Motivation for Process of Land Use Changes and Urban Expansion in an Area in Vietnam

Quang Hien Truong\(^1\) and Van Tuyen Dinh\(^2\)

\(^1\)(Faculty Of Geography - Land Administration, Quy Nhon University, Vietnam)
\(^2\)(College of Economics and Management, Huazhong Agricultural University, China)

Abstract: In recent years, in the world in general and Vietnam in particular, the process of urbanization has been going strong, which leads to changes in land use purposes. Land use changes have both positive and negative sides; these changes significantly affect the economic - social life of the local people. In this paper, we will present an overview of land use changes of Quy Nhon City, Binh Dinh Province, Vietnam on the basis of inheritance and development from the previous research findings \([19]\) and main contents of this research are based on analysis results from remote sensing images with GIS technology, combined with the actual investigation, analyzing the factors as motivation affecting land use changes of Quy Nhon City, finally making recommendations and solutions to reasonably manage and use land for Quy Nhon city in the future. Research results will be an important reference for local authorities and land managers in reasonably managing and using land as well as planning policies for the long term development of the locality.

Keywords: Motivation, Land use changes, GIS, Quy Nhon, Land planning

I. INTRODUCTION

Land is a precious asset of humanity, so land use should be taken to protect and preserve this valuable resource on a sustainable basis for economy, society and environment. In recent years, in the world in general and Vietnam in particular, the process of urbanization has been going strong, which leads to changes in land use purposes. Land use changes have both positive and negative side; the positive sides are exploiting uncultivated lands, wasted land to put into use in a useful way, serving for economic - social development of the locality, but there also exist the negative points which the process of urbanization has lost a large part of agricultural land to serve for building industrial zones, residential areas and serving for other public purposes. This has led the inadequacies of economic - social issues for the local people and for the land managers.

Quy Nhon City, Binh Dinh Province has a total natural area of 28,552.85 km\(^2\), is a coastal city of South Central Coast Region of Vietnam. In recent years, the process of urbanization has been going strong and land use changes for the process of urbanization of the locality has also been very large. In this paper, we will present an overview of land use changes of Quy Nhon City, Binh Dinh Province, Vietnam on the basis of inheritance and development from the previous research findings \([19]\) and main contents of this research are analyzing the factors as motivation affecting land use changes of Quy Nhon City, finally making recommendations and solutions to reasonably manage and use land for Quy Nhon city. Research results will be an important reference for local authorities and land managers in reasonably managing and using land as well as planning policies for the long term development of the locality.

II. RESEARCH METHODS

The theme used the following research methods:

Investigation, data collection Method

- Collecting data and documents from the relevant authorities (Department of Natural Resources and Environment, Office of Natural Resources and Environment, the People's Committees of Wards, etc.)
- Besides collecting data from the State authorities on land, we also conducted investigations and direct interviews with the local people to see more clearly the land use status of each area while the comments of the local people about land use issues will serve as a basis for proposing solutions to reasonably use land later.

Field survey Method

Field survey is to get the GPS points, and also see the land use status in the City, distribution location of types of land to serve the land classification on remote sensing images.

After classifying types of land on remote sensing images, the comparison with the field to verify the accuracy of the classification is needed, since the adjustments are made to suit the land use status in the field.
Remote Sensing Images Processing Method

Using ENVI software to classify the land according to classification method of verification, thereby producing the major land types. After carrying out the error handling, field comparison, using ArcGIS software to edit map of types of land in each period, eventually overlaying maps of types of land in 2000, 2005, 2010 and 2014 to acquire land change map of the research are during period of 2000-2014.

Within the scope of the research, we only give results of land use changes in terms of the space and the number which was analyzed and processed from remote sensing images and published in previous research findings [19], based on analysis results from remote sensing images with GIS technology, combined with the actual investigation, analyzing the factors as motivation affecting land use changes of Quy Nhon City in the period of 2000-2014.

Map Method

Using map method to the maps of land use status, cadastral maps, as a basis for evaluating the land use changes later. Also, using this method to edit the maps from remote sensing images [19].

Statistical method

Statistical method is used to describe, analyze, compare and evaluate the land use changes in research area, from which produce data tables in area of types of land of the years, as a basis for analyzing the land use changes over the periods.

