Traditional Natural Resource Stewardship in Malaysia's Rapidly Changing Landscape

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Abstract—Malaysia is exceptionally rich in natural resources, especially in its forests. The indigenous peoples, known as Orang Asli, live in the forests and depend on their natural resources. One such group is the Temiar living in the forest on the Titiwangsa range. They view forest as *Tuhad*, the creator. They have accumulated indigenous knowledge on preserving the forest over centuries. Some of this knowledge is encapsulated in their calendar, known as *Tahud*. They observe rules on the timing of cultivation, on the hunting of animals, and on the extraction of resources. These rules ensure the survival of the forest for the future. As Malaysia has embraced development, many projects threaten the forests, especially the clear-cutting by logging companies. Deforestation affects other aspects of the ecosystem such as water supply, biodiversity, and the climate. For the indigenous peoples, forest is life so the loss of forest is like the loss of life. Some have been forced to migrate to the cities to work, and there they lose their indigenous knowledge. Some communities have defended their traditional lands by blockading the loggers, and getting help from lawyers and NGOs. It is vital to preserve, document, and mainstream this indigenous knowledge for the benefit of the indigenous communities, the nation, and the planet.

Biodiversity and ecological connectivity: The safety net

The Malay Archipelago is remarkably rich in biophysical resources and is recognised as one of the twelve most megadiverse areas of the globe. Malaysia is blessed with a mosaic of tropical ecosystems and landscapes, from jagged mountain peaks in the interior to lush rainforests on lowland hills, wetlands, mangroves, languid coasts, offshore islands, and one of the richest reef-endowed seas. The number of different habitats is high in proportion to the size of the country's land-mass, with a high number of plant and animal species, including many endemic species both on land and underwater.

With a long geological and evolutionary history, Malaysia is a global centre of tropical floral diversity where over 90 percent of the country's terrestrial biological species occur in natural forests. In its million-year old dominion lies countless wealth that will never be known to man, from the hidden life that occurs below ground to majestic life forms high above the canopies. In the seas, Malaysia makes up part of the Coral Triangle that has the highest diversity of marine life in the world. The seas are flanked by an extensive continental shelf that is home to a bountiful and rich plethora

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of marine life in the coastal ecosystems of reefs, mangroves, lagoons and estuaries. The mangrove forests along sheltered, muddy shores, bays and deltas act as coastal defence against large waves and erosion, as witnessed during the tsunami of 2004. Mangroves are also ecologically important as they serve as breeding and nursery grounds for juveniles of many marine fish and shellfish species, including commercially important ones. These landscapes are important local carbon sinks and sources that are intricately woven into the global bio-geoclimatic tapestry that governs earth processes.

Malaysia's plentiful natural resources perform many critical ecological functions and ecosystem services that are utilised by indigenous and local communities living in the hills and coastal areas. The many types of biologically diverse forests provide countless varieties of crops, fruits, vegetables, medicines, spices, ornamentals, timber and non-timber products that are socially, environmentally and economically important to urban, rural and indigenous communities.

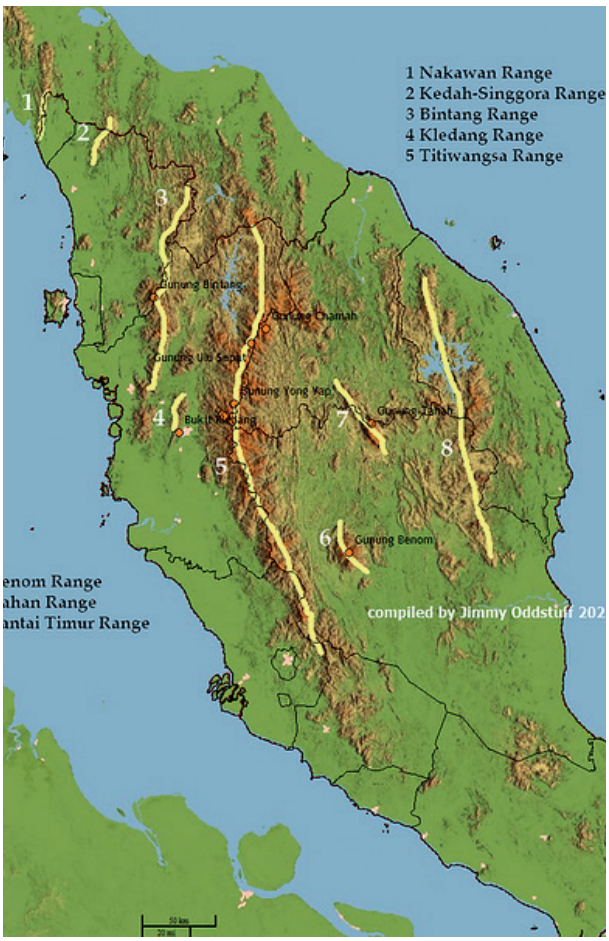

Figure 1. Titiwangsa and other ranges in West Malaysia (map from www.smugmug.com)

