The Role of Cadastral Surveys in Land Management Practices in Zanzibar

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Key words: Cadastral Surveys, cadastral information, land administration, land management

SUMMARY

Land management and administration entails making decision and implementation of decisions about land. Cadastral surveys which produce cadastral information of land have always been used in various ways to make and implement various decisions on land and landed properties.

Cadastral information give location of land parcels, define boundaries, gives sizes which are fundamental pieces of information on the issues of land allocation procedures, valuation of properties and reduction of litigation. As well the information has been used as criteria for assessing and levying land tax as well as land rent. Other notable use and advantages of cadastral information is that the owner of the land can use it as collateral in banks to acquire loans.

Generally the cadastral surveys as practiced in Zanzibar give the fundamental information for land registration as required by law, facilitate conveyancing and ease proper planning and facilitate management of land as a scarce resource.

However the cost of surveying is very high and generally beyond the reach of the majority of the population. The present cadastral survey methods need to be improved in order to make surveying more quicker and less costly so as to make it affordable to the common man and make it contribute more in the national economy.

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1. INTRODUCTION

Zanzibar consists of two small islands off the coast of East Africa. The bigger island - Unguja with an area of 1660 sq.km and the smaller one - Pemba with an area of 864 sq.km. The total population is at present about 980,000 inhabitants. Zanzibar forms one part of the United Republic of Tanzania. However, it is highly autonomous with its own President and Cabinet. All the Acts and laws mentioned here are applicable only within Zanzibar territory. The Tanzanian laws and Acts are not applicable in Zanzibar unless agreed upon by the Zanzibar Legislative Assembly – the House of Representatives.

2. LAND MANAGEMENT

Land Management and Administration deal with making and implementing decisions about land. It is concerned with the stewardship of land both for the present and future generations. Land administration serves various functions in a society: As a result, it has political, economic and social dimensions. Sometimes it is used to meet certain political goals, mostly in the case of land reform. Economically, it used as an instrument for poverty reduction. Socially, it used in strengthening of the role of vulnerable groups in a society, like women, farmers, and indigenous groups. O'Riodan (1971) urges that land management includes allocation of resources over space and time according to the needs, aspirations and desires of man within the framework of technological inventiveness, his political and social institutions and legal and administrative arrangements. On the other hand, Dale and McLaughlin (1988) suggest that at the end of the spectrum, land management may involve making fundamental policy decisions about the nature and investment in the land. At the other hand, it includes the routine operations - decisions made each day by land administrators such as surveyors, valuers and land registrars. Again land management includes the formation of land policy, the preparation of development and land use plans and administration of land related programs.

3. CADASTRAL SURVEYING ACTIVITIES - A HISTORICAL OVERVIEW

3.1 Pre-Revolution Period 1890-1964

Institutionalized land administration activities started during the British rule when they formally established their colonial administration in Zanzibar in 1890. As early as 1897, the need for having a proper land administration accompanied with cadastral surveying was felt when many peasants started getting into debt through mortgaging their land, and they could not pay the loans and many as a result lost their farms. Boundary disputes were many and endless. Owners had no security of ownership and acreage of their farms was not known. Boundaries were kept using permanent features like mango trees, coconuts, breadfruit trees,

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etc. The Government realized the importance of solving boundary disputes and increased the ownership of tenure. All farms were required to be surveyed and rights to be registered. Hence it was felt that proper cadastral survey to facilitate land registration was required. Hence in early 1900s, British established Land Survey section in the Public Works Department which was given the responsibility to oversee all land administration activities in the country. In 1912, they introduced the Land Survey Ordinance which was the first piece of legislation responsible for directing, regulating and control land survey activities. However the Government had to postpone this project due to high costs incurred. According to 1923 estimates, the whole exercise was to cost eighty thousand Sterling Pounds (Zanzibar Government, 1923).

