2022 Online Seminar AgFReM Research Consortium in ISM

Special Lecture on Statistics with R

March 7(Mon) – 8 (Tue), 2022

Day I

		Date	March 7, 2022			
16:00～	**16:10**	**Seminar Introduction**		Prof. Ashi Yoshimoto	ISM	Japan
16:10	16:50	Estimating varying coefficient for longitudinal data with R		Prof. Tetsuji Tonda	Hiroshima Prefectual Univ.	Japan
16:50～	**17:00**	**Break**				
17:00～	17:40	Challenges for Sustainable Coffee Value Chains in the Buffer Zones of Bukit Barisan Selatan (BBS) National Park, Lampung-Indonesia		Prof. Bustanul Arifin	Univ. of Lampung	Indonesia
17:40	18:00	A Multi-Scale Network with Percolation Model to Describe the Spreading of Forest Fires		Ms. Sara Perestrelo	Univ. of Évora	Portugal
18:00	**18:20**	**Break**				
18:20	19:00	Image analysis in R for forestry		Dr. Peter Surovy	Czech Univ. of Life Sci. Prague	Czech
19:00	**20:00**	**Online Gathering**		Dr. Masashi Konoshima	Univ. of the Ryukyus	Japan

Day II

		Date	March 8, 2022			
13:00～	13:20	Predicting bird species richness using the 3-dimensional structure of the forest with Global Ecosystem Dynamics Investigation (GEDI) and National Ecological Observatory Network (NEON) dataset		Dr. Shingo Obata	Univ. of Tennessee	USA
13:20～	13:50	Timber trading and pricing of plantation grown teak in Laos		Dr. Phongxiong Wanneng	National Univ. of Laos	Laos
13:50～	**14:00**	**Break**				
14:00	14:40	Exploratory spatial data analysis with R		Dr. Daisuke Murakami	ISM	Japan
14:40	**15:00**	**Break**				
15:00	15:40	Survival analysis application to the forest data with R		Dr. Ken-ichi Kamo	Sapporo Medical Univ.	Japan
15:40	**16:00**	**Break**				
16:00	16:40	The importance of biotic and abiotic risks assessment and modelling in the development of frameworks for forest growth models in Portugal		Dr. Nuno de Almeida Ribeiro	Univ. of Évora	Portugal
16:40	**17:10**	**Gathering Discussion**		Dr. Masashi Konoshima	Univ. of the Ryukyus	Japan
17:10	**17:20**	**Closing Remarks**		Prof. Ashi Yoshimoto	ISM	Japan

March 7 (Mon), 2022
16:10 ~ 16: 50

Estimating varying coefficient for longitudinal data with R

Tetsuji Tonda (Prefectural University of Hiroshima)

In regression model for longitudinal data, such as forest growth, it is important to model the growth behavior and to evaluate the effects of covariates. The varying coefficient is a regression coefficient that changes over time. The varying coefficient can be used for visualizations or interpretations of covariate effects. In this talk we introduce how to estimate the varying coefficient for several regression model with demonstration in R.

17:00 ~ 17:40

Challenges for Sustainable Coffee Value Chains in the Buffer Zones of Bukit Barisan Selatan (BBS) National Park, Lampung-Indonesia

Bustanul Arifin (University of Lampung)

This study examines barriers and opportunities for sustainable coffee value chains, covering the farming system of smallholder coffee in the buffer zones of the Bukit Barisan Selatan (BBS) National Park, sustainable production and the coffee trade from farm level to export markets. Farm-household survey was conducted during the peak of Covid-19 pandemics in the period of December 2020-January 2021. The total number of samples was 320 farm-households who stay inside the park, outside the park and in forest area not part of BBS National Park, spreading from the districts of West Lampung and West Coast of Lampung Province. These data were analyzed carefully by developing typologies of smallholder coffee farmers in the BBS buffer zones, performing farm-economic analysis, land conservation performance, expenditure analysis for the poverty status, details of value chain analysis of how the coffee bean goes from villages to Port of Panjang, before the export markets. Some important findings could be summarized as follows: Land holding of smallholder coffee farming ranges about 0.25 to 2.50 hectare, where each farmer control about one parcel of land, including in a very steep slope adjacent to BBS National Park. Farmers generally sell the bean to collector traders due to pre-finance capital arrangement, agricultural inputs, etc. The number of trees (other than coffee) is very few, ranging from 20-50 trees/ha either inside the Park, outside the Park, and in forest area not part of BBS National Park, far below the recommended number of 400 trees/ha, providing serious challenges for sustainable coffee value chains in the study area and Indonesia in general. Coffee smallholders generally maintain their coffee farms, both inside and outside BBS National Park and perform crop care leading to good agricultural practices (GAP), but not conservation. Coffee bean has to be sold immediately as farmers and farmers' groups do not have drying and storage facility. Forwarders have played important roles in coffee value chain, such as providing marketing access and in enforcing the sustainability principles of coffee trade. As forwarders do not require large-scale traders to differentiate the coffee bean from inside or outside the Park, there is no incentive to adopt sustainability principles. In addition to involving global coffee corporation and coffee exporters, the implementation of sustainability certification in coffee should involve directly and indirectly the forwarders. Sustainability certification as a component of new trade initiatives is not easy to implement in the buffer zones of BBS National Park. The stakeholders ABGC (academics, business, government and civil society) partnership should encourage smallholders to organize as a group, to ensure monitoring system and traceability principles of coffee bean, in order to improve the sustainability of coffee value chains.

