increase (Figure I-20).



Source: Agricultural Statistics Bulletin

Figure I-19 Coffee production

(f) Vegetables

Exports of such items as paprika, garden peas, snap peas, baby corn and cut flowers (mainly roses) to the European markets have been rapidly expanding. The Agriflora, a commercial large-scale farm, started production in the mid-1990s, but bankrupted in 2006. The company owned about 1,000 hectares of land close to the Lusaka International Airport, and produced about 5,000 tons of fresh vegetables for exports. Moreover, the farm made contract with the smallholder farms within 50 km radius of the processing factory, and exported fresh vegetables by air cargos.

Processed products of paprika are manufactured by the ZAHVAC/Bimzi Company (mainly engaging in extraction of essential oils) and the Cheetah Zambia Ltd. (production of flakes and powders). The paprika output amounted to 1,500 tons in 1998 and 2,000 tons in 2002, though it is expected to fill the gap caused by the reduction in Zimbabwe (from 12,000 tons in 1999 down to 3,000 tons in 2004) and South Africa (by outbreaks of disease), due to the shortage of investment, it could not develop as fast as expected. As shown in Table I-8, out of 2,700 hectares of the planting acreage in 2003/04 (estimate), 200 hectares was planted by commercial farms and the remaining was grown by 2,800 smallholder farmers on a contract basis. Their average planting acreage is 0.5-1 hectare and the yield per hectare 400-600 kg on rainfed field, and in case of using irrigation facilities as high as 3,000 kg. The yield per hectare in large-scale farms is 3,000-4,000 kg.

(5) Agricultural productivity and income level of farmers

It is important to consider the regional feature of agriculture in examining the agricultural production and income levels of farmers in Zambia. Since the detail is explained in Chapter IV: Farming Types, in this section the main features of agriculture in each province is roughly explained in referring to Table I-10. It should be considered that affected by the climatic and other conditions, not only planting acreage but also cultivated crops vary one year after another.

Table I-10 Ratios of farms cultivating crops by province (%, 2000)

	Central	Copperbelt	Eastern	Luapula	Lusaka	Northern	North-Western	Southern	Western	Whole country
Maize	94.6	90.3	98.3	59.1	86.7	64.7	90.2	95.5	91.5	85.1
Sorghum	22.4	17.9	7.9	7.9	6.2	35.9	23.3	19.1	36.6	20.4
Millet	23.0	9.2	12.4	19.1	2.2	63.1	18.2	12.4	51.5	26.1
Rice	1.8	1.2	8.0	5.1	0.5	7.8	2.5	0.1	22.5	6.0
Cassava	33.5	31.4	24.9	93.9	15.4	87.8	78.0	9.1	61.2	49.6
Sweet potato	73.2	57.1	53.3	68.3	47.8	73.6	72.0	59.7	34.9	60.8
Potato	7.1	5.4	6.4	2.1	4.4	8.8	16.2	5.8	1.0	6.3
Groundnuts	66.9	73.9	67.9	73.8	46.9	71.2	40.4	64.7	35.1	63.1
Beans	31.6	36.8	24.2	36.9	25.7	63.4	46.0	24.4	25.6	36.2
Cowpea	17.2	7.6	28.5	9.1	10.1	21.0	8.0	11.4	10.3	15.5
Wheat	0.4	0.4	0.3	0.3	0.3	0.6	0.3	0.3	0.3	0.4
Cottn	13.4	0.4	25.9	0.4	2.5	0.4	0.3	6.8	0.7	7.1
Tobacco (Barley)	1.1	0.7	6.1	3.5	0.4	3.6	3.1	0.7	4.2	3.0
Tobacco(Virginia	0.9	0.4	1.3	2.0	0.3	2.1	1.6	0.6	2.4	1.4
Sunflower	12.5	1.7	15.1	1.7	3.5	9.2	5.7	11.9	0.8	7.8
Soybean	5.5	4.8	8.0	3.7	2.0	7.2	4.2	2.0	0.6	4.9
Paprika	4.1	2.9	1.4	2.0	2.3	2.8	2.6	3.0	2.0	2.5
Sugarcane	11.0	12.1	14.5	5.1	10.4	10.4	7.7	9.2	5.7	10.0
Cashewnut	2.8	5.6	1.2	5.2	2.4	4.4	1.1	1.6	2.1	3.0
Vegetables	50.3	50.4	32.5	33.8	55.5	33.8	28.8	50.5	18.7	38.2
Others	16.7	13.8	9.3	18.5	15.0	19.2	18.6	14.9	12.5	15.1

Source: CSO, 2000 Census of Population and Housing
Note: Ratios of number of planting farms out of total number of farms

While maize is grown all over the country as the staple food crop, the ratios of cultivating farms are lower in Luapula Province (59.1 %) and Northern Province (64.7 %) than the average of whole country (85.1 %). In Northern Province the ratio of millet cultivating farms (63. 1%) is high. In Luapula Province cassava is widely grown (93.9 %). Similarly the ratios of cassava growing farms in Northern Province (87.8%), North-Western Province (78 %) and Western Province (61.2 %) are higher than the national average. Ratio of rice growing farms is only 6.0 % but it is at the highest (22.5 %) in Western Province.

Following maize, the high ratios of planting farms are observed in sweet potato (60.8 %) and groundnut (63.1 %). Against the national average ratio of farms planting beans was 36.2 %, those of Northern Province (63.4 %) and North-Western Province (46.0 %) are higher. Regarding vegetables, the national average ratio is 38.2 % and those of Lusaka Province, Central Province, Copperbelt Province and Southern Province are higher. Yet those of Western Province (18.7 %) and North-Western Province (28.8 %) are considerably lower.

Yields of main cereal crops, as stated earlier, are generally low. Here the maize yield is explained in detail. Table I-11 shows the analyzed result of maize yield for 21 years (1987-2007). The average yield per hectare for 21 years in the whole country was 1.6 tons. Those provinces above the national average include Central, Copperbelt, Luapula, Lusaka and Northern Provinces. On the contrary, that below the national average is Western Province. The highest yield on the provincial basis in the period was recorded in Lusaka Province around 1990, excluding in 2003. Yield variation (the highest divided by the lowest) was generally as high as 3.45, in particular high in Southern Province (18.8) and Eastern Province (8.22) and Western Province (5.76). Although the periods do not fully correspond with each other, compared with the yield during the period of the maize biased policies, the yield had declined for 11 years in the latter half of analyzed period. An exception is Lusaka Province, where maize yield increased by 1.23 times.

Table I-11 Yield of maize by province (kg/ha, 1987-2007)

		Central	Copperbelt	Eastern	Luapula	Lusaka	Northern	North-Western	Southen	Western	While country
Average yield		2,297	2,149	1,368	1,870	1,848	1,817	1,510	1,457	837	1,606
ave. whole country＝1.00		1.43	1.34	0.85	1.16	1.15	1.13	0.94	0.91	0.52	1.00
Maximum	Yield	3,514	3,503	2,638	2,834	3,521	2,963	2,202	3,584	1,917	2,523
	Year	1993	1990	1993	1994	2003	1988	1991	1988	1988	1993
Minimun	Yield	1,344	1,090	321	712	799	792	1,039	191	333	731
	Year	1999	1998	1992	1998	1987	1989	2001	1992	1992	1992
maximun/minimun		2.62	3.21	8.22	3.98	4.40	3.74	2.12	18.80	5.76	3.45
(a) 1987-96	yield	2,509	2,439	1,520	2,282	1,646	2,193	1,745	1,627	1,010	1,768
(b) 1997-07	yield	2,105	1,885	1,229	1,496	2,032	1,476	1,297	1,302	680	1,459
	(b)/(a)	0.84	0.77	0.81	0.66	1.23	0.67	0.74	0.80	0.67	0.83

Source: Agricultural Statistics Bulletin

Table I-12 shows the data on the basis of the Post Harvest Survey[1)] carried out for the whole country and supplemented by two additional surveys. According to the national average, though varying year by year, the income from agricultural and livestock products accounted for 70-80 % of the total income and the remaining 20-30 % came from non-agricultural income. Out of the income from agricultural products, 30-40 % originated from cereals.

Table I-12 Income composition of small- and medium-scale farms (%)

		2000/01	2003/04
Agricultural products		69.1	72.5
	Cereal	38.3	35.1
	Root crops	14.2	17.7
	Beans	8.3	9.6
	Non-edible crops	2.4	5.5
	vegetables/fruits	5.9 [1]	4.6 [1]
	Other crops	— [2]	0.1
Livestock products		2.8	5.1
Non-agri. activities		27.7	21.7

Source: Zulu, B., T.S.and others, 2007. p.5.

Notes: 1) Crops are shown in gross output value including production costs.
Horticultural crops (vegetables and fruits) include only sales value.
2) For convenience, determined as two times of horticultural crops.
3) Data of 2000/01 do not include velvet beans, paprika, pop corn, sugarcane, sugarbean, greengum and guineapea.
4) The totals do not add up to 100%, but are quoted as in the source.

Table I-13 shows the gross agricultural income by agro-ecological region. The “lowest rainfall region” corresponds to the Agro-Ecological Region I, where the ratios of cereal and livestock products in the gross agricultural income are high. Root and tuber crops are not highly important. The average income per farm of the region in the 2003/04 marketing year exceeded the national average. The “low rainfall region” coincides with the Agro-Ecological Region II, where the ratio of non-food commercial crops is high. The “high rainfall region” includes the Agro-Ecological Regions II and III, where the ratio of cereal is high. The “highest rainfall region” coincides with the Agro-Ecological Region III, corresponding with the area of northern part of Zambia. In this region, the ratios of fruits, vegetables

1) The survey is conducted every year by Central Statistics Office, with the subject to about 8,000 farms, including smallholder farms (0.1-5 hectares) and medium-scale farms (5-20 hectares). Ballard Zulu and others (2007) carried out supplementary surveys for the reason that the Post Harvest Survey does not include such growing sectors as fruits, vegetables and livestock products as its subjects.

and cereals are high.

Throughout all regions, the gross agricultural income in the 2003/04 marketing year increased from that in 2000/01. Adequate rainfall in 2003/04 was attributed to the increase. The lowest growing rate took place in the “high rainfall region” might be caused by the high proportion of cereal there.

While an analysis for longer period is required, the high increase rate in income observed in the lowest rainfall region and the low rainfall region, the so-called dry area, is assumed to be caused by the dissemination of high value crop planting such as cotton, tobacco, fruits and vegetables. In other regions with higher rainfall, due to a delay of development of commercial agriculture, the income remains lower than the national average.