III. RESULTS AND DISCUSSION

Generalizing research area

Quy Nhon City is the coastal city of Binh Dinh Province, Vietnam with geographical coordinates from 13°36'00" to 13°54'00" Northern Latitude, from 109°06'00" to 109°22'00" Eastern Meridian.
- The East is bordered with East Sea.
- The West is bordered with Tuy Phuong District and Van Canh District.
- The South is bordered with Song Cau District, Phu Yen Province.
- The North is bordered with Tuy Phuoc District and Phu Cat District.

The City consists of 16 wards and 5 communes, including 1 island commune, 3 peninsula communes and 1 mountainous commune. Total natural area is 28,552.85 km2, accounting for 4.72% of the whole Binh Dinh Province. The seaside is 42km long. [3, 4]

Quy Nhon Population was 284,951 people in 2014, including 138,242 males and 146,709 females, the population in urban and rural areas was 259,551 people and 25,400 people, respectively. The population density was 998 people / km2.

Traffic network of the City is quite favorable with National Highway 1A passing through Tran Quang Dieu and Bui Thi Xuan wards, connected with National Highway 1D to Song Cau (Phu Yen); Provincial Highway to Dong Xuyen (Phu Yen) and National Highway 19 to Gia Lai, Kon Tum. Inner roads are always upgraded, newly opened and expanded to meet economic development conditions of the City. National port is connected with Quy Nhon Port through waterway. [3, 4]

Land use changes in Quy Nhon City, Binh Dinh Province, Vietnam in 2000 – 2014 period

In the period of 2000 - 2014, land use changes in Quy Nhon City, Binh Dinh Province happened very complicatedly, including the changes of the total natural land area due to urban expansion. In previously published research findings [19], we presented the process and method of remote sensing image processing to obtain maps of types of land and edited maps of main type of land and map of land use changes in the period of 2000 - 2014.

Based on results of remote sensing image analysis, correction of errors and the data collected from the land management authority, we obtained the results the current use of the land types in 2000, 2005, 2010 , 2014. Since then, we can evaluate the land use changes in terms of number over the periods.
In 2000 – 2005 period

Table 1: Land use changes of Quy Nhon City in 2000 – 2005 period unit: ha

<table>
<thead>
<tr>
<th>PURPOSE OF LAND USE</th>
<th>2000</th>
<th>2005</th>
<th>Changes Increase (+) / Decrease (-)</th>
<th>Changes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural land category (NNP)</td>
<td>3340.87</td>
<td>3237.57</td>
<td>-103.3, -3.09</td>
<td></td>
</tr>
<tr>
<td>Forest land category (LNP)</td>
<td>4740.92</td>
<td>5288.4</td>
<td>+547.48, 11.55</td>
<td></td>
</tr>
<tr>
<td>Non-agricultural land category (PNN)</td>
<td>2381.19</td>
<td>3090.2</td>
<td>+709.01, 29.7</td>
<td></td>
</tr>
<tr>
<td>Water surfaces Land category (SMN)</td>
<td>2717.71</td>
<td>2702.99</td>
<td>-14.72, -0.54</td>
<td></td>
</tr>
<tr>
<td>Unused land category (CSD)</td>
<td>8463.31</td>
<td>7324.84</td>
<td>-1138.47, -13.45</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>21644.00</td>
<td>21644.00</td>
<td>0, 0</td>
<td></td>
</tr>
</tbody>
</table>

Based on the above table, we can see that the area of forest land category and non-agricultural land category in 2005 increases in comparison with that in 2000. Areas of other land categories decrease. The most decreasing is unused land category. The reason is the state concern in reclaiming, thus a considerable area of unused land is afforested and covered green in empty land and bald mountains. Besides, a part of agricultural land is transferred use purposes into non-agricultural land.

In 2005 – 2010 period

Table 2: Land use changes of Quy Nhon City in 2005 – 2010 period unit: ha

<table>
<thead>
<tr>
<th>PURPOSE OF LAND USE</th>
<th>2005</th>
<th>2010</th>
<th>Changes Increase (+) / Decrease (-)</th>
<th>Changes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural land category (NNP)</td>
<td>3237.57</td>
<td>3314.99</td>
<td>+77.42, 2.39</td>
<td></td>
</tr>
<tr>
<td>Forest land category (LNP)</td>
<td>5288.4</td>
<td>10270.09</td>
<td>+4981.69, 94.20</td>
<td></td>
</tr>
<tr>
<td>Non-agricultural land category (PNN)</td>
<td>3090.2</td>
<td>5497.84</td>
<td>+2407.64, 77.91</td>
<td></td>
</tr>
<tr>
<td>Water surfaces Land category (SMN)</td>
<td>2702.99</td>
<td>2890.97</td>
<td>+187.98, 6.95</td>
<td></td>
</tr>
<tr>
<td>Unused land category (CSD)</td>
<td>7324.84</td>
<td>6578.96</td>
<td>-745.88, -10.18</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>21644.00</td>
<td>28552.85</td>
<td>+6908.85, 31.92</td>
<td></td>
</tr>
</tbody>
</table>