The mountains and forests that occupy the hinterland of the country supply clean potable water and fresh, clean air, regulate floods and protect soil and watershed for remote communities, villages as well as urban ones, that live along the main rivers and tributaries and in the downstream settlements. The flowing waters are laden with vital nutrients that feed and nourish connected ecosystems from the hills to the rivers and the sea, sustaining terrestrial and aquatic life. Vast rainforests, such as the Titiwangsa Range running down the spine of the peninsula, the Crocker Range in Sabah and the highlands of Sarawak, are instrumental in maintaining the hydrological cycles, contributing to the formation of atmospheric rivers in the sky that are crucial in regulating the country's climate. The interacting biophysical foundation makes up the climatic resources of Malaysia, which is affected especially by the dynamics in the amount of warmth from the sun, and rainfall that varies throughout the year depending on seasons across the land.

The interconnectedness and interdependence of biodiversity and ecosystems reflect the complexity and balanced intricacies of the web of life they maintain and protect,

which in turn, not only benefit the local people but also the region, and globally (Sodhi and Ehrlich 2010: 51, 65). Our dependence on natural resources and the free services they bless us with is complete and crucial. For indigenous peoples, this dynamic complexity is the focal point of their traditional ecological knowledge accumulated over a long period of time.

Since its independence in 1957, Malaysia has experienced tremendous development and progress (Zafir and Magintan 2016: 5). Population growth and fast economic development have put extremely high demands on natural resources. Pressures on the environment have intensified. The extraction of natural resources, along with urbanisation and industrialisation, have impacted the ecosystems and natural landscapes, including the air, causing changes to the very biophysical foundations we depend on, and, upsetting the balance of nature, in some cases reaching its tipping points. The country has not avoided unsustainable development, especially in recent times, causing fragmentation of ecosystems and disruption of biodiversity and ecological processes.

Traditional knowledge: The epitome of sustainability in natural resource stewardship

Malaysia is populated by approximately eighty distinct ethnic groups, each with its own unique history, background, and variations in religion, culture, belief and value systems. The communities can be found interspersed from the highlands to the coastal areas, utilising resources in their immediate surroundings. Many of these ethnic groups belong to the indigenous communities that have had a long history of interacting with the natural landscapes they inhabit. There are relationships, connections and, dynamics between the two that create their unique cultural identities, traditions, beliefs and value systems. All these factors make indigenous communities very prudent in maintaining a harmonious and sustainable relationship with the environment.

In Malaysia, indigenous peoples occupy specific geographical areas, commonly living in their customary or traditional lands in the forests or rural areas, while a few groups live close to the coast. In Peninsular Malaysia, eighteen sub-ethnic groups are collectively known as *Orang Asli* (aborigines), while in Sabah and Sarawak they are commonly known as *Orang Asal* (original peoples) (Salleh 2006: 20). Traditionally, their lands are surrounded by natural forest areas, rivers, and mountains. The terrain and its geographical locations have important roles in shaping these communities and the way they have practised their livelihood for centuries. Natural resources are very important in the life of the indigenous people and shape their aesthetic, cultural and spiritual values. The majority of the indigenous people still make their livelihood in traditional ways that are heavily influenced by their natural environment and the ancient wisdoms passed down from their ancestors. Due to their close affinity to their lands, their culture, spirituality, beliefs and values are closely associated with their natural environment. Their hunting, food collection, farming, and fishing are oriented to subsistence, taking only what they need. They contribute to the conservation of plants and wildlife, and the protection of soil fertility, water and other resources. Thus, indigenous people's lifestyle and livelihood practices are the epitome of sustainability.