Table I-13 Gross agricultural income by agro-ecological division

Agro-ecological division	Marketing year note 1)	No. of farms (weighted)	Ratios in gross agricultural income (%)								Gross agri. income (USD)	
			Cereal	Root crops	Banana oil seeds	non-edible commercial crops	Other crops	Fruits vegetables	Livestock products	Total	unit:1000	per fram
Lowest rainfall area	2000/01	231,858	34.3	1.8	4.1	9.2	-	21.8	28.8	100.0	19,841	86
Division I	2003/04	264,460	21.4	0.4	2.5	12.3	22.8	14.1	26.5	100.0	57,559	218
Low rainfall area	2000/01	297,220	22.3	1.2	8	33.6	-	25.6	9.4	100.1 2)	33,694	113
Division II	2003/04	331,148	16.1	1.3	6.5	52.8	0.2	9.4	13.8	100.1 2)	61,909	187
High rainfall area	2000/01	147,628	45.3	7.5	8.7	5.4	-	17.2	15.9	100.0	8,258	56
Divisions II, III	2003/04	165,697	40.1	9.2	11.1	12.6	0.3	10.3	16.4	100.0	13,033	79
Highest rainfall area	2000/01	450,217	27.7	10.2	15.8	0.3	-	36.6	9.2	99.8 2)	30,978	69
Division III	2003/04	505,839	27.3	10.1	12.9	0.2	0.2	36.2	13.1	100.0	55,679	110
Whole country	2000/01	1,126,921	34.3	1.8	4.1	9.2	-	21.8	28.8	100.0	26,427	82
	2003/04	1,267,145	21.4	0.4	2.5	12.3	22.8	14.1	26.5	100.0	52,123	149

Source: Zulu, B., T.S.and others, 2007. p.12.

Notes: 1) "Marketing year" covers from April to March of the following year.

2) In the source, indicated as 100.

2. Prospect of Agricultural Development

(1) Food crops

Under the Kaunda government, specifically from the latter half of 1970s to the 1980s, the maize production expansion policies brought a fiscal burden to the government, which was thus put to an end with the implementation of structural adjustment policies by the following Chiluba government. From the aspect of present day, the maize biased policies may be regarded to be highly extraordinary. Yet as stated earlier, it had to be implemented against the complicated domestic political background. Moreover the food crisis worldwide at that time might be considered as the background. Furthermore the abundant food, though limited to maize, provided the basis of a political stability of Zambia, a multiracial state, and for nurturing its calm national character.

For a country with rural or agricultural population accounting for 60-70 % of the total population, the fact that the maize related budget accounted for 20 % of the national budget cannot be said to be highly excessive. Maize as the wage goods was required to be in low price especially from the mining side through its efficient production from both the state and private sectors. As consumers, similar to Japanese people who are keen to obtain white rice meals, the people of Zambia have a desire to get the bright white “shima” as the staple food, and even now they mentally would have it.

Certainly the policies excessively biased to maize brought various adverse effects. Particularly

the planting techniques dependent on chemical fertilizer resulted in a waste of precious resources. In the area with insufficient infrastructure of farmland, the effect of fertilizer application was insecure. When rains wash away expensive fertilizer, its effect is lost. As the maize with potentially high yield varieties disseminated and consequently the traditional crops decreased, particularly in the area with low rainfall, food insecurity rose, and the agriculture became vulnerable to the direct effects of weather vagaries. Moreover the dependent character of farmers on the government strengthened, at the same time the sense of self-reliance for securing food by their own initiative and for achieving the increased production weakened.

Yet since the reform, agricultural diversification has progressed. The production of minor cereal such as millet and sorghum, cassava and sweet potato increased, and as a result the production in the respective suitable areas has been making the progress as hoped for. In the area with abundant water resources, the agricultural production during dry season will become important. In Zambia, the dry and wet seasons are distinctively divided, and the dry season with little rain expands for 4-5 months. Without irrigation, crops hardly grow. Recently the pumps with foot pedals are extensively used. Even some smallholder farmers use the pumps driven by engine. Such types of irrigation are at present limited to the farming area close to urban cities and the farms mainly growing cash crops. The crop planting during dry season is particularly important from the standpoints of income increase and securing food supplies. Needs for research development such as crop selection, variety improvement and development of planting methods should become higher. The roles played by public institutions and NGOs in this aspect should also be more important.

Such an epoch-making agriculture is on one hand against a providence of nature, thus calls for a caution. Although water resources are abundant, it is in general terms, thus when ground water simultaneously pumped up, unforeseen events may take place. To the extent permissible of cost and return, utilization of river water and construction of dams would be needed in future. From the aspect of public infrastructure investment, road building is indispensable. Yet the investment plans taking the local conditions and cost aspects into account are called for.

While the modern investment from outside is important, the utilization of native local resources should also be considered. For example, the application of expensive and sometimes not easily available chemical fertilizer is needed depending on the situation, since the utilization of manure is seen, its scientific analysis and applied research are also required.

(2) Export crops

Recent diversification of exporting crops and increase in value of agricultural products are the bright elements for Zambia, which is trying to emerge from an economy biased to the exports of mining resources led by copper. In undertaking poverty alleviation and in maintaining food security, a growth of the export crop sector is indispensable. In directing toward a stable development of agriculture and rural area, the promotion of food crops and export crops are closely connected each other.

At present in this connection, three keywords, i.e., smallholder farms, commercial/large-scale farms and contract farming, appear to be important. Dual structure of agriculture tends to create a

contradictory pattern, and, as in the neighboring country Zimbabwe, a state may fall into the critical situation. Though not fully analogous, the setting of Zambia resembles. The issue how whites and Africans can manage the coexistence and cooperation in the farming sector is important even in future.

While the contract farming system is currently enhancing the growth of export crop production, it will have many problems. Historically until a very recent time, a great number of farming carried out by Africans has been a subsistence agriculture based on self-sufficiency. In such a type of farming, production is not carried out for producing a surplus. It aims at achieving their own survival, and coexisting with families and relatives. It did neither need to standardize the sizes of products nor to control the quality. It did not use chemical fertilizer and pesticides.

The contract farming on the other hand is a type of farming dependent on purchased productive and input goods from outside. In other words, without funds one cannot basically conduct production. Even when a credit is obtained, unless profit is earned, the management runs into deficit. In rural area where cash revenue is not common, it turns the farms being deeply entangled in debt. Unless one has a mortgage, one cannot find a lender despite his wishes. His sole mortgage is land. Yet the land is not a private asset, but under the customary land tenure system. To change it to a modern system is not simple. Under the customary system, land is part of the integrated body concerning power, income, social status and incentives. For these reasons, the contract farming basically develops in the suburbs of cities at the beginning.

Zambia is basically pursuing the path toward the market economy. It proceeds in the framework of global economy, accordingly as far as this framework maintains, the relationship of mutual dependence would strengthen. In the connection, the conventional socialist economy and further the less developed market economy need to be duly considered. They are of a fundamentally different nature from the mechanism of market economy. While it is an urgent issue to build a system fitted with the market economy, the system may conflict with the old system. Under the less developed market economy, high transaction costs often take place. For the reason, it needs to establish a fare and impartial third party institution, which strictly checks the implementation and supervision of contracts.

In considering the export agriculture in future, it is highly important to emphasize on competitiveness, comparative advantage and economic efficiency. Zambia as a land locked country is under unfavorable conditions in terms of transportation. The current rise of petrol prices is expected to continue for some time. Exports through long distance transportation especially air transportation are doubtful in terms of the economic efficiency. Moreover considering the global environment becomes an indispensable aspect. Promotion of export industry only pursuing the price difference among countries, in other words only the profit but not considering the global environment may be approaching its end sooner or later. It suggests that an export industry considering intra-regional trades and highly processed products is to be examined.

(3) Direction of agricultural development

More than ten years has passed since Zambia started the liberalization and privatization of its economy. Although the contents of liberalization were not fully comprehensive, at the same time it is questioned that in the world where the globalization has been rapidly progressing, whether Zamia

should direct its agricultural development on the basis of principles of free trade. Although the country concerned should judge this point by itself, there may be several issues to be considered.

The first issue is to strengthen the self-sufficient basis of the basic food. At present, outside agriculture, there is no developed economic sector other than mining. While efforts for developing the industrialization are required, its outcome cannot be realized in a short period. At present the prices of natural resources have been rising, and the future agriculture should be examined in assuming that this trend will continue.

In a very simplified picture, if foreign exchange rates are determined by market mechanism, the rise in resource prices would lead a hike of Zambian currency, the Zambian kwacha. As a result, some symptoms of the Dutch Disease may appear. In other word, food could be imported in lower prices. The typical case is seen in Nigeria after the oil crisis in 1970s. As imports of agricultural products increased, the domestic agriculture declined. While the current world economic structure is not totally same as in that time, it is feared that the dependence on imports of agricultural products would be likely to rise.

One quite different element from that time is the bio-energy boom. Zambia aims at developing the bio-energy industry in the Fifth Development Plan of 2007. Already the planting of Jatropha started in 45,000 hectares in Chongwe District of Southern Province, 15,000 hectares in Kasama District of Northern Province and other districts like Solweji District of North-Western Province, most of them in the contract farming[1)]. The raw materials of bio-ethanol include sugarcane, sorghum and cassava, and the Nakambala Zambia Sugar Company is expanding the planting area of sugarcane for providing the raw materials for bio-ethanol.

Most of literatures regarding the Zambian agriculture point out that land and labor force are abundant in Zambia. Land issues were already explained earlier, and in the area under the customary land tenure system there is a risk of increasing outbreaks of land dispute in accompanying with the development of contract production farming.

In the labor market, as the wages of simple manual workers are extremely low, if the demand for labor increases, the wage would rise in a short period. In other word, assuming the present daily wage being around USD 1, which stands at a low absolute level compared with that in developed countries, it would easily rise to USD 2-3 in a short period.

One of the serious problems in Zambia is a decrease in population caused by AIDS/HIV. While the death rate by AIDS has been declining in urban area, it is still high in rural area. Decrease in agricultural labor force caused by AIDS adversely affects agricultural production. It is an urgent matter to assist the farms, which lost the labor force by AIDS or have the agricultural labor force infected with AIDS.

As discussed above, efforts for developing agriculture are essential to Zambia for undertaking to escape from the monoculture economy centering on the mining industry. Although it is still under various constraints, an efficient and fair policy approach to induce to develop its agriculture should be examined.

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1) African Biodiversity Network, Agrofuels in Africa, 2007. p.13

3. Present Situation and Issues of Forests and Forestry

(1) Overall situation of forests

Zambia is one of the southern African countries having a large area of forests amounting to 45,610 thousand hectares, accounting for about 60% of the total land area (752,600 km^2) of Zambia. Within the forest area, the government on a priority basis carries out the forest conservation in the forest reserves and the national parks, each accounting for 9 % of the total land area of the country.