Remarkably, natural land area of Quy Nhon City in this period increases to 6,908.85ha due to expansion of the City and integration of Phuoc My Commune, Tuy Phuoc District into Quy Nhon City. The increase of natural land area of the City leads to the increase of all land categories. However, area of unused land still decreases to 745.88ha. The reason is that wild land is strongly used for afforestation in this period, helps develop a green – clean – beautiful city and prevent erosion.

In 2010 – 2014 period

Table 3: Land use changes of Quy Nhon City in 2010 – 2014 period unit: ha

<table>
<thead>
<tr>
<th>PURPOSE OF LAND USE</th>
<th>2010</th>
<th>2014</th>
<th>Changes Increase (+) / Decrease (-)</th>
<th>Changes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural land category (NNP)</td>
<td>3314.99</td>
<td>3286.89</td>
<td>-28.1, -0.85</td>
<td></td>
</tr>
</tbody>
</table>
In 2010 – 2014 period, area of agricultural land category keeps increasing (by 45%), area of non-agricultural land increases and area of other land categories decreases. The reason is that unused land is strongly used for afforestation and other public benefit purposes and water surfaces land is converted land use purpose into non-agricultural land to serve urbanization process of Quy Nhơn City.

**Overall land use changes in 2000 – 2014 period**

### Table 4: Land use changes of Quy Nhơn City in 2000 – 2014 period unit: ha

<table>
<thead>
<tr>
<th>PURPOSE OF LAND USE</th>
<th>2000</th>
<th>2014</th>
<th>Changes Increase (+)/ Decrease (-)</th>
<th>Changes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural land category (NNP)</td>
<td>3340.87</td>
<td>3286.89</td>
<td>-53.98</td>
<td>-1.62</td>
</tr>
<tr>
<td>Forest land category (LNP)</td>
<td>4740.92</td>
<td>14896.68</td>
<td>10155.76</td>
<td>214.21</td>
</tr>
<tr>
<td>Non-agricultural land category (PNN)</td>
<td>2381.19</td>
<td>5668.47</td>
<td>3287.28</td>
<td>138.05</td>
</tr>
<tr>
<td>Water surfaces Land category (SMN)</td>
<td>2717.71</td>
<td>2856.10</td>
<td>+138.39</td>
<td>5.09</td>
</tr>
<tr>
<td>Unused land category (CSD)</td>
<td>8463.31</td>
<td>1844.71</td>
<td>-6618.6</td>
<td>-78.20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>21644</strong></td>
<td><strong>28552.85</strong></td>
<td><strong>6908.85</strong></td>
<td><strong>31.92</strong></td>
</tr>
</tbody>
</table>

The above table shows land use changes of Quy Nhơn City over the past 14 years. Urbanization process of the City increases natural land area to 31.92% due to the integration of Phước My Commune, Tuy Phước District into Quy Nhơn City. Besides, land category structure changes due to reclaiming and use of unused land in other purposes such as afforestation, building road and building public works. Urbanization process also decreases area of agricultural land, especially in the areas near the City Center. These decreased agricultural land is used for constructing apartment buildings, factories and other social works.