The indigenous people, such as the Temiar sub-ethnic group, who live in sixteen villages deep in the central forest on the main Titiwangsa Range of Peninsular Malaysia, view the forest as the most important factor in their lives. They describe their relationship with the forest proverbially as "*isi dengan kuku*" (nail and flesh). If there is no forest, then there can be no beliefs, culture, customs and traditions as everything that qualifies an individual as an indigenous person originates from the forest. Births, illnesses, deaths, celebrations, and other aspects of the life cycle revolve and intertwine with the forests. Their way of life is ecologically connected to the environment, hence they are part of their environment. To them, forest is *Tuhad*, the Creator, a sacred embodiment. Any activities involving the forest, such as entering the forest, has its own special ritual, conducted to seek approval from their ancestors and gain protection from evil spirits. There are many acts forbidden while going into the forest because they would offend the spirits. They have a holistic and systemic relationship with their environment. For example, their perception of forest includes all types of vegetation (there are many types in Malaysia), along with the rivers, rocks, hills and mountains — namely, both the living and non-living elements, as one cannot exist without the other. This is similar to the concept of an ecosystem, the environment as an interconnected system of organisms interacting with their physical environment. The Temiars' profound respect for the forest and its inhabitants is the very foundation of deep ecology and land ethics.

They see themselves as custodians responsible for protecting the welfare of all lives in the forest. They believe that everything created by *Tuhad* has its role and function. For instance, the plants from the forest provide medicines to cure many of the illnesses that they encounter. The forest holds many secrets waiting to be revealed. The local indigenous knowledge of medicinal plants has high potential for use in the modern medical field in treating ailments and diseases. All forest resources can be used, such as palm fronds for roofing, bamboos or tree bark for house walls, flowers and fragrant plants for celebrations. They find it unfortunate that the public in general views the forests only as a quick source of cash from timber without fully understanding their secret riches.

The Temiars' way of life revolves around their community's calendar that is founded upon their interpretation of the forest. The calendar is the result of their long observation of the dynamic, interwoven processes of nature which has formed their ancient wisdom and worldview of the forest and its environment. The calendar, called *Tahud*, does not follow the typical twelve-month cycle of the modern calendar but reflects the diversity of nature's cycles in phases of time and season. *Tahud* manifests the deep understanding of biodiversity and ecological connectivity that the Temiar has with their environment. Important "dates" include *grob* and *tendrel,* the start and end of the "year." both observed in a small welcoming celebration by the whole community. *Grob* is the start of the flowering and budding season of most forest trees while *tendrel* is at the end of dry season when deciduous trees drop their leaves. *Grob* is followed by the fruiting season, the rainy season, and the dry season. After this, there are a couple of months of rest for the forest to recover. Throughout this calendar, community activities are designed to sync with the availability of resources within the specific phases. This adherence is strictly enforced and no one is allowed to conduct activities, such as hunting,

outside the appointed period. They are only permitted to hunt for certain species of wildlife, and breaking the taboo will cause illness and diseases. They are forbidden to track down any species, and may kill only those animals that they encounter by chance and only fast-growing species which reproduce frequently, such as deer. Species that grow slowly and reproduce only once are prohibited from being hunted. Although this hunting strategy has been practised for thousands of years, the animals still thrive and can be harvested regularly until this day as they have not been hunted to extinction. However, the encroachment of logging and the clear-cutting of many forests has caused many species to disappear in a short period of time, resulting in a shortage of food and an increase in human-wildlife conflicts.

Figure 2. Traditional hill rice cultivation, harvesting and processing are still carried out as a communal activity (photos by Persatuan Aktivis Sahabat Alam)

Farming of the staples, rice and millets, starts at the end of the rest period. They practise shifting cultivation and time the cropping to coincide with the availability of water during the rainy season and end with harvesting and processing during the dry season (Figure 2). The perception that the farming practices of the Orang Asli are destructive to the forest is unfounded and based on superficial analysis. The farmers first conduct a ritual known as *tatak tandil* and *tatak halak* to obtain approval from the elders and leaders before a piece of land can be cleared for farming. After approval is given, they identify the suitable sites. Clearing the land for each family is done together communally as *gotong-royong*. The vegetation is cleared carefully, observing certain

taboos, such as not removing large trees, fruiting trees or other trees forbidden by their ancestors. This method ensures regrowth at the site within twenty to thirty years. Because the site is not completely bare of vegetation, the soil is protected from damage and loss. The size of the cleared area is limited but large enough to support the community for the year.

The farming rotates among several fixed locations without having to clear new areas during the designated period. When one area starts to decline in fertility, the community moves to the next suitable area, and the previous land is left idle to rest and undergo natural healing through regeneration of the soil and vegetation. The farming is only a minor disturbance which spurs the cycle of ecological succession. Remnants of the previous vegetation are allowed to regrow and within twenty to thirty years the forest can revive. With the wisdom from such practice over a long period, the communities know how long it takes to allow natural regeneration and the recovery of the land's fertility. These practices preserve biodiversity and ecological connectivity, ensuring minimal disruption to the land and maintaining the ecological resilience of the utilised area and the ecosystem in general.

