Mori foundation

The final Report

2009

Standard's Development of GIS bounding to the Pre-ante VER

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Contents

1 Introduction

Recently coming of A/R CDM (Afforestation/Reforestation Carbon Developing Mechanism) and Forest's VER (Verified Emission Reduction as forestation) as the carbon trading scheme based on the Kyoto protocol, the way of the monitering and baseline calliculation of the CO2 fixation have been heatedly discussed in many scientists especially about the reliability and scientific nature.

The technology of GIS and remote sensing based on the satellite images have given the scientific reliability to the discussion. Thought most of the forestation projects already use the technologies, the good practice of the technical approach was not organized, and fixed so much.

It is making the project developer to try to use the technologies try and error. It automatically spends much cost to the developer.

This project of making the manual for the process will provide the efficiency to the development.

1－1 Project objective

This field research is for baseline caliculation for implementation of CarbonFix standard's plantation. And the purposes of the project are in the below.

1, Improving the skills of the use of remote sensing and ArcGIS

2, Making manuals of the field sampling for the caliculation of sequestration of CO2 by using GIS.

3, Research of the good practice by sustainable sequestration of the CO2 with the trees in this Area.

1－2 project background

Project area's history:

The reasons of desertification in the project area is complex, the one is excesive agriculture and the other is also excesive pasturage. With the

growth of the population, more and more foods have been needed in the transition of economy from central planning toward privatized land and free markets.

So after founding of People's Republic of China(1949) , farming lands have been developed excessively 4 times by 2000(in which year 退耕还林 policy started) in several regions, including inner Mongolia, of China. (烏蘭図雅, 2000)

But inner Mongolia was not suited to cultivation because of low precipitation originally.(refer to "climate_Huhot_1971-2000.pdf")

So this excessive farming with excessive grazing had been expanding the desertification in inner Mongolia region. (Brogaard S, 2002)

China government established 退耕还林 policy(*) to mitigate the desertification.

Our project area had been also cultivated excessively for making buckwheat and potato, however , the policy prohibited the cultivation, then a few of larches and poplars were planted in 2001.

But a incident happened , which the livestock of the village people fed the seedling of the trees 2 months after planting the trees.

The people in the surrounding village are in poverty situation, and they also earn their living by pasturage. As I said, the grass land resources in inner Mongolia region have been declined (Mengli ZHAO 2005), so the weeds and tree's seedlings are so valuable for pasturage.

The policy also prohibits the people to graze the livestock in the area, but it was invalid in the situation.

The amount of budget for the planting project was so small because of the poor finance of the local government (旗下営). So the 退耕还林 project in our area was frustrated by the lack of the funds in 2001.

From 2001 to 2007(our project starts), the people in the surrounding village had been grazing in the area although the law prohibited that.

In addition to the long-time excessive cultivation, such grazing made the estate to desertification area.

(*)退耕还林 policy

“退耕还林” means restoration of cultivated land to forest.

For the mitigating desertification, soil erosion and salinization, the policy prohibits farmers to cultivate in the area of 25°slopes. The policy was established 1999 as a pilot project in Gansu, Shaanxi and Sichuan province, and, from early 2000, the project was also started in the region of inner Mongolia.

For the purpose 3:

To protect the exposed land caused by land cultivation based on the Land cover change project managed by the government, we plant trees to cover the land with green. We especially focus on the sloping land to plant trees.
We implement the project for the purpose of mesurement against poverty as well We plant fruit trees like apricot and sajihb for local people to sell them.

This land cover change project managed by the government during agrarian restructuring in Northeast China: During the last quarter of the 20th century the agrarian sector in China went through a series of reforms. Changes in government policy on land use led to extensive changes in land cover, culminating in the 1990s. These changes were detected from multi-temporal Landsat TM images of 1990, 1995 and 2000 for Northeast China. Overlay of the mapped land cover in ArcInfo showed that farmland and grassland decreased while water, built-up areas, and woodland increased. More than three-quarters of the detected changes occurred during 1990–1995. Farmland changed mainly to woodland, water, and built-up areas while woodland and grassland were converted chiefly to farmland. Spatially, the change from woodland to farmland adjoined the margin of natural forests while change in the opposite direction was restricted to the agropastoral west. Paradoxically, reclamation of grassland to farmland also took place in the agropastoral west. These conflicting changes were caused primarily by lack of stability and consistency in the government's land use policies. The purpose of the forest management is protecting the desolated

land, otherwise it will changes to desert, and which leads to sequestration of CO2. We are planting not only Larch(2000/ha), Poplar(around 1300/ha), Apricot(2000/ha) and Sajibh(2000/ha) in our area. they are all native species. The best approach of forestry plantation is mixed stands considering biodiversity, because it will be strong for some pests or disease and broadleaf woods such like poplar are more effective for fixation of ground(it helps to defend desertification) and protecting Larchs from strong seasonal wind.