Once again the Government's recognition of the necessity of having reliable and up to date information of land through a comprehensive land surveying and recording system was highlighted in the Official Gazette of the Zanzibar Protectorate of September 26, 1936 when on the issue of settlement and Registration of rights to land within Zanzibar, it revealed that:

"Government has long had under consideration the necessity of replacing the existing registration of documents affecting land by more complete system of land registration based upon a cadastral survey..... The establishment of a register of rights to land based upon a suitable cadastral survey is therefore a matter of pressing importance in the plantation areas of Pemba and of rapidly increasing importance in those of Zanzibarthus apart from primary need to safeguard simply of all lawfully acquired rights to land upon which all security of tenure and therefore all agricultural effort ultimately depends, the establishment of proper land records is also indispensable to the effective, equitable and economic application of most of productive reforms required to develop and strengthen the agricultural industry generally and the clove industry more especially.

In 1912, the Government invited Sir Ernest Dawson who was a leading expert in cadastral surveys and land registration to look into better ways of recording rights and gave his proposals. Topographic maps at a scale of 1:10560 were immediately produced with the idea that property boundaries could then be drafted on them. However these proposals were not fully implemented. In the early in 1930s the whole idea was reviewed and in 1934 Sir Ernest Dawson once more was invited and produced detailed proposals. This time he suggested that the Shehias (the smallest administrative units) be surveyed and later be used as cadastral blocks for the purpose of surveying all clove plantations in the area. Aerial photographs were to be used to earmark boundaries of properties especially the clove plantations which were easily visible in the photographs. The photographs were to be used as registry maps and to be kept in the land register. This method was less costly compared with the conventional methods of land surveying.

Based on these proposals a series of field experiments were undertaken to test the applicability of various techniques for cadastral surveying and settlements of rights. When the Government accepted these proposals, a new **Department of Surveying and Registration** was created and proposed a Bill for the settlement and Registration of Rights to Land in 1937.

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Strategic Integration of Surveying Services FIG Working Week 2007 Hong Kong SAR, China, 13-17 May 2007 In 1938 air photography for the island of Pemba was done as well as establishing the Shehia boundaries. However the Bill was not made in to law due to other pressing problems of debt settlement. Due to this problems and the eruption of World War II, the systematic cadastral surveying with accompanying land registration was never realized. The Department was busy surveying all mortgaged land so as the Government could have clear records of all land mortgaged to enable it pay the debt for the mortgagees in order to prevent the dispossession through indebtedness of indigenous land holders. In return the Government got its money back through sale of crops.

Due to the above mentioned developments, in 1958, the Government once again invited another adviser – Mr. Les Howells whose responsibilities were to reconstitute the Department of Surveying and advised on the best method of cadastral surveying and registration of land rights. However due to high costs involved, this was again put off until 1964 when the new government (after the political revolution) completely overhauled the land administration system.

3.2 Post Revolution Period – After 1964

After the political revolution of 1964, land administration and management practices took new turn as all land was vested in the Government. Many of the ordinances established by the British Colonials stopped functioning as were simply ignored. However cadastral surveying activities were conducted in very sporadic way especially for areas where the Government intended to develop the areas such as construction of the airport, amusement parks, new housing schemes, etc. Very few surveying activities for individuals were ever conducted due to prevailing political situation. The situation was taken as not conducive for private investment as socialism that was introduced as the official policy, largely discouraged private investment.

Later, in 1989, the Government introduced the Zanzibar Integrated Land and Environmental Management (ZILEM) program. The main aim of the program was to survey and register each piece of land in Zanzibar as well as to facilitate transfer and in due course to activate the land market and boost the economy. To facilitate that, cadastral surveys were to be done in order to make registration possible. However due to the withdrawal of the donor, cadastral surveys were never done and so was the registration process and the whole project came to a stand still. It was obvious that with the coming of this project with its intention of conducting surveys for all peasants farms, it would have solved many land problems associated with boundary as well ownership conflicts.

4. THE PRESENT SITUATION

Until 1989, only Government surveyors were allowed to conduct any survey work in Zanzibar. However with the introduction of the Land Surveyor's Act in 1989, private surveyors were allowed. However each and every survey done by a Government surveyor or a

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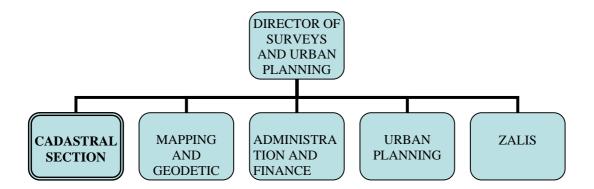
private surveyor has to be approved by the Director of Surveys on behalf of the Government. This means that the Government still retains the last decision in any survey work.

