Asian Indigeneity, Indigenous Knowledge Systems, and Challenges of the 2030 Agenda

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Abstract:	Adopted by the UN General Assembly in 2015, the 2030 Agenda pledges to leave no one behind through the 17 Sustainable Development Goals (SDGs) and 169 targets ratified by the international community to address the global challenges of our time. This framework and universal action plan articulates the inclusion of the indigenous peoples in the social, economic, and environmental dimensions of sustainable development. Nonetheless, the world's largest inhabitants of indigenous peoples are in Asia. However, despite the affirmation of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), the concept of indigeneity is still controversial, politically contested, and considered immaterial by many states in the Asian region. With limited rights and inadequate access to social services, the indigenous knowledge systems and practices has evolved through time to provide solutions to local problems that sustained many marginalised communities. This article revisits the socio-political notion of indigeneity in the region and its implications to the indigenous community. It also explores the diversity of indigenous knowledge systems and traditional practices and its relevance on the SDGs particularly on food security, community livelihoods, human well-being, natural resources management, and biodiversity conservation. The conclusion reflects the need for legitimate recognition and political enablement of indigenous peoples in the implementation of 2030 Agenda by forging collaborations between academic researchers, policy-makers, and indigenous organizations in the Asian community.
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Response to Reviewers:	The authors are very grateful to the insightful comments and recommendations provided by the two reviewers. We revised the paper following their suggestions to improve the content of this article. Reviewer_1 1.I expect you to explain more about how the 2030 Agenda can be driven within Asian context such as the importance of role of government and indigenous groups.

Actions Taken/Response: In page 9 of the revised manuscript, we included the initial progress in the implementation of the 2030 Agenda in selected Asian countries that adopted the Sustainable Development Goals (SDGs). The role of the government and indigenous peoples organizations have been tackled in this section.

2.Could you put more of your explanations on re-developing and re-arranging the Indigenous Knowledge System of indigenous people and how to make the indigenous groups to be centered at this movement?

Actions Taken/Response:In page 11, we noted that various multilateral treaty and intergovernmental bodies like the Intergovernmental Panel on Climate Change (IPCC), the Convention on Biological Diversity (CBD), and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) expressed the need of including indigenous knowledge systems in international reports emphasizing its importance on global policy. To be centered in this movement, we discussed in page 9 the key role of the indigenous groups in the sustainability agenda through indigenous knowledge integration in environmental governance initiated by other countries i.e. Australia.

3.How can the knowledge system be used to legitimize the indigenous people in the concept of 2030 Agenda?

Actions Taken/Response: We proposed in this article to define indigenous peoples not as the often argued “first people” but as distinct peoples inhabiting the traditional territories or ancestral lands attested by history and inimitable cultural identity and is the non-dominant voiceless sector of the multicultural realities in Asia. The distinctiveness of cultural identity is manifested by the exclusive practice of indigenous knowledge systems and their social exclusion/non-integration is an evidence of being socioculturally different from the majority of the populations.

4.I suggest to correct some grammatical errors such as in the part 3. Indigenous peoples in the Sustainable Development Goals (SDGs): Two of the SDGs specifically are referred to the indigenous peoples in its target by 2030. First, it is the Goal 2 section 2.3 on enhancing agricultural productivity and income of small-scale producers, in particular the indigenous peoples and other marginalized groups, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment (United Nations 2015). The second goal broadly aims to end hunger, achieve food security and improved nutrition and promote sustainable agriculture. Second, it is the Goal 4 section 4.5 on eliminating gender disparities in education and ensuring equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations (United Nations 2015).

Actions Taken: Reviewed and corrected

Reviewer 2

a. Need to be addressed the possibility that the 2030 Agenda could be adapted within Asian context in a more detailed way. Need more information about that concept.

Actions Taken/Response: One of the unique features of the 2030 Agenda is the extensive leeway it provides to the states. As such, countries that adopted and started the implementation have set their own goals, targets, and strategies that will align with the global goals. To date, most countries are into the baseline and benchmarking studies to identify the national priorities thus, we highlighted in this article the importance of forging collaborations in implementing and achieving the sustainable goals.

In page 8, we included a brief background on the conception of sustainable development goals and how it differs on its predecessor, the Millennium Development Goals (MDGs)

	b. Please explain how 193 countries of the United Nations General Assembly decided to include the indigenous people issues in the 2030 Agenda despite the Asian countries' non-recognition and rejection on that issue. Is there any different reaction regarding this kind of concept between Western countries and Asian countries? Actions Taken/Response: In page 7, we briefly explained that the United Nations has adopted no definition for "indigenous peoples" even in the Indigenous Rights Declaration. The absence of a clear and authoritative definition makes the concept subjective to varying interpretations. One of the prevailing argument is that its applicability is restricted to certain territories only. In general, countries who voted against the UNDRIP like New Zealand and Australia eventually adopted the concept and successfully integrate indigenous knowledge systems into their environmental policies. On the contrary, the majority of Asian nations who voted in favor of the UNDRIP failed to do the same. The socio-political settings in the Asian region are very diverse and so, the treatment of indigenous issues remains without consensus and unresolved. c. Need to overall check some minor errors in grammar found in this paper. For instance, in 6 page, "Among Asian countries, very few countries has fully recognize the international concept of indigenous people and gave unconditional right to self-determination to the indigenous peoples." -> "Among Asian countries, very few countries have fully recognized the international concept of indigenous people and given unconditional right of self-determination to the indigenous peoples." Actions Taken/Response:Reviewed and corrected.

Asian Indigeneity, Indigenous Knowledge Systems, and the Challenges of 2030 Agenda

Abstract

Adopted by the UN General Assembly in 2015, the 2030 Agenda pledges to leave no one behind through the 17 Sustainable Development Goals (SDGs) and 169 targets ratified by the international community to address the global challenges of our time. This framework and universal action plan articulate the inclusion of the indigenous peoples in the social, economic, and environmental dimensions of sustainable development. Nonetheless, the world's largest inhabitants of indigenous peoples are in Asia. However, despite the affirmation of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), the concept of indigeneity is still controversial, politically contested, and considered immaterial by many states in the Asian region. With limited rights and inadequate access to social services, the indigenous knowledge systems and practices have evolved through time to provide solutions to local problems that sustained many marginalized communities. This article revisits the socio-political notion of indigeneity in the region and its implications for the indigenous community. It also explores the diversity of indigenous knowledge systems and traditional practices and its relevance on the SDGs particularly on food security, community livelihoods, human well-being, natural resources management, and biodiversity conservation. The conclusion reflects the need for legitimate recognition and political enablement of indigenous peoples in the implementation of the 2030 Agenda by forging collaborations between academic researchers, policy-makers, and indigenous organizations in the Asian community.

Keywords

Indigenous peoples, Sustainability, Socio-ecological systems, Conservation, SDGs

1. Introduction

About two-thirds of the world's indigenous peoples live in Asia, which is home to more than 2,000 civilizations and languages (UN Department of Public Information 2014). Aside from being a critical biodiversity hotspot, the Southeast Asian region has more than 1, 500 indigenous groups - among the richest ethnic diversity in the world (IWGIA 2018, 2017). Yet, the indigenous people of this region is also among the world's most vulnerable, politically oppressed, and neglected minorities (Fukurai 2018; Clarke 2001). The concept of indigeneity in Asia is far from clear and naturalized, especially when compared to other nations (Baird 2011). Though signatories in the 2017 United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), many Asian countries contested the definition and does not acknowledge the notion of "indigenous peoples" and its applicability to their respective political territory (IWGIA 2017, 2018; Etchart 2017). The gravity of the socio-political issues led to historical and concurrent ethnic-based conflicts, genocide, and ethnic cleansing in some countries which to date, others remain unresolved (Fukurai 2018; Clarke 2001; Beyrer and Kamarulzaman 2017; Candelaria 2018; Anderson 2015; Kolås 2017; Li 2002). Understanding the scale, location and nature conservation values of the lands over which indigenous peoples exercise traditional rights is central to the implementation of several global conservation and climate agreements (Garnett et al. 2018). The neglect over indigenous peoples issues prompted the 70th Session of the United Nations General Assembly to include this matter in the 2030 Agenda for Sustainable Development Goals (SDGs) adopted by the heads of state from 193 countries (United Nations 2015). This universal action plan, which will guide development programs and policies throughout the world until 2030, comprises 17 SDGs, 169 targets, and 232 indicators that take into account issues left unresolved by the Millennium Development Goals (MDGs) in 2000, which did not include a single reference to indigenous peoples (Cisneros 2017). Apart from the direct references in the declaration, two of the Sustainable Development Goals and many

of the associated targets are relevant for indigenous peoples (United Nations 2015). Moreover, the overarching framework of the 2030 Agenda contains numerous elements that can go towards articulating the development concerns and participation of indigenous peoples (United Nations 2015). The Agenda came into effect on 1 January 2016 and will carry through the next 15 years; however, the indigenous peoples in Asia still struggle for recognition and support for empowerment. With denied rights and limited access to basic social services, many ethnic minorities managed to survive by adapting and mitigating in various ways the impacts of global environmental change (Gómez-Baggethun et al. 2013; Maldonado et al. 2016; Mercer et al. 2010; Nkomwa et al. 2014; Miyan 2015). Traditional ecological knowledge has also sustained the cultures, livelihoods, and agricultural resource management systems of local and indigenous communities throughout Asia for centuries (Parrotta et al. 2009; Altieri and Nicholls 2017; Cordero et al. 2018). As such, we also highlighted in this paper the challenges faced by the indigenous peoples in the Asian region as well as the need for greater engagement in integrating indigenous knowledge systems for inclusive and sustainable development initiatives in the implementation of 2030 Agenda.

