

講演要旨集

第5回金沢大学環日本海域環境研究センター連携部門
国際テーマシンポジウム

“東アジアの農村社会・都市社会をめぐる環境とその発展”

摘 要

第五届国际合作研讨会
金泽大学环日本海域环境研究中心

“城乡可持续发展与生态文明”

Abstracts

The 5th International Thematic Symposium of Department of Inter-
institutional Collaboration, Institute of Nature and Environmental
Technology, Kanazawa University

*“Environment and the Sustainable Development of Rural and
Urban Societies in East Asia”*

2021年3月12日, 石川県金沢市角間町 金沢大学自然科学大講義棟 AV 講義室
12 March 2021, AV Lecture Room, Natural Science and Technology, Kanazawa
University, Kanazawa, Japan

第5回環日本海域環境研究センター連携部門 国際テーマシンポジウム
「東アジアの農村社会・都市社会をめぐる環境とその発展」

第五届国际合作研讨会 金沢大学環日本海域環境研究中心
“城乡可持续发展与生态文明”

(2021年3月12日, 金沢大学自然科学大講義棟 AV 講義室)

目 次

塚脇真二 (金沢大学) 「東アジアの農村社会・都市社会をめぐる環境とその発展」 1
张 晶晶 (华中师范大学) 瑶族女性村组干部的崛起——以中国广西金秀 L 村为例—— 3
张 文明 (华东师范大学) 中国农村内生发展的可能性考察——以江西 N 村为例—— 5
市原あかね (金沢大学) 農業農村消滅の危機と再生の可能性：日本の現状を踏まえて 9
中村浩二 (石川県自然史資料館)・エドパリナ R・ドゥルヌアン E 持続発展のための世界農業遺産サイトの相互交流 (6年間の成果と今後の展望)：能登および佐渡 (日本) とイフガオ棚田 (フィリピン) 11
荒木祐二 (埼玉大学) 中農地の生物多様性をはぐくむ日本の環境保全型農業 13
岡田 遥 (埼玉大学)・辻原毬乃・荒木祐二・塚脇真二 草地生態系における絶滅危惧種の保全 —さいたま市田島ヶ原サクラソウ自生地を例に— 15
本田匡人 (金沢大学) 石川県の都市部および郊外部における人間社会への農薬の暴露と蓄積 17
陳 琪豪・馬 露 (武漢大学) 大気汚染が性と生殖に関する機能に及ぼす影響 19

The Fifth International Thematic Symposium of Department of Inter-
institutional Collaboration on “Environment and the Sustainable
Development of Rural and Urban Societies in East Asia”

(12th March 2021, AV Lecture Room, Natural Science and Technology Building, Kanazawa
University, Kanazawa, Japan)

Contents

TSUKAWAKI Shinji (Kanazawa University) <i>The 5th International Thematic Symposium "Environment and the Sustainable Development of Rural and Urban Societies in East Asia"</i>	----- 2
ZHANG Jingjing (Central China Normal University) <i>The Rise of Yao Women Leaders: A Case Study of the L Village in Guangxi, Chinas</i>	----- 4
ZHANG Wenming (East China Normal University) <i>Research on the Possibility of Endogenous Development in Rural China: Based on Three Villages in Central China</i>	----- 6
ICHIHARA Akane (Kanazawa University) <i>Agricultural and Rural Extinction Crisis and Possibility of Regeneration on the Basis of the Current Situation in Japan</i>	----- 10
NAKAMURA Koji (Ishikawa Prefectural Museum), EDPALINA R., DULNUAN E. <i>Twining of Globally Important Agricultural Heritage Systems (GIAHS) for Reactivation and Sustainable Development of Local Communities, with Special Reference to Noto Peninsula (Japan) and Ifugao Rice Terraces (Philippines)</i>	----- 12
ARAKI Yuji (Saitama University) <i>Japan's Environmentally Friendly Farming for Enhancing the Biodiversity in Cropland</i>	----- 14
OKADA Haruka (Saitama University), TSUJIHARA Marino, ARAKI Yuji and TSUKAWAKI Shinji <i>Conservation of Endangered Species in Grassland Ecosystem: A Case of Wild Primrose Habitat in Tajimagahara, Saitama</i>	----- 16
HONDA Masato (Kanazawa University) <i>Pollution of Neonicotinoid Insecticides in Human Society at Urban and Rural Area in Ishikawa</i>	----- 18
CHEN Qihao and MA Lu (Wuhan University) <i>The Influence of Ambient Air Pollution on Reproductive Health</i>	----- 20

第5回環日本海域環境研究センター連携部門国際テーマシンポジウム “東アジアの農村社会・都市社会をめぐる環境とその発展”

塚脇真二

(金沢大学環日本海域環境研究センター連携部門)

環日本海域環境研究センター連携部門は、環日本海域を中心に東アジア全域における環境情報の交換・収集・維持管理を進めるとともに、国際研究ネットワークの構築とその維持・発展を支援し、広く国内外へ情報を発信することを目的として設置された。さらに、環日本海域という地政学的に重要な地域における文理融合型学際的研究の振興をはかることも目的としている。このような目的にのっとり、これまでに4回の国際テーマシンポジウムを開催してきた。