4.1 The Land Surveyor's Act (1989)

The Land Surveyor's Act (1989) was introduced in order to direct the different ways and established acceptable standards in the surveying profession. It explains in detail the process and the technicalities required in any survey work done in Zanzibar. It also introduced a surveyor's board and required all surveyors to be registered and licensed by the board. The main functions of the board are to certify the competence of the surveyors and enforcement of the professional code of conduct and ethics. The Act also empowers the Minister responsible for survey matters to make regulations and technical instructions for the better implementation of the Act. It also accommodated new surveying technology. As well, it replaced the old surveying decree of 1912. The act also introduced a new concept of private surveying which was not there before. However no company has so far been formally established to deal with private surveying. Some of the reasons could be the restrictive cost of surveying and the fact that surveying itself is voluntary and hence only when the need arises for the owner to have a cadastral survey done for his/her parcel of land then can he/she ask for the surveying services.

4.2 The Department Of Surveys And Urban Planning

The Department of surveys and Urban Planning is the sole government organ responsible for surveys on the islands. It is located in the Ministry of Water, Construction, Energy and Lands. At present the department is having the following structure:



The cadastral section is the one dealing with cadastral surveying. It is comprised of the following staff members:

Surveyors 2 Technicians 10 Field Assistants 50

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Strategic Integration of Surveying Services FIG Working Week 2007 Hong Kong SAR, China, 13-17 May 2007 The workforce of the department allocated for the cadastral surveying activities does not meet the demand of the surveyed plots as indicated above, bearing in mind that they work in two separate islands with almost half of the workforce stationed on each island. Again their productivity is very low as there are other factors that also affect their efficiency, such as frequent breakdown of vehicles, lack of fuel and other factors.

Many people living in urban areas need land parcels to build their houses on. Hence the demand of surveyed land has been and still is high compared to supply. The number of applications received in any period of time far exceeds the number of parcels surveyed within that time. For example the following figures present the real situation. In 2006, the number of applications received was 2466 while the supply reached only 370 plots which are only about 15 percent of the demand and the rest either kept waiting or opted for unplanned areas. The same situation has been repeated in the previous years.

4.3. Recent Developments

In late 2004, the Government, with the help from the Government of Finland introduced the Zanzibar Sustainable Management of Land and Environment (SMOLE). The project was introduced following earlier corporation in the land management sector that was existing between the two governments until 1996. The project has been divided in to four components: Land Management, Capacity Building, Public Awareness and Environment. Most relevant in this discussion is the Land Management and Capacity Building components. The main objective of the Land Management component is to have improved Security of Tenure and Sustainable use of Land. While the Capacity Building component's objective is to increase the capacity of the Department by providing it with survey equipment, transport facilities as well as short term training programs to enable it function efficiently. Through these two components the Government has acquired survey equipment such as total stations and GPS equipment. It has also been supplied with vehicles as well as series of short term consultants for different issues. The project also pays for buying survey materials like cement, sand, etc., for preparing beacons. In addition, the Project sponsored new mapping of the whole islands in order to produce new digital maps for different purposes. The scales of the maps are 1:2,500, 1:10,000 and 1:50,000.

5. THE PROCESS OF CADASTRAL SURVEYING

Cadastral surveying is a process of measuring new or changed boundaries of a land parcel and includes recovery and restoration of land boundaries. The main reason of doing cadastral surveying is to give an unambiguous location of land parcels, their sizes and shapes. The cadastral information generated is a prerequisite for any land registration to take place. In fact it is important in the assignment, processing and transfer of interests in land, levying land tax, supporting land markets, etc.

