

Preface

Encounter in the Solomon Islands

A variety of trees grow on the riverbank and many birds come to use those trees. Droppings of these birds fall into river and streams; the roots of the mangrove at the river's mouth catch the droppings. These droppings enrich the mangrove soils and also provide a preferred food of fish. Thus, several kinds of fish come to the mangrove to nest and lay their eggs. Birds have several other roles including contributing to people. If a bird roosts on a tree in a garden, her droppings enrich the soil for crops. She may eat nuts and fly away, but when she lands she only eats the fruity flesh and drops living seeds in a remote area. New nut trees grow from those seeds and we people eat them.

About 4 months after I started my first fieldwork in Olive village, Roviana Lagoon, Western Province, Solomon Islands, I started a conversation with an impressive informant. Her story, as described above, showed a rich and deep knowledge of the local ecosystem. Hearing it encouraged me to conduct additional research on the interactions between people and the natural world in this area. Her story supported my hypothesis that the people of Roviana recognized the existence of ecological webs of human–plant–animal interaction and that this recognition played an important role in subsistence, resource use, and the conservation of natural resources, as well as land management.

This village, located on an island covered by dense tropical rain forest, provided a home for villagers who collected forest resources for their livelihood and cleared small areas of land for the production of root crops. The island displayed a rich level of biodiversity. Even though only a few land mammals thrive on such an island, a wide variety of abundant birds filled the forest, settlements, which have gardens with a variety of bird songs. The village faced a large coral lagoon, where the villagers angled or netted fishes. The informant was a woman in her mid-50s, an “ordinary” villager, i.e., neither a customary leader nor a healer, who had only completed 4 years of primary school education. However, her knowledge of the forest sounded comprehensive and ecologically sound. I was sometimes surprised by the depth of her knowledge, especially as it related to how different creatures—including

humans—interacted within the environment where she lived. She insisted that she had developed this knowledge through her own experiences rather than learning from others. She continued her story:

Since commercial logging started in our territory, the birds have fewer places to live. As a result, fewer birds nest in the trees and enrich our soils with their droppings. Seed dispersal has also decreased and fewer fishes come to the mangroves. Listen. In the past, birds helped the trees grow and we had a forest. We people are thankful for the birds that scatter seeds, allowing new trees to grow, because we may receive royalty money from the logging company. However, logging robs the birds of their places to live and make their nests.

The development of the rural area of Roviana accelerated after the logging operations started. This caused the forest to deteriorate and changed the lifestyles of the villagers. In addition to changes in forest management, Olive village experienced rapid changes under the developing market economy that coincided with population growth and urbanization. Unfortunately, the adverse pressure that development created on the forest came from multiple sources; both internal and external factors were involved. That is, the people themselves chose to accept the logging operation, to expand cash cropping by clearing the forest, and to sell forest resources with the goal of improving the quality of their lives, even though these behaviors were partly driven by unavoidable globalization and local population growth. I felt a little confused and did not initially understand why people who had such rich ecological knowledge were simultaneously willing to exploit forest resources.

Purpose of the Study

I primarily intend to document the subsistence lifestyle and lifeways of the people of Roviana in relation to the natural world, their indigenous ecological knowledge, and related recent changes in the Roviana Lagoon, Solomon Islands, using a transdisciplinary approach that integrated ecology, ethnography, agriculture, remote sensing, and statistics. My fieldwork, which started in 2001, serves as the basis for this study. This research provides an interesting case study of ecological and cultural interaction between humans and a landscape with a high level of biodiversity, and is designed to analyze the changes occurring in this society and ecosystem. This study analyzes how humans and biodiversity interact and also how humans and the ecosystem react to the socioeconomic changes occurring in the Solomon Islands. This study will provide informative suggestions that are designed to address a series of general questions, such as, “What kinds of factors have determined whether current human actions are sustainable or will result in a collapse of biocultural diversity in the Solomon Islands?” “How do Solomon Islanders recognize nature and biodiversity conservation in traditional ways or under socioeconomic changes?” and “How can the human societies of the Solomon Islands achieve that harmonization under changing socioeconomic conditions?” Therefore, my efforts were spent on collecting (1) human-related ecological data that could be used to analyze how people produced and consumed both food and other resources in a tropical rain forest