2. The Definition of Indigeneity in Asia

The term "indigenous" has long been used as a designation distinguishing those who are "native" from their "others" in specific locales and with varying scope (Merlan 2009). Historically, this concept was first applied at the end of the 19th century by European colonizers to racially differentiate themselves from the colonized subjects (Baird 2015; Casumbal-Salazar 2015; Baird 2011). This definition changed over the years and in 1938, the Pan-American Union referred to it as the first inhabitants of the lands (Baird 2011). This "first" or "original" peoples' concept of indigeneity, that differentiate based on ethnicity have emerged and become popularized in Asia in the 1970s and 1980s (Baird 2015). Recently, the term "indigenous" has

also been used to distinguish the marginalized and vulnerable people living in the state borders, including those who may not be the "first peoples" (Baird 2016). The label "indigenous peoples" or its equivalent term in countries that still reject the concept are thus both highly political and subjective, reflecting opposing efforts to define the social basis of nation-states (Clarke 2001; Bertrand 2011). In fact, many Asian nations still contested the definition and do not acknowledge the concept of "indigenous peoples" even after the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) in September 2007 (IWGIA 2017, 2018; Etchart 2017). Disputes focus on conceptions of the particularly sustainable environmental relations of indigenous groups, on the compatibility of universal human rights with the particular entitlements of indigenous and cultural minorities, as well as on the justification for and achievement of their claims to local resources, self-determination, and autonomy (Buergin 2015; United Nations 2008). The concept often provokes considerable caveats at the national level, particularly among Asian states where—in Southeast and East Asia—only the Philippines and Japan accept the use of the term "indigenous peoples" to describe parts of their populations (Buergin 2015; Aikenhead and Ogawa 2007; Casumbal-Salazar 2015).

On the other hand, the majority of ASEAN (Association of Southeast Asian Nations) members together with India, China and other nations rejected the framework due to varying political and ideological interpretations claiming it does not apply to them (Bertrand 2011; Clarke 2001; Baird 2015; Buergin 2015; IWGIA 2017; Baird 2016). Indonesian authority argued that the concept of indigenous peoples is not applicable as almost all Indonesians (with the exception of the ethnic Chinese) are indigenous and thus entitled to the same rights (Nababan and Sombolinggi 2017). The government granted autonomy in some areas, albeit for both minority and non-minority (Baird, 2011). In a particular case, the Indonesian government gave concessions to the Papuans but not the rights as indigenous peoples (Bertrand 2011). Consequently, the Indonesian government has rejected calls for specific needs from groups

identifying themselves as indigenous (Nababan and Sombolinggi 2017). Vietnam, Laos, Bangladesh, and China have a similar stance to that of Indonesia for not recognizing indigenous peoples (IWGIA 2017). The Lao government, however, severely restricts fundamental rights, including freedom of speech (IWGIA 2017). Organizations openly focused on indigenous peoples or using related terms in the Lao language are not allowed and open discussions about indigenous peoples with the government can be sensitive (IWGIA 2017). Nonetheless, the very existence of indigenous people in the Asian region is evident even from a local and international perspective (Table 1). In different parts of Asia, indigenous peoples are called "Masyarakat adat" in Indonesia, "Orang Asli or Orang Asal" in Malaysia, "hill tribes" in Thailand, "Scheduled Tribes"or "Adivasis" in India, "Jummas" in Bangladesh, "Adivasi Janajati" in Nepal, ethnic minorities, and among others distinguishing them as socio-culturally distinct group of people from the majority (IWGIA 2017, 2018).

Table 1: Indigenous Populations and Number of Indigenous Groups in Selected Asian Countries

Asian Nations	Indigenous Population	No. of Indigenous Groups
East and Southeast Asia		
1. Japan	1,100,000-1,400,000	2
2. Taiwan	559,036	16
3. China	111,964,901	55
4. Philippines	14,000,000-17,000,000	110
5. Indonesia	50,000,000-70,000,000	1,128
6. Malaysia	4,369,176	57
7. Thailand	923,257	9
8. Vietnam	12,300,000	54
9. Laos	No data available	49
10. Myanmar	35,020,000	100
11. Cambodia	400,000	24
South Asia		
12. India	104,000,000	705
13. Bangladesh	1,586,141	54
14. Nepal	9,540,000	63

Note: Except for Taiwan, which is a non-member of the United Nations, the aforementioned Asian nations voted in favor and among the signatories of the UN Declaration on the Rights of Indigenous Peoples (UNDRIP).
Source: (IWGIA 2017, 2018; United Nations Development Programme 2010)

This criterion of self-identification and identification of others as members of a distinct socio-cultural group have been the institutional definition for indigenous peoples by the World Bank's Operational Directive 4.20 (World Bank 1991). Other indicators include having an indigenous language different from the national language, the presence of customary and political institutions, close attachment to territories and natural resources, and subsistence-oriented production (World Bank 1991). With policies strategically defined by global institutions, the legitimate recognition as indigenous peoples provides transnational benefits provided by various international organizations, intergovernmental agencies, and other foreign governments, which have policies targeted towards overseas indigenous peoples (Kingsbury 1998). Yet, to date, some of these ethnic groups are not only denied of such recognition but also of citizenship thereby making them socially excluded and amongst the impoverished sectors (Toyota 2005; Milton et al. 2017).

The politicized non-recognition of indigenous peoples in Asia may explain the paucity of research data and their under-representation in both local and international policies as well as in the continuing marginalization of many indigenous groups in the region. Among Asian countries, very few countries have fully recognized the international concept of indigenous people and given unconditional right of self-determination to the indigenous peoples (IWGIA 2017). Both Japan and Malaysia has adopted the UNDRIP and endorsed the Outcome Document of the World Conference on Indigenous Peoples but has not ratified International Labour Organisation (ILO) Convention 169 (IWGIA 2017, 2018). Taiwan, on the other hand, is not a member of the United Nations and has not been able to vote on the UNDRIP, nor to consider ratifying ILO Convention 169 (IWGIA 2017). At present, one of the major challenges faced by many indigenous peoples in Asia appear to be deep-rooted in the lack of national recognition and consequently, the denied legal rights despite the UNDRIP and ILO 169 agreements. The new Constitution of Nepal promulgated in 2015 denies the collective rights

and aspirations for identity-based federalism of indigenous peoples (IWGIA 2017). In 2017, the Indigenous Peoples Bill submitted by Indonesia's indigenous movement still awaits to be discussed in the National Legislation whereas Vietnam's draft proposal on the development of the Law on Ethnic Minorities was already rejected by its National Assembly (IWGIA 2017). There is also continued efforts to get indigenous peoples rights in the draft Constitution of Thailand that is still subject to further deliberation (Baird, Leepreecha, and Yangcheepsutjarit 2017; IWGIA 2017). The historical cause of regional conflicts and issues stemmed from the absence of an authoritative definition nor a general agreement to the meaning of indigenous peoples (Kingsbury 1998). Though certain criteria have been established to identify indigenous peoples by the ILO and World Bank, the United Nations has adopted no definition even in the UN Declaration on the Rights of Indigenous Peoples (Office of the United Nations High Commissioner for Human Rights 2013). Given its relevance in political discourse, national and international policies, and legal implications, the consensus on the definition is highly needed in the Asian region. Similar to SDGs, the ASEAN Socio-Cultural Community Blueprint 2025 also envisions for an inclusive community with the goal of reducing the barriers on ethnic minority groups, vulnerable and marginalized groups, and to promote indigenous and traditional knowledge (ASEAN 2016). This, however, will be likewise unattainable without a regional consensus devoted to the recognition and protection of minorities and indigenous peoples. Finally, finding a common ground for defining the indigenous peoples within the Asian community is not impossible. The indigenous peoples are discernible in many states as distinct peoples inhabiting the traditional territories or ancestral lands attested by history and inimitable cultural identity and is the non-dominant voiceless sector of the multicultural realities in Asia.

3. Indigenous peoples in the Sustainable Development Goals (SDGs)

The idea of the Sustainable Development Goals (SDGs) first emerged from the outcome of the Rio+20 Conference in 2012 (United Nations 2012). In September 2015, after three years of negotiations, the 193 world leaders in the UN General Assembly adopted the SDGs consisting of 17 global goals with 169 targets to be achieved in 2030 (United Nations 2015). The UN described the formulation of the 2030 Agenda as the most inclusive in its history. The SDGs address some of the key shortcomings and gaps of the Millennium Development Goals (MDGs) where indigenous peoples were largely invisible. Indeed, one of the major criticism in the MDGs is its setting that partly ignored the human rights standards and principles, especially on the issues of inequality within a country (Office of the United Nations High Commissioner for Human Rights 2008). In contrast to the MDGs, the SDGs incorporate a broader and more transformative agenda relevant to the challenges of the 21st century through global goals (Fukuda-Parr 2016).

Through active engagement in the process towards the 2030 Agenda, the indigenous peoples have been included in the political declaration of the SDGs as well as in the follow-up and review section that calls for indigenous peoples' participation (United Nations 2015). Two of the SDGs are specifically referred to the indigenous peoples in its target by 2030. First, it is the Goal 2 section 2.3 on enhancing agricultural productivity and income of small-scale producers, in particular the indigenous peoples and other marginalized groups, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment (United Nations 2015). The second goal broadly aims to end hunger, achieve food security and improve nutrition, and promote sustainable agriculture. Second, it is the Goal 4 section 4.5 on eliminating gender disparities in education and ensuring equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children

in vulnerable situations (United Nations 2015). The fourth SDG aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

At the national level, the governments' of Bangladesh, India, Indonesia, Japan, Malaysia, Nepal, Philippines, and Thailand adopted and started the implementation of the SDG framework through baseline and benchmarking studies (Allen, Metternicht, and Wiedmann 2018). The goal-setting process of the UN SDG presents a novel approach as it affords extensive freedom for implementation among the member states (Biermann, Kanie, and Kim 2017). The role of the government, therefore, is critical in setting the priorities for the national goals, targets, and strategies within the context of global goals. This will require significant capacities for political leadership on sustainable development at all the levels of government from national to local and cutting across sectoral borders (Stafford-Smith et al. 2017; Biermann, Kanie, and Kim 2017). In this regard, the sectors of indigenous peoples are key components of sustainability agenda especially on environmental policies as they occupy over quarter of the world's land surface of conservation importance (Garnett et al. 2018) and their indigenous knowledge systems are now widely recognized tool in natural resource management (Ban et al. 2018; Ens et al. 2016; Tengö et al. 2014; Maldonado et al. 2016). The largest remaining natural resources in Asia are safeguarded by indigenous populations (Rerkasem, Yimyam, and Rerkasem 2009; Poffenberger 2006) and the perspective of integrating indigenous knowledge systems in both local and regional policies should be reconsidered. Some models of indigenous knowledge integration in environmental governance can be examined from the experience of other nations like Australia, Canada, Mexico, and many others (Duncan et al. 2018; Leiper et al. 2018; Audefroy and Sánchez 2017; Arsenault et al. 2018). Moreover, the International Panel on Climate Change (IPCC) even calls for the inclusion of indigenous knowledge systems in international reports highlighting its importance on science, policy and global politics (Ford et al. 2016). The role of academic researchers is likewise indispensable in the framing of research

agenda, knowledge production, policy analysis, and expert assessments needed by the national government and the international community (Parsons, Fisher, and Nalau 2016; Ford et al. 2016). For these reasons, implementing and achieving the goals of the 2030 Agenda requires interlinkages between indigenous peoples' organizations, academic researchers, and the national government.