The Cadastral surveyor in Zanzibar is facing mainly two scenarios:

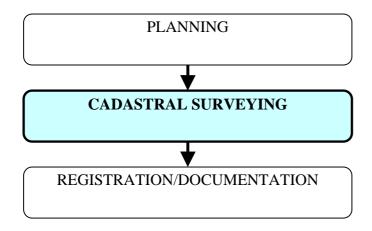
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The survey of a land parcel (plot) in a town planning boundary: In the areas covered by town planning boundaries, a surveyor is provided with a survey order issued by the Director of Surveys and Urban Planning (in the case of Pemba the survey order is issued by the Head of Department who executes all the functions of the Director on his behalf), to execute a cadastral survey of an area following an approved town planning drawing (proposal). The parcel is surveyed by using a total station and coordinated (fixed) system is used. A cadastral map (survey plan) is produced. A set of beacons or Iron pins in concrete (IPC) are used as marks for monumentation to define boundary lines. During all stages when the survey is carried out, accuracy as well as the degree of conformity of standards set according to the Land Surveyor's Act is observed. The survey plan is later submitted to the Director for final approval. The plan shows the parcel number, survey plan number, numbers of beacons used, date surveyed, and signed by the surveyor and checked by the chief surveyor. The numbering of parcels shown in the survey plan run sequentially and continues in the next survey plan of the same neighborhood. As well the numbering of survey plans in the same neighborhood follows the same system. In the next neighborhood, the system repeats itself with numbering starting a new. As well, the whole system once again repeats itself in the next administrative district. With this system, during registration activity, each parcel gets a unique reference number (UPRN) showing District, Neighborhood, Survey Plan and Parcel Number.

Then the survey plan is submitted to the Department of Lands and Registration for allocation and registration to take place.

Survey of areas outside the town planning boundary: In the case of areas outside the township boundary, the main difference is that the surveyor is not supplied with a town planning drawing but with a proposal prepared by the Integrated Planning Unit (IPU) showing proposals according to zoning requirements for that particular area. As well, the proposals have in the first place to be approved by the Director. All other technicalities and numbering are followed as explained above.

The figure below shows the strategic position of the cadastral surveys in relation to land registration and documentation for the proper land management.



6. THE COST OF CADASTRAL SURVEYS

In the general context of cadastral surveying, accuracy is an important issue because the degree of accuracy and conformity of standards determine the type of equipment to be used and the cost to be incurred. It generally implies that high accuracy means high cost.

The above explained process of conducting cadastral surveys indicates that considerable costs are incurred. Formerly surveys were conducted by using plane table and compass. Now due to advancement of technology they are not used any more. The present equipment used are the theodolites, tacheometers, Electro optical Distance Meter (EDM), total stations and the more modern Global Positioning System (GPS). All these are used in fixed boundary system of surveys. The GPS method is not widely used as there are various signal obstructions. The islands are largely covered by thick vegetation mainly in the western side and hence this method can not be used. However some trials of the method have been conducted in the eastern side where the vegetation is not so thick and has produced positive results. The method was used to survey salt farms and cadastral plans were produced.

Although general boundary system is allowed but in a fixed boundary concept where boundaries are defined mathematically, they are always regarded as superior to general boundary system, however accurately portrayed.

While many people are aware of the advantages of getting their land surveyed specifically on the issue of using it as collateral, solving boundary disputes and increase security of tenure, high costs incurred are always very restrictive. The cost of surveying of one plot of about one hectare located at about 10 kilometers from the office can be as high as \$ 250. Surveying of urban plots is also costly as price of fuel, and materials for monumentation (cement, aggregates, iron pins) always go up. Again the issue of sporadic surveying itself is always very costly compared to systematic way. The amount of money that is used to survey one plot can be used to survey 5 adjoining plots.

7. GENERAL ADVANTAGES OF CADASTRAL INFORMATION

Systematic records of land and rights in land have great importance for public administration, land planning and land development and private transactions in land. This situation is particularly true in those developing countries where the rapid growth of population has caused increasing pressure on rural land, while simultaneously a massive migration of people to cities and towns has led to uncontrolled growth of urban centers. Nevertheless, the need for accurate land records is often ignored by policy-makers; and the cadastral system of many countries is, in consequence, highly defective.