2017年3月の第1回のシンポジウムでは「東アジア・東南アジアにおける UNESCO 持続発展プログラムの諸問題」をとりあつかった。引き続いて2018年2月に開催した第2回「近現代における環日本海域の農村社会環境の特質」、ならびに上海の華東師範大学で2019年3月に開催した第3回「東アジアの農村社会・都市社会をめぐる環境とその発展」では、今世紀になって「世界の工場」として急速な工業発展を成し遂げ、アメリカに次ぐ世界第2位の経済大国となった中国の、急激な経済発展の代償ともいえる深刻な環境汚染問題や社会問題を歴史的な観点を含めて議論し、日本の農村・都市社会と比較しつつ再検討するとともに、工業発展の負の側面である大気汚染の現状とその健康影響についての意見交換と情報交換を行った。

新型コロナウイルスの世界的な流行のため、2020年2月29日開催の第4回目の国際テーマシンポジウムは国内参加者のみでの情報交換会となったが、その結果もふまえ、第5回目となる今回の国際テーマシンポジウムでは、これまでのシンポジウムでとりあつてきた内容をさらに深化させるとともに、中国側では華東地域から華中地域へと研究対象地域を拡大する。一方の日本側からは、消滅の危機に瀕している農村の再生問題や環境保全型農業の取り組み、絶滅危惧種の保全、農薬の暴露や蓄積の問題といった話題を提供する。これに加えて、世界農業遺産における相互交流や若手人材育成の実例を紹介する。

The 5th International Thematic Symposium "Environment and the Sustainable Development of Rural and Urban Societies in East Asia"

TSUKAWAKI Shinji

Institute of Nature and Environmental Technology,
Kanazawa University, Kanazawa, Japan

The Department of Inter-institutional Collaboration at the Institute of Nature and Environmental Technology, Kanazawa University promotes the exchange, collection, and maintenance of environmental information throughout East Asia, mainly in the area of the Circum-Sea of Japan, and it supports also the construction, maintenance and development of international research networks within the area. Furthermore, the department aims to promote multi- and interdisciplinary research that integrates various research fields such as humanities and natural sciences in the geopolitically important region of the area of the Circum-Sea of Japan. In order to realise the above-stated aims, the department has been organising three international thematic symposia since 2017.

The first symposium in March 2017 dealt with “UNESCO Programmes for Sustainable Development in East and Southeast Asia - World Heritage, Biosphere Reserves and Global Geoparks –“. The second symposium “Rural Environment in the Modern Circum-Sea of Japan” in February 2018 and the third symposium “Environment and the Sustainable Development of Rural and Urban Societies in East Asia” in March 2019 were held at Kanazawa and Shanghai, respectively. Over these two symposia, various discussions of China's rapid industrial development in this century, including historical perspectives of the rural societies, were made and re-examined in comparison with Japanese rural and urban societies. Further, the exchange of research results and information on the current status of air pollution, which is a negative aspect of industrial development, and its health effects were conducted.

Due to the pandemic of the new virus all over the world, the fourth symposium was held only by the Japanese participants at Kanazawa University on the 29th of February. In this fifth International Theme Symposium, the contents of the previous symposia will be further deepened, and the research area will be expanded from East China to Central China in Chinese side. On the other hand, the Japanese side will provide topics such as the problems of the refurbishment of rural areas facing in danger, efforts for environment-oriented agriculture, conservation of endangered wild species, and exposure and accumulation of pesticides. In addition, examples of mutual exchange and development of young human resources at the Globally Important Agricultural Heritage Sites will be introduced.

瑶族女性村组干部的崛起——以中国广西金秀 L 村为例——

张 晶晶

（华中师范大学中国农村研究院）

中国广西金秀的 L 村是瑶族聚居的村庄。自 2000 年之后，该村女性陆续担任村民小组组长、村委会主任及村党委书记等村中的重要职务。到 2019 年为止，该村的村组干部中的女性数量已经多于男性。形成这种特殊现象的原因，主要有四类：首先是历史原因，瑶族地区受男尊女卑观念影响小，能力强者，无论男女均可担任政治首领。其次是家庭内部分工的变化，男女家务分工及长辈对主妇的帮助等因素，缩减了主妇从事家务劳动的时间，增加了女性参与村务的可能性。第三是村务内容的变化，从以集体生产为主转向以生活互助为主，有利于女性管理村庄事务。第四是性别特质，该村村民普遍认为，女性有耐心、做事负责、擅长沟通，比男性更适合担任村委职务。

The Rise of Yao Women Leaders:
A Case Study of the L Village in Guangxi, China

ZHANG Jingjing
Center for Chinese Rural Studies
Central China Normal University, Wuhan, China

L village, located in Jingxiu County of Guangxi, China, has long been one of the Yao People's settlements. From 2000, women began to increasingly occupy the village's important political positions, such as team leaders, village head, and the secretary of the village's CPC branch. Up till now, there are more women leaders at the village. There are four reasons for this particular phenomenon. First is the historical reason. Yao ethnic groups are unaffected by the popular idea in rural China that women are inferior to men. The capable people should be selected as leaders regardless of the gender. Second is the change in the division of labor among family members. With more housekeeping duties shared by husbands and the elders, women can spare more time – and thus, are more likely – to take part in the village common life. Third is the changes in village affairs, which have already transformed from collective production to mutual support and help. Thus, social caring work, rather than governing duties, is expected from villagers' leaders and fits women's role in the villages. The last is gender image. As most L villagers believe, women with their patience, sense of responsibility, and good communication skills are more suitable for village's official positions.