Forest vegetation of Zambia is largely classified to two groups. The first group is the closed forests, mainly comprising of evergreen trees of the *Cryptosepalum* and deciduous trees of the *Baikiaea*. The second group is the open forests sometimes called the savanna woodlands accounting for 87.5 % of the total Zambian forests, including the Miombo Woodlands, the Kalahari Woodlands, the Mopane Woodlands and the Munga Woodlands (Table I-14).

Table I-14 Classification of forests

Classification	% to total forest area
Closed forests	8.2
Open forests	87.4
Miombo	58.3
Kalahari	15.8
Mopane	7.2
Munga	6.1
Others	4.4

Source: Forest Certification in Zambia, Njovu 2004

Among these woodlands, the Miombo Woodlands account for about 60 % of the total forest area, constituting the main part of Zambian forests. Its soil fertility however low, therefore the trees belonging to the Legume family having root nodule bacteria are predominant. The main trees of Miombo Woodlands are *Brachystegia, Julbernadia, Isoberlinia, Marquesia* and *Uapaca*. Beside timbers, the collection of mushrooms and honey is observed. The Miombo Woodlands are not limited to Zambia but cover the vast area of the southern Africa including Angola, Zimbabwe, Malawi, Mozambique, Tanzania, and Democratic Republic of the Congo, thus the typical woodlands of the region.

The purposes that the Zambian government manages forests are not only the forest conservation in specific area but also for providing timbers to various industries like the mining industry. Since the productivity of native forests is so low that their timber supplies are limited on one hand, the demand for timber increased from various industries including the mining sector on other hand, the government started reforestation in the 1960s. Though it was held on a pilot basis at the beginning, the area under industrial reforestation currently reaches over 55,000 hectares. Afforested trees are Pine (79 %) and Eucalyptus (20 %). However new reforestation and its expansion are not enough, consequently the commercial reforested acreage is currently decreasing. It is pointed out that reforestation has substantially reduced the pressure on the native forests in Copperbelt Province, the main copper producing area. Up to 1991, all reforested land was owned directly by the government or through the Zambia Forestry and Forest Corporation (ZAFFICO), a semi-governmental organization. But due to the liberalization policies of 1991, ZAFFICO sold its assets together with part of its

reforested land, and at present ZAFFICO as a private company owns 2000 hectares of reforested land. To be noted, the forestry administration is charged by the Forestry Department of the Ministry of Tourism, Environment and Natural Resources.

(2) Ownership and holding of forests

The ownership of all lands and natural resources in Zambia belongs to the President representing the people. Accordingly the Forest Act states that all trees "are owned" by the President on behalf of the Zambian people. Concerning the management of natural resources however the authority is transferred to various state agencies, thus concerning forests the authority is delegated to the traditional local heads or the Director of Forest Department. Forests are classified into the following three groups according to the types of ownership or holdings:

(i) Forest reserves: Like the water catchment area of rivers, the forests that national values are recognized, which are designated by the state or local governments. Harvesting is allowed under license
(ii) Trust lands: They are used by local communities for their subsistence. Limited harvesting is allowed
(iii) National parks: They are managed for protecting wild life. No forestry activities like harvesting of trees are allowed

(3) Management and utilization of forest resources

Forestry industry contributes at least 3.7 % to GDP. Within the industry, the largest part is the wooden fuel, including commercial charcoal production of 2.2% and subsistent wood collection of 0.8 %. Then 90 % of the people are using the fuelwood thus produced. However the productivity of forestry industry is low throughout all stages from production, processing to distribution, furthermore due to the underdevelopment of the infrastructure such as roads and communications, the transaction costs become high. For the reason, the improvement of efficiency in forestry industry including small-scale enterprises would bring great benefits to the economy and environment. On the other hand, as it is estimated that 900,000 hectares of forests are being lost every year, it is requested to reduce such a high declining rate. One of the main causes of forest reduction is charcoal production, which is widely used by poor households in urban area.

The consumption of charcoal in urban area is estimated to amount to 3.9 kg per day or 1,040 kg per year per household. In 2000, the charcoal consumption in Lusaka is estimated to be 245,000 tons, which is equivalent to 15 million m^3 of timber. For the period of 2006-1010, the number of urban households is estimated to increase by 100,000, thus a further increase of charcoal demand will certainly take place. In strengthening the forestry management in cooperation with the producers and in improving the efficiency of charcoal production, thus strengthening their negotiating position in the market would bring the direct economic benefits to the rural poor.

Reduction in forests becomes also a serious environmental issue. As the causes, apart from charcoal production, inadequate farming techniques, uncontrolled bush fires, uncontrolled forest

cutting for the construction uses, and overgrazing of animals are pointed out. Moreover the illegal cutting and unlawful trading of timbers are the serious issues. Furthermore it is said that 250,000 hectares of forests are lost every year, caused by uncontrolled development of forestry products, illegal settlements and transfers from forests to farmlands (Table I-15). Other factors resulting in forest reduction include population increase, urbanization and industrialization.

Table I-15 Trend of forest acreage

Forest acreage (1000 ha)			Annual changes			
			1990-2000		2000-2005	
1995	2000	2005	1000ha/year	%	1000ha/year	%
49,124	44,676	42,452	-445	-0.9	-445	-1.0

Source: FAO, Global Forest Resources Assessment 2005

Most of the domestic timber demand comprises of fuelwood and charcoal, which constitute the major energy sources of the country. In particular, production and marketing of charcoal is an important source of income in rural area. The high demand for construction timbers follows. On the other hand, around the period of independence, Zambia imported timbers for meeting the uses of construction industry, afterward, thanks for forestry development, Zambia at present turns a net exporting country of timber and its products (Table I-16).

Table Ⅰ-16 Production, consumption and exports of timber and its products (2002)

Items	Production m^3	Consumption m^3	Imports		Export	
			Amount m^3	Value US$ 000	Amount m^3	Value US$ 000
Timber	157,000	155,439	251	71	1,812	452
Wood panel	17,900	18,823	923	281	0	0
Wood fuel	7,219,000	7,219,013	13	1	0	0
Wood scrap	67,000	67,031	31	2	0	0
Fiber/pulp	0	22	22	12	0	0
Recycled paper	0	1,663	1,663	38	0	0

Source: FAO web-page

In addition, as other important forestry products than timber, mushrooms, wildlife for meat, honey, honey wax, fruits, insects (caterpillars for food), plant fiber and medicinal plants.

(4) Issues of forests and forestry

Issues of forests and forestry of Zambia would be considered from the two aspects of environment and economy.

From the aspect of environment, as the factors to reduce and degrade forests, such three factors as charcoal production, clearing agricultural land, and clearing for settlements and related development are mentioned. For the purpose of forest protection, a guideline with more strict management and utilization should be introduced.

From the economic aspect, in spite of the rich forestry resources, their appropriate utilization is not fully realized thus sufficient benefits are not obtained due mainly to rural poverty. Therefore it needs to improve the utilization modality so as to maximize the benefits while maintaining the

sustainability of forest resources.

As the copper mining has been the largest economic activity in the country, in order to alleviate rural poverty, the government is undertaking the policies promoting diversification of economic activities especially in focusing on rural area. This means an increasing demand for farmland, and results in a reduction of forests. From the aspect of individual income, efficiency of agriculture is higher than forestry thus the rate of expansion faster, which resulted in advancement of the settlement in the Miombo woodlands. Yet as the soil fertility of the woodlands is low so is its agricultural productivity, thus in fact it is difficult to obtain sufficient benefits and the poverty there would not easily disappear.

In future, it is needed to raise the profitability by means of improved market of diverse forestry products rather than the transfer to farmland, and to this effect it should pursue the maximization of profits obtained from forestry resources while effectively protecting forests.

4. Development Goals and Position of Agriculture and Forestry

(1) Economic development plans

After independence, almost all African countries, whether a socialist government or not, emphasized the roles of state in development and economic management, and formulated five- or seven-year development plans. Zambia also successively formulated five-year plans, starting from the Provisional Development Plan (1964-66) immediately after the independence, the First (1966-71), the Second (1972-76) and the Third Five-Year Plans (1980-84) were prepared.

However in the 1980s when the economic crisis and introduction of the structural adjustment programmes led by the World Bank and IMF prevailed, the preparation of five-year plans became difficult, thus instead of five-year development plans, the economic recovery programmes for the period of two to three years were formulated.

Launching of the Third Five-Year Development Plan, as the Zambian economy fell into a crisis due to the declined copper prices and the oil crisis, delayed for three years. Moreover after the Third Five-Year Development Programme, there was an interruption of five years until the Fourth Five-Year Development Plan. During the period, in 1987 the Kaunda/UNIP government abolished the Structural Adjustment Programme led by the World Bank/IMF, and formulated its own New Economic Recovery Programme-the Interim National Development Plan 1987-1988, and afterward the Fourth Five-Year Development Programme (1989-93). Yet as around 1989 the Kaunda/UNIP government actually introduced the structural adjustment programme along the direction of IMF again, furthermore in 1991 when the newly elected Chiluba/MMD Government took over Kaunda/UNIP rule, the Fourth Five-Year Development Plan was abandoned in the middle. Afterward for a long period no five-year development plan was prepared.

By the mid-1990s, the aid coordination among donors, mainly Europeans and the US, made progress, as well as the sector-wide approach, which specified the sector policies and sector investment plans. In Zambia, in the late 1990s, the following four Sector Investment Plans (SIPs) were introduced.

(i) The Agricultural Sector Investment Programme (ASIP): the first phase 1996-99
(ii) The Basic Education Sub-Sector Investment Programme (BESSIP): the first phase 1999-2002, and the second phase 2002-2005
(iii) The National Health Strategic Plan
(iv) The Road Sector Investment Programme: 1998-2002

Since around 2000, in responding to the accumulated debt problem of poor countries, the Debt Relief Initiative for Heavily Indebted Poor Countries (HIPCs) started. As the poverty reduction became the central development issue in the world, indebted poor countries in Africa were required to produce the Poverty Reduction Strategic Papers (PRSPs) to become eligible for the HIPC debt relief [1].

In May 1998, the government formulated the National Poverty Reduction Strategic Framework. The framework listed the following five strategies for reducing poverty: (a) achievement of a broad based economic development, with an emphasis on agriculture and rural development; (b) provision of physical infrastructure; (c) improvement of the productivity of small industries in urban area and the informal sector; (d) development of human resources; and (e) coordination, monitoring and evaluation of projects and activities related to poverty alleviation.