1－3 Project area & Research term

The area of the project is [L-R: 601504~611753, T-M: 4544789~4537927]. (Reference frame: WGS_1984_UTM Zone_49N, Projection: Transverse_ Mercator)

This research was implemented in 1/8/2009~1/9/2009. The term of field work is 13/8/2009~1/9/2009.

2 Material &Method

2－1 Materials

we frequently use the next instruments for the field work, some Shovels, Measures(scroll ruler), HandSaws and Pumper truck×1 and 60cmPVC tube ×135 and the other instruments for general sampling field works.

PVCtubes were used for the poles to identify the place of sampled.

For the caliculation of the area, 4GPS(Promark2 Ashtech,Garmin Mobile mapper), GIS(ArcGIS 9.2) and the satellite images are used.

The satellite images are A-LOS(Daichi) picture, and we especially use the medium picture of “A−LOS prism”.

2－2 Definition of the eligible planting place

Firstly, I fixed the project area roughly(zoning) by GIS and satellite images before implementation of the field work, for our area size will be above 1700ha and it is difficult to measure the area only by GPS grand truth(the field work method of the area measurement). So , at first, the area was fixed by GIS(1/8/2009~12/8) roughly and next, using the roughly fixed

map, the field work was implemented.

2－2－1 Zoning

I defined the area use by GIS, especially, I divided eligible planting place(the place to be planted in the future) and non-eligible place. Refer to the definition of eligibility(CarbonFix Standard 's Criteria & Methodology : "CFS-criteria").

2－2－2 Grand truth

Using the Map, I validated the definition of the area. the research phase is important because there are usually not few mistakes in the definition fixed by GIS only.

Through the field work, if the mistake was found, I checked the GPS coord of the place and added the adjustment to ArcMap after the fieldwork.

[pic1]

2－3 The method of sampling for baseline calculation

Sampling spots: 135

It is said that the general amount of spots are 9~10 spots per hectare(Refer to CFS-criteria), however I tried to sample more than general for the accurate result .

Generally speaking, the more sampling , the better it is.

Sampling size: 1m×1m

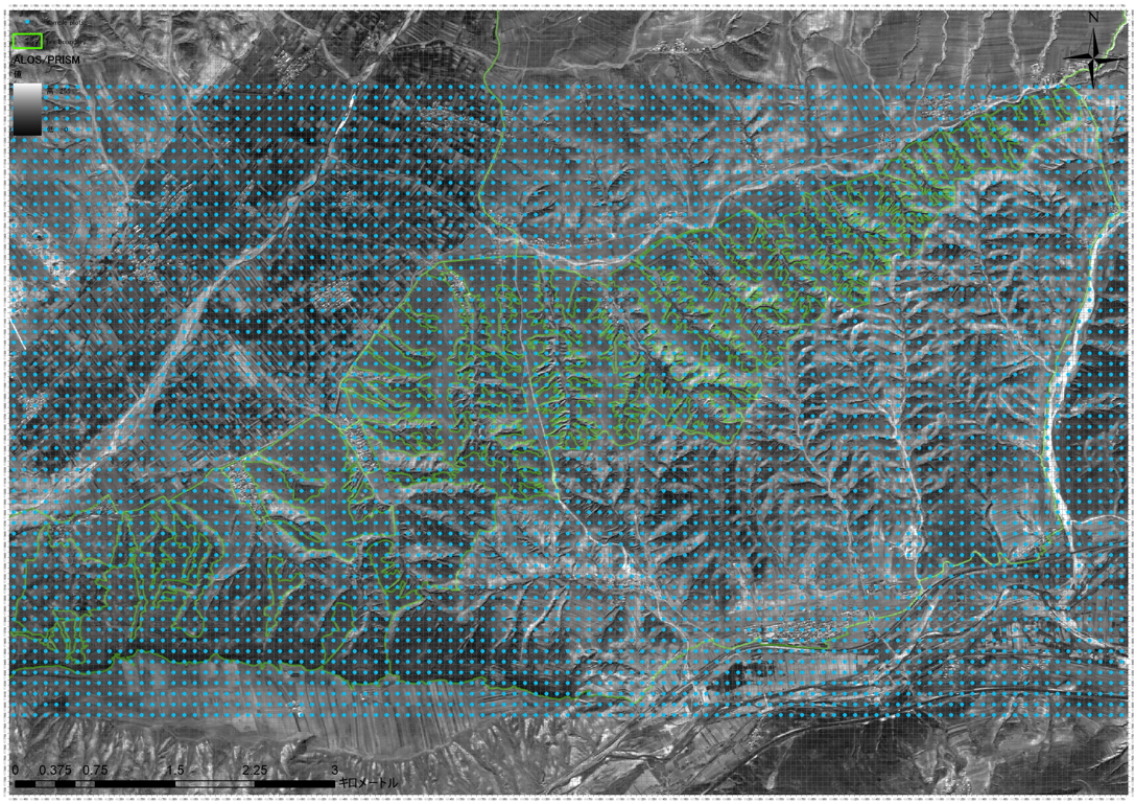
The size is already fixed by CFS-criteria and caliculated by measures