**Overall land use changes over many periods**

### Table 5: Land use changes of Quy Nhơn city over many periods

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Area (ha)</td>
<td>%</td>
<td>Area (ha)</td>
<td>%</td>
<td>Area (ha)</td>
</tr>
<tr>
<td>Agricultural land category (NNP)</td>
<td>-103.3</td>
<td>-3.09</td>
<td>77.42</td>
<td>2.39</td>
</tr>
<tr>
<td>Forest land category (LNP)</td>
<td>547.48</td>
<td>11.55</td>
<td>4981.69</td>
<td>94.20</td>
</tr>
<tr>
<td>Non-agricultural land category (PNN)</td>
<td>709.01</td>
<td>29.78</td>
<td>2407.64</td>
<td>77.91</td>
</tr>
<tr>
<td>Water surfaces Land category (SMN)</td>
<td>-14.72</td>
<td>-0.54</td>
<td>187.98</td>
<td>6.95</td>
</tr>
<tr>
<td>Unused land category (CSD)</td>
<td>-1138.47</td>
<td>-13.45</td>
<td>-745.88</td>
<td>-10.18</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>0</td>
<td>0</td>
<td>6908.85</td>
<td>31.92</td>
</tr>
</tbody>
</table>

**Figure 3: Diagram of the land use changes of Quy Nhơn city in 2000 – 2014 period**
Through data table and chart above, we can see that all land types changed over the period of 2000 - 2014, the most significant change was the area of forest land, this type of land increased quite much (214.22%) after 14 years, the least significant change belonged to agricultural land; Unused land type tended to decrease markedly, the area of this land fell by more than 78%, this is a good trend, benefiting economic - social development, and while limiting wastage of land resources.

Figure 4: Land use changes map of Quy Nhon city in 2000 – 2014 period

Motivation for process of land use changes and urban expansion in Quy Nhon City, Binh Dinh Province, Vietnam

Main causes leading land use changes in the City of Quy Nhon

Through the classification of land from remote sensing images for mapping land changes over the periods, combined with fieldwork and direct interviews with the local people, we have found that: In the period of 2000 - 2014, the process of urbanization of Quy Nhon City took place most powerful, the process of urbanization led land use changes and area expansion of this City, the land change over time primarily was transferring use purposes from other types of land to non-agricultural land. Like this:

- Natural land area of the city in 2014 increased compared to 2000 of 6808.44 ha. The reason is due to expanding city administrative boundaries (Phuoc My commune was merged into the city in 2005) and in the previous years, natural land area was determined based on topographical maps and data was computed with not high precision. Data from 2010 to date is calculated by digital technology based cadastral maps, it has higher precision.

- Agricultural land gradually increased due to the exploitation, reclamation of unused land to put into planting protective forests.

- Non-agricultural land increased by 3287.28 ha compared to 2000 (increased 138.05%), including especially the industrial zone land (increased 1751.76 ha) due to the establishment of Nhon Hoi Industrial Zone. In addition, the area of specialized land also increased rapidly to develop transport infrastructure, irrigation, education, health, culture, sports ... and other construction works.

- Unused land gradually decreased due to the exploitation into agricultural and non-agricultural purposes.

In the past years, land types have had changes, infrastructure development land, rural and urban land increased in conformity with the laws of the society in order to develop the economy, improve the life of the local people and make the face of the rural and urban areas much changed. However, in the coming years, with
the rapid development impairment, the need to use land for economic sectors, especially the construction of infrastructure, industrial - handicraft zones (clusters), rural and urban housing will increase sharply, requirements set out are making land use plans for both strictly protecting paddy land of high-yield and satisfying the requirements to use the land for other purposes as appropriate, achieving the highest efficiency.

- Agricultural land: In recent years, due to strong urban and industry development planning, agricultural land area of Quy Nhon City has been increasingly narrowed. Therefore, to match the characteristics of urban agriculture, ensure food security, the city has implemented and applied scientific and technical progress in agricultural production in order to improve productivity and income value per unit area, products made with high economic value.

- Implementing the City Party's directing opinions, making mass production of hybrid rice in the field of Quy Nhon City is one of the measures concerned for intensive farming to increase productivity and output, contributing to increased income for farmers.

- Aquaculture land: Aquaculture land area in recent years tended to increase, which is consistent with the topography and the natural conditions of the city, because it is adjacent to the sea, it suits the development of aquaculture, serving for the needs of the local people here and the surrounding areas, while being able to export a part, bringing higher income for the city.

- Non-agricultural land: Non-agricultural land area in fact have always tended to increase and is mainly used for purposes of construction of technical infrastructure (transport, irrigation), social infrastructure, etc. However, the distribution of these types of land is not even among communes, only heavily concentrated in the wards and the economic centers. Infrastructure system in the communes still remains limited (Nhon Hai and Nhon Chau).

- Rural residential land: Increasingly more closely and efficiently managed the use but slow to invest in renovation because the economic conditions of the local people are still difficult; residential land and construction land in residential areas are sparsely distributed, making it difficult in investing in construction of infrastructure, improving cultural life, health, education and living of the local people.