In December 1998, ,based on the Strategic Framework, the National Poverty Reduction Action Plan 1999-2004 was prepared as a five-year plan for implementing poverty reduction. The Action Plan put up its goals as follows: (a) to reduce the incidence of poverty (ratio of population under poverty line) from 70 % to 50 %; (b) coordination of all poverty reduction programmes; and (c) to monitor and evaluate the effects of poverty reduction programmes. Moreover the Action Plan emphasized the efforts initiated by poor people themselves, and is expected to assist such efforts.

The World Bank/ IMF approved the Interim Poverty Reduction Strategic Paper (I-PRSP) at the end of 2000. Based on the I-PRSP, the 2002-2004 Poverty Reduction Strategic Paper (PRSP 2002-2004) was enacted in March 2002. The PRSP 2002-2004 set the “economic theme” and the “social theme” as the two pillars of poverty reduction. In the “economic theme”, the PRSP emphasized the importance of economic growth stimulation for improving the livelihood and welfare of the poor. It targeted agricultural development as the engine of income expansion for the poor. The PRSP recognized that growth stimulation should be complemented by “social theme”. In particular, it perceived basic education and basic health care were powerful instruments for assisting the poor, and allocated much resources to these sectors (PRSP 2002-2004: p.38).

The PRSP 2002-2004 estimated Zambia wouldneed to grow at an annual rate of 6 to 8 % to achieve the poverty reduction targets set for 2015, and it viewed the projected growth rates of 2002-2004 of around 4 % would be too modest. The PRSP 2002-2004 also considered the importance of investment expansion for recovering the economic growth.

President Mwanawasa, immediately after his inauguration, tasked the Ministry of Finance and National Planning to prepare a transitional national development plan. The President then ordered to

[1] The Debt Relief Initiative for Heavily Indebted Poor Countries was launched in 1996, and the Enhanced Debt Relief Initiative for Heavily Indebted Poor Countries in 2001 respectively.

produce five-year national development plan from 2006 onwards. Thus, the Second Poverty Reduction Strategic Paper was formulated as the Fifth National Development Plan covering the period of 2006-2010. A formulation of the five-year plan was thus realized for the first time in 15 years after the Fourth Five-Year Plan (1989-1993) was abandoned in the halfway. President Mwanawasa pointed out for the reasons for introducing a five-year national development plan that it was needed even in a liberalized economy, to prioritize the public investment and to provide the basis of cooperation with donors (FNDP).

The Fifth National Development Plan was formulated on the basis of the National Vision 2030. The National Vision 2030 put the goal to make Zambia a prosperous middle income country by the year 2030. The theme of the Fifth National Development Plan is "broad based wealth and job creation through citizenry participation and technological advancement", which is further divided into the economic and social sub-themes. The strategic focuses are placed on economic infrastructure and human resources development. The Fifth Plan also emphasizes agricultural development as the engines of economic growth as well as for providing the opportunities for improving livelihoods. Measures for promoting economic growth are complemented by various approaches in the social aspect. They include the distribution favorable to the poor, safety net, social protection and good governance.

The Poverty Reduction Strategic Papers are supposed to be implemented with people's participation so that the stakeholders participate in the formulation and monitoring. Concerning PRSP of Zambia this participatory process is reportedly carried out relatively well as seen in the active engagement of civil soceity organizations.

The Civil Society for Poverty Reduction (CSPR) Zambia, a network organization of NGOs, participated in PRSP. CSPR was organized in October 2000 as a network of civil society organizations. It dispatches the representatives to the eight working groups of PRSP (Mpepo 2003). When CSPR started, all of some 10 NGO members placed their headquarters in Lusaka. At present 25 NGOs register in the steering committee of CSPR. Including those not belonging to the steering committee, about 90 groups affiliate (Mpepo & Seshamani 2005). CSPR also produced a civil society version of PRSP ("A PRSP for Zambia: A Civil Society Perspective") and delivered it to the Minister of Finance and National Planning. Mr. Mpepo, who is the coordinator of CSPR, acknowledges that "PRSP of Zambia to a sizable extent reflects the opinion of civil society regarding poverty reduction.[1)]"

(2) Agricultural development plans

In 1992, the Zambian government, together with the implementation of structural adjustment policies, started the reform of agricultural sector policies. The cruxes were the liberalization of agricultural sector and the promotion of entry of private enterprises into such activities as production, distribution and financing.

[1)] CSPR raises the following issues: (i) it is time-consuming and insufficient to provide information to the civil society from the government; (ii) a gap between the budget allocation and the actual expenses; (iii) the marginalized people and the poor, despite they are the target of PRSP, are hardly involved in PRSP, and remain in indirect relationship through civil society organizations and others; and (iv) members of parliament are hardly involved in PRSP (Mpepo & Seshamani 2005).

In 1996, the Agricultural Sector Investment Programme (ASIP) was launched. ASIP set the following five objectives: (a) food security; (b) generation of income and employment; (c) maintenance and improvement of such agricultural resource base as land and water; (d) to contribute to industrial development; and (e) expansion of exports of agricultural products. In order to achieve these objectives, 10 strategies were set up. They are: liberalization of agricultural markets; diversification of crop production;, development of the livestock sector; emphasizing services to smallholders; expanding economic opportunities for outlying areas; improving the economic status of women; improving the use of the available water resources; , full utilization of land suitable for agriculture; measures against natural disasters; and sustainable agriculture (PRSP 2002-2004). While in ASIP it was considered to be the indispensable prerequisites to restructure the Ministry of Agriculture and Cooperatives,, and to promote the decentralization, the insufficient understanding among the staff regarding ASIP, compounded by a delay of training and the anxieties for their future so that they may be dismissed, the restructuring of the ministry has not proceeded, and the expected outcome has not fully been achieved.

The Agricultural Commercialization Programme (ACP) 2002-2005 was formulated as the successive programme of ASIP which terminated in 2001, and it kept the linkage with the plan of agricultural sector in PRSP.

In the PRSP 2002-2004, the agricultural sector was expected to focus on: (a) accomplishment of policy reform initiated at the beginning of the 1990s; (b) building and reform of legal systems (defining the distribution policies of agricultural inputs and products); and (c) increase in the production and productivity and competitiveness of agriculture.

In 2004, the National Agricultural Policy 2004-2015 (NAP) was established. The basics of NAP are liberalization, commercialization, linkage between the public and private sectors, and provision of effective services. Prospects envisaged by the NAP are to secure food supplies and to develop an efficient, competitive and sustainable agriculture, which are able to contribute to GDP. The NAP 2004-2015 put up the following five priority objectives: (a) to ensure national and household food security; (b) contribution to industrial development; (c) increasing agricultural exports; (d) generation of income and employment opportunities; and (e) maintenance and improvement of agricultural resource base.

For achieving the above five objectives, the NAP 2004-2015 presents 19 strategies. The main strategies among others include: liberalization and private sector development; securing the quality and sanitary and phytosanitary requirement of agricultural products for exports: strengthening agricultural services for small scale farmers; arrangement of institutional and legal framework; access to land; development of appropriate technology; promotion of gender equity; sustainable and environmentally sound agriculture; and so forth.

(3) Forestry development plans

A. The Zambia forestry action plan

In Zambia, the forest and forestry administration has been conducted on the basis of the forest policy formulated in 1965 and the Forest Law enacted in 1973. However in view of the noticeable

reduction in forest resources, with the funds of UNDP, the Dutch and Zambian governments, and assistance of FAO (the Tropical Forest Action Plan 1993-1998), the Zambia Forestry Action Plan (ZFAP) for 20 years from 2000 to 2020 was formulated. The overall goals of ZFAP include enhancement of the contribution of forestry sector within socio-economic development, poverty alleviation and improvement of food security.

In the action plan of ZFAP, there are the following four sub-programmes:

- Indigenous Forest Management and Biodiversity Conservation Programme
- Trees and Forest Development Programme
- Forest Industry Development Programme
- Woodfuel Energy Development

Moreover, as the institutional assistance for ZFAP, there are the following sub-programmes:

- Forestry Education and Training Programme
- Forestry Research and Extension Programme
- Planning, Monitoring and Evaluation Programme

Moreover in order to promote the private sector and NGOs to participate in sustainable forest management, the sub-programmes focus on provision of incentives to the private sector and enhancement of the investment motivation.

B. New forest policy

Based on ZFAP a new National Forest Policy was formulated in 1998. It aimed at establishing a rational and sustainable protection, management, production and utilization of forest resources. Moreover for supporting this forest policy, a new Forest Act was enacted in 1999.

The principles of the Policy are as follows:

(i) Trees are important to environmental preservation, ecosystem conservation and sustainable socio-economic development;

(ii) There is an inseparable relationship between humans, trees and land;

(iii) There in need to create responsible partnerships, with gender equity, among stakeholders in forestry activities, to ensure the permanence and stability of forests;

(iv) There is need to combine scientific and indigenous knowledge in the management and utilization of the forest resources; and

(v) There is need for enhanced private sector participation in forestry development.

Furthermore the Policy is expected to address the following four main areas:

(i) Resource management and development

- Enhancement forest resources management
- Security of forest estates
- Expansion of plantations
- Ecosystem conservation
- Agro-forestry
- Forestry research and extension

(ii) Resource utilization

- Securing of sustainable utilization of such products as timber, wood fuel and other products than wood

(iii) Capacity building

- Capacity building of stakeholders by means of human resource development and institutional/structural reform

(iv) Gender equality

- Securing the gender equality in decision making, extension, training and fund raising
- Building of women's organizations

C. The Forestry programme in the fifth national development plan

Based on ZFAP and the New Forestry Policy, the Fifth National Development Plan in the chapter of natural resources also formulates the programme for forests and forestry. The following shows the outlines:

(i) Sustainable Indigenous Forest Resource Management

Objectives: Management and conservation of indigenous forest resources in a sustainable manner

Strategies:

- Interdisciplinary integration of development projects concerning forest industries
- Implementation of sustainable forest management and conservation
- Strengthening protection and monitoring of forest resources

(ii) Sustainable Wood Fuel Management

Objective: Promoting efficient use of wood energy and the alternative sources

Strategies:

- Promoting sustainable and participatory management of wood fuel
- Establishing fuelwood plantations
- Improving efficiency and technology of charcoal production/utilization
- Strengthening the collaboration with the Energy Regulation Board

(iii) Industrial and Plantation Forestry

Objective: Enhancing the economic and social contribution of industrial and plantation forestry

Strategies:

- Strengthening the commercial forestry
- Promoting the financing in the forestry sector
- Improving the access to information, market opportunities, trade channels and technology