中国农村内生发展的可能性考察——以江西 N 村为例——

张 文明

（华东师范大学国家教育宏观政策研究院）

随着城市化、工业化和市场经济的发展，我国社会主要矛盾已经转化为人民日益增长的美好生活需要和不平衡不充分的发展之间的矛盾，如何发展和振兴农村成为影响中国整体发展进程的重要问题。近年来，由于受到加快农村经济发展的需求以及农村各方面资源的局限性对其内生发展制约的影响，因而各地不断推出各种地方发展规划以推广当地特色农业产业的发展，加大对农村产业规模发展的资源投入，以保证地方经济的增长。在包括技术、政策、投资等外部资源涌入农村的过程中，其原有的、内生的发展机制必然受到影响，并需要根据不同的社会情境进行调整。其间，内部力量与外来力量出于各自考量而构建的相互关系与互动模式是决定地方发展的关键因素，也是农村发展最核心的问题，也是本文的关注点所在。具体而言，本文关注在外部力量以项目的形式推进和参与农村发展的过程中，当地原本的内生机制是如何被打破的？项目逻辑与农民内生的策略又有怎样的博弈？

基于此，本研究以江西省 B 村为研究对象，以内生发展理论为研究视角，采用深度访谈的研究方法对该村蜜桔产业的发展过程和内、外部力量的博弈行为展开研究。在本研究案例中，“项目”以 1991 年-1992 年的重大冻灾为契机，并以 2006 年的蜜桔推广工程为发展顶峰，逐步嵌入到农村产业发展之中。本文主要抓住这个过程的两个关键发展阶段，即冻灾（将冻灾后的发展措施视为一种“项目机制”）和“双百工程”，首先分析了该村原本的内生的经济发展基础——发现该村原本内生的发展基础在于农民积极、有效的参与和村干部协调形成的内外部隐性协商机制，正是在这样的基础之上，本土资源优势得以有效开发和发挥作用；其次，本文具体研究了这两个项目实施的政策逻辑、农民内生的发展策略、以及二者在相互博弈过程中的“互构”关系，进而分析在外部资源以各种方式“进入”农村发展的过程中，二者的博弈过程及其后果是什么的问题。

通过研究，本研究主要得出如下结论：第一，原本的内生机制是依赖于农民积极、有效的参与而建立的。其中，合作是有效参与的基础，同时，村干部在协调内部和外部的资源和利益关系的过程中建立起了地方与超地方之间隐性的协商机制；第二，在冻灾事件中，自然灾害既给地方政府带来了介入农村产业发展的契机，也给农民带来了开垦合法性和进一步“悄悄”开垦、改种的借口。在这一阶段中，二者博弈的结果可以说是心照不宣的“合谋”。更进一步地说，这也是因为冻灾使农民面临生存危机，其行动以生存理性为基本原则，从而加大了对外部资源的需求、降低了对外部权力嵌入的权衡，而双方利益导向的一致性则是本次项目嵌入得以成功的根本原因；第三，“双百工程”中地方政府展示了发展区域经济的焦虑感和实现政绩的初衷，导致在推进过程中越来越偏离发展本身的意义，表现出较强的行政“强制”逻辑，使得特色产业的可持续性发展的前景受到影响。作为其中的利益获得者和受动者——农民的行动逻辑则从生存理性向经济理性转向，但是问题是农民的利益获得变得不稳定或趋向减少。农民在争取

更大利益的同时又要避免与行政有正面的冲突，所以他们的“抗争”行为安静而低调，主要是口头上的不满和行动上的默默转换至销售领域或者其他产业，以及通过子辈教育表现其无奈和失望；第四，简单化的扩张过程中缺乏实践知识的支撑导致品质参差不齐是目前蜜桔产业遭遇瓶颈的重要原因。结果是区域的整体经济前景趋向迷失；第五，外部资源的介入需结合产业发展不同阶段的资源需求情况，介入过程中应重视地方居民的有效参与，这样才能在实现产业健康发展的同时又增强农民对地方产业和对农村的认同感。

Research on the Possibility of Endogenous Development in Rural China: Based on Three Villages in Central China

ZHANG Wenming

National Institute of Educational Policy Research
East China Normal University, Shanghai, China

With the development of urbanization, industrialization and market economy, the major social contradiction in China has been transformed into the contradiction between the people's growing need for a better life and unbalanced, inadequate development. How to develop and revitalize rural areas has become an important issue affecting the overall development process of China. In recent years, due to the need of accelerating the development of rural economy, and the adverse impacts of the limitations of various resources in rural areas on its endogenous development, various local development programs are constantly launched in various regions to promote the local characteristic agricultural industry, increase the investment in the rural industry development, and ensure the growth of local economy. While the countryside gets flooded with external resources, including techniques, policies and investment, its original and endogenous development mechanism is inevitably affected and needs to be adjusted according to different social situations. Meanwhile, the interrelationship and interaction mode established by internal forces and external forces based on their respective considerations is the key factor determining local development, as well as the core issue of rural development, which is also the focus of this paper. Specifically, this article focuses on how the original endogenous mechanism was broken in the process of external forces promoting and participating in rural development in the form of projects. What is the tug of war between project logic and farmers' endogenous strategy?

To investigate these questions, this paper takes village B in Jiangxi province as the research object with endogenous development theory as the research perspective. We mainly adopt the research method of in-depth interview to conduct a detailed study on the development process and game behavior of internal and external forces of the tangerine industry in this village. In this case study, "projects" were gradually embedded into the rural industrial development, taking the major freezing disaster from 1991 to 1992 as an opportunity, and the tangerine promotion project in 2006 as the peak of development. This paper mainly focuses on two key development stages, namely the freezing disaster (regarding the development measures after the freezing disaster as a "project mechanism") and the "double hundred project". Firstly, we analyze the original endogenous economic development foundation of the village — we found that the original endogenous social basis of the village lies in the internal and external implicit consultation mechanism formed by the active and effective participation of farmers and the coordination of village cadres, on which the advantage of local resources can be

effectively developed and play a role; Then, this paper extensively studies the policy logic of the implementation in these two projects, farmers' endogenous development strategies, as well as the game and mutual construction process of the two in the process of mutual game, and then further analyzes the game process and its consequences in the process of external resources "entering" rural development in various ways.