The tradition of this ancient calendar is still practised and ingrained in the Temiars' way of life and livelihood. In essence, *Tahud* reflects the deep ecological knowledge and comprehension of forest ecology that allow the Temiar to sync their daily activities with that of nature's without having to spend extra energy. Through this practice they make use of nature's technology, which is non-intrusive and free, and are able to coexist harmoniously with all of its elements without any conflict. For the Temiar, and Orang Asli in general, their farming practices balance productivity with environmental sustainability and species protection. As a result, the Temiar and other indigenous communities can still farm even after thousands of years utilising the same resources in the same foraging grounds of their traditional lands. By contrast, modern use of forest resources is extractive, exploitative and exhaustive, lacking any regard for anything but the most profit, and hence unsustainable. Modern land and resource use and management have a lot to learn from indigenous people.

For the Orang Asli, loss of forests is seen as a critical matter because without forests they will also perish. They see forests as life itself. Forests are not only important for their sustenance but also for the survival of their children and their future generations, hence the forests must be protected at all costs. That is why the Orang Asli are unwavering in their efforts to protect their customary lands from land-grabbing and logging by erecting blockades and standing guard round the clock.

Environmental crisis and its implications for the sustainability of traditional knowledge

Over the years, as Malaysia progressed, modernisation and economic development have imposed pressures on these communities, some of which have staged intense struggles to withstand the impact on their practice of traditions, customs and livelihood. In the last fifteen to twenty years, they started to experience gradual but significant decline in many of the resources on which they depend, largely due to encroachment

Figure 3. A vast area of primary rainforest clear-cut for timber in the Kelantan-Terengganu border of Peninsular Malaysia. Forest conversions to agricultural use, such as this, has resulted in the loss of biodiversity and habitat, and the displacement of indigenous people (photo by Persatuan Aktivis Sahabat Alam).

on their forests by corporations with approval for development projects such as forest plantations, quarrying, mining, dam construction, and lately the Musang King durian plantations. This decline has become widespread on indigenous peoples' traditional lands throughout Malaysia. Some of the most destructive projects are forest plantations that clear-cut the original forest several tens of thousands of acres down to the bare ground (Figure 3).

Such rampant deforestation is critical as it results in habitat loss for many species. The indigenous communities also lose their source of foods, medicines, herbs and flowering plants used for celebration of traditions and customs such as *Sewang*. They lose basic resources such as materials for hunting tools, blowpipes and traps, as well as bamboo and timber such as *Nibong* and *Bertam* used for housing. They have to travel by foot for longer distances to seek out the same resources. In some instances, they lose all of their customary land (*tanah adat*).

Deforestation ultimately results in the loss of their traditional knowledge, because the natural resources on which they rely to maintain their customs, beliefs and traditions disappear permanently. The community has to migrate to urban areas to generate income and depend on purchased resources (as opposed to wild free resources), such as modern medicines and purchased food. Another effect of deforestation is change in the weather patterns, such as rainfall. When massive tracts of rainforests are destroyed, the natural ecological balance of the forest ecosystem is disturbed. The large-scale loss of forest affects evapotranspiration and the hydrological cycle, altering the movement of moisture in the atmosphere and resulting in shifts in the weather patterns (Sodhi and Ehrlich

2010: 153). This in turn disrupts their traditional calendar, especially the farming of rice and millet, which depend on sufficient rain and sunlight. If the timing of planting and germination does not sync with the expected weather, many disasters ensue including devastation by pests, such as munias and rodents that feed on the crops. Unpredictable weather patterns are challenging to manage within their traditional calendar. If the clearance of forest areas continues each year, there is greater likelihood of major changes in weather patterns (Gray and Ewers 2021: 4). The revered traditional calendar may lose its significance as a focal reference. Traditional wisdom and knowledge will come under challenge. Deforestation diminishes the biodiversity and ecological connectivity of the forest ecosystem and threatens its resilience. The resulting decline in the provision of forest resources will cause indigenous communities to depend more heavily on farming and other means of livelihood (Figure 4).