4. The Role of Indigenous Knowledge Systems

Indigenous knowledge is broadly defined as an evolving cumulative body of knowledge, practice, and belief about the relationship of living beings (including humans) with one another and with their environment handed down through generations by cultural transmission (Berkes, 1993; Gadgil et al., 1993). It is also called traditional ecological knowledge, traditional wisdom, aboriginal science, traditional knowledge, and among others (Aikenhead and Ogawa 2007; Hummel and Lake 2015). This knowledge is a product of direct experience and careful observations of the natural world by the indigenous peoples and has been a conceptually problematic field of research (Aikenhead and Ogawa 2007). Locally shared knowledge could be considered as an asset distinctive from the other five capitals (physical, financial, human, social and natural capital) (Shiro et al. 2007). In the case of Yunnan farmers in China, spatially dispersed farmers carefully observed local ecosystem (human capital) and shared their experience within the community (social capital), which resulted in anthropogenic accumulation of collective knowledge, and this enabled the farmers to identify and find solution to local problems (Shiro et al. 2007). Knowledge capital stock could be depleted or vanished due to abandonment, displacement, loss of interest, and among others (Sujarwo et al. 2014; Shiro et al. 2007). Thus, for rural development to be sustainable, there is a need to consider local, community, and/or traditional knowledge as capital assets in rural development projects (Shiro et al. 2007). Studies exploring indigenous peoples' experiences and responses to

pertinent global environmental concerns have increased in the past two decades (Parsons et al., 2016). A number of these publications discusses the pivotal role of indigenous knowledge on a wide array of themes encompassing the field of social, environmental and health sciences. Its applicability on ecosystem degradation, climate change and climate-related hazards, food security, human well-being, and conservation of biodiversity has lately gained more interest and recognition worldwide (Ford et al., 2016; Garutsa & Nekhwevha, 2016; Hiwasaki et al., 2015; Ingty, 2017; Mistry & Berardi, 2016; Nkomwa et al., 2014; Oniang'o et al., 2004; Quave & Pieroni, 2015; Wilder et al., 2016). This includes the inclusion of indigenous knowledge systems on international reports and assessments of Intergovernmental Panel on Climate Change (IPCC) (Ford et al. 2016), the Convention on Biological Diversity (CBD), and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (Tengö et al. 2017). However, that many traditional knowledge and practices are understudied and fast disappearing worldwide (Atreya et al., 2018; Parrotta et al., 2009; Parsons et al., 2016; Reyes-García et al., 2013; Saynes-Vásquez et al. 2013; Srithi et al., 2009; Voeks & Leony, 2004).

The distinctiveness of indigenous peoples' knowledge, cultural identity, and traditional practices over ancestral domains are markers shared by indigenous populations. Furthermore, their history of oppression, marginalization, and disappearing culture warrants their claims for legitimate recognition as indigenous peoples (Anaya 1996).

5. Putting Indigenous Knowledge Systems into Practice

5.1 Food Security and Community Livelihood

With the growing population all over the world, it is unclear how the current global food system will meet the future demand for food hence, ensuring equal access to adequate and nutritious food produced in an environmentally and socio-culturally sustainable manner is one of the

greatest challenges of the time (Vinceti et al. 2013). This important issue is among the SDGs of the 2030 Agenda directly referred to the indigenous peoples and other vulnerable sectors of the society. Embedded in their respective traditional practices, indigenous knowledge systems concerning wild food resources is essential for subsistence and livelihood income for many ethnic communities in Asia (Broegaard et al. 2017; Delang 2006b; Tamayo 2010; Jianchu and Mikesell 2003). Though efforts to domesticate selected plant species for local people have started in some region, many government agencies and research institutions still overlooked the potential economic benefits of wild edible plants as well as the advantages of traditional systems and practices (Delang 2006a, 2006b; Lulekal et al. 2011; Bvenura and Afolayan 2015; Maroyi 2014; Ebert 2014). In the case of Tagbanua tribe of Palawan Island in Philippines, local vegetables and fruits are outsourced from traditionally managed plots while their main earnings is derived from harvesting of resin from the Almaciga tree (*Agathis dammara* (Lambert) L.C. Rich or *Agathis philippinensis* Warb.) and rattan (Lacuna-Richman 2004, 2003; Dressler 2005). The Tagbanua restrict themselves from clearing parts of the forest due to their dependence on almaciga resin and other forest resources which sustains their livelihood and basic needs in the community (Lacuna-Richman 2004, 2003; Dressler 2005). In Nepal, the collection of yarsagumba (*Ophiocordyceps sinensis*) in the Himalayan mountains accounts up to 65% of total household income with the highest contribution in the poorest households which further reduce income inequality by 38% (Shrestha, Dhital, and Gautam 2017). The current market price for 1 kg of high-grade Tibetan Yarsagumba in China, Hong Kong, and in the US is now $128,000 USD from $32,000 USD in the 2006 making it one of the most expensive medicinal herbs in the world (Shrestha, Dhital, and Gautam 2017; Koirala et al. 2017). The use of economically important plant resources and innovative practices are also crucial to many households in the region. One of the lesser-known tradition is the use of *Elaeocarpus floribundus* seeds as a source of vegetable oil in Myin Ka village in Myanmar (Shin et al. 2018). The vegetable oil

from *E. floribundus* seeds is still uncommercialized and could be further explored for its potential to generate additional livelihood revenue to the community. The *E. floribundus* fruits are eaten raw as a wild edible fruit in South Asia and recent studies reported that its fruit extract has antibacterial activity against food-borne pathogens (Sircar and Mandal 2017) while the leaf extracts had significant activities against CEM-SS cancer cells (Utami et al. 2006). Gathering of food plants in the wild is a local practice of foraging tribes in the Philippines to augment the food shortage (Balilla et al. 2012; Mandia 2004; Tangan 2007). Aside from subsistence, the Karen hill tribes inhabiting Thailand also valued wild food for additional profits apart from growing cash crops though with certain restrictions set by the government (Delang 2006b, 2006a; Suk 2016). About 50% of the poor and at-risk households in Timor-Leste similarly forage for wild food during food deficit season (Erskine et al. 2014). Such knowledge is important for human survival. In fact, some of the reported emergency food plant species is often cited as coping strategies of indigenous peoples during periods of insufficiency. Other ethnic communities also considered it as part of traditional culinary practice and cultural identity transmitted across generation (Iwasaki-Goodman 2017). The local populace is also more engaged in the conservation of plant species that are part of the traditional cuisine (Putri, Hakim, and Indriyani 2017). Given the importance of indigenous knowledge systems in food security, community livelihoods and well-being in many underserved indigenous populations, the potential contribution of indigenous peoples should be re-examined in realizing the SDGs on Zero Hunger (SDG 2) and other relevant targets.

5.2 Natural Resources Management and Conservation

The indigenous peoples safeguard the sites of few remaining natural resources, and their way of life, customs, and traditions had helped sustain rural communities and protect vulnerable forests in the age of modernity (Etchart 2017). For instance, the Dayak people in East

Kalimantan, Indonesia practices a traditional farming system called “simpukng” which is a managed secondary forest planted with selected species of fruits, rattan, bamboo, timber and other plants (Mulyoutami, Rismawan, and Joshi 2009). This sustainable forest gardens are owned by families and passed down from one generation to the next while others are managed on a communal basis (Mulyoutami, Rismawan, and Joshi 2009). This concept of sustainable utilization and management of shared resources is similar to the Village Community Forests (VCFs) of the indigenous peoples of Bangladesh (Misbahuzzaman and Smith-Hall 2015; Chowdhury et al. 2018), the “ala-a system” of Ifugaos in the Philippines (Camacho et al. 2012), and the Fengshui forest in China (Kim, Li, and Son 2017; Yuan and Liu 2009). It is estimated that there may be over 140 million forest-dependent people in Cambodia, Indonesia, the Philippines, Thailand, and Vietnam, representing about one-third of the population in these nations. This estimate includes people who live on or near forest lands and are dependent on forest resources for a significant portion of their subsistence and livelihood requirements (Poffenberger 2006). Almost all of the indigenous communities in Bangladesh are also living within the boundary of 2.53 million ha of forest lands representing about 17.5% of the country's area (Rahman and Alam 2016). Yet, despite the large indigenous population and economic dependence, various governments in the region did not consider them to be a major component in management until recently (Poffenberger 2006). In the community forests system (CFS), the entire community has a consensus on the management of which is also the source of livelihood such as bamboo and timber harvesting as well as for wild fruits, herbs and other resources (Table 2).