Through research, the following conclusions are drawn: first, the original endogenous mechanism is established by the active and effective participation of farmers, where cooperation plays the key factor. At the same time, in coordinating internal and external resources and interest relations, village cadres have established the hidden consultation mechanism between local and super local; Second, in the freezing disaster, natural disasters not only bring opportunities for local governments to intervene in rural industrial development, but also bring farmers the legitimacy of reclamation and further "quietly" reclamation, replanting excuses. At this stage, the result of their game can be said to be tacit "collusion". Furthermore, such situation is also brought by the farmers' strong survival desire facing the freezing disaster. Their actions take the survival rationality as the basic principle, thus increasing the demand for external resources and reducing the balance of external power embedding. The consistency in both parties' interests is the fundamental reason for success; Third, in the "double hundred project", the local government shows the anxiety of developing regional economy and the original intention of achievement, which leads to the gradual deviation from the meaning of development itself in the process of promotion, and shows strong logic of administrative "compulsion". As a result, the prospect of sustainable development is affected by the regional expansion of characteristic industries. The behavioral logic of peasants, as the interest gainer and the affected one, turns from the survival rationality to the economic rationality, but the problem is that the interests of peasants become unstable or tend to decrease. While striving for greater interests, farmers also need to avoid positive conflicts with the administration. Thus, their "struggle" is quiet and low-key, which is mainly verbal dissatisfaction and action in the silent that transfers to the sales field or other industries. At the same time, their "silent" helplessness and disappointment is reflected through their education for children; Fourth, the lack of practical knowledge in the process of over-simplified expansion leads to uneven quality, which is an important reason for the bottleneck of tangerine industry. As a result, the region's overall economic prospect tends to get lost; Fifth, the intervention of external resources should be combined with the resource demand in different stages of industrial development. And the effective participation of residents should be attached importance in the intervention process, so as to achieve the healthy development of the industry and enhance the farmers' sense of approval to local industries and rural areas.

農業農村消滅の危機と再生の可能性：日本の現状を踏まえて

市原あかね

(金沢大学人間社会研究域経済学経営学系)

世界的に小農が見直される一方で、日本の農業と農村は危機的な状況に至っています。産業社会＝工業社会の帰結が日本においては極端で、切羽詰まった形で現れています。この点を概観した後、地球温暖化、生物多様性、文化多様性に関わる農業・農村の意義・価値についてどのような議論がなされているか、農業農村に関わる新たな動きにどのようなものがあるかを報告する。

Agricultural and Rural Extinction Crisis and Possibility of Regeneration on the Basis of the Current Situation in Japan

ICHIHARA Akane

School of Economics, College of Human and Social Sciences,
Kanazawa University, Kanazawa, Japan

While smallholders are being reviewed over the world, Japanese agriculture and rural areas are facing crisis. The consequences of an industrial society are extreme in Japan and are appearing in a form of impasse.

After grasping this point, a proposal about the significance and value of agriculture and rural areas related to global warming, biodiversity and cultural diversity will be made, and the new developments in agricultural and rural areas will be proposed.

持続発展のための世界農業遺産サイトの相互交流
：能登（日本）とイフガオ棚田

中村浩二¹・エドパリナ リザリタ R²・ドゥルヌアン ユーラリー E³

(¹石川県自然史資料館, ²金沢大学環日本海域環境研究センター,

³フィリピン国立イフガオ大学)

現在(2020年6月),世界には62サイト(22カ国)が,FAOの世界農業遺産(Globally Important Agricultural Heritage Systems, GIAHS)に認定されているが,多くのサイトが存続の危機に直面している。筆者らは,2014年2月から2021年1月まで,フィリピンのGIAHSイフガオ棚田の危機を克服し,地域の活性化と持続発展を担うことができる若手人材(イフガオ里山マイスター)の養成事業を実施した。本事業は,「JICA草の根技術協力事業(地域活性化特別枠)」の支援をえて,イフガオGIAHSと能登GIAHSの相互交流を通じて実施した。本講演では,(1)日本と世界のGIAHSの概要,(2)能登とイフガオの現状と危機の原因,(3)里山マイスター養成システムの特色と成果,(4)「里山(Satoyama)」コンセプトが国際プラットフォーム(GIAHS,生物多様性条約,ユネスコ世界文化遺産,SDGs)に有する重要性,(5)人材育成を通じた能登とイフガオの連携(GIAHS Twinning)の今後の展望について述べる。

Twinning of Globally Important Agricultural Heritage Systems (GIAHS)
for Reactivation and Sustainable Development of Local Communities, with
Special Reference to Noto Peninsula (Japan) and Ifugao Rice Terraces
(Philippines)

NAKAMURA Koji¹, EDPALINA Rizalita R.² and DULNUAN Eulalie D.³

(¹Ishikawa Prefectural Museum of Natural History, ²Institute of Nature and
Environmental Technology, Kanazawa University, ³Ifugao State University)

In the world, a total of 62 sites from 22 countries have been certificated by FAO as Globally Important Agricultural Heritage Systems (GIAHS). Almost all sites have been facing serious challenges of deterioration and collapse. We have been implementing mutual exchange programs between GIAHS Noto Peninsula (Japan) and Ifugao Rice Terraces (Philippines), supported by the JICA Grassroots Technical Cooperation from 2014 to 2021. This project aims to cultivate young human capacity (Satoyama Meisters) for reactivation and sustainable development of local communities in both GIAHS. In this talk, we will report (1) Outlines of GIAHS in Japan and World, (2) Causes of challenges in Noto and Ifugao, (3) Special features and achievements from Satoyama Meister Training Programs in Noto and Ifugao, (4) Importance of “Satoyama” concept and its mainstreaming on the global platforms (e.g. GIAHS, CBD-IPSI, UNESCO World Heritages, SDGs) for sustainable development of local and global communities, (5) Perspectives toward the next steps of Noto-Ifugao GIAHS Twinning..