17:40 ~ 18:00

A Multi-Scale Network with Percolation Model to Describe the Spreading of Forest Fires

Sara Perestrelo (University of Évora)

Forest fires have been a major threat to forest ecosystems and its biodiversity, as well as the environment in general, particularly in the Mediterranean regions. To mitigate fire spreading, this study aims at finding a fire-break solution for territories prone to fire occurrence. To the effect, here follows a model to map and predict phase transitions in fire regimes (spanning fires vs. penetrating fires) based on terrain morphology. The structure consists of a 2-scale network using site percolation and SIR epidemiology rules in a cellular automata to model local fire Dynamics. The target area for the application is the region of Serra de Ossa in Portugal, due to its wildfire incidence. The study considers the cases for a Moore neighbourhood of warm cells of radius 1 and 2 and also considers a heterogeneous terrain with 3 classes of vegetation. Phase transitions are found for different combinations of fire risk for each of these classes and use these values to parametrize the resulting landscape network.

18:20 ~ 19:00

Image analysis in R for forestry

Peter Surovy (Czech University of Life Science Prague)

Remote sensed imagery plays important role for forest monitoring, describing the status and evolution of forest features like species composition, height of the forest canopy or biomass stock. The acquired images can be analyzed manually, for a smaller area, but for larger extent automatic techniques are necessary to provide objective results and also make the work less labor costly and time feasible. In this talk we are going to present techniques and methods for image classification in R, most specifically Random forest classification technique. We show the basics of the algorithms and how to apply it on images and how to interpret the results. Random forest is one of many available techniques for automatic image analysis and at the end of lecture we will discuss the advantages and disadvantages and compare with other algorithms and their implementation in other software.

March 8(Tue), 2022
13:00 ~ 13: 20

Predicting bird species richness using the 3-dimensional structure of the forest with Global Ecosystem Dynamics Investigation (GEDI) and National Ecological Observatory Network (NEON) dataset

Shingo Obata (University of Tennessee)

We introduce our ongoing research aiming at prediction the bird species richness in the eastern United States using Global Ecosystem Dynamics Investigation (GEDI) and National Ecological Observatory Network (NEON) dataset.

13:20 ~ 13:50

Timber trading and pricing of plantation grown teak in Laos

Phongxiong Wanneng (National University of Laos)

The market demand and price of teak in Laos vary broadly and depend on several factors. The aim of this study was to assess timber trading and pricing based on a survey of teak buyers. The research investigated teak trading methods, markets and prices paid for particular timber types and quality grades. Three types of teak timber are commonly sold: 24.7% as standing trees, 39.6% as round logs and 35.7% as square logs. The main wood products produced from plantation teak include joinery products, door and window frames, and furniture (57.9%, 26.3% and 15.8% respectively). The end buyers of teak timber in Laos are sawmillers and wood manufacturer. Teak timbers supplied to end buyers from growers via the local traders account for 49.0%, followed by 41.3% by direct supply from teak growers and 9.7% via the local small sawmillers and wood manufacturers. The price of teak timber varies significantly based on four main factors: timber types, log sizes, log quality (grades) and distance from plantation site to road (for standing trees). The round log price of 250US$/m3, based on both log diameter size (D26-30 cm) and log quality grade (A grade), was much lower than the 321US$/m3 amount paid for the same size of round log (D26-30 cm) based on log diameter alone (no grading price). It can be concluded that there is a need to develop a clear system or standard for teak log grading and pricing in Laos.

14:00 ~ 14:40

Exploratory spatial data analysis with R

Daisuke Murakami (Institute of Statistical Mathematics)

In this talk, I will introduce global indicator of spatial association (GISA) including the global Moran's I and the G* statistics, and local indicator of spatial association (LISA) including the local Moran's I and G* statistics, that are useful for quantifying and testing spatial patterns (e.g., hot spot) underlying data. Using prefectural population data in Japan, it is explained how to estimate and visualize these indicators using an R package spdep.

15:00 ~ 15:40

Survival analysis application to the forest data with R

Ken-ichi Kamo (Sapporo Medical University)

Survival analysis is a statistical method that has been widely used, especially in the medical field.   Since the target of the analysis is the survival interval including censoring cases, a specific approach has been established.   The censoring refers to cases which cannot reach to the endpoint within the observation period.   This characteristic of censoring is expected to be utilized in data analysis in the forest field, because this field often requires the long-term observation.   In this presentation, the process of performing survival analysis is introduced step by step by using R.   The contents are 1) the reproduction of survival curve by Kaplan-Meier method, 2) the significance test of the survival function (log-rank test), and 3) how to perform the regression analysis (Cox proportional hazards model) in the situation with explanatory variables.   In the presentation, the sample data"leukemia" which is prepared in R is used.   At last, the results of applying survival analysis to the data of tree-pulling experiment in a forest will also be mentioned.

16:00 ~ 16:40

The importance of biotic and abiotic risks assessment and modelling in the development of frameworks for forest growth models in Portugal

Nuno de Almeida Ribeiro (University of Évora)

The increasing Mediterranean climate influence in Portuguese forests is pressuring the ecosystems to adapt, mainly to the rapid alteration of abiotic factors, that change the availability of radiation, temperature and water. In one side, forest ecosystems resilience is exceeded and the tree vitality is compromise by biotic factors in the form of diseases and plagues. In other side, the fire risk in increased by the new abiotic factors specially in highly flammable species that were planted in former, less risky, environment conditions. In the present presentation it will be discuss the importance of biotic and abiotic risks assessment and modelling in the development of frameworks for forest growth models in the definition of new proposals for forest landscape transformation and with the development of new silvicultural models, to match the needs for carbon and water uptake in the actual climate emergency policies.