Table 2. The key benefits of traditional Community Forests System

Utilization/Relevance	References
1. Food source for local households (wild vegetables and fruits)	(Mulyoutami, Rismawan, and Joshi 2009; Chowdhury et al. 2018)
2. Livelihood income derived from harvested and processed forest products	(Mulyoutami, Rismawan, and Joshi 2009; Pinyopusarerk, Tran, and Tran 2014; Camacho et al. 2012; Kim, Li, and Son 2017)
3. Sources of fuelwood	(Mulyoutami, Rismawan, and Joshi 2009; Chowdhury et al. 2018; Camacho et al. 2012; Kim, Li, and Son 2017)
4. Source of drinking water	(Chowdhury et al. 2018)
5. Source of medicinal plants	(Mulyoutami, Rismawan, and Joshi 2009; Chowdhury et al. 2018; Camacho et al. 2012)
6. Source of construction materials	(Chowdhury et al. 2018; Mulyoutami, Rismawan, and Joshi 2009; Pinyopusarerk, Tran, and Tran 2014; Camacho et al. 2012; Kim, Li, and Son 2017)
7. Community funds	(Chowdhury et al. 2018)
8. Social functions (forest plants are used in traditional ritual ceremonies)	(Mulyoutami, Rismawan, and Joshi 2009; Chowdhury et al. 2018; Kim, Li, and Son 2017)

The success of VCF has been demonstrated in many parts of Asia. In Bangladesh, the villagers have maintained collective funds from the income of the VCF products that provide for children's education and medical treatment of the disadvantaged families (Misbahuzzaman and Smith-Hall 2015). The Tay and Nung ethnic groups in the mountain regions of Vietnam (Pinyopusarerk, Tran, and Tran 2014), and Masyarakat Adat of Indonesia (Astuti and McGregor 2017) were able to secure a joint ownership and exclusive rights to community land forest. With these few exceptions, most of the traditional community forests have no land tenure though owned traditionally or otherwise occupied or managed continuously by the indigenous populations. The traditional community forests are not only sustainable but also economically beneficial to the participating households even in different regions (Jha 2015; Chowdhury et al. 2018; Rai, Neupane, and Dhakal 2016). Other ethnic groups are also engaged in tropical home

gardens, one of the oldest forms of managed land-use systems considered to be an epitome of sustainability (Kumar and Nair 2004). Tropical home gardens have economic and socio-cultural importance in many regions, especially to those with constrained access to land resources (Table 3).

Table 3. Economic, social and/or cultural foundations of home gardens

1. Low capital requirements and labor costs – suitable for resource-poor and small-holder farming situations
2. Better utilization of resources, greater efficiency of labor, even distribution of labor inputs and more efficient management
3. Diversified range of products from a given area and increased value of outputs
4. Increased self-sufficiency and reduced risk to income from climatic, biological or market impacts on particular crops/products
5. Higher income with increased stability, greater equity and improved standards of living
6. Better use of underutilized land, labor or capital, besides creating capital stocks to meet intermittent costs or unforeseen contingencies
7. Enhanced food/nutritional security and ability to meet the food, fuel, fodder, and timber requirements of the society
8. Increased fulfillment of social and cultural needs through sharing or exchange of produces and recreational opportunities
9. Better preservation of indigenous knowledge

Source: (Kumar and Nair 2004)

With limited land rights and forced migration, Thailand's ethnic minorities rely on home gardens as an important food source (Srithi et al. 2012). Thailand's Karen, Hmong, and Mien home gardens are very rich in species, making them important repositories for botanical agro-biodiversity, particularly for food crops. In fact, 90% of home gardens in Northeast Thailand includes wild food plants (Cruz-Garcia and Struik 2015). For Cao Lan home gardens in Vietnam, most plant species are used for food, but some other species are valued for ornamental, medicinal, construction, animal fodder, stimulants, and for other purposes (Timsuksai, Tien, and Rambo 2015). Though most home gardens tended native plants, the "hill people" in the Indo–Burma biodiversity hotspot incorporates introduced species, and cultural practices make the home gardens in the region a sustainable and economically viable subsistence (Barbhuiya, Sahoo, and Upadhyaya 2016). They also serve as an important means of conservation of native plants through use thereby reducing pressure on wild resources (Barbhuiya, Sahoo, and

Upadhyaya 2016). Its role in conservation is evident in the home gardens of the Orang Asli in Malaysia, which include the domestication of IUCN threatened species such as the *Aquilaria malaccensis* Lamk. and *Eurycoma longifolia* Jack (Milow et al. 2013). Evidence of farmers' extensive transplanting of species in their gardens and fields indicates that they are ensuring availability and stability of the wild food plant supply for domestic consumption, which is crucial for local food security (Cruz-Garcia and Price 2014). This also shows the positive role of integrating indigenous knowledge in protecting the threatened species and vulnerable habitats from the peril of extinction. The Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES) includes the commitment to recognize and respect the contribution of indigenous and local knowledge to the conservation and sustainable use of biodiversity and ecosystems in its operating principles (Karki et al. 2017). The function of some home gardens, however, had shifted from subsistence towards commercial farming for higher income. In a case study in Indonesia, this resulted to decreased plant diversity and evenness, a higher level of ecological and financial risk to the owners, higher requirements for external inputs such as fertilizers and pesticides, a lower level of community equitability, and increased instability (Abdoellah et al. 2006). Indeed, recent findings indicate that collaborations involving conservationist, indigenous peoples and governments would yield significant benefits for the conservation of biocultural diversity for future generations (Garnett et al. 2018).

6. Conclusion

The inclusion of the indigenous peoples in the Sustainable Development Goals (SDGs) has paved the way to revisit relevant issues within the Asian region. Science-policy governing bodies and agreements such as the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), Intergovernmental Panel on Climate Change (IPCC), and the Convention on Biological Diversity (CBD) acknowledges the importance of indigenous and local knowledge systems to inform international biodiversity assessments and decision-making

process (Tengö et al. 2017; Ford et al. 2016). The treatment of indigenous issues in the IPCC is of particular interest because the indigenous peoples have been identified as being uniquely sensitive to climate change impact, and their accumulated knowledge is now given due regard (Ford et al. 2016). It is now highly recommended that efforts to solve real-world problems should first engage with those local communities that are most affected, beginning from the perspective of indigenous knowledge and then seeking relevant scientific knowledge to expand the range of options for action (Mistry and Berardi 2016; Brondizio and Tourneau 2016; Altieri and Nicholls 2017). This stemmed from the growing evidence on the relevance of indigenous knowledge systems and experience in addressing the present and future pressing concerns on global environmental change (Gómez-Baggethun et al. 2013; Alexander et al. 2011; Ford et al. 2016; Rahman and Alam 2016; Ingty 2017), disaster risk reduction and management (Hiwasaki et al. 2015; Mercer et al. 2010), natural resources management (Anthwal et al. 2010; Singh, Pretty, and Pilgrim 2010; Karki et al. 2017), sustainable agriculture (Shiro et al. 2007; Neyra-Cabatac, Pulhin, and Cabanilla 2012; Singh, Pretty, and Pilgrim 2010), and food security (Oniang'o, R., Allotey, J., and Malaba 2004; Ong and Kim 2017; Putri, Hakim, and Indriyani 2017). Yet, despite the surge of interest in this research area, indigenous knowledge is underutilized, not fully integrated into policies, and under-represented in the various national and international forum. With the adoption of the 2030 Agenda, the Asian community needs to re-examine the social, economic, political, and environmental policies that directly affect the lives of the indigenous populations. The legal recognition of indigenous communities and the acknowledgment of the contribution of their local knowledge are vital in promoting resilience in the face of critical biodiversity loss and threats environmental degradation. This is of particular importance as the loss of knowledge and practices have already been noted in recent years (Caneva et al. 2017; Sujarwo et al. 2014; Srithi et al. 2009; Atreya et al. 2018). The future of sustainable management of natural resources in the Asian community lies in forging

collaborations between academic researchers, policy-makers, and the indigenous peoples. The implementation of the 2030 Agenda, therefore, calls for culturally sensitive initiatives and better engagement with the indigenous peoples to uphold their rights and be involved in achieving the new sustainable goals.

References

Abdoellah, Oekan S., Herri Y. Hadikusumah, Kazuhiko Takeuchi, Satoru Okubo, and Parikesit. 2006. Commercialization of Homegardens in an Indonesian Village: Vegetation Composition and Functional Changes. *Agroforestry Systems* 68 (1): 1–13. https://doi.org/10.1007/s10457-005-7475-x.

Aikenhead, Glen S, and Masakata Ogawa. 2007. Indigenous Knowledge and Science Revisited. *Cultural Studies of Science Education* 2: 539–620. https://doi.org/10.1007/s11422-007-9067-8.

Alexander, Clarence, Nora Bynum, Elizabeth Johnson, Ursula King, Tero Mustonen, Peter Neofotis, Noel Oettlé, et al. 2011. Linking Indigenous and Scientific Knowledge of Climate Change. *BioScience* 61 (6): 477–84. https://doi.org/10.1525/bio.2011.61.6.10.

Allen, Cameron, Graciela Metternicht, and Thomas Wiedmann. 2018. Initial Progress in Implementing the Sustainable Development Goals (SDGs): A Review of Evidence from Countries. *Sustainability Science* 13 (5): 1453–67. https://doi.org/10.1007/s11625-018-0572-3.

Altieri, Miguel A., and Clara I. Nicholls. 2017. The Adaptation and Mitigation Potential of Traditional Agriculture in a Changing Climate. *Climatic Change* 140 (1): 33–45. https://doi.org/10.1007/s10584-013-0909-y.

Anaya, S. James. 1996. *Indigenous Peoples in International Law*. Oxford: Oxford University Press.

Anderson, Kjell. 2015. Colonialism and Cold Genocide : The Case of West Papua. *Genocide*

Studies and Prevention: An International Journal 9 (2): 9–25. https://doi.org/10.5038/1911-9933.9.2.1270.

Anthwal, Ashish, Nutan Gupta, Archana Sharma, Smriti Anthwal, and Ki Hyun Kim. 2010. Conserving Biodiversity through Traditional Beliefs in Sacred Groves in Uttarakhand Himalaya, India. *Resources, Conservation and Recycling* 54 (11): 962–71. https://doi.org/10.1016/j.resconrec.2010.02.003.

Arsenault, Rachel, Sibyl Diver, Deborah McGregor, Aaron Witham, and Carrie Bourassa. 2018. Shifting the Framework of Canadian Water Governance through Indigenous Research Methods: Acknowledging the Past with an Eye on the Future. *Water* 10 (1). https://doi.org/10.3390/w10010049.

ASEAN. 2016. *ASEAN Socio-Cultural Community Blueprint 2025*. Jakarta: Association of Southeast Asian Nations.

Astuti, Rini, and Andrew McGregor. 2017. Indigenous Land Claims or Green Grabs? Inclusions and Exclusions within Forest Carbon Politics in Indonesia. *Journal of Peasant Studies* 44 (2): 445–66. https://doi.org/10.1080/03066150.2016.1197908.

Atreya, Kishor, Dipesh Pyakurel, Krishna Singh Thagunna, Laxmi Dutt Bhatta, Yadav Uprety, Ram Prasad Chaudhary, Bishwa Nath Oli, and Sagar Kumar Rimal. 2018. Factors Contributing to the Decline of Traditional Practices in Communities from the Gwallek–Kedar Area, Kailash Sacred Landscape, Nepal. *Environmental Management* 61 (5): 741–55. https://doi.org/10.1007/s00267-018-1009-6.