農地の生物多様性をはぐくむ日本の環境保全型農業

荒木祐二

(埼玉大学教育学部)

農業生態系における生物多様性の保全は、持続可能な農業の実現に向けて欠かせない取り組みである。農業が有する多機能的役割を検証し、持続可能な農業を発展させるために、農薬や無機肥料の使用が低減された「環境保全型農業」が世界中で実践されている。環境保全型農業では、慣行農法に比べて化成肥料と農薬の使用量を 50%以上削減することをめざしている。

日本の場合、農林水産省が 1999 年から環境保全型農業を推進している。その取り組みの一つが「エコファーマー」の認証である。エコファーマーとは、土づくりと化学肥料・化学合成農薬の使用低減に一体的に取り組む農業従事者のことである。以下のような農業を営むことで、エコファーマーに認定される。(1)化成肥料や農薬を使用しない有機農法、(2)カバークロップ(写真 1) やリビングマルチを用いた化成肥料・農薬の低減、(3)冬期に水田を湛水しておく「ふゆみずたんぼ」(2 か月以上の湛水期間を確保)。エコファーマーに認証されている農業従事者は、2000 年以降に増加傾向にある(図 1)。

環境保全型農業は、農地生態系において生物多様性を豊かにすることが証明されている。環境保全型農業を施した日本の水田では、殺虫剤を使用しない農法により、クモ、トンボ、カエルといった分類群の個体数を大幅に増加させるといった研究事例が報告されている。そうした複数の種類の生物を食す捕食者(ジェネラリスト)の数が増えたことで、農薬の使用量を低減できている。本報告では、日本における環境保全型農業の取り組みを紹介しつつ、農地における生物多様性の保全のあり方について検討する。



写真 1. カバークロップ(緑肥)の作付け。

出典:農林水産省(2016.)

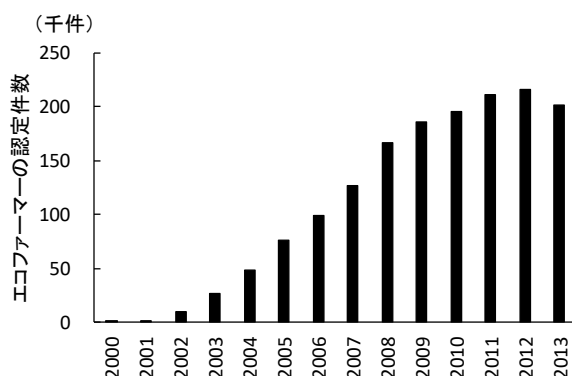


図 1. 日本におけるエコファーマーの認定件数の推移。

出典:農林水産省(2014)を基に作成。

Japan's Environmentally Friendly Farming for Enhancing the Biodiversity in Croplands

ARAKI Yuji

Faculty of Education, Saitama University

Conservation of biodiversity in croplands is important for sustainable agriculture. In order to develop sustainable agriculture and demonstrate the multifunctional roles of agriculture, the “Environmentally Friendly (EF) Farming”, in which the use of agrochemicals and inorganic fertilizers is reduced, is practiced around the world. In EF farming, the amount of chemical fertilizers and pesticides are reduced by more than 50% from conventional farming practices in the region.

In the case of Japan, MAFF (Ministry of Agriculture, Forestry and Fisheries) has supported efforts for the EF farming since 1999. As an action plan, there is a certification of "Eco-farmer". Eco-farmer is an agricultural worker and organization that are engaging in soil management and have reduced the use of chemical fertilizers and pesticides by more than 20% compared to conventional cultivation methods. Eco-farmer is carrying out several activities effective in conserving biodiversity. For example, (1) organic farming which is farming not to use chemical fertilizers or pesticides, (2) reduce chemical fertilizers and pesticides by using cover crops (Photo 1) of living mulch plants, (3) flood control in the paddy field with water in winter (secure a watering period of more than 2 months). The number of Eco Farmer has been increasing since 2000 (Fig. 1).

EF farming has proved effective at enhancing biodiversity in various taxa. For example, it is known that EF farming significantly enhanced the numbers of various taxa such as spider, dragonfly and frog in the paddy field of Japan. In this case, the use of pesticides has been reduced due to the increased numbers of generalist predators.



Photo1. Planting of cover crop (green manure crop).

Source: MAFF (2016).

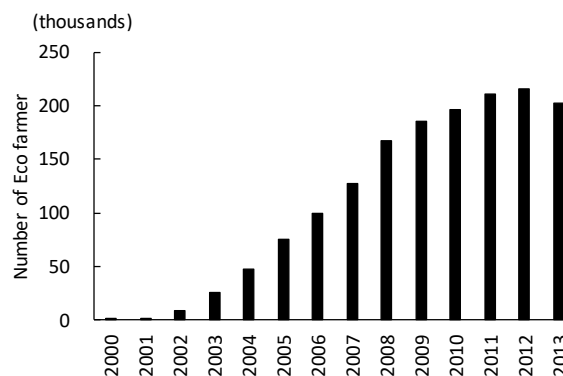


Fig. 1. Changes in number of Eco farmer in Japan.