ecosystem, (2) botanical data revealing what kinds of resources they used, (3) data on biodiversity showing how this type of production, consumption, and resource use depended on the natural world and how that world was positively or negatively affected by these human activities, (4) psychological (or traditional anthropological and sociological knowledge) data designed to reveal what recognition underlies such activities, (5) socioeconomic data showing how recent changes affected the interactions between humans and the natural world around them, and (6) qualitative data related to what and how social institutions and cultural factors worked to support resource management and conservation. Additionally, human health and biological evolution were also studied to provide a background related to how humans adapt to change, although these data were mentioned only in passing in this book. Overall, this book provides a multidisciplinary and thorough study of the interaction between humans and the natural world on a relatively small spatial scale in the Pacific and islands of Southeast Asia.

Human ecology is the study of human adaptation and adaptability in an ecosystem, both biologically and culturally. A number of studies have attempted to understand how humans adapt to change in subsistence-based societies, i.e., how they produce and consume foods through foraging and agriculture. However, I felt that previous studies oversimplified the production system in two ways. First, the ecosystem approach analyzed society at the population level, even though decision making is done at the household or individual level. Second, the interaction between humans and the natural world cannot be analyzed by simply measuring the flow of energy; this type of study requires an analysis of the complex webs of biocultural diversity. Additionally, many studies have concluded that traditional shifting cultivation cycles and indigenous land-management systems are generally sustainable through appropriate land use and food production. However, several recent studies indicated that societies could fail to sustain their current shifting cycles under ongoing demographic and socioeconomic changes. People experience these changes today. In the field, I found that Roviana people used various ecological settings strategically. They adopted different cultivation methods and crops for different settings, and different communities or households adopted different strategies. Exploring such subsistence diversity rather than simply measuring energy flow at the population level now serves as an important new field in the study of human ecology.

Ethnobotany involves not only understanding how local people recognize, use, and manage energy-providing plants but also studying the use of all other plant resources, and can therefore be applied to the study of the human–ecosystem relationships observed here. In this regard, “quantitative ethnobotany” attracted my attention and led to my designing this study with the goal of measuring the cultural importance of each species in different societies and environments. This method also identifies important and useful vegetation or land cover types that local people find useful. Systematically quantifying detailed observations of human behaviors and lifestyles allows me to improve measurements of the usefulness and importance of different species and various types of land use.

Additionally, a new academic field called “folk ecology” or “folk biology” has been defined as the study of cognitive aspects of interactions between humans and the natural world. Dr. Scott Atran and others revealed that Mayan people of Guatemala recognized the existence of ecological human–plant–animal webs and these people’s behavior and management of biodiversity was associated with this type of recognition. My intense interest in this study led me to integrate this psychological domain into my analyses of the background of the ways local people use and manage the forest. This view was very important as it related to understanding whether or not local people recognize complicated interactions between different species. Many previous studies had criticized local people for generally exploiting resources for only short-term benefits without considering any undesirable effects of their activities and perhaps without realizing that they were not contributing to the conservation and creation of biodiversity in the way they had hoped. The theories and methodologies of human ecology, quantitative ethnobotany, and the new study of folk ecology can be combined and quantitatively analyzed in a way that quantitatively links different domains of humans and the natural world. This allowed me to simultaneously analyze the ecosystem, human behavior, and human recognition of environmental ecology comprehensively, statistically, and mathematically.

Another motivation was an increasing global interest in social-ecological production landscapes while emphasizing their global importance. Recent debates related to the conservation of biodiversity have encouraged a broader global recognition of the importance of sustainably preserving natural environments even though they are human-modified [e.g., Target 3 in Strategic Plan for Biodiversity 2011–2020 and the Satoyama Initiative in the 10th Meeting of the Convention of the Parties, Convention on Biological Diversity (CBD-COP10), in 2010]. People have long depended on biodiversity and received ecological services used for their own survival and welfare. This did not necessarily mean they destroyed biodiversity or ecosystems, because human modification might contribute to the creation and conservation of biodiversity. For example, the removal of a tree within a forest aids the growth of understory vegetation and pioneer shade-intolerant trees, and these trees provide ecological niches of some kinds of animals. In this way, social–ecological production landscapes may contribute to balancing the conservation of biodiversity with rural development by using resources wisely and by preserving the rights of local people to live on the land.