(iv) Private and Public Sector Capacity Building

Objective: Developing the efficient private sector concerning the processing and distribution

system of timber

Strategies:

- Promoting the outgrower scheme in the production and the cottage industry of natural rubber
- Capacity building of forestry entrepreneurship
- Distributing the market information

(v) Strengthening Community Based Forest Management

Objective: Building up the local forest governance through decentralization and community based forest management

Strategies:

- Promoting joint management of forest resources
- Establishing community structures and developing skills
- Formulating joint forest management plans and putting in place appropriate legal frameworks

(vi) Agro-Forestry and Afforestation Programme

Objective: Strengthening the capacity of extension and research staff for actively promoting agro-forestry and afforestation activities

Strategies:

- Establishing on-station and on-farm trials
- Promoting village nurseries and securing woodlots
- Formulating the integrated land utilization plans

(vii) Strengthening Forestry Education and Training

Objective: Supporting the Zambia Forest College and the in-service training of its staff

Strategies:

- Rehabilitating college facilities and reviewing curricula
- Improving staff skills through staff development programmes
- Developing and implementing staff training programmes

(viii) Supporting Forest Business Enterprises

Objective: Improving investment environment in the forestry sector and providing a support to rural and urban livelihood through sustainable forest based enterprises

Strategies:

- Increasing the funds of Forest Development Credit Facility
- Promoting micro- and small-scale credit to rural based enterprises
- Promoting bee keeping and apiculture

(ix) Strengthening Forestry Research and Information Management System

Objective: Generating and maintaining the up-to-date forest data and information

Strategies:

- Implementing research programmes concerning inventories and assessment
- Conducting forest accounting and valuation
- Rehabilitating research facilities
- Establishing forest database

Chapter II Present Situation and Trend of Cooperation for the Development of Agriculture and Forestry

1. Present Situation of Cooperation for Development

(1) Cooperation of bilateral and multilateral donors/organizations

A. General trend

The Government of Zambia worked out the Poverty Reduction Strategic Paper (PRSP), the initiative being taken by the World Bank, based on the Poverty Reduction Action Plan that was formulated in May 1999. It then held the National Conference assembling the stakeholders, and after obtaining their consensus, in May 2000 the government cabinet meeting as well as the IMF/ World Bank approved PRSP.

In February 2007, the Fifth National Development Plan (FNDP 2006-2010) was approved. While PRSP was prepared in focusing on poverty reduction, FNDP, aiming "to create the broad based wealth and employment through citizens' participation and technology progress", states the importance to simultaneously achieve economic growth and poverty reduction. It also regarded the development of economic infrastructure and human resources as the strategic viewpoints, and defined education, healthcare, infrastructure and agriculture as the priority areas.

At present in Zambia, in parallel with the formulation of the Fifth National Development Plan, the aid coordination among donors is making a progress in many sectors, thus the government, with the support of each donor, formulates the Joint Assistance Strategy of Zambia (JASZ) [1)], which aims at harmonizing the aid procedures for achieving the goals of the State Development Plan. The JASZ claims the aid toward the general fiscal assistance, introduction of the lead donor formula, and the division of labor among responsible sectors. It is also formulating the Minute of Understanding in every sector for achieving the above ideas at sector level (The MOUs of education, healthcare and assistance to the private sector were already formulated). Main objectives of aid coordination are to prevent from aid flooding caused by unorganized aid of many donors, to reduce the transaction costs (such as time, provision of special treatment, personnel cost etc.), and to seek the alignment with the government plans such as PRSP and the Fifth National Development Plan.

Japan signed the MOU of Initiative for Harmonization in Practice in 2004 for increasing the efficiency of aid. Moreover so as to promote the understanding concerning its aid policies and modalities, Japan formulated the ODA Strategy Paper in cooperation with the Ministry of Finance, which described the aid policies and future plans of Japan, thus made efforts to demonstrate its aid policies.

On the other hand in the agriculture sector, while as the first sector-wide approach (the approach in which the government and donors share the sector development policies and implement the activities in a consistent manner) in Africa, the above Agricultural Sector Investment Programme was

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1) Roles played by the cooperating partners in JASZ are divided into three groups: lead donors, active donors and silent (or background) donors. In the agricultural sector, Japan is taking the position as an active donor.

carried out for the period of 1996-2001 under the leadership of the World Bank. However due to a lack of concerted action among donors (Japan did not participate since it did not have an aid modality corresponding to the general fiscal assistance and the common basket scheme – a common sharing of funds between the government and donors), and the shortage of fund management capacity at the side of Ministry of Agriculture and Cooperatives, it did not bring out the fully satisfactory result. Under the circumstance, FAO, the coordinator of donors in agricultural area, being skeptical to coordinated aid so far, has not been active in the aid coordination. For the reason, the movement of aid coordination in agricultural area delays compared with other sectors, but is now obliged to go along with the rapid trend of aid coordination since 2006.

At present, the movement of aid coordination is further advanced, such issues that how to hit a balance between the understanding/implementation of Japanese aid and the aid of fiscal assistance type, and whether fiscal assistance should be carried out are under discussion mainly by the local Japan's ODA task force including the experts in agricultural area toward the implementation of more effective and efficient aid.

In the agricultural sector, instead of FAO, the lead donors in the form of the troika system consisting of Sweden, the US and the World Bank will work as the contact persons in the dialogues with the Ministry of Agriculture and Cooperatives and play the coordinating role among donors. To be noted that the troika system has a three-year term, and the chairman in the first year will be Sweden then in the second year the US or the World Bank, but three years later, as part of the present members may be replaced by other donors, thus a new troika system would be born.

Regarding the implementation system of projects, many donors establish Project Management Unit (PMU) or Project Implementation Unit (PIU) independent from the existing administrative organization, while the Ministry of Agriculture and Cooperatives assumes the overall responsibility. Moreover many donors adopt the modality that the staff of Ministry of Agriculture and Cooperatives is seconded to a project for its implementation period, which is regarded as one of causes making the ministry staff empty. It may also lead for donors to compete each other for recruiting the competent staff at the Zambian side. The Japanese Government for its part nominates the staff of the ministry as the counterpart (C/P) in setting the project office within the existing administrative organization, accordingly adopts a modality of project implementation in emphasizing the technology transfer to C/P. It is only the Japanese Government among main donors that adopts such a modality.

B. Bilateral cooperation

In the agricultural area, those undertaking the aid in a large scale are the bilateral aid agencies mainly of the West and North European countries, and the international organizations such as the World Bank, the International Fund for Agricultural Development (IFAD) and the African Development Bank (AfDB).

Sweden (Sida) implements the Agriculture Support Programme (ASP), the largest among the bilateral aid. Although not as large as in size, the Netherlands and the Northern European countries like Norway have a long history of aid activities in Zambia, thus achieve a certain outcome in the agricultural sector. USAID carries out, not a direct aid to the government, but mainly the direct

assistance to private sector though NGOs like the Cooperative League of USA (CLUSA). Agricultural projects under implementation by country are as follows:

(i) Sweden (the Swedish International Development Agency: Sida)

The goal of Sida in Zambia is to reduce poverty through the initiatives in healthcare, agriculture, infrastructure and commerce.

One of the Sida projects for 2003-2007 and under implementation is the Agricultural Support Programme (ASP). The objectives of ASP are, as those described in PRSP, to contribute to food security, employment generation and poverty reduction. Its main components are as follows:

(a) Encouragement of agricultural production through crop production (including an increase in seed production, crop diversification and postharvest)
(b) Encouragement of land management (including farming methods for soil conservation and control of soil erosion and drainage)
(c) Encouragement of agribusiness including training about business and management (including income generation activities, agriculture as a business, market research and initiating enterprises)
(d) Linkage with wholesale purchasers, micro-finance and outgrower managers (smallholder farmers in 20 districts of Central, Eastern, Northern and Southern Provinces comprise the target group)

(ii) Germany (the German Technical Cooperation: GTZ)

Zambia is one of the priority countries of GTZ, which has carried out the cooperation activities for 28 years in Zambia in such areas as decentralization, water resource and governance. During the period of West Germany, the integrated agricultural cooperation for North-Western Province was the principal activity, while at present, in the framework of the "Assistance for Community Development in the Decentralization of Southern Province" which aims at the empowerment of smallholder farmers, subject to Choma, Mazabuka, Monze and Sinazongwe Districts in Southern Province, the assistance including participatory extension services, farming methods for soil conservation, business management, seed multiplication and provision of community development fund is being carried out. This project, started in 2004 and terminated in 2006, is now being planned to extend to the whole country.

(iii) The Netherlands

The Dutch cooperation in agricultural sector aims at encouraging the private sector in providing an environment so as to easily enter into the sector. Specifically it conducts: (a) assistance to research development to various agricultural research stations and the Golden Valley Agricultural Research Trust (GART); (b) assistance to agricultural and rural development focusing on Western Province conducted by the Netherland Development Organization (SNV); (c) assistance for improving livelihood of rural residents in utilizing the information communications technology (ICT); (d) assistance to the training such as the Natural Resource Development College (NRDC), the Zambia

Export Growers Association (ZEGA), the Training Trust (NZTT) and the Zambia National Farmers Union (ZNFU); and (e) financing assistance to the market access for the Livestock Development Trust (LTD) together with USAID, NORAD and Denmark.

(iv) USA (United States Agency for International Development: USAID)

The Strategic Plan for Zambia of USAID (2002-2010) has the following five strategies: (a) strengthening the competiveness of private sector in the areas of agriculture and natural resources; (b) improvement of the quality of basic education for school children; (c) improvement of the health situation of Zambian people; (d) maintenance of reliable government; and (e) reducing the impact of HIV/AIDS.

These strategic objectives of the Plan to provide competitiveness to agriculture and natural resources correspond with the principles and practices of programmes of Zambian government. In realizing these objectives, the following four consequences would be brought up: (a) enhanced access to markets; (b) promotion of value added products and service technology; (c) enhanced access to financing measures and business development; and (d) improvement of the growth environment.

At present, USAID is implementing: the assistance to the Agricultural Consultative Forum (ACF); promoting toward the market economy through the assistance to CLUSA, ZNFU, CARE, the Zambia Agribusiness Technical Assistance Center (ZADAC) and private sector; and the financial assistance to the Regional Research Network of Southern Africa.

(v) Norway (Norwegian Agency for Development Cooperation: NORAD)

All funds of the Norwegian cooperation are basically passed through Sweden Sida, the Netherlands, ZNFU and the Programme Against Malnutrition (PAM), etc. Norway cooperates mainly in the areas of education, governance, roads and natural resource management (especially wildlife). In the agricultural sector, financial assistance to ZNFU (for its activity of the farming methods for soil conservation) and PAM, and for encouraging dialogues between the public and private sectors, and assistance to ACF together with the Netherlands and USAID.