Audefroy, Joel F., and B. Nelly Cabrera Sánchez. 2017. Integrating Local Knowledge for Climate Change Adaptation in Yucatán, Mexico. *International Journal of Sustainable Built Environment* 6 (1): 228–37. https://doi.org/10.1016/j.ijsbe.2017.03.007.

Baird, Ian G. 2011. The Construction of Indigenous People in Cambodia. In *Alterities in Asia: Reflection on Identity and Regionalism*, edited by Leong Yew, 155–76. New York:

Routledge.

Baird, Ian G. 2015. Translocal Assemblages and the Circulation of the Concept of 'Indigenous Peoples' in Laos. *Political Geography* 46: 54–64. https://doi.org/10.1016/j.polgeo.2014.12.001.

Baird, Ian G. 2016. Indigeneity in Asia: An Emerging but Contested Concept. *Asian Ethnicity* 17 (4): 501–5. https://doi.org/10.1080/14631369.2016.1193804.

Baird, Ian G., Prasit Leepreecha, and Urai Yangcheepsutjarit. 2017. Who Should Be Considered 'Indigenous'? A Survey of Ethnic Groups in Northern Thailand. *Asian Ethnicity* 18 (4): 543–62. https://doi.org/10.1080/14631369.2016.1268044.

Balilla, Vincent S, Julia Anwar-Mchenry, Mark P Mchenry, and Riva Marris. 2012. Aeta Magbukún of Mariveles : Traditional Indigenous Forest Resource Use Practices and the Sustainable Economic Development Challenge in Remote Phil. *Journal of Sustainable Forestry* 31 (7): 687–709. https://doi.org/10.1080/10549811.2012.704775.

Ban, Natalie C, Alejandro Frid, Mike Reid, Barry Edgar, Danielle Shaw, and Peter Siwallace. 2018. Incorporate Indigenous Perspectives for Impactful Research and Effective Management. *Nature Ecology & Evolution* 2 (November): 1680–1683. https://doi.org/10.1038/s41559-018-0706-0.

Barbhuiya, A. R., U. K. Sahoo, and K. Upadhyaya. 2016. Plant Diversity in the Indigenous Home Gardens in the Eastern Himalayan Region of Mizoram, Northeast India. *Economic Botany* 70 (2): 115–31. https://doi.org/10.1007/s12231-016-9349-8.

Berkes, Fikret. 1993. Traditional Ecological Knowledge in Perspective. In *Traditional Ecological Knowledge Concepts and Cases*, edited by Julian T. Inglis, 55–62. Ottawa: International Program on Traditional Ecological Knowledge International Development Research Centre. http://www.portalces.org/sites/default/files/migrated/docs/1223.pdf#page=68.

Bertrand, Jacques. 2011. Indigenous Peoples Rights as a Strategy of Ethnic Accommodation: Contrasting Experiences of Cordillerans and Papuans in the Philippines and Indonesia. *Ethnic and Racial Studies* 34 (5): 850–69. https://doi.org/10.1080/01419870.2010.537358.

Beyrer, Chris, and Adeeba Kamarulzaman. 2017. Ethnic Cleansing in Myanmar: The Rohingya Crisis and Human Rights. *The Lancet* 390 (10102): 1570–73. https://doi.org/10.1016/S0140-6736(17)32519-9.

Biermann, Frank, Norichika Kanie, and Rakhyun E. Kim. 2017. Global Governance by Goal-Setting: The Novel Approach of the UN Sustainable Development Goals. *Current Opinion in Environmental Sustainability* 26–27: 26–31. https://doi.org/10.1016/j.cosust.2017.01.010.

Broegaard, Rikke Brandt, Laura Vang Rasmussen, Neil Dawson, Ole Mertz, Thoumthone Vongvisouk, and Kenneth Grogan. 2017. Wild Food Collection and Nutrition under Commercial Agriculture Expansion in Agriculture-Forest Landscapes. *Forest Policy and Economics* 84: 92–101. https://doi.org/10.1016/j.forpol.2016.12.012.

Brondizio, E. S., and F.-M. L. Tourneau. 2016. Environmental Governance for All. *Science* 352 (6291): 1272–73. https://doi.org/10.1126/science.aaf5122.

Buergin, Reiner. 2015. Contested Rights of Local Communities and Indigenous Peoples in Conflicts over Biocultural Diversity: The Case of Karen Communities in Thung Yai, A World Heritage Site in Thailand. *Modern Asian Studies* 49 (6): 2022–62. https://doi.org/10.1017/S0026749X14000390.

Bvenura, Callistus, and Anthony J. Afolayan. 2015. The Role of Wild Vegetables in Household Food Security in South Africa: A Review. *Food Research International* 76 (P4): 1001–11. https://doi.org/10.1016/j.foodres.2015.06.013.

Camacho, Leni D., Marilyn S. Combalicer, Youn Yeo-Chang, Edwin A. Combalicer, Antonio

P. Carandang, Sofronio C. Camacho, Catherine C. de Luna, and Lucrecio L. Rebugio. 2012. Traditional Forest Conservation Knowledge/Technologies in the Cordillera, Northern Philippines. *Forest Policy and Economics* 22: 3–8. https://doi.org/10.1016/j.forpol.2010.06.001.

Candelaria, Sedfrey M. 2018. The Plight of Indigenous Peoples within the Context of Conflict Mediation, Peace Talks and Human Rights in Mindanao, the Philippines. *Thesis Eleven* 145 (1): 28–37. https://doi.org/10.1177/0725513618763838.

Caneva, Giulia, Lorenzo Traversetti, Wawan Sujarwo, and Vincenzo Zuccarello. 2017. Sharing Ethnobotanical Knowledge in Traditional Villages: Evidence of Food and Nutraceutical 'Core Groups' in Bali, Indonesia. *Economic Botany* 71 (4): 303–13. https://doi.org/10.1007/s12231-017-9395-x.

Casumbal-Salazar, Melisa S.L. 2015. The Indeterminacy of the Philippine Indigenous Subject. *Amerasia Journal* 41 (1): 74–94. https://doi.org/10.17953/aj.41.1.74.

Chowdhury, Md. Arif, Fatima-Tuz- Zahra, Md. Farhadur Rahman, and Kamrul Islam. 2018. Village Common Forest Management in Komolchori, Chittagong Hill Tracts, Bangladesh: An Example of Community Based Natural Resources Management. *Small-Scale Forestry*, 1–19. https://doi.org/10.1007/s11842-018-9402-9.

Cisneros, G.T. 2017. Indigenous Peoples and Mexico's Contributions to the 2030 Agenda. In *Mexico and the Post-2015 Development Agenda. Governance, Development, and Social Inclusion in Latin America*, edited by Ulfgard R. Villanueva. New York: Palgrave Macmillan. https://doi.org/https://doi.org/10.1057/978-1-137-58582-0_11.

Clarke, G. 2001. From Ethnocide to Ethnodevelopment? Ethnic Minorities and Indigenous Peoples in Southeast Asia. *Third World Quarterly* 22 (3): 413–36. https://doi.org/10.1080/01436590120061688.

Cordero, Rodrigo León, M Suma, Siddhartha Krishnan, Chris T Bauch, and Madhur Anand.

2018. Elements of Indigenous Socio-Ecological Knowledge Show Resilience despite Ecosystem Changes in the Forest-Grassland Mosaics of the Nilgiri Hills, India. *Palgrave Communications* 4 (105): 1–9. https://doi.org/10.1057/s41599-018-0157-x.

Cruz-Garcia, Gisella S., and Lisa L. Price. 2014. Human-Induced Movement of Wild Food Plant Biodiversity Across Farming Systems Is Essential to Ensure Their Availability. *Journal of Ethnobiology* 34 (1): 68–83. https://doi.org/10.2993/0278-0771-34.1.68.

Cruz-Garcia, Gisella S., and Paul C. Struik. 2015. Spatial and Seasonal Diversity of Wild Food Plants in Home Gardens of Northeast Thailand. *Economic Botany* 69 (2): 99–113. https://doi.org/10.1007/s12231-015-9309-8.

Delang, Claudio O. 2006a. Not Just Minor Forest Products: The Economic Rationale of Wild Food Plants by Subsistence Farmers. *Ecological Economics* 59: 64–73. https://doi.org/10.1016/j.eco lecon.2005.10.006.

Delang, Claudio O. 2006b. The Role of Wild Food Plants in Poverty Alleviation and Biodiversity Conservation in Tropical Countries. *Progress in Development Studies* 6 (4): 275–86.

Dressler, Wolfram. 2005. Disentangling Tagbanua Lifeways, Swidden, and Conservation on Palawan Island. *Human Ecology Review* 12 (1): 21–29.

Duncan, Tom, Jaramar Villarreal Rosas, Josie Carwardine, Stephen T. Garnett, and Cathy J Robinson. 2018. Influence of Environmental Governance Regimes on the Capacity of Indigenous Peoples to Participate in Conservation Management. *Parks* 24 (November): 87–102. https://doi.org/10.2305/IUCN.CH.2018.PARKS- 24- 2TD.en.

Ebert, Andreas W. 2014. Potential of Underutilized Traditional Vegetables and Legume Crops to Contribute to Food and Nutritional Security, Income and More Sustainable Production Systems. *Sustainability* 6 (1): 319–35. https://doi.org/10.3390/su6010319.

Ens, Emilie, Mitchell L. Scott, Yugul Mangi Rangers, Craig Moritz, and Rebecca Pirzl. 2016.

Putting Indigenous Conservation Policy into Practice Delivers Biodiversity and Cultural Benefits. *Biodiversity and Conservation* 25 (14): 2889–2906. https://doi.org/10.1007/s10531-016-1207-6.

Erskine, William, Anita Ximenes, Diana Glazebrook, Marcelino da Costa, Modesto Lopes, Luc Spyckerelle, Robert Williams, and Harry Nesbitt. 2014. The Role of Wild Foods in Food Security: The Example of Timor-Leste. *Food Security* 7 (1): 55–65. https://doi.org/10.1007/s12571-014-0406-9.