My research finally suggested the importance of understanding internal diversity. In this context, internal diversity means intra-society, intra-household, or intra-individual diversity. Biological diversity is usually analyzed at various levels such as genetic, species, population, community, and ecosystem. In contrast, the diversity in human society or culture, as an agent that uses biodiversity, has been considered to have been relatively homogeneous in the past. However, some of the villagers in one village may favor natural resource conservation, while others advocate against it, and still others feel neutral. Additionally, even specific individuals may be involved in conflicting helpful, harmful, and neutral actions simultaneously or recognize biocultural (external) diversity. One tree species may serve a useful purpose when a villager needs to use it and seeks it out, but the same species may be

considered a weed in agricultural land. Internal diversity thus exists in levels of the ecological unit (individual, household, village), with people having differences in their behavior in different situations, and in different psychological domains. We need to acknowledge that such multilevel types of diversity exist not only in natural environments but also in human societies and such types of diversity should be taken into consideration when attempting to understand their lives, knowledge, and recognition. This viewpoint is important if conservationists and people working for conservation agencies who live and work outside the community want to integrate their planned conservation practices with local people and their traditional environmental knowledge. Through these interdisciplinary data and discussions, I intend to provide useful information for ecologists, anthropologists, conservation practitioners, and rural development planners.

Structure of This Book

The book starts with a review of background information related to the Solomon Islands, human adaptation, and biocultural diversity in Melanesia, as well as socio-economic changes (Chap. 1). The concept of living with biodiversity and the working hypothesis are explained. Then, Chap. 2 explains the regional geographical context and historical background of the study site.

Chapters 3, 4, 5, 6, 7, 8, and 9 provide findings from various aspects of detailed fieldwork. Chapter 3 describes the vegetation and landscape from both ecological and cultural viewpoints, i.e., the data suggest forests are botanically diverse and the local people recognize that the local landscape reflected this diversity. Chapter 4 shows how people use different ecosystems, specifically the main island and barrier island ecosystems of the study area with their independent geological histories, that are separated by a coral lagoon sea. This chapter addresses a variety of disciplines such as land use, shifting cycles, land tenure, soil nutrients, subsistence production, vegetation, land cover change, and carrying capacity. Chapter 5 employs a quantitative ethnobotanical analysis to explore the kinds of plants the people use for their daily life and compares the local plant and land use patterns of a rural village and an urbanized village. This chapter then addresses how local people depend on biodiversity and how traditional human modifications of the forest contribute to the conservation of biodiversity by integrating the results presented in Chap. 3. These findings illustrate how a local society's use of resources was related to community welfare as well as to environmental preservation.

Chapter 6 explores the psychological aspects of human–environment–ecological interaction. The people of Roviana identified and acknowledged a variety of interactions that occur between humans, plants, and animals. However, this chapter also shows how the villagers recognized that people may have adverse effects on the ecosystem. These analyses are used to discuss the existence of traditional conservation ethics that are designed to protect biodiversity and may affect it. Chapter 7 then examines the acculturation of individuals to ethnobotanical knowledge in association

with the effects of modernization. Cultural consensus analyses and modernity scores suggested that modern Western knowledge is easily integrated into the ethnobotanical knowledge system and is related to the loss of diverse botanical knowledge.

Chapter 8 predicts the future of Roviana, based on comparative research in the urban area of Roviana. Households in Munda town were economically vulnerable and at risk of encountering poverty and other hardships. This result suggested the necessity of taking action to conserve the rural lifestyle and give it a viable future. Chapter 9 provides qualitative information such as customary rules related to forest use and ecosystem management with the goal of exploring the possibility of integrating the ways that local people modify forests into new biodiversity conservation programs. Finally, Chap. 10 summarizes the findings, suggests ways to harmonize the interactions of humans and the natural world of Roviana, and proposes how this system sustainably benefits the people of Roviana.

Kyoto

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