Source: MAFF (2014).

草地生態系における絶滅危惧種の保全 —さいたま市田島ヶ原サクラソウ自生地を例に—

岡田 遥¹・辻原毬乃²・荒木祐二¹・塚脇真二³

(¹埼玉大学教育学部, ²川越市役所, ³金沢大学環日本海域環境研究センター)

埼玉県東南部の荒川河川敷に位置する田島ヶ原サクラソウ自生地は、湿性植物群落が発達していることから、国の特別天然記念物に指定されている。ここに自生する約 250 種の維管束植物には、サクラソウやノウルシなどの約 30 種の絶滅危惧種が含まれる。本調査地では、サクラソウの個体数が 2003 年に記録した 235 万個体をピークに減少し続けており、野生絶滅の危機に瀕している。その要因として、サクラソウと競合するノウルシやコバギボウシの分布域の拡大が挙げられる。しかし、ノウルシも絶滅危惧種に指定されている。

本研究では、サクラソウや競合種が生育する場所に 1m×1m の方形区を設置し、競合種の除去実験を行った。ノウルシは、直径 80cm 円内に出現した個体の地上部を 4 月上旬に刈り取った。コバギボウシは、方形区内に出現したすべての個体を 4 月上旬から定期的に刈り取った。これらの方形区と、何も除去しない対照区におけるサクラソウの植被率の推移を比較した。結果として、対照区ではサクラソウの植被率が低下した一方、ノウルシやコバギボウシを除去した方形区では 4 月下旬からサクラソウの植被率が上昇した。

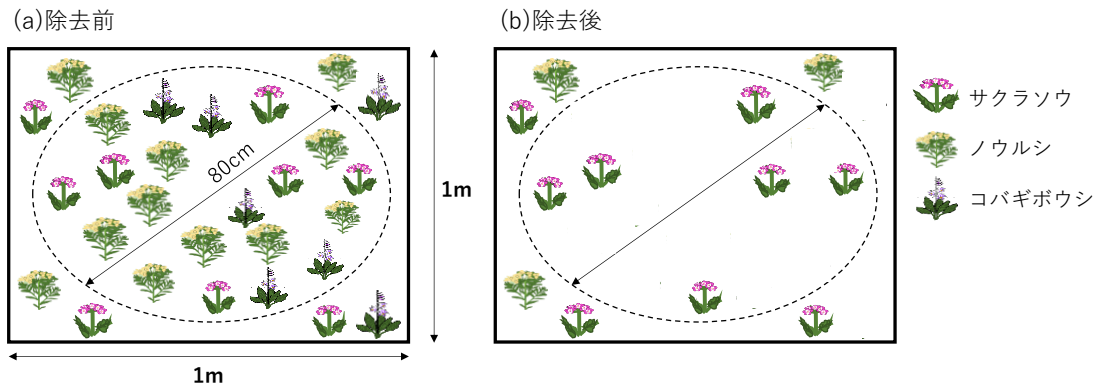


図 1. サクラソウと競合する種の除去実験方法.

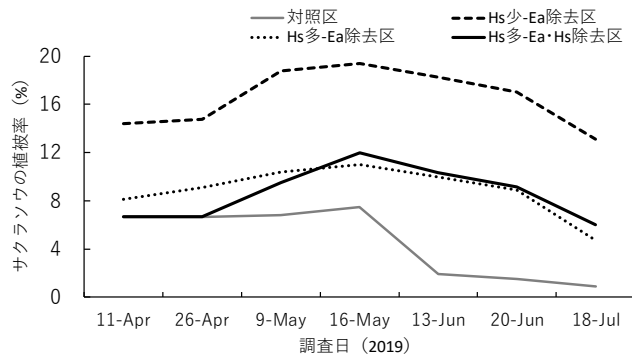


図 2. 競合種除去実験によるサクラソウ植被率の推移. 写真 1. フィールド調査のようす.

Conservation of Endangered Species in Grassland Ecosystem: A Case of Wild Primrose Habitat in Tajimagahara, Saitama

OKADA Haruka¹, TSUJIHARA Marino², ARAKI Yuji¹, TSUKAWAKI Shinji³

¹Faculty of Education, Saitama University, ²Kawagoe City Office,

³Institute of Nature and Environmental Technology Kanazawa University

The Tajimagahara Wild Primrose habitat is situated on a floodplain of the Arakawa River in the southeastern part of Saitama Prefecture. This habitat has been designated as a special natural monument in Japan due to the keeping of 30 endangered species on the wetland plant community. At the study site, the population of *Primula sieboldii* has continued to decline since 2003, and *P. sieboldii* faces the danger of wild extinction. One of the factors is the expansion of the distribution area of *Euphorbia adenochlora* and *Hosta sieboldii*, which shades *P. sieboldii* significantly. However, *E. adenochlora* is an endangered species, too.

In this study, we carried out an experiment to restore *P. sieboldii* by removing *E. adenochlora* and *H. sieboldii*. By removal of *E. adenochlora* which is appearing in a circle with a diameter of 80 cm, and all individuals of *H. sieboldii*, the coverage of *P. sieboldii* was increased since late April.