The identification of an unambiguous identification of parcels and a related descriptive record, offers some or all of the following advantages, depending upon the precise purpose for which it has been established:

- (a) Greater ease, cheapness and security to individuals in dealing in land. Private conveyance of unregistered land is often expensive and unsafe. Experience has shown that in Zanzibar many people have been swindled of their money and suffered losses for engaging themselves in dubious transactions of land and landed properties. Sometimes the would-be sellers cannot even prove their possession of the property they intend to sell. If the would-be buyers are not careful enough they would buy a property that sometimes does not exist or belongs to someone else, not the seller.
- (b) Consequent stimulation of the land market and investment in land, particularly through longer term credit secured on land. All banking institutions in Zanzibar insist on plans and good title before giving loans. The plans produced by cadastral surveying are the ones accompanying the titles and hence become a prerequisite for any piece of land to become security for a loan. Unsurveyed land can not be used as collateral in the present banking system as the system of sale deeds used in the unsurveyed areas does not give enough security. The sale deeds use general boundary concept in the description of the property – they mainly use features and names of adjoining owners which obviously keep changing and the boundaries become fluid. But in a fixed boundary concept where boundaries are defined mathematically, surveyors and landowners alike tend to regard a boundary location that is expressed in terms of bearing and distance and securely anchored to a coordinate control network as superior to a mere graphical boundary, however accurately portrayed.
- (c) Reduction in litigation with consequent saving in cost and time to individuals and the State. In many developing countries, much of the work of the courts is concerned with disputes concerning land. In Zanzibar, the situation is the same, until the government was forced to establish a specific court known as the Land Tribunal (established by the Land Tribunal Act, 1994), solely responsible to deal with all cases on land and landed properties. Before that, land cases were being dealt with in normal courts and hence were usually taking long time and so more costly. However the Tribunal took unnecessarily long time and was at last inaugurated in December last year. There is no explanation on the cause of the delay. However since its inception, 48 cases have been registered with the Tribunal. In such a short

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period of time, that number of cases is alarming as it shows how much the normal courts had always been occupied with land issues. With the introduction of the Tribunal we hope this will ease the burden of the courts and will leave them free for other cases.

- (d) Machinery for assessing and levying land tax. Historically, cadastres were often first established for this reason. Following the introduction of the policy of the liberalization of trade and the new land policies in Zanzibar during the 1990s, many investment projects were established. Many of these projects were tourist hotels built along coastal areas and petrol stations dotted all over the islands. All the sites of these projects were surveyed as a prerequisite for their allocation and approval of the project. By using cadastral information such as location and area of each site as criteria for calculation, the government is collecting a good amount of tax and rent from the operators.
- (e) Basic data and machinery for implementation of land reform measures. It has been the experience of several countries that it is difficult to draft or enforce reform laws unless precise information about land tenure (e.g. parcel sizes or incidence of tenancy) is available. When it comes to the issue of land reform, lack of such information often leads to a chaotic situation when even if the reform goes ahead, boundary disputes become a chronic issue. A good example has been experienced in Zanzibar where immediately after the revolution of 1964, the government expropriated land from big land owners and distributed it to landless families free of charge as part of the sweeping land reforms. The new owners were issued with some sort of documents that showed the general boundary of the lot as the boundaries were based on some permanent features or to names of adjoining owners. No surveys were conducted to determine the exact location of the boundaries and hence no graphical information ever existed. As the features as well as the names of owners of adjoining properties kept and still keep changing due to various reasons, many problems arose and continue to rise that are related to both boundary as well as ownership disputes. There is a clear evidence that had these boundaries been properly surveyed followed by a suitable monumentation, it would have provided the necessary and sufficient conditions of a secure tenure and it is obvious that many disputes could have been avoided if there was a clear monumentation of points on the ground so that the adjoining neighbors could see the limits of their land.
- (f) Control of land transactions by means of which compliance is ensured with planning requirements, or by means of which rural indebtedness, uneconomic subdivision, excessive alienation of land to non-nationals, etc. can be prevented; According to the Land Tenure Act, (1992), agricultural land occupying less than 0.6 of a hectare is considered uneconomic and hence cannot be subdivided. On the other hand, alienation of land to non-nationals is prohibited. This is shown in various clauses of the Land Transfer Act, (1994). If these areas are surveyed, the cadastral information so obtained can always be used to enforce these acts as any land transaction has to be registered. The transactions, land use, planning requirements as well as the sizes of land parcels can be checked (at the registration stage) if they conform to the requirements of the laws.