(vi) UK (Department of International Development: DFID)

DFID formulated the Zambia Strategic Plan in 1999. The Plan corresponds with the then National Poverty Reduction Action Plan and has the four priority areas: governance, health, education and HIV/AIDS, and focuses on the implementation stage of the Poverty Reduction Strategy. It also aims at improving the livelihood of the poor in rural and urban areas. The priority elements include: (a) generating the partnership in the city suburbs; (b) activation of communities, road construction and water supply in Northern Province; and (c) anti-drought measures and the damage reduction in Southern Province.

However, the project of DFID under implementation is limited to the assistance to the Monthly Crop Monitoring Survey conducted by the Ministry of Agriculture and Cooperatives in cooperation with FAO.

(vii) Finland

The ongoing project of Finland is solely one project, the cooperation in the areas of fisheries, aquaculture, markets and information communications in the framework of a rural village development plan in Luapula Province to be implemented from March 2006 to February 2010. Yet the Finnish cooperation in Luapula Province has been carried out for more than 25 years.

C. Multilateral cooperation

The World Bank, which has a considerable leverage in the development trend of agricultural sector, just started in 2006 a five-year project aiming at the commercialization of smallholder farms named the Agricultural Development Support Project (ADSP). Moreover in 2006 IFAD also approved a seven-year project called the Smallholder Livestock Investment Programme, which aimed at livestock hygiene and re-stocking for encouraging the use of animal draft power. ADB for its part is about to start a five-year project called the Smallholder Agricultural Production and Marketing Support Project, a project assisting the production and marketing of smallholders.

(i) The World Bank

The overall goal of the World Bank assistance is to promote the growth, production diversification and exports in integrating such policies as HIV/AIDS, gender and environment for improving the dissemination of social services. Moreover the strategic goals of World Bank are specified that: (a) sustainable economic growth under a diversified export-oriented economy; (b) livelihood improvement and protection of disadvantaged people; and (c) private sector managed effectively and efficiently.

The representative project of World Bank under implementation is the Agricultural Development Support Programme (ADSP) started from June 2006. Since 2002 the Ministry of Agriculture and Cooperatives prepared the ADSP as the successive programme of ASIP, and in January 2004 in consultation with a World Bank mission it changed the project title to the ADS Project (ADSP) with the following three objectives:

(a) Enhancing the productivity of smallholders production system, which is expected to lead to the food security and increase in the income
(b) Assistance to the agricultural research with competiveness and in emphasizing on outcomes, strengthening decentralized extension services at the level of district, block and camp, and strengthening smallholder farmers within rural communities through agricultural infrastructure and capacity building
(c) Strengthening the capacity of agricultural organizations in the areas of policy analysis, programme implementation and monitoring/evaluation

Three components of ADSP and their respective cost estimates are as follows:

Component 1: Assistance to farmers and agribusiness USD 33,200,000

- Financing scheme for supply chains USD 12,200 ,000
- Market improvement facilities USD 6,000,000
- Develop a network of farm roads USD 15,000,000

Component 2: Institutional development USD 3,900,000
Component 3: Project management and coordination USD 2,600,000
Total USD 39,600,000 (in which foreign exchange USD 37,200,000)

(ii) The International Fund for Agricultural Development (IFAD)

IFAD has the mission to fight the starvation in developing countries and the poverty in rural area. As the recent strategies for Zambia, IFAD has been assisting such areas as implementation of food security, reduction of vulnerability through support services, improvement of access to productive assets and technological knowledge, and diversification of revenue sources. IFAD is also focusing its assistance on strengthen the linkage between smallholders and supplier side. Other areas include the smallholder livestock sector, natural resource management including farming method of soil conservation, and commercialization of smallholders. Its major projects are as follows:

(a) Forest Resource Management Programme (2002-2008)

Cost Estimates: USD 12,630,000

Responsible administration: the Ministry of Tourism, Environment and Natural Resources.

(b) Smallholders Enterprise and Marketing Programme: SHEMP (2000-2008).

Cost estimates: USD 15,940,000

Components:

- Assistance for the development of groups of small enterprises including for strengthening formation of local NGOs
- Construction of access roads, assistance for small-scale intermediate traders, development of market linkages including market diversification
- Assistance to policy and legal systems

After completing the project, a termination evaluation will be held in September 2007.

(c) Small-Scale Livestock Investment Programme (2007-2014)

Cost estimates: USD 10,110,000

Components:

- Capacity development of animal disease control in the public sector
- Vaccination against the East Coast fever and its research
- Vaccination against the contagious bovine pleuropneumonia and its surveillance

Project staff has been selected and the project will start soon.

(d) Village Financing Programme (2007-2013)

Cost estimates: USD 13,810,000 (co-financed with Sida)

The project was already approved by IFAD, but, as the project staff is under recruitment, it has not started yet.

(iii) The African Development Bank (AfDB)

The strategy of AfDB for Zambia, as the basis of reduction of rural poverty, food security and acceleration of sustainable growth of the whole economy, is to achieve a broad based growth of

agriculture through the increase in agricultural productivity and income of smallholders as the key area within the agricultural sector. This strategy should be achieved by means of an intensive, expanded and diversified agriculture for exports, and the promotion of market linkage between smallholders and strengthened and expanded agribusiness.

(a) Smallholder Agricultural Production and Marketing Support Project

This five-year project (2006-2011) was formulated by a mission of the FAO Investment Center in July 2003, and is now in the pipeline of AfDB financing.

The components are as follows:

- Size expansion of smallholders under the outgrower scheme
- Promotion of production and supply of high quality seeds and pollination plants
- Livestock veterinary services, extension services, setting up the organizations for maintenance/management of irrigation facilities, setting up cooperatives, and capacity building within the Ministry of Agriculture and Cooperatives in such areas as the standardization and grading of agricultural products
- Survey regarding the large-scale farmland development for practicing a sustainable commercial agriculture
- Provision of funds for project implementation and management

The total project cost is estimated to be USD 42 million, in which 90 % is for production support corresponding to the above first and second components, and the remaining 10 % is for capacity building, survey and project management corresponding to the above third, fourth and fifth components.

(b) Small-Scale Irrigation Project: SIP (2002-2008)

The project covers the three districts of Sinazongwe, Mazabuka and Chongwe. The components include: establishing a small-scale irrigation plan; establishing a village bank; strengthening the organization for the staff of the Ministry of Agriculture and Cooperatives. Construction of an irrigation dam in Kanakantapa and Neganega areas is being planned.

Cost estimates: USD 10,770,000

(c) Zambia Agricultural Marketing, Processing and Infrastructural Programme (ZAMPIP) in Eastern Province and ASIP Support Programme (1999-2008)

Cost estimates: USD 30,300,000

(iv) The European Union (EU)

EU formulates a strategic paper for the assistance of Zambia during the period of 2001 to 2007, which concludes the private sector as the main actor of economy. In the paper, three sectors – agriculture, mining and tourism – are selected as the most potential sectors for a balanced growth and private investment. EU has so far focused on transportation infrastructure, setting up of organizations, capacity building, support for macro-economy and other programmes (healthcare, HIV/AIDS and education).

In the strategic paper, in recognizing that poverty reduction in rural area depends on the sufficient transportation infrastructure, three major interventions have been undertaken in the transportation sector. They are: (a) preventive maintenance/management of trunk, main and district roads; (b) maintenance/management and rehabilitation of farm roads (or feeder roads); and (c) surveys concerning the transportation modes (railway/road) and for their upgrading.

Major ongoing projects are as below:

(a) Assistance to Soil Conservation Farming Units (2005-2008)
Cost estimates: Euro 1,970,000

(b) Assistance to Agricultural Diversification and Food Security in Western and North-Western Provinces (2006-2013)
Cost estimates: Euro 1,500,000

(c) Kaoma Rural Livelihood Improvement Programme (2003-2007)
Cost estimates: Euro 700 thousand

(d) Export Development Programme II (2003-2007)
Cost estimates: Euro 6,500,000

(v) The Food and Agriculture Organization of the United Nations (FAO)

Until 2006 when the movement of aid coordination became active, FAO played the role of coordination and arrangement of donors in the agricultural area, and the intermediary between the Ministry of Agriculture and Cooperatives and donors. As the assistance to the Ministry, FAO undertook the emergency aid after droughts in the forms of planting materials and other agricultural inputs, and an aid by means of capacity building. At present, it carries out the assistance to agricultural extension activities through technological dissemination like the soil conservation farming method. Main projects under implementation are as follows:

(a) Project for Food Security and Nutrition Action and Communication in Luapula Province (2003-2007).
Cost estimates: USD 2,380,000

(b) Oil Palm Planting/Processing in Luapula Province for Food Security and Nutrition Improvement (2003-2007).
Cost estimates: USD 314,000

(c) Institutional Building in Ministry of Agriculture and Cooperatives for the Purpose of Monthly Cropping Survey (2006-2009).
Cost estimates: USD 570,000

(d) Emergency Assistance to Early Finding and Prevention of Avian Influenza (2005-2007)
Cost estimates: USD 400,000

(e) Capacity Building for Promoting of forming Cooperatives of Smallholders (2006-2007)
Cost estimates: USD 328,000

(f) Livelihood Improvement in SADC countries Through Food Security and Nutrition Improvement (2005-2007)
Cost estimates: USD 12,200,000

(g) Assistance to Cassava Production/Processing for Employment Generation (2006-2008)
Cost estimates: USD 335,000

(h) Food Security Project of Cassava Farming (2006-2008)
Cost estimates: USD 750,000

D. Agricultural policies and strategies of Zambian Government

After the Mwanawasa Government took over in January 2002, the Government of Zambia has placed three sectors as the priority areas: agriculture, mining/manufacturing and tourism, which should contribute to the economic growth. Since the Government launched the National Agricultural Policy in December 2004, it has been taking efforts to put the strategies and plans in line with the Policy into effect.

(i) The National Agricultural Policy

The national agricultural plan was formulated by the former Chiluba Government at the end of 1997, but its draft plan was not approved by the cabinet, thus a broad redrafting was made, yet as the Mwanawasa Government was born in January 2002, even the revised one was not approved. In the revised draft plan, the following policies were emphasized: promotion of export crops, resolution of dual structure, regulation on genetically engineered crops, preservation of genetic resources, focus on sustainable agriculture, and to this effect the soil conservation farming method and appropriate technology.