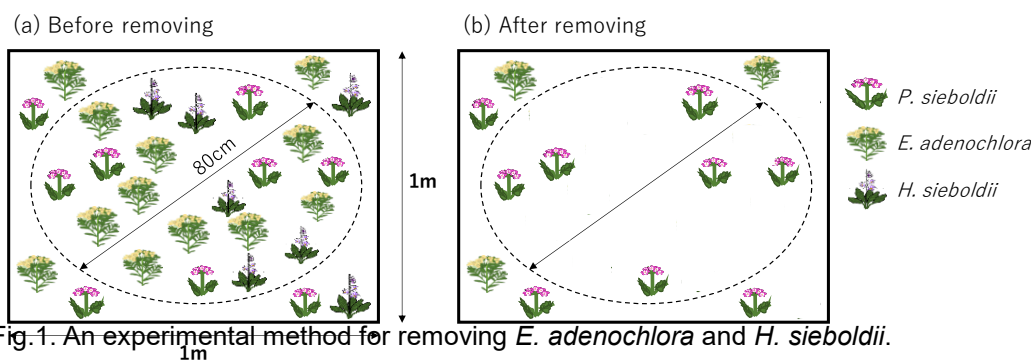


Fig.1. An experimental method for removing *E. adenochlora* and *H. sieboldii*.

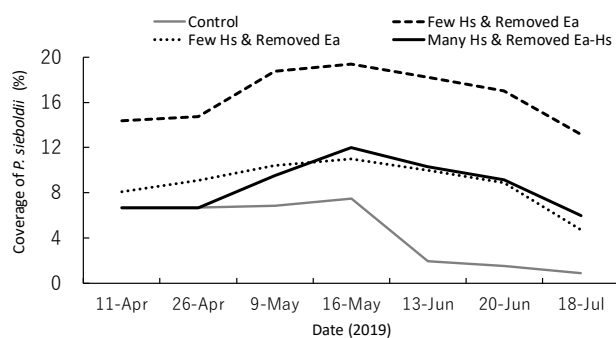


Fig.2. Changes in coverage of *P. sieboldii* in the four experimental plots.



Photo 1: Field survey in Apr. 2019.

石川県の都市部および郊外部における人間社会への農薬の暴露と蓄積

本田匡人

(金沢大学環日本海域環境研究センター)

ネオニコチノイド系農薬は 1980 年代に開発された比較的新しい農薬のグループであり、害虫駆除目的に家庭や農業用地で幅広く使用されている。このネオニコチノイド系農薬は昆虫に特異的な毒性を持ち、その他の農薬に比べて哺乳類の様な昆虫以外の生物に対しては殆ど影響を持たないと考えられてきた。そのため、現在ではネオニコチノイド系農薬は世界で最も流通・使用されている農薬の 1 つになっている。この世界中での莫大な使用は、河川水・土壌・野生生物などを含む幅広い自然環境でネオニコチノイド系農薬が検出される事態を招いている。更にこのネオニコチノイド系農薬は様々な農作物およびその加工食品でも数多く検出されている。

これまで人間には殆ど影響が無いと考えられてきたネオニコチノイド系農薬だが、近年の研究で初期の発生段階における神経系の発達に対する影響などが示唆された。これらの研究結果はネオニコチノイド系農薬の人間への暴露と健康への潜在的な影響への懸念を引き起こした。

人間でのネオニコチノイド系農薬およびその代謝産物の暴露実態の解明は、その暴露経路と健康へのリスク評価の為に必須となる。また、人間への暴露は、通常農薬が残留した食品の摂取が主要な経路だと考えられているが、過去の研究では農地からの大気経路による呼気暴露も懸念されている。しかしながら、人間での直接的なバイオモニタリング調査は少なく、世界的に見ても大規模に使用されているアジア圏では特にその報告が少ないのが現状である。

本研究では、石川県内の 2 地域から人間の尿および身体・居住・食事情報の質問票を収集（金沢：n = 63，能登：n = 16）した。この尿中のネオニコチノイド系農薬および代謝産物の濃度と収集した各情報を用いて、石川県における暴露濃度，状況，および経路の推定を行った。さらに、石川県の都市部および郊外部における暴露状況および経路の比較も行った。

Pollution of Neonicotinoid Insecticides in Human Society at Urban and Rural area in Ishikawa

HONDA Masato

Institute of Nature and Environmental Technology,
Kanazawa University, Kanazawa, Japan

Neonicotinoids are a relatively new class of pesticides used since the 1980s for pest control in home gardens, indoor, and in agriculture. Neonicotinoids have insect-specific neurotoxicity, and are considered to be less toxic than other classes of broad-spectrum pesticides for other organisms, such as mammals. Therefore, neonicotinoids are one of the most widely used class of pesticides in the world. The widespread use of neonicotinoids has led to measurable concentrations in a broad range of environment, such as surface water, soil, and wildlife. Further, residues of neonicotinoids have been found in many agricultural products and processed foods. Recent studies reported potential effect for the development of the nervous system in the early stage of human. These issues have raised concern about neonicotinoids in terms of human exposure and potential health risks.

Studies that describe the exposure of humans to neonicotinoids and their metabolites are essential to elucidate exposure pathways and potential health risks. It is considered that a major pathway of pesticide exposure for human is food intake. However, some studies revealed inhalation exposure contributed to pesticides contamination in a human. A few biomonitoring of neonicotinoid pesticide in a human was reported previously, especially in Asia where one of the most pesticides consumed area in the world.