- (g) Public planning of all kinds; the need for urban planning, in particular, is tremendous. The large-scale cadastral map with the addition of other essential data, such as contouring, is a vital tool for public health or engineering works; while the related records can provide equally essential information on, e.g., owners, land values, buildings, etc.
- (h) A tool for an Introduction of National Land Information Systems. As Zanzibar is now in the process of establishing the land information system (ZALIS), cadastral information is considered as a backbone of the project. After collecting information on the properties, such as parcel number, location, size and use, and information of the owners, such as names, addresses, etc, more information can be added to this to produce a wide base of information. Other working instruments for public administration; for instance, the most natural way to determine and group a population is by reference to its dwelling sites, which can be most suitably defined through the parcel number. Agricultural statistics, electoral registers, assessments books, statistics concerning enterprises, buildings, etc, can be built up in the same way and grouped by reference to the parcels on which the different activities take place or the people live. If automation is introduced, the parcel number can be used as the key by which all registers of this type can be integrated. The information can be arranged according to any desired grouping or area. This system can be further developed by identifying dwellings and the mid-points of all parcels by their approximate co-ordinates. All information in the integrated data system can then be located on maps automatically, a great advantage in inventory and planning operation. The system in the end can be developed to form part of the National Spatial Data Infrastructure.

8. CONCLUSIONS AND RECOMMENDATIONS

In Zanzibar, history shows that cadastral surveys started during colonial time. It was introduced to serve the interest of the Colonial government in dealing with land management and administration when they introduced the Department of Surveys and vested it with the power of all land management activities. One of the main functions of the department was to conduct the survey of government's as well as individuals' land in order to solve boundary and ownership disputes that had emerged over time.

Cadastral surveys area important for the better management of land as it establishes the extent of each land surveyed. The size, location and other attributes of land are used in the assignment, processing and transfer of interests in land, levying land tax, supporting land markets, etc.

On many occasions the Government had tried many times to have all parcels of land in the islands of Zanzibar surveyed. But in all those occasions it was found that it was not possible due to costs involved.

In recent developments the Government among other things, has tried to incorporate private surveyors in order to realize this noble goal.

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The introduction of the Sustainable Management of Land and Environment Project (SMOLE) in recent time, will obviously bring benefits to land management practices as two of projects' main components are Land Management and Capacity Building where through the two components the Department of Surveys is provided with the necessary equipment and other costs to conduct cadastral surveying.

But the main point here is the sustainability issue. Will the Government be able to finance the project after the departure of the donors? Most unlikely. Hence other methods should be sought which in the long run would bring sustainability. Another issue on sustainability is the inability of the project to support the staff in any long meaningful training program. The Government must look for other ways of sponsoring training programs in order to increase the capacity of its staff so as to be able to meet the demand of having trained and competent staff to face the demand for surveyed land.

Another notable issue which obviously prohibits the speedy execution of the work is the fact that land registration is sporadic and hence the surveying activities themselves become sporadic as well, and hence become more expensive on individual basis. The need to introduce systematic registration which would lead to systematic cadastral surveying should be looked in to. On the other hand, the cadastral survey methods themselves need to be looked into so as to make surveying affordable to the general public.

One of the methods of cadastral surveying which can be used, is by using the new georeferenced orphophotos acquired recently. By photo interpretation the boundary of farms can be picked and marked on the ortho-photos. The information can then be transferred and linked to the computer database with the alphanumeric data. However the resolution has to be adequate for the cadastral purposes so that it should be possible to see the features and identify them on the ground. At present, in urban areas the resolution is good enough for this work to be done with relative accuracy while in rural areas where the photo scale is 1:25,000 the resolution is not good enough for cadastral purposes. The suggested general scale of the photos should be 1:8,000 while maps should be 1:1,000 in urban areas while in rural areas the map scale should be 1:2,500. It is recommended that the topographic mapping be revised so as to produce the good resolution required for cadastral purposes.

Another way is to motivate people to erect features that are visible in the photographs along the boundary of their fields. In clove plantations, there is a possibility to grow some marker trees in the corners which are taller than the clove trees. These trees should be distinguishable from the photographs.

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