- Unused land: Over the past time, unused land, uncultivated land have been exploited and reused to the high extent. Generally, regarding land use changes, types of agricultural land, specialized land and residential land all tend to increase, much exploitation of unused land is positive change trend consistent with economic - social development situation and general requirements for the exploitation and use of land resources.

The specific motivations effect the fluctuations of land use purposes in Quy Nhon city

For implementation of theme, we conducted site surveys with 300 sheets of questionnaires to people living in different areas, photographed areas with the special land use changes, and consulted to the land managers of Quy Nhon and Binh Dinh cities. The results showed that the land use changes in Quy Nhon city in the past 14 years mainly due to the following motivations:

1. The land use restructures to promote the efficiency per unit area.
2. Demand of construction and development of public works such as transport, irrigation, offices, ... (3) the conversion trend of land use purposes on the key areas for service and urban development.
3. Residential and specialized lands have encroached into agricultural land, fishery land; and agriculture and fishery lands will expand into the unused land or towards the restructuring of the plant.
4. The increase in population led to rising housing demand, this was also a motivation for land use changes, specifically:
   - Land use changes for transport

   According to research, the area of non-agricultural land group significantly increased due to land use changes of other types of land such as agricultural land, forest and unused land. The reason was the planning of economic zones, entertainment parks and other welfare facilities. In recent years, the land use changes served for expanding the transport network have been shown mostly clear, now Highway 19 and Highway 1D are in the construction phase and has changed land use purposes of multiple types of land, including the residential land.
Besides, land use changes for industrial zones development were also focused, Quy Nhon city currently is focused on developing Phu Tai industrial zone and Nhon Hoi economic zone, this industrial zones development largely changes the land use purposes of forest and unused lands into non-agricultural land to serve the purposes of manufacture and business. This represents the urbanization process is taking place strongly in Quy Nhon City.

In recent years, along the urbanization process, the construction of entertainment areas serving the needs of citizens is particularly interested in by management classes of Quy Nhon city in the beauty of cityscape as well as meets the requirements of people. Many parks are renovated and expanded, some national entertainment areas has been building.

+ Tourism - Culture - Sports Urban Area of Phu Hoa lake with the area of 325 hectares, the total construction investment of over 5,000 billion VND. This is an entertainment area of the city, this area is mainly unused land, forest land and water surfaces Land, which can be exploited by the deserted areas and the land that does not bring economic benefits to better use.
Entertainment Area of Nhon Ly has the area of nearly 300 hectares embracing Eo Gio landmark. The project consists of items such as golf course, 6-star villas resort, hotel, 5-star restaurant, international conference center, play yard ..., began to operate, and performed from quarter 1/2016. The formation of this area has used the water surfaces land, unused land in the city. The project comes into operation when not only contributes to change the face of tourism, budget, promotes economic- social development, attracts local labors in the province, but also become a basis of attracting investment waves into Binh Dinh Province. (Figure 9)

- Land use changes for residential areas expansion

Along the urbanization is the increase in population, so the demand of residential land to citizens is an urgent problem posed. In Quy Nhon, period 2000 - 2014 many new residential areas was built, such as East Dien Bien Phu residential area, these two residential areas in Northern river of Ha Thanh ... these were formed to facilitate people in solving the housing problems, and the state planned new urban areas, contributed to gentrification. The establishment of settlements was a motivation for land use changes in Quy Nhon city and all types of land changed into urban areas are mostly agricultural, forestry, industrial and unused lands. This contributed to the rational use of land resources, but also caused significant impacts on the life of people in the loss of agricultural land, affected food safety locally. Therefore, there should be useful measures to resolve these issues. (Figure 10)

Therefore, through the research of land use changes in Quy Nhon city, we found that there were so many motivations affecting the land-use change of Quy Nhon city in which the most important motivation was the quickly economic and social development of the city in recent years. The urbanization led to different demands on land; and the changes of land use purposes into public purposes and housing were necessary. This was a motivation leading to land-use changes, which were mainly the changes of land use purposes from other types of land into non-agricultural land use purposes.