precisely[pic2], dried weighted at last[pic3].

[pic2]

[pic3]

Method: Random sampling in the spots fixed by GIS



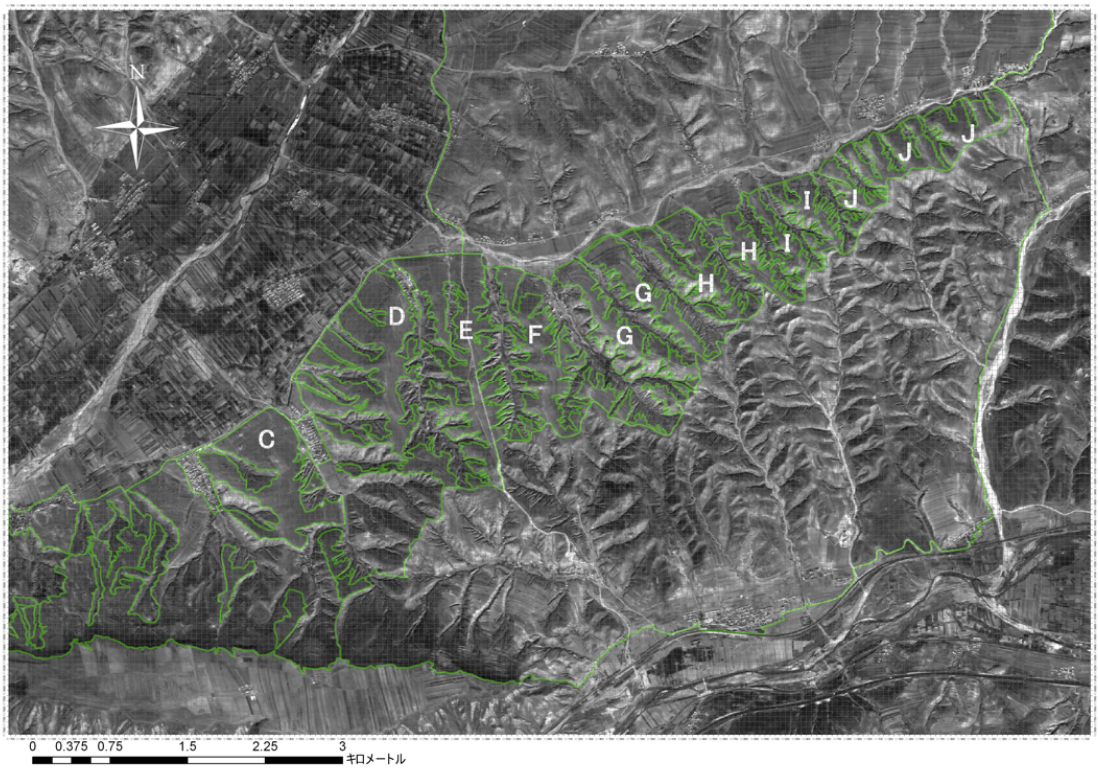
[pic4]

The method is random sampling, but more precisely speaking,
I randomly decide the sampling spots in the spots systematically fixed by GIS mapping. The blue mapping were systematically fixed in 50m order.

3 Result

3－1 Definition of the eligible planting place

The next picture was the result of zoning and grandtruth.



[pic5]

The caliculation of the area sizes by each ID.

Table1. Area size of the project

ID	AREA (m2)
C	780075
D	1127045
E	973286
F	636239
G	758748
H	644667
I	413657
J	726342

3－2 The result of the sampling

The sampling for baseline is under implementation. So the result have not arrived yet.

4 Conclusion

This project was already pended for the financially reason mainly.
So there will be no meaning for the making manuals for the CarbonFix Standard.

But through this project, I could get the field work skills and GIS skills, so I believe they would be helpful for my future theme.

5 Acknowledgements

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・Zhang san Ren

6 References

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