In this study, we are collecting spot urine samples and questionnaire that asking personal data (physical, habitat, and food) from two sampling area in Ishikawa prefecture: Kanazawa (mainly urban area, $n = 63$) and Noto (mainly rural area, $n = 16$). Using the concentration data of neonicotinoids and personal data, we estimate the exposure level, situation, and pathway of neonicotinoid in Ishikawa. Additionally, we compare the differences in locations of neonicotinoids concentration between the urban and rural areas in Ishikawa.

大気汚染が性と生殖に関する機能に及ぼす影響

陳 琪豪・馬 露
(武漢大学健康学院)

The Influence of Ambient Air Pollution on Reproductive Health

CHEN Qihao and MA Lu

School of Health Sciences, Wuhan University, Wuhan, China

In recent decades, many studies have witnessed the significant decline of human fertility, in which the environmental degradation could play a deleterious role. Some epidemiological studies suggest an association between exposures to air pollution and impairment of reproductive health. However, the adoption of different study designs and statistical evaluations causes the inconsistent study results. Furthermore, many results drawn from studies in other countries could not be applicable to the Chinese populations who are usually exposed to high level of air pollution. China is now experiencing a deteriorating air quality. With the aggravating trend of aging population and release of the two-child policy, the relationship between air pollution and infertility has become a public health concern in China. Therefore, our studies focus on the adverse effects of air pollution on reproductive health. We have conducted several studies to investigate the effect of air pollution on reproductive health in Hubei province.

The study content comprises two main items: 1. The effect of air pollution on semen quality. 2. The effect of air pollution on negative gestational outcomes. To investigate the effect of air pollution on male fertility, semen quality data of 1852 subjects who attended the Reproductive Medicine Center of Renmin Hospital at Wuhan University were collected (from January, 2013 to August, 2015). Using generalized linear model, the relationship between each exposure variable (PM_{10} , O_3 , SO_2 , NO_2) and sperm parameters for several exposure windows (0-9, 10-14, 15-69, 70-90, 0-90 days before sampling) were explored. The results indicated a strong relationship between air pollution and the decrease in semen quality. The adverse effect of PM_{10} , SO_2 , NO_2 was more obvious in the early phase of spermatogenesis, and the effects of O_3 were more obvious during lag 0-9 and lag 10-14 days. To address negative gestational outcomes, three epidemiological studies have been conducted in different cities of Hubei province (Wuhan, Huangshi, Shiyan). We examined the associations between maternal exposure to air pollutants and negative gestational outcomes for three exposure windows (the first trimester, the second trimester, the third trimester). In Wuhan, to specify each participant's exposure to fine particulate matter, Land-used regression models was developed to predict the spatial variability of particulate matter at a 1km spatial resolution. In Huangshi, after adjusting for pregnancy hypertension, gestational diabetes, and other maternal information, the relationship between air pollution and small for gestational age (SGA)

was examined. In Shiyan, the short-term effects of air pollution on preterm birth were further explored. The results suggested that air pollution had adverse effects on both low birth-weight infants and premature infants. Compared with fine particulate matter, the effect of gaseous pollutant SO₂ on preterm birth was particularly pronounced.

Taken together, our studies are intended to provide a basis for air quality management policies and the promotion of reproductive health. Regional, national and international efforts are needed to reduce air pollution, not only to improve human fertility, but also to improve quality of life.

第5回金沢大学環日本海域環境研究センター連携部門国際テーマシンポジウム

「東アジアの農村社会・都市社会をめぐる環境とその発展」

<実施委員会>

塚脇真二（金沢大学環日本海域環境研究センター・教授）
弁納才一（金沢大学人間社会研究域経済学経営学系・教授）
長谷部徳子（金沢大学環日本海域環境研究センター，教授）
小林信介（金沢大学人間社会研究域経済学経営学系・教授）
古泉達矢（金沢大学人間社会研究域法学系・准教授）
唐寧（金沢大学環日本海域環境研究センター・教授）

第五届国际合作研讨会金泽大学环日本海域环境研究中心合作部

「城乡可持续发展与生态文明」

<执行委员会>

塚脇真二（金泽大学环日本海域环境研究中心・教授）
弁納才一（金泽大学人类社会研究域经济学经营学系・教授）
長谷部徳子（金泽大学环日本海域环境研究中心・教授）
小林信介（金泽大学人类社会研究域经济学经营学系・教授）
古泉達矢（金泽大学人类社会研究域法学系・副教授）
唐寧（金泽大学环日本海域环境研究中心・教授）

The 5th International Thematic Symposium of Department of Inter-institutional Collaboration, Institute of Nature and Environmental Technology, Kanazawa University “Environment and the Sustainable Development of Rural and Urban Societies in East Asia”

<Organising Committee>

TSUKAWAKI Shinji (Professor, Department of Inter-institutional Collaboration, Institute of Nature and Environmental Technology, Kanazawa University)
BENNO Saiichi (Professor, Faculty of Economics, Institute of Human and Social Sciences, Kanazawa University)
HASEBE Noriko (Professor, Division of Terrestrial Environmental Studies, Institute of Nature and Environmental Technology, Kanazawa University)
KOBAYASHI Shinsuke (Professor, Faculty of Economics, Institute of Human and Social Sciences, Kanazawa University)
KOIZUMI Tatsuya (Associate Professor, Faculty of Law, Institute of Human and Social Sciences, Kanazawa University)
TANG Ning (Professor, Division of Atmospheric Environmental Studies, Institute of Nature and Environmental Technology, Kanazawa University)

2021年3月12日，金沢大学自然科学大講義棟 AV 講義室

2021年3月12日，金泽大学自然科学研究科大楼

12 March 2021, Natural Science Building, Kanazawa University, Japan