Etchart, Linda. 2017. The Role of Indigenous Peoples in Combating Climate Change. *Palgrave Communications* 3 (May): 17085. https://doi.org/10.1057/palcomms.2017.85.

Ford, James D., Laura Cameron, Jennifer Rubis, Michelle Maillet, Douglas Nakashima, Ashlee Cunsolo Willox, and Tristan Pearce. 2016. Including Indigenous Knowledge and Experience in IPCC Assessment Reports. *Nature Climate Change* 6 (4): 349–53. https://doi.org/10.1038/nclimate2954.

Fukuda-Parr, Sakiko. 2016. From the Millennium Development Goals to the Sustainable Development Goals: Shifts in Purpose, Concept, and Politics of Global Goal Setting for Development. *Gender and Development* 24 (1): 43–52. https://doi.org/10.1080/13552074.2016.1145895.

Fukurai, Hiroshi. 2018. Fourth World Approaches to International Law (FWAIL) and Asia's Indigenous Struggles and Quests for Recognition under International Law. *Asian Journal of Law and Society* 5 (01): 221–31. https://doi.org/10.1017/als.2018.10.

Gadgil, Madhav, Fikret Berkes, and Carl Folke. 1993. Indigenous Knowledge for Biodiversity Conservation. *Ambio* 22 (2): 151–56. http://www.jstor.org/stable/4314060.

Garnett, Stephen T, Neil D Burgess, John E Fa, Álvaro Fernández-llamazares, Zsolt Molnár, Cathy J Robinson, James E M Watson, et al. 2018. A Spatial Overview of the Global Importance of Indigenous Lands for Conservation. *Nature Sustainability* 1 (September):

369–374. https://doi.org/10.1038/s41893-018-0100-6.

Garutsa, Tendayi C., and Fhulu H. Nekhwevha. 2016. Labour-Burdened Women Utilising Their Marginalised Indigenous Knowledge in Food Production Processes: The Case of Khambashe Rural Households, Eastern Cape, South Africa. *South African Review of Sociology* 47 (4): 106–20. https://doi.org/10.1080/21528586.2016.1204243.

Gómez-Baggethun, Erik, Esteve Corbera, Victoria Reyes-García, and Esteve Corbera. 2013. Traditional Ecological Knowledge and Global Environmental Change: Research Findings and Policy Implications. *Ecology and Society* 18 (4): 72–80. https://doi.org/10.5751/ES-06288-180472.

Hiwasaki, Lisa, Emmanuel Luna, Syamsidik, and Jose Adriano Marcal. 2015. Local and Indigenous Knowledge on Climate-Related Hazards of Coastal and Small Island Communities in Southeast Asia. *Climatic Change* 128 (1–2): 35–56. https://doi.org/10.1007/s10584-014-1288-8.

Hummel, S., and F.K. Lake. 2015. Forest Site Classification for Cultural Plant Harvest by Tribal Weavers Can Inform Management. *Journal of Forestry* 113 (1): 30–39. https://doi.org/10.5849/jof.13-082.

Ingty, Tenzing. 2017. High Mountain Communities and Climate Change: Adaptation, Traditional Ecological Knowledge, and Institutions. *Climatic Change* 145 (1–2): 41–55. https://doi.org/10.1007/s10584-017-2080-3.

Iwasaki-Goodman, Masami. 2017. Transmitting Ainu Traditional Food Knowledge from Mothers to Their Daughters. *Maternal and Child Nutrition* 13 (June): 1–9. https://doi.org/10.1111/mcn.12555.

IWGIA. 2017. *The Indigenous World 2017*. Edited by Katrine Broch Hansen, Käthe Jepsen, and Pamela Leiva Jacquelin. Copenhagen: The International Work Group for Indigenous Affairs (IWGIA). https://www.iwgia.org/images/documents/indigenous-

world/indigenous-world-2017.pdf.

IWGIA. 2018. *The Indigenous World 2018*. Edited by Pamela Jacquelin-Andersen. Copenhagen: The International Work Group for Indigenous Affairs (IWGIA). https://doi.org/10.4135/9781446201077.n34.

Jha, Kaushalendra K. 2015. Non-Timber Forest Products, Their Vulnerability and Conservation in a Designated UNESCO Heritage Site of Arunanchal Pradesh, India. *Notulae Scientia Biologicae* 7 (74): 444–55. https://doi.org/10.15835/nsb.7.4.9701.

Jianchu, Xu, and Stephen Mikesell. 2003. Indigenous Knowledge for Sustainable Livelihoods and Resources Governance in MMSEA Region. In *Proceedings of the III Symposium on MMSEA 25–28 August 2002, Lijiang, P.R. China*, edited by Xu Jianchu and Stephen Mikesell, 1–7. Kunming: Yunnan Science and Technology Press.

Karki, Madhav, Rosemary Hill, Dayuan Xue, William Alangui, Kaoru Ichikawa, and Peter Bridgewater. 2017. *Knowing Our Lands and Resources: Indigenous and Local Knowledge and Practices Related to Biodiversity and Ecosystem Services in Asia. Knowledges of Nature*. Paris: UNESCO. www.unesco.org/new/links/ipbes-pubs%5Cnhttp://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/temp/LINKS/IPBES_AP_2017_V3LR.pdf.

Kim, Seongjun, Guanlin Li, and Yowhan Son. 2017. The Contribution of Traditional Ecological Knowledge and Practices to Forest Management: The Case of Northeast Asia. *Forests* 8 (12): 1–14. https://doi.org/10.3390/f8120496.

Kingsbury, Benedict. 1998. 'Indigenous Peoples' in International Law: A Constructivist Approach to the Asian Controversy. *The American Journal of International Law* 92 (3): 414–57. https://www.jstor.org/stable/2997916.

Koirala, Pranawa, Bidur Pandit, Pratibha Phuyal, and Ken Zafren. 2017. Yarsagumba Fungus: Health Problems in the Himalayan Gold Rush. *Wilderness and Environmental Medicine*

28 (3): 267–70. https://doi.org/10.1016/j.wem.2017.04.007.

Kolås, Åshild. 2017. Framing the Tribal: Ethnic Violence in Northeast India. *Asian Ethnicity* 18 (1): 22–37. https://doi.org/10.1080/14631369.2015.1062050.

Kumar, B. M., and P. K.R. Nair. 2004. The Enigma of Tropical Homegardens. *Agroforestry Systems* 61–62 (1–3): 135–52. https://doi.org/10.1023/B:AGFO.0000028995.13227.ca.

Lacuna-Richman, Celeste. 2003. Ethnicity and the Utilization of Non-Wood Forest Products: Findings from Three Philippine Villages. *Silva Fennica* 37 (1): 129–48. https://doi.org/10.14214/sf.516.

Lacuna-Richman, Celeste. 2004. Subsistence Strategies of an Indigenous Minority in the Philippines: Nonwood Forest Product Use by the Tagbanua of Narra, Palawan. *Economic Botany* 58 (2): 266–85. https://doi.org/10.1663/0013-0001(2004)058[0266:SSOAIM]2.0.CO;2.

Leiper, Ian, Kerstin K. Zander, Cathy J. Robinson, Josie Carwadine, Bradley J. Moggridge, and Stephen T. Garnett. 2018. Quantifying Current and Potential Contributions of Australian Indigenous Peoples to Threatened Species Management. *Conservation Biology* 00 (0): 1–10. https://doi.org/10.1111/cobi.13178.

Li, Tania Murray. 2002. Ethnic Cleansing, Recursive Knowledge, and the Dilemmas of Sedentarism. *International Social Science Journal* 54 (3): 361–71. https://doi.org/10.1111/1468-2451.00388.

Lulekal, Ermias, Zemede Asfaw, Ensermu Kelbessa, and Patrick Van Damme. 2011. Wild Edible Plants in Ethiopia: A Review on Their Potential to Combat Food Insecurity. *Afrika Focus* 24 (2): 71–121. https://doi.org/10.21825/af.

Maldonado, Julie, T. M.Bull Bennett, Karletta Chief, Patricia Cochran, Karen Cozzetto, Bob Gough, Margaret Hiza Redsteer, Kathy Lynn, Nancy Maynard, and Garrit Voggesser. 2016. Engagement with Indigenous Peoples and Honoring Traditional Knowledge

Systems. *Climatic Change* 135 (1): 111–26. https://doi.org/10.1007/s10584-015-1535-7.

Mandia, E H. 2004. The Alangan Mangyan of Mt. Halcon, Oriental Mindoro: Their Ethnobotany. *Philippine Quarterly of Culture and Society* 32 (2): 96–117. https://doi.org/10.2307/29792551.

Maroyi, Alfred. 2014. Not Just Minor Wild Edible Forest Products: Consumption of Pteridophytes in Sub-Saharan Africa. *Journal of Ethnobiology and Ethnomedicine* 10 (1): 1–9. https://doi.org/10.1186/1746-4269-10-78.

Mercer, Jessica, Ilan Kelman, Lorin Taranis, and Sandie Suchet-pearson. 2010. Framework for Integrating Indigenous and Scientific Knowledge for Disaster Risk Reduction. *Disasters* 34 (1): 214–39.

Merlan, Francesca. 2009. Indigeneity. *Current Anthropology* 50 (3): 303–33. https://doi.org/10.1086/597667.

Milow, Pozi, Sorayya Malek, Nur Shahidah Mohammad, and Hean Chooi Ong. 2013. Diversity of Plants Tended or Cultivated in Orang Asli Homegardens in Negeri Sembilan, Peninsular Malaysia. *Human Ecology* 41 (2): 325–31. https://doi.org/10.1007/s10745-012-9555-7.

Milton, Abul Hasnat, Mijanur Rahman, Sumaira Hussain, Charulata Jindal, Sushmita Choudhury, Shahnaz Akter, Shahana Ferdousi, Tafzila Akter Mouly, John Hall, and Jimmy T. Efird. 2017. Trapped in Statelessness: Rohingya Refugees in Bangladesh. *International Journal of Environmental Research and Public Health* 14 (8): 1–8. https://doi.org/10.3390/ijerph14080942.

Misbahuzzaman, Khaled, and Carsten Smith-Hall. 2015. Role of Forest Income in Rural Household Livelihoods: The Case of Village Common Forest Communities in the Chittagong Hill Tracts, Bangladesh. *Small-Scale Forestry* 14 (3): 315–30. https://doi.org/10.1007/s11842-015-9290-1.