Afterward under the agricultural minister, Mr. Sikatane, of the new government, further revisions were added, then a draft plan covering for 13 years period of 2003-2015 was at last completed in September 2003, which finally became the National Agricultural Plan 2004-2015, and approved by the Parliament in December 2004.

The vision of the plan states that “to promote the development of an efficient, competitive and sustainable agriculture that secures food security and increased income”. Further the vision at the same time is assumed to contribute to “poverty reduction and economic growth”, the overall goal of PRSP (Poverty Reduction Strategic Paper). Comparing with the draft produced in the former government, NAP adds the following five sub-sectors: (a) irrigation; (b) land utilization; (c) farm mechanization; (d) development of cooperatives; and (e) training of agricultural cooperative staff.

NAP stresses increase in production, liberalization and commercialization of the agricultural sector, promotion of the partnership between the public and private sectors, the provision of effective agricultural services, which would lead to sustainable agriculture. By means of the implementation of these measures, it further states that the distribution of agricultural inputs and the government interventions to crop markets, which may disturb the entries of private sector, would not be necessary.

(ii) The Agricultural Commercialization Programme (ACP): 2002-2005

ACP was formulated as the successive programme of the Agricultural Sector Investment programme (ASIP), which terminated in December 2001, and at the same time designed as a main vehicle for implementing the agricultural components of PRSP into practice. However because ASIP

ended unsatisfactorily　ACP as well could not obtain enough financial supports from donors, thus it reached to the expiring date only in the form of draft. At present, within the Ministry of Agriculture and Cooperatives, ACP is simply positioned as a guideline for promoting commercialization of agriculture.

The principal objective of ACP is to promote of the development led by the competitive private sector, hence it has such components as promotion of agribusiness, agricultural credit and development of agricultural infrastructure.

(iii) The Five-Year Strategic Plan of the Ministry of Agriculture and Cooperatives: 2006-2010

This Plan is a strategic plan of the Ministry of Agriculture and Cooperatives formulated every five year starting from 1994. The Plan includes a review of the activities in the past five years by the senior staff of the Ministry and a strategic plan for the coming five years. As the five-year plan for 2001-2005 terminated, on the basis of the outcomes of the workshop held in August 2005, the five-year strategic plan for 2006-2010 was formulated, and at present it is under implementation. At the workshop, a SWOT (Strength, Weakness, Opportunities and Threats) analysis was introduced, and the SWOT of the Ministry was analyzed by the staff themselves, and the review of each department and the strategy for forthcoming five years were proposed.

(iv)　The Fifth National Development Plan (FNDP)

The FNDP is the successive plan of the Transitional National Development Plan (TNDP, 2002-2006). Although its finalization considerably delayed, after the discussion concerning the draft held at the stakeholder meeting, it was finally approved by the Parliament in February 2006. Regarding the chapter of agricultural sector, it basically corresponds with the direction of the above NAP, but in case of FNDP, each sector was worked out in detail at the respective Sector Advisory Groups (SAGs), which were established by donors concerned when FNDP was formulated. Therefore all projects including those funded by donors would need to be positioned within the FNDP programmes (the alignment with FNDP in JASZ).

In this connection, the Fertilizer Support Programme, which is a subsidy scheme of agricultural inputs (the subsiding rate: 50%) to smallholders with the aim of food security, has called for more than half of the total budget of Ministry of Agriculture and Cooperatives. Since it has so far been the target of criticism of major donors for the reason that it skews the market, it would be reduced every year so as to eventually be abolished (In FNDP, the government budget for Fertilizer Support Programme will not be included after 2009).

(2) Cooperation of Japan

A. Performance record of the cooperation by type

The total amount of Japanese aid to Zambia, particularly in technical cooperation (Table II-1) has been in a declining trend since the fiscal year (FY) 2002.　However, including the amount of debt relief, it considerably increased in 2005 when the Enhanced Heavy Indebted Poor Countries Initiative

started. On the other hand, the aid of other major donors has been in an increasing trend, consequently the aid amount of Japan to Zambia ranked at the lowest among them in 2004. By sectors, while the aid to education, healthcare, water resources and infrastructure have been expanding, that to agriculture decreasing (Table II-3).

Table II-1 ODA of Japan for Zambia (unit:¥ 100 million)

	Technical Assistance	Grant aid	Yen loans
FY 2002	18.17	22.57	0
FY 2003	16.19	18.64	0
FY 2004	17.25	18.83	0
FY 2005	15.94	32.80	0
Cumulative total up to FY 2004	410.80	949.11	494.97

The technical assistance is based on the actual expenses of JICA.
The grant aid and yen loans are based on the official letters of exchange.
For Zambia, a debt relief amounting to ¥70,776 million was forgiven in FY 2004.

Reference:
The assistance of bilateral donors (2005) (unit: USD million)
①US 97.42 ②UK 57.16 ③Denmark 43.70 ④Norway 30.58 ⑤Sweden 29.66 ⑥Japan 29.10
UK, Norway and EU provide the general fiscal assistance. USAID provides the assistance to the sector pooling fund.

Table II-2 Record of JICA performance to Zambia

( ): cumulative number in man/year

	FY 2005	FY 2004	FY 2003	FY 2002	Cumulative until FY 2005
Technical cooperation (J¥00 million)	15.94	17.46	16.19	18.17	394.86
Acceptance of trainees (person)	83(+13)	141(＋18)	157(＋16)	150	1,631
Dispatch of experts (person)	29(+21)	24(＋19)	24(＋18)	24	521
Dispatch of study teams (person)	39(+2)	40	20(＋10)	50	1,302
Dispatch of JOVC (person)	64(+50)	27(＋57)	24(＋79)	45	952
Dispatch of Senior Volunteers (person)	6(+7)	1(＋11)	5(＋11)	5	17
Provision of supplies (J¥ million)	107.42	156.39	146.99	140.04	5,150.46
Technical Cooperation Projects (No.)	6	Started 1 Continued 4	Started 1 Continued 4	Started 3 Continued 4	12
Development Study Projects (No.)	0	Started 0 Continued 0	Started 0 Continued 0	Started 0 Continued 0	22

Source: JICA Annual Reports

Table II-3 Trend of aid amounts of Japan for Zambia: by sector (unit : USD 1,000)

	2002	2003	2004	2005
Agriculture	0	2474.72	2173.82	3117.17
Healthcare	2298.48	4580.07	9998.80	7772.03
Education	0	5127.26	1998.71	5575.39
Water	4900.24	5164.28	3086.87	7589.10
Infrastructure	12785.32	12247.80	1737.93	986.01
Economy/fiscal and, governance	0	1205.95	775.21	924.34
Other social sectors	0	663.68	478.08	444.60
Private sector	0	665.66	275.02	430.70
Debt relief	27525.94	2899.05	0	720081.74

Source: Ministry of Foreign Affairs, The Country Evaluation: Zambia

B. Positioning of the agriculture and forestry sector in Japan's ODA

In the Country Aid Plan for Zambia formulated by Japanese Government in October 2002, the following five priority areas are indicated:

(i) Support for poverty alleviation focusing rural development
(ii) Improvement of health care/medical services with enhanced cost-effectiveness
(iii) Support for efforts to create a balanced economic structure
(iv) Human resources development and institutional building to facilitate independent development
(v) Promotion of intraregional cooperation

Among the above five priority areas, those related to agriculture are covered under the above areas of (i) and (iii). Specifically, under the above (i), (a) increase in agricultural productivity; (b) sustainable rural development; (c) dissolving the dual structure between urban suburbs and isolated areas, and under the above (iii), such sub-priority areas as development of cultivation techniques, storing and distribution technology of vegetables and promotion of livestock industry are listed.

As one of the characteristics of Japanese aid to the agriculture sector, it is observed that while other main donors emphasize on "agricultural development", Japan assists in centering on "rural development".

During the 1990s, Japan gave the largest amount of aid to the agricultural sector among donors, thus, together with that of Sweden, two countries altogether accounted for over 80 % of total agricultural assistance. However since Japan reduced the amount by about 50 % from 2002, it now ranks at the sixth in terms of aid amount. USA ranks at the first, followed by Sweden, Germany, Norway and Belgium. The reduction of Japanese aid was caused by the substantial reduction in food aid and the aid for food production increase after 2002, which were carried out in the 1990s (source: Ministry of Foreign Affairs, Country Evaluation of Zambia).

C. Overview of cooperation programmes in the agricultural and forestry sector

In view that rural development closely relates to poverty reduction, Japan will actively engage in such areas of cooperation as productivity increase, extension of agricultural technology, and building

of farmers' organizations.

(i) Technical cooperation project: The Project for Participatory Village Development in Isolated Areas (PaViDiA)

The project period:

1st Phase: June 2002-May 2007

2nd Phase: June 2007-May 2009

Project area: Chongwe in Lusaka Province and Mprokoso and Luwingu in Northern Province

Abstract: The project aims at building the capacity of rural residents far from markets to resolve their problems and strengthening the institutions for supporting the activities. It undertakes participatory village development and the extension activities for sustainable agriculture, thus is expected to set up a practical model to coordinate these activities and establish it in Zambia.

(ii) Technical cooperation project: The Project for the Improvement of Animal Health and Production Delivery Extension Services

Project period: January 2006-January 2009

Project area: Seven districts in Southern Province and Sesheke in Western Province

Abstract: The project aims at increasing the livestock production in Zambia through enhancement of animal health technology in the livestock husbandry of Zambia. To this effect, the project collects and analyzes the information of livestock husbandry of Zambia, and presents the diagnosis for resolving the problems. Moreover it holds local workshops for improving the animal health, and conducts the extension of animal health improvement technology.

(iii) Technical cooperation project: Food Crop Diversification Support Project for Enhancement of Food Security

Project period: October 2006-October 2011

Project area: Three districts in Eastern Province, two districts in Lusaka Province and three districts in Southern Province

Project summary: Maize, the major crop in Zambia, is vulnerable to droughts, in facts its production declined caused by the droughts from 2002, which brought a serious food shortage. While in the recent several years the weather has been favorable and the output increased, an agriculture biased toward maize is still difficult to cope with the vagaries of weather. This project intends to diversify agriculture/food through the production increase in the drought tolerant food crops like cassava and sweet potatoes and the extension of their processing technology, thus to provide a situation of stable food supply.

(iv) Technical cooperation project: Project for Development through Empowerment of Rural Communities in the Zambia Initiative Areas

Project period: January 2006 - December 2008

Project area: Three districts in Western Province

Abstract: In January 2001, the Government of Zambia, in consideration of the linkage between the humanitarian assistance to refugees and the development assistance in their recipient areas, started the Zambia Initiative (ZI), which intended to make the refugees participate in the poverty countermeasures in the western part of the country, the recipient region of the Angolan refugees. While many donors led by the United Nations High Commissioner for Refugees (UNHCR) are providing assistance to such priority development sectors as agriculture/livestock husbandry, healthcare, education and infrastructure, Japan, for its part, in utilizing the know-how obtained in PaViDIA, implements a micro-project for community development centering on agricultural development, and technical training to agricultural extension workers in Western Province, the recipient region of the Angolan refugees, in targeting the resident refugees as well as local residents.

