Natural Language Processing and Identifying Characteristics of Japan's Regional Forests, Forestry and Policies

Keywords: Natural language processing (NLP), Regional Forest Plans, Broadleaf trees

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ABSTRACT

This paper proposes utilization of natural language processing (NLP) and text mining technology in analyzing Japan's "Regional Forest Plans" and related documents to identify the characteristics of the forests, forestry practices, policies, issues and problems of each region, and discusses quantification and visualization of the results of such analyses for comparison and evaluation purposes. Particularly focused on are broadleaf trees.

After World War II, the Japanese government vigorously promoted expansive conifer afforestation. As a result, the main domestic supply is composed of softwood, and, contrary to the global trend, the growing stock has been accruing every year. This abundant resource from the man-made forests is not being harvested and utilized while Japan's import of wood products has been increasing, pushing down the self- supply ratio.

As to broadleaf trees, Japan's domestic supply of hardwoods has been unable to meet its demand therefor. But no clear plan is in place to increase the production of hardwoods in the future. Nor are the current situation and issues clearly understood.

It is therefore recommended to plant broadleaf trees, attend to them and increase the supply of hardwoods for the revitalization of Japan's forestry. What should be avoided in doing so is the uniform approach of the post-WWII afforestation that required the plantation of conifers only throughout Japan. Broadleaf trees vary a great deal from region to region. Any plan to cultivate the species and produce and supply hardwoods in a sustainable manner must take into consideration various differences of each region. To that end, it is important to establish a system that allows quantitative comparison and evaluation of the forests and the forestry of the regions.

In Japan, numerous documents are available that refer qualitatively to forests, forestry and associated issues and problems and forestry policies. This paper proposes utilization of NLP and text mining technology as a new method of analyzing those documents. Our presentation at this Conference will discuss the results of the analyses of the documents, and focusing on hardwoods, the identified qualitative characteristics of Japan's regional forests and forestry, and the derived results of quantitative comparison and evaluation.

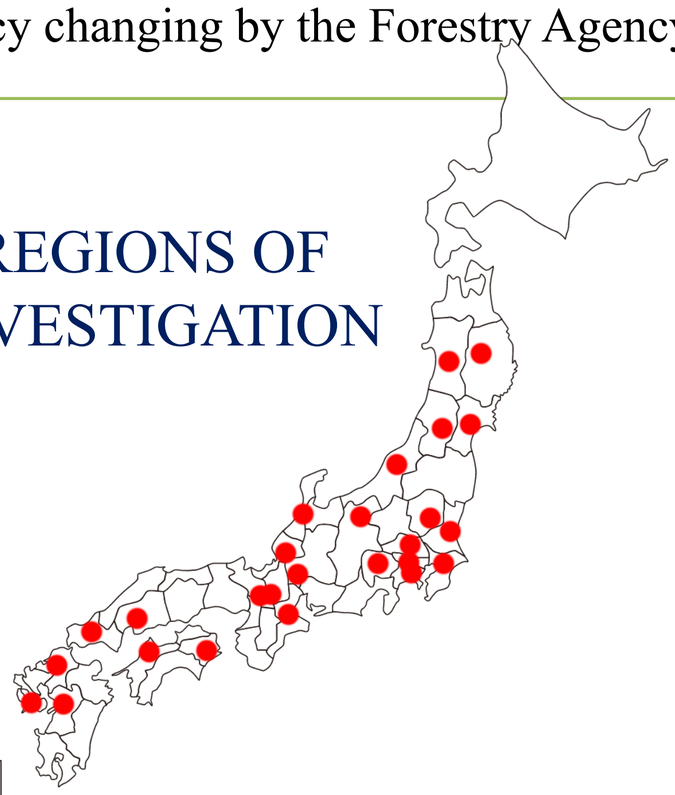
BACKGROUND

1950's
- Expansive afforestation after WWII
- Afforestation with Needleleaf tree

1980's
- Soaring sovereign lumbers price
- Massive importing foreign lumbers

2010's
- Insufficient management of forests
- Policy changing by the Forestry Agency

REGIONS OF INVESTIGATION



PROGRESS AND RESULTS

Regions of investigation: 26 Forest Planning Zones
Tree species of investigation: 14 species

TREE SPECIES WITH HIGH FREQUENCY OF APPEARANCE IN 26 PLANS

		Iwate	*Miyagi*	*Akita*	*Yamagata*	*Ibaraki*	*Tochigi*	*Saitama*	*Chiba*	*Tokyo*	*Kanagawa*	*Niigata*	*Ishikawa*	*Fukui*	*Yamanashi*	*Nagano*	*Gifu*	*Mie*	*Shiga*	*Kyoto*	*Hiroshima*	*Yamaguchi*	*Tokushima*	*Ehime*	*Fukuoka*	*Nagasaki*	*Kumamoto*
Needleleaf trees	*Needleleaf tree*	191	59	11	40	38	34	24	48	24	43	12	26	76	133	32	61	63	25	34	51	114	17	12	90	68	44
	Cedar	0	18	19	15	11	0	16	33	16	20	37	23	0	21	39	51	21	0	0	11	38	11	16	15	20	15
	Cypress	0	0	0	0	15	0	13	19	13	19	0	0	0	21	15	39	21	11	0	17	52	0	14	17	23	49
	Pine	0	0	0	0	0	0	0	0	0	0	30	12	0	0	0	0	11	0	0	12	36	0	0	0	0	0
	Japanese red pine	20	13	0	0	0	0	0	0	0	0	14	0	0	18	16	12	0	0	0	12	0	0	0	0	0	0
	Japanese larch	17	0	0	0	0	0	0	0	0	0	0	0	0	20	19	0	0	0	0	0	0	0	0	0	0	0
	Mixed (forest)	0	0	0	11	0	0	0	11	0	29	0	0	17	0	14	0	0	0	0	0	0	0	0	0	0	0
Broadleaf trees	*Broadleaf tree*	198	67	21	53	15	45	25	64	25	69	30	46	89	135	57	109	89	46	37	45	120	23	22	103	75	85
	Sawtooth oak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0	0	43
	Japanese beech	0	0	0	0	0	0	0	0	0	17	28	0	0	0	12	15	25	0	0	0	0	0	0	0	0	0
	Oak	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0
	Konara oak (Quercus serrata)	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	18	15	0	0	0	0	0	0	0	0	0
	Birch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0
	Maple	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0
	Chinese cork oak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0
	Princess tree (Paulownia tomentosa)	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Camphor tree	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0
	Mushroom	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0