Mistry, Jayalaxshmi, and Andrea Berardi. 2016. Bridging Indigenous and Scientific Knowledge. *Science* 352 (6291): 1274–75. https://doi.org/10.1126/science.aaf1160.

Miyan, M. Alimullah. 2015. Droughts in Asian Least Developed Countries: Vulnerability and Sustainability. *Weather and Climate Extremes* 7: 8–23. https://doi.org/10.1016/j.wace.2014.06.003.

Mulyoutami, Elok, Ratna Rismawan, and Laxman Joshi. 2009. Local Knowledge and Management of Simpukng (Forest Gardens) among the Dayak People in East Kalimantan, Indonesia. *Forest Ecology and Management* 257 (10): 2054–61. https://doi.org/10.1016/j.foreco.2009.01.042.

Nababan, Abdon, and Rukka Sombolinggi. 2017. Indonesia. In *The Indigenous World 2017*, edited by Katrine Broch Hansen, Käthe Jepsen, and Pamela Leiva Jacquelin, 336–45. Copenhagen: The International Work Group for Indigenous Affairs (IWGIA).

Neyra-Cabatac, Neyrma M., Juan M. Pulhin, and Daylinda B. Cabanilla. 2012. Indigenous Agroforestry in a Changing Context: The Case of the Erumanen Ne Menuvu in Southern Philippines. *Forest Policy and Economics* 22: 18–27. https://doi.org/10.1016/j.forpol.2012.01.007.

Nkomwa, Emmanuel Charles, Miriam Kalanda Joshua, Cosmo Ngongondo, Maurice Monjerezi, and Felistus Chipungu. 2014. Assessing Indigenous Knowledge Systems and Climate Change Adaptation Strategies in Agriculture: A Case Study of Chagaka Village, Chikhwawa, Southern Malawi. *Physics and Chemistry of the Earth* 67 (69): 164–72. https://doi.org/10.1016/j.pce.2013.10.002.

Office of the United Nations High Commissioner for Human Rights. 2008. *Claiming the Millennium Development Goals: A Human Rights Approach*. Geneva. http://www.gbv.de/dms/zbw/573252092.pdf.

Office of the United Nations High Commissioner for Human Rights. 2013. Indigenous

Peoples and the United Nations Human Rights System Fact Sheet No.9/Rev.2. Geneva: Office of the United Nations High Commissioner for Human Rights. https://doi.org/10.2307/2949826.

Ong, Homervergel G., and Young Dong Kim. 2017. The Role of Wild Edible Plants in Household Food Security among Transitioning Hunter-Gatherers: Evidence from the Philippines. *Food Security* 9 (1): 11–24. https://doi.org/10.1007/s12571-016-0630-6.

Oniang'o, R., Allotey, J., and Malaba, S.J. 2004. Contribution of Indigenous Knowledge and Practices in Food Technology to the Attainment of Food Security in Africa. *Concise Reviews in Food Science* 69 (3): 87–91.

Oniang'o, R, J Allotey, and S J Malaba. 2004. The Food Chain: Contribution of Indigenous Knowledge and Practices in Food Technology to the Attainment of Food Security in Africa. *Journal of Food Science* 69 (3): CRH87-CRH91. http://login.ezproxy.lib.vt.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=ffh&AN=2004-07-Aa1211&scope=site.

Parrotta, John A., Lim Hin Fui, Liu Jinlong, P. S. Ramakrishnan, and Youn Yeo-Chang. 2009. Traditional Forest-Related Knowledge and Sustainable Forest Management in Asia. *Forest Ecology and Management* 257 (10): 1987–88. https://doi.org/10.1016/S0378-1127(09)00221-7.

Parsons, Meg, Karen Fisher, and Johanna Nalau. 2016. Alternative Approaches to Co-Design: Insights from Indigenous/Academic Research Collaborations. *Current Opinion in Environmental Sustainability* 20: 99–105. https://doi.org/10.1016/j.cosust.2016.07.001.

Pinyopusarerk, Khongsak, Thi Thu Ha Tran, and Van Dien Tran. 2014. Making Community Forest Management Work in Northern Vietnam by Pioneering Participatory Action. *Land Use Policy* 38: 257–63. https://doi.org/10.1016/j.landusepol.2013.11.019.

Poffenberger, Mark. 2006. People in the Forest: Community Forestry Experiences from

Southeast Asia. *International Journal of Environment and Sustainable Development* 5 (1): 57–69. https://doi.org/10.1504/IJESD.2006.008683.

Putri, Wahyu Kusumayanti, Luchman Hakim, and Serafinah Indriyani. 2017. Plants Diversity for Ethnic Food and the Potentiality of Ethno-Culinary Tourism Development in Kemiren Village, Banyuwangi, Indonesia. *Journal of Indonesian Tourism and Development Studies* 5 (3): 161–68. https://doi.org/10.21776/ub.jitode.2017.005.03.04.

Quave, Cassandra L., and Andrea Pieroni. 2015. A Reservoir of Ethnobotanical Knowledge Informs Resilient Food Security and Health Strategies in the Balkans. *Nature Plants* 1 (February): 1–6. https://doi.org/10.1038/nplants.2014.21.

Rahman, Habibur, and Khurshed Alam. 2016. Forest Dependent Indigenous Communities' Perception and Adaptation to Climate Change through Local Knowledge in the Protected Area—A Bangladesh Case Study. *Climate* 4 (12): 1–25. https://doi.org/10.3390/cli4010012.

Rai, Rajesh Kumar, Prem Neupane, and Arun Dhakal. 2016. Is the Contribution of Community Forest Users Financially Efficient? A Household Level Benefit-Cost Analysis of Community Forest Management in Nepal. *International Journal of the Commons* 10 (1): 142–57. https://doi.org/10.18352/ijc.594.

Rerkasem, Kanok, Narit Yimyam, and Benjavan Rerkasem. 2009. Land Use Transformation in the Mountainous Mainland Southeast Asia Region and the Role of Indigenous Knowledge and Skills in Forest Management. *Forest Ecology and Management* 257 (10): 2035–43. https://doi.org/10.1016/j.foreco.2008.11.008.

Reyes-García, Victoria, Maximilien Guèze, Ana C. Luz, Jaime Paneque-Gálvez, Manuel J. Macía, Martí Orta-Martínez, Joan Pino, and Xavier Rubio-Campillo. 2013. Evidence of Traditional Knowledge Loss among a Contemporary Indigenous Society. *Evolution and Human Behavior* 34 (4): 249–57. https://doi.org/10.1016/j.evolhumbehav.2013.03.002.

Saynes-Vásquez, Alfredo, Javier Caballero, Jorge A. Meave, and Fernando Chiang. 2013. Cultural Change and Loss of Ethnoecological Knowledge among the Isthmus Zapotecs of Mexico. *Journal of Ethnobiology and Ethnomedicine* 9 (1): 1–10. https://doi.org/10.1186/1746-4269-9-40.

Shin, Thant, Kazumi Fujikawa, Aung Zaw Moe, and Hiroshi Uchiyama. 2018. Traditional Knowledge of Wild Edible Plants with Special Emphasis on Medicinal Uses in Southern Shan State, Myanmar. *Journal of Ethnobiology and Ethnomedicine* 14 (48): 1–13. https://doi.org/10.1186/s13002-018-0248-1.

Shiro, Chikamatsu, Jose Ireneu Furtad, Lixin Shen, and Mei Yan. 2007. Coping with Pressures of Modernization by Traditional Farmers: A Strategy for Sustainable Rural Development in Yunnan, China. *Journal of Mountain Science* 4 (1): 057–070. https://doi.org/10.1007/s11629-007-0057-9.

Shrestha, Uttam Babu, Krishna Ram Dhital, and Ambika Prasad Gautam. 2017. Economic Dependence of Mountain Communities on Chinese Caterpillar Fungus Ophiocordyceps Sinensis (Yarsagumba): A Case from Western Nepal. *Oryx*, 1–9. https://doi.org/10.1017/S0030605317000461.

Singh, Ranjay K., Jules Pretty, and Sarah Pilgrim. 2010. Traditional Knowledge and Biocultural Diversity: Learning from Tribal Communities for Sustainable Development in Northeast India. *Journal of Environmental Planning and Management* 53 (4): 511–33. https://doi.org/10.1080/09640561003722343.

Sircar, Bijayanta, and Shyamapada Mandal. 2017. Screening of Elaeocarpus Floribundus Fruit Extracts for Bioactive Phytocomponents and Antibacterial Activity against Food-Borne Bacteria. *International Journal of Research in Medical Sciences* 55 (8): 3665–71. https://doi.org/10.18203/2320-6012.ijrms20173582.

Srithi, Kamonnate, Henrik Balslev, Prasit Wangpakapattanawong, Prachaya Srisanga, and

Chusie Trisonthi. 2009. Medicinal Plant Knowledge and Its Erosion among the Mien (Yao) in Northern Thailand. *Journal of Ethnopharmacology* 123 (2): 335–42. https://doi.org/10.1016/j.jep.2009.02.035.

Srithi, Kamonnate, Chusie Trisonthi, Prasit Wangpakapattanawong, Prachaya Srisanga, and Henrik Balslev. 2012. Plant Diversity in Hmong and Mien Homegardens in Northern Thailand. *Economic Botany* 66 (2): 192–206. https://doi.org/10.1007/s12231-012-9199-y.

Stafford-Smith, Mark, David Griggs, Owen Gaffney, Farooq Ullah, Belinda Reyers, Norichika Kanie, Bjorn Stigson, Paul Shrivastava, Melissa Leach, and Deborah O'Connell. 2017. Integration: The Key to Implementing the Sustainable Development Goals. *Sustainability Science* 12 (6): 911–19. https://doi.org/10.1007/s11625-016-0383-3.

Sujarwo, Wawan, Ida Bagus Ketut Arinasa, Francois Salomone, Giulia Caneva, and Simone Fattorini. 2014. Cultural Erosion of Balinese Indigenous Knowledge of Food and Nutraceutical Plants. *Economic Botany* 68 (4): 426–37. https://doi.org/10.1007/s12231-014-9288-1.

Suk, Ann N. 2016. Community-Based Efforts in Health Promotion in Indigenous Villages on the Thailand-Myanmar Border. *Reviews on Environmental Health* 31 (1): 163–67. https://doi.org/10.1515/reveh-2015-0063.