(v) Individual technical cooperation (training): Farmer-Based Aquaculture Training

Cooperation period: Starting in November 2005

Cooperation institute: The National Aquaculture Research and Development Center in Copperbelt Province

Abstract: In the fishery sector, in the framework of the assistance to the Mwekera Fish Culturing Station in Kitwe city, the provision of equipments/materials and the use of collateral funds were carried out in the past, then from 1994 to 1997 in the framework of the fish propagation and culturing plan, an assistance was provided to the technology transfers concerning the fish propagation and culturing, artificial feed manufacturing for fish culture, and plankton production for aquaculture. In Zambia, while fish is the main protein source, the caching amount is declining thus the dependence on the propagation and culturing is rising, nevertheless due to the inappropriate technology it cannot cope with the demand. This training courses aim at giving the guidance of appropriate technology for those who engaging in small-scale fish propagation/culturing and enhancing the technique of extension workers of the Ministry of Agriculture and Cooperatives. The training courses are expected to be held at the Mwekera Fish Culturing Station.

(vi) Acceptance of trainees: Agricultural Extension of Zambia (special training courses to a country)

Period: 2000-2006 (seven times)

Quota to Zambia: 10 persons

Implementation agency: The JICA Obihiro International Center

Abstract: To implement training courses so that the extension workers could acquire the extension techniques to be applied in the field of Zambia

(vii) Development study project: Small-Scale Gravity Irrigation

Period: June 2007 (S/W agreement), the two and half years for the full-scale survey

Area: Northern Province and Luapula Province

Abstract: In targeting smallholders, the project is expected to identify an effective community-based irrigation project in applying small-scale gravity irrigation, and to formulate an action plan for improving the agricultural productivity and profitability of smallholders.

(viii) Dispatch of expert: Adviser for Agriculture/Rural Development

Period: August 2003-August 2008

Dispatched agency: The Planning Department of Ministry of Agriculture and Cooperatives

Objective: To improve the capacities of policy planning, management and donor coordination of the Ministry of Agriculture and Cooperatives

(ix) Dispatch of the Japan Overseas Cooperation Volunteers (JOCV)

At the time of March 2008, the following five volunteers in the agricultural sector are being dispatched in field: extension workers on community development (2 persons), animal husbandry (2 persons), and vegetables (1 person).

2. Direction of International Cooperation

(1) Issues of agriculture and forestry development

Zambia has a land amounting to 752 thousand km^2, about two times of Japan, in which 58 % is arable land (one-fifth of which is actually cultivated), and irrigable land of 423 thousand hectares (in which the current irrigated land is 100 thousand hectares). With a mild climate, vast cultivable land and rich water resources, the country owns a high potential to development. Since the livelihood of most Zambian people depends on the activities relating to agriculture, the development of agricultural sector contributes to the welfare improvement of the Zambian people, and leads to the growth of GDP and the expansion of employment. However the sector has various obstacles and limiting factors as below.

They include: (a) low productivity (the use of animal draft power and mechanization does not advance); (b) high dependence on rain fed agriculture, while irrigation is limited; (c) a high ratio of post harvest loss; (d) lack of the forecast/warning systems; (e) low development of infrastructure and high cost of fuels and transportation; (f) lack of financing schemes targeting small- and medium-scale farmers; (g) lack of agricultural markets for smallholders; (h) limited domestic market; (i) heavy dependence on chemical fertilizer (j) gender related problems (k) the remaining traditional land tenure system (most land remains under traditional chieftains; (l) low utilization rate of land/water resources; (m) high dependence on production and consumption of maize; (n) continuing dual structure since the colonial era; (o) underdevelopment of cooperative activities; and (p) unsustainable agricultural practices destroying the environment (excessive forest cutting, and the unconventional slash-and-burn

farming practice with a short fallow period).

(2) Direction of Japanese cooperation

The Government of Japan defines five priority areas in providing the Zambian aid, in which those related to the agricultural sector are “Support for poverty alleviation focusing rural development” and “encouraging an agriculture responding to the market economy”. The author considers that on one hand the programmes for achieving “Support for poverty alleviation focusing rural development” are required to include (a) Rural development programme and (b) Food security promotion programme, on the other hand “Nurturing agriculture corresponding to the market economy” to include (c) Sustainable agricultural production programme” (reference: Fig. II-1: Chart of Agricultural Strategy for Zambia).

Cooperation of Japanese Government specifically the cooperation of JICA in the agricultural sector has so far been undertaken in focusing on the assistance to PaViDIA in line with “poverty alleviation focusing rural development” among the five priority areas of the assistance to Zambia. On the other hand, the Ministry of Agriculture and Cooperatives of Zambian Government acknowledges the agriculture as a profit making business, not as a social welfare activity, and aims at developing an efficient and competitive agriculture leading to the economic growth, which is clearly explained in the above National Agricultural Policy as well as the Fifth National Development Plan.

Major donors as well as the Government of Japan, while in putting poverty reduction as the overall goal, provide the assistance with a clear policy that the commercialization of smallholder agriculture should contribute to the economic growth of Zambia. Under the circumstances, the agricultural strategy of Japanese Government is needed to implement, in addition to the assistance to “Poverty alleviation in rural areas” to date, the assistance to “Nurturing agriculture corresponding to market economy”, which eventually contributes to poverty countermeasures.

In order to achieve “Development of an agriculture responding to market economy”, it is necessary to develop a stable, sustainable and highly productive agriculture, which should be supported under “Sustainable agricultural production programme”.

In concrete terms, promotion of the projects centering on “Irrigation development”, one of the priority subsectors of Government of Zambia, is considered to lead to a stable, sustainable and highly productive agriculture. In this case, however, instead of the conventional large-scale irrigation infrastructure, which requires a great amount of costs for its construction and maintenance/management, it may be appropriate to assist such as the software side like the creation of a social system of irrigation sector, and the development of irrigation techniques in an appropriate size so that smallholders could build them in using locally available supplies and easily maintain and manage by themselves (Fig. II-1: “Peri urban irrigation scheme development”). Moreover, the irrigation development targeting the emerging smallholder farmers in the areas along the north-south trunk roads and lines rail and around cities (Fig. II-1 “Irrigation development in city suburbs”), and a realization of the Farm Block Concept[1)] (Fig. II-1: Assistance to farm blocks”), which assumes the

[1)] The farm block concept is a resettlement plan for employment generation and rural development. The block

coexistence between small/medium-scale farms and large-scale farms through the outgrower scheme, are exactly in line with the government direction toward agricultural commercialization, thus the assistance of Japan to these areas should be highly appropriated.

In Africa, while there are many successful cases of agricultural commercialization are found in such crops as cocoa, cotton, fresh vegetables and cutting flowers, they should ensure a sustainable economic growth of countries concerned, and lead to poverty reduction. Thus in future, it is considered that, in ensuring the alignment with Fifth National Development Plan and the National Agricultural Policy, the formulation of profitable and sustainable projects through the commercialization of agriculture is required.

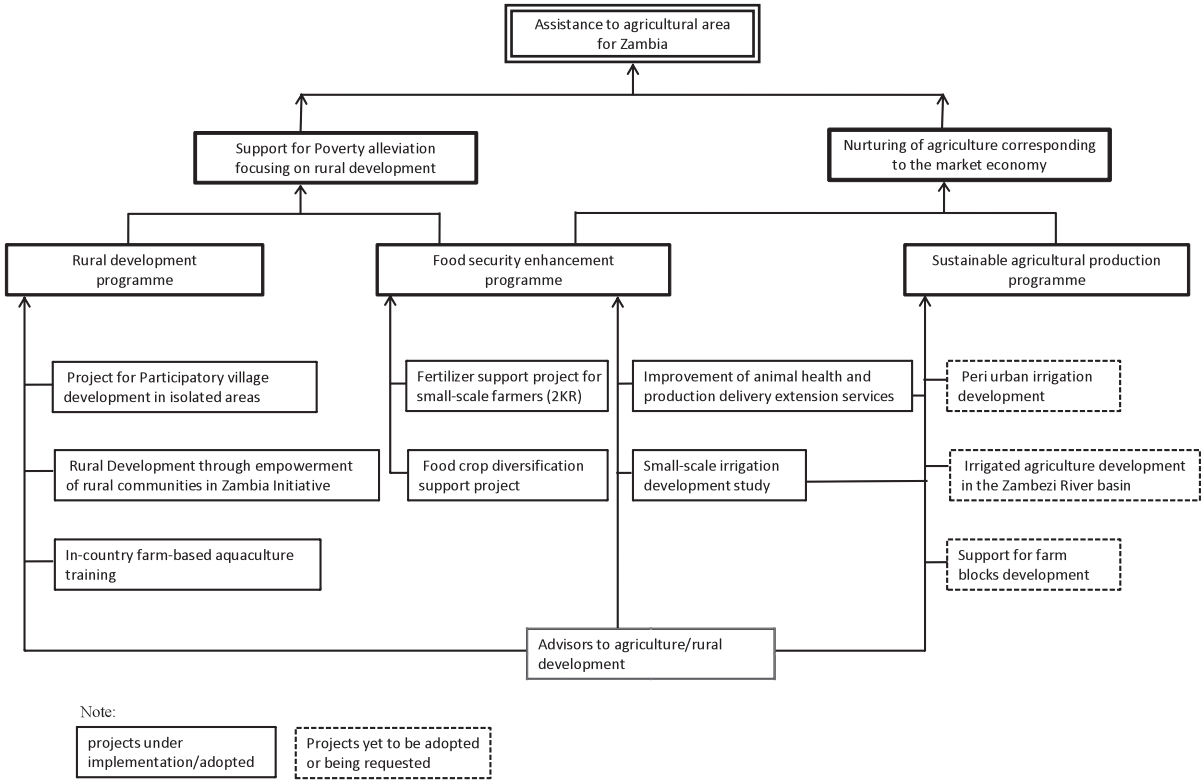

Figure II-1 Map of Japan's agricultural strategies for Zambia

with a size of above 100,000 hectares would be established one in each province, where a core venture is placed as the nucleus, and small/medium-scale farmers and large-scale farmers operate the agriculture in harmony through the outgrower scheme. The government prepares the basic infrastructure. At present, three out of nine blocks are under development.

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