The solutions of reasonable management and use of land

Solutions for Mechanisms and Policies

For the use of land is reasonable and scientifically based on rational savings and use of land resources, the state policy is sorely needed to manage this work. To do so, then:

- Planning and plans of sectors, industries and localities using lands have to be ensured on the basis of planning and plans of using land approved; the formulation, organization and implementation of planning and plans of using land must be closely united from top to bottom (3 classes of province, district and commune) meet the requirements of economic - social development, ensure national defense and security.

- Defining boundary and publicly announcing rice cultivation land, protective forest and specially-used forest in need of strict protection. Balancing and increasing investments in social infrastructure,
technical infrastructure, building storage, processing and consumption facilities in the developing regions of agricultural products; having appropriate measures to reduce production cost and increase revenue for agricultural workers’ life.

- Closely organizing, managing and monitoring the development planning economic zones, industrial zones, production and business base of non-agricultural land. The use of non-agricultural land for the purpose of production and business have to according to plan, save and efficiently.

- Having mechanisms and policies to attract investment in infrastructure construction, industrial, service and tourism development in sync with the economic - social infrastructure, minimizing the use of rice cultivation land, protective forestland and specially-used forestland transferred to non-agricultural use purposes.

- Strengthening of inspection, test and treatment timely of illegal violations and ensuring the proper use of land according to planning and plan, strictly implementing planning and plan criteria of land use approved.

- Proposal to Provincial People’s Committee and resolutely withdrawing the lands which have been allocated to agencies, organizations, enterprises and individual households but not used or not used effectively in accordance with the law.

Solutions for Land Use

- Rice cultivation land, protective forest and specially-used forestlands: checking, demarcating and marking and planting in the site and public announcing the area.

- Industrial land: reviewing and assessing the current land use situation in a comprehensive manner in order to restrict to the extent of maximum the purpose change of agricultural land, especially rice cultivation land into industrial land; encouraging investment in infrastructure development.

- Urban land: reviewing and planning urban land use in the direction of rational distribution. Limiting the construction, which directly affects the important transport routes, of new urban areas.

- Land for infrastructure development: during the implementation of planning and plan of land use, it should be prioritized to invest in infrastructure development one-step before to motivate the synchronization as planned.

Solutions for Science and Technology

Increasing investment in basic survey of land; building a database, completing land information system; determining norm system of specific land use as planned in order to improve the accountability and autonomy of each management class and land use; human resource training, scientific research, high-tech application in land management; improving the quality of forecast, formulation, appraisal, management, implementation and monitoring of planning and planning of using land.

Solutions for Protection, Land Reclamation and Environmental Protection

- Promoting the regeneration, protection, afforestation and greening of barren land and hills, and planting green trees in the urban areas and industrial zones.

- Investing in waste disposal sites of industrial zones, hospitals, urban areas ... to ensure the waste is treated to meet standards before being discharged into the environment, the industrial zones is only put into use upon having a completed wastewater treatment area.

- Firmly moving the whole production facilities pollutants from residential areas according to the land use plan approved.

IV. CONCLUSIONS

By researching the land use changes in Quy Nhon, Binh Dinh cities, Vietnam and the motivations to land use changes process in this city; we drew some conclusions as follows:

- In the period 2000 - 2014 the urbanization process of Quy Nhon city was strongest, it led to land use changes and area extension of the City. Accordingly, the natural area of the city in 2014 increased by 6808.44 ha compared to 2000, caused by expanding the city administrative boundary (Phuoc My commune was merged into the City in 2005); Farmland was ascending by exploiting and reclaiming the unused land to put into plant protective forest; Non-Agricultural Land increased by 3287.28 ha (138.05%); Unused Land was decreasing due to the exploitation for agriculture and non-agricultural purposes.

- The process of land use changes in Quy Nhon city in the past 14 years was mainly caused due to the motivations such as the land use restructure to promote efficiency per unit area, building and development needs of public works, conversion trend of land use purposes in some key areas to develop services, urban ... the increase in population leads to highly increasing housing demand, it was also a motivation of land use changes.

To manage and use properly land resources, Quy Nhon needs to have specific measures such as macroeconomic policy of land management, detailed planning scenarios of land use and interest in the issues of
environmental rehabilitation and protection in order to fulfill the potential lands based on sustainable economy, society and environment.

V. REFERENCES

[25] Tran Anh Tuan, Tran Thi Van. Evaluation of forest cover change in Con Dao District, Ba Ria Vung Tau using remote sensing and GIS technology, University of Natural Sciences, 2012.