Tamayo, E., ed. 2010. *Traditional Livelihoods and Peoples*. Chang Mai: Asia Indigenous Peoples Pact (AIPP) Foundation. http://www.iwgia.org/publications/search-pubs?publication_id=663.

Tangan, Fatima T. 2007. Wild Food Plants as Alternative Fallow Species in the Cordillera Region, the Philippines. In *Voices from the Forest: Integrating Indigenous Knowledge into Sustainable Upland Farming*, edited by Malcolm Cairns, 96–102. Washington:

Resources of the Future Press.

Tengö, Maria, Eduardo S. Brondizio, Thomas Elmqvist, Pernilla Malmer, and Marja Spierenburg. 2014. Connecting Diverse Knowledge Systems for Enhanced Ecosystem Governance: The Multiple Evidence Base Approach. *Ambio* 43 (5): 579–91. https://doi.org/10.1007/s13280-014-0501-3.

Tengö, Maria, Rosemary Hill, Pernilla Malmer, Christopher M. Raymond, Marja Spierenburg, Finn Danielsen, Thomas Elmqvist, and Carl Folke. 2017. Weaving Knowledge Systems in IPBES, CBD and Beyond—lessons Learned for Sustainability. *Current Opinion in Environmental Sustainability* 26–27 (February): 17–25. https://doi.org/10.1016/j.cosust.2016.12.005.

Timsuksai, Pijika, Nguyen Dinh Tien, and A Terry Rambo. 2015. Homegardens of the Cao Lan, a Tai-Speaking Ethnic Minority in Vietnam's Northern Mountains. *Southeast Asian Studies* 4 (2): 365–83.

Toyota, Mika. 2005. Subjects of the Nation Without Citizenship: The Case of the 'Hill Tribes in Northern Thailand. In *Multiculturalism in Asia*, edited by Will Kymlicka and He Baogang, 1st ed. New York: Oxford University Press. https://books.google.co.uk/books?id=NWYTDAAAQBAJ&printsec=frontcover#v=onepage&q&f=false.

UN Department of Public Information. 2014. Indigenous Peoples in the Asian Region: Thirteenth Session of the UN Permanent Forum on Indigenous. May: 1–2. http://www.iss.nl/ikdm/IKDM/IKDM/3-3/articles/agrawal.html.

United Nations. 2008. United Nations Declaration on the Rights of Indigenous Peoples. *United Nations General Assembly*, No. Resolution 61/295: 10. https://doi.org/10.1093/iclqaj/24.3.577.

United Nations. 2012. The Future We Want. Resolution. A/RES/66/288. *Resolution Adopted*

by the General Assembly on 27 July 2012. https://doi.org/A/RES/66/288*.

United Nations. 2015. Transforming Our World: The 2030 Agenda for Sustainable Development. *General Assembley 70 Session* 16301 (October): 1–35. https://doi.org/10.1007/s13398-014-0173-7.2.

United Nations Development Programme. 2010. Indigenous Peoples of the Philippines. *Fast Fact*. http://www.ph.undp.org/content/dam/philippines/docs/Governance/fastFacts6 - Indigenous Peoples in the Philippines rev 1.5.pdf.

Utami, Rahayu, Nurhasniza Khalid, Mohd Aspollah Sukari, Mawardi Rahmani, and Ahmad Bustaman Abdul. 2006. Phenolic Contents , Antioxidant and Cytotoxic Activities of Elaeocarpus Floribundus Blume. *Pakistan Journal of Pharmaceutical Sciences* 26 (2): 245–50.

Vinceti, Barbara, Céline Termote, Amy Ickowitz, Bronwen Powell, Katja Kehlenbeck, and Danny Hunter. 2013. The Contribution of Forests and Trees to Sustainable Diets. *Sustainability* 5 (11): 4797–4824. https://doi.org/10.3390/su5114797.

Voeks, Robert A, and Angela Leony. 2004. Forgetting the Forest: Assessing Medicinal Plant Erosion in Eastern Brazil. *Economic Botany* 58 (2004): 94–106. https://doi.org/10.1663/0013-0001(2004)58[S294:FTFAMP]2.0.CO;2.

Wilder, Benjamin T., Carolyn O'Meara, Laurie Monti, and Gary Paul Nabhan. 2016. The Importance of Indigenous Knowledge in Curbing the Loss of Language and Biodiversity. *BioScience* 66 (6): 499–509. https://doi.org/10.1093/biosci/biw026.

World Bank. 1991. Operational Directive 4.20: Indigenous Peoples. *World Bank Operational Manual*. Washington DC.

Yuan, Juanwen, and Jinlong Liu. 2009. Fengshui Forest Management by the Buyi Ethnic Minority in China. *Forest Ecology and Management* 257 (10): 2002–9. https://doi.org/10.1016/j.foreco.2009.01.040.

Title Page

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Abstract

Adopted by the UN General Assembly in 2015, the 2030 Agenda pledges to leave no one behind through the 17 Sustainable Development Goals (SDGs) and 169 targets ratified by the international community to address the global challenges of our time. This framework and universal action plan articulate the inclusion of the indigenous peoples in the social, economic, and environmental dimensions of sustainable development. Nonetheless, the world's largest inhabitants of indigenous peoples are in Asia. However, despite the affirmation of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), the concept of indigeneity is still controversial, politically contested, and considered immaterial by many states in the Asian region. With limited rights and inadequate access to social services, the indigenous knowledge systems and practices have evolved through time to provide solutions to local problems that sustained many marginalized communities. This article revisits the socio-political notion of indigeneity in the region and its implications for the indigenous community. It also explores the diversity of indigenous knowledge systems and traditional practices and its relevance on the SDGs particularly on food security, community livelihoods, human well-being, natural resources management, and biodiversity conservation. The conclusion reflects the need for legitimate recognition and political enablement of indigenous peoples in the implementation of the 2030 Agenda by forging collaborations between academic researchers, policy-makers, and indigenous organizations in the Asian community.

Keywords

Indigenous peoples, Sustainability, Socio-ecological systems, Conservation, SDGs

Title: Asian Indigeneity, Indigenous Knowledge Systems, and the Challenges of 2030 Agenda

The authors are very grateful to the insightful comments and recommendations provided by the two reviewers. We revised the paper following their suggestions to improve the content of this article.

Reviewer_1	Actions Taken
1. I expect you to explain more about how the 2030 Agenda can be driven within Asian context such as the importance of role of government and indigenous groups.	In page 9 of the revised manuscript, we included the initial progress in the implementation of the 2030 Agenda in selected Asian countries that adopted the Sustainable Development Goals (SDGs). The role of the government and indigenous peoples organizations have been tackled in this section.
2. Could you put more of your explanations on re-developing and re-arranging the Indigenous Knowledge System of indigenous people and how to make the indigenous groups to be centered at this movement?	In page 11, we noted that various multilateral treaty and intergovernmental bodies like the Intergovernmental Panel on Climate Change (IPCC), the Convention on Biological Diversity (CBD), and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) expressed the need of including indigenous knowledge systems in international reports emphasizing its importance on global policy. To be centered in this movement, we discussed in page 9 the key role of the indigenous groups in the sustainability agenda through indigenous knowledge integration in environmental governance initiated by other countries i.e. Australia.
3. How can the knowledge system be used to legitimize the indigenous people in	We proposed in this article to define indigenous peoples not as the often argued

the concept of 2030 Agenda?	"first people" but as distinct peoples inhabiting the traditional territories or ancestral lands attested by history and inimitable cultural identity and is the non-dominant voiceless sector of the multicultural realities in Asia. The distinctiveness of cultural identity is manifested by the exclusive practice of indigenous knowledge systems and their social exclusion/non-integration is an evidence of being socioculturally different from the majority of the populations.
4. I suggest to correct some grammatical errors such as in the part 3. Indigenous peoples in the Sustainable Development Goals (SDGs): Two of the SDGs specifically are referred to the indigenous peoples in its target by 2030. First, it is the Goal 2 section 2.3 on enhancing agricultural productivity and income of small-scale producers, in particular the indigenous peoples and other marginalized groups, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment (United Nations 2015). The second goal broadly aims to end hunger, achieve food security and improved nutrition and promote sustainable agriculture. Second, it is the Goal 4 section 4.5 on eliminating gender	Reviewed and corrected

disparities in education and ensuring equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations (United Nations 2015).	
Reviewer 2	
a. Need to be addressed the possibility that the 2030 Agenda could be adapted within Asian context in a more detailed way. Need more information about that concept.	One of the unique features of the 2030 Agenda is the extensive leeway it provides to the states. As such, countries that adopted and started the implementation have set their own goals, targets, and strategies that will align with the global goals. To date, most countries are into the baseline and benchmarking studies to identify the national priorities thus, we highlighted in this article the importance of forging collaborations in implementing and achieving the sustainable goals. In page 8, we included a brief background on the conception of sustainable development goals and how it differs on its predecessor, the Millennium Development Goals (MDGs)
b. Please explain how 193 countries of the United Nations General Assembly decided to include the indigenous people issues in the 2030 Agenda despite the Asian countries' non-recognition and rejection on that issue.	In page 7, we briefly explained that the United Nations has adopted no definition for "indigenous peoples" even in the Indigenous Rights Declaration. The absence of a clear and authoritative definition makes

Is there any different reaction regarding this kind of concept between Western countries and Asian countries?	the concept subjective to varying interpretations. One of the prevailing argument is that its applicability is restricted to certain territories only. In general, countries who voted against the UNDRIP like New Zealand and Australia eventually adopted the concept and successfully integrate indigenous knowledge systems into their environmental policies. On the contrary, the majority of Asian nations who voted in favor of the UNDRIP failed to do the same. The socio-political settings in the Asian region are very diverse and so, the treatment of indigenous issues remains without consensus and unresolved.
c. Need to overall check some minor errors in grammar found in this paper. For instance, in 6 page, "Among Asian countries, very few countries has fully recognize the international concept of indigenous people and gave unconditional right to self-determination to the indigenous peoples." -> "Among Asian countries, very few countries **have** fully **recognized** the international concept of indigenous people and **given** unconditional right **of** self-determination to the indigenous peoples."	Reviewed and corrected.