Figure 4. Training on organic farming conducted by NGO groups for communities affected by deforestation (photo by Diribumi Ecological Services

There has been an increase in human-wildlife conflicts in all sixteen Temiar villages in central Peninsular Malaysia over the last two decades. Reports on encounters with elephants, tigers, and bears entering villages, farms and plantations are on the increase ((Shahriman et al. 2017: 113). In some cases, these encounters cause injury or even death, usually with wildlife on the losing end. Tigers are on the IUCN (International Union for the Conservation of Nature) Critically Endangered species list threatened with extinction; the Asian and endemic pygmy elephants are on its Endangered list; and sun bears are on its Vulnerable species list. Decline in the population of these mammals could alter the forest as these species play important ecological roles in the forest ecosystem. All three species are known to be seed dispersers of forest trees. Their decline could cause changes in the distribution of the Orang Asli's food trees, medicinal

plants, and culturally important plants. This is another strong reason that could result in their traditional knowledge not being passed down to younger generations.

Although Malaysia is a signatory of the United Nation Declaration on the Rights of Indigenous Peoples (UNDRIP) and has obligations to uphold the basic rights of Orang Asli, this is not well implemented. The Orang Asli should be able to practise their culture, customs and traditions freely, and should not need to migrate. But when logging takes away their forests, many young people migrate to the city, or get employment in farms, oil palm plantations, or as skilled and unskilled workers. They are assimilated into modern lifestyles and become detached from their original identities and culture. They lose their traditional knowledge which is bound up with the forest. Traditions and culture exist as long as the forest exists, but disappear when the forest disappears. Those who move to the city are in survival mode. They are satisfied with their income and new lifestyle, but they have lost the rich culture that makes them Orang Asli. The Orang Asli Act 1954 defined an Orang Asli as someone who "speaks an aboriginal language, habitually follows an aboriginal way of life and aboriginal customs and beliefs and remains a member of an aboriginal community."

Most of those who have migrated to cities no longer conform to this definition and hence may lose their rights as Orang Asli. From a legal point of view this is a huge loss especially in relation to customary land. By moving away from the old way of life, they effectively forfeit their rights to their land. They not only lose their customs, culture, tradition and eventually traditional knowledge, but they lose their future, because they no longer have rights to the land.

Traditional knowledge is gradually being dismantled by development, resource extraction, plantation agriculture, urbanisation and modernisation. Deforestation of the traditional lands and forest deprives the indigenous people of the means to adapt to rapid change. The affected communities are often not consulted about an impending project. When forests are logged out and lost permanently, the impacts on people, biodiversity and the physical landscapes are severe. The traditional knowledge that indigenous communities have safeguarded for generations may be lost.

Changing the narratives

It is well known that traditional community practices and traditional knowledge can provide solutions to climate change. In Malaysia, there is a rich and diverse heritage of traditional knowledge among various ethnic groups, but little of this is documented and thus this treasure is at risk of being lost. The main threat is large-scale deforestation. All the sixteen Temiar villages are affected but the impact differs. In some, the forest is already completely lost. In others, the forest is seriously affected, partially lost, or still intact but vulnerable. One community has persistently blocked the attempts of logging operators to enter their customary land.

The Titiwangsa Range is the last bastion of lush, abundant, and highly biodiverse primary forest ecosystems in Peninsular Malaysia, but is being plundered mercilessly for short-sighted economic gains.

The Temiar communities have sought help. They have got lawyers from the Bar

Figure 5. The NGO Persatuan Aktivis Sahabat Alam conducts training on community forest watch, documentation and mapping customary land boundaries with various indigenous communities using simple technology such as hand-held GPS and drones. (photos by Persatuan Aktivis Sahabat Alam)

Figure 6. Indigenous communities have been more vocal in protecting their land rights from loggers and land developers (photos by Persatuan Aktivis Sahabat Alam)

Council to educate and train them on legal issues, customary land rights, human rights, and social and environmental justice. Environmental NGOs, such as Sahabat Alam Malaysia and Persatuan Aktivis Sahabat Alam, have also assisted them by raising awareness on environmental issues in the media, writing memoranda to state governments, and giving training on advocacy work (Figure 5). The communities have learnt how to use technology, such as drones and GPS (global positioning system), to conduct their own monitoring of the forest monitoring and mapping of the boundaries of their traditional lands, for use in court cases against logging companies. The Temiar have also reached out to other indigenous communities in the central peninsula to share their knowledge and experience. They are aware of the need to resist now before the degradation of the forest becomes even worse. In recent years, more and more indigenous communities have organised human blockades and demonstrations to obstruct loggers from gaining access to their customary lands (Figure 6).

After fifteen years, this movement is growing stronger. Through court actions, it has prevented 61,000 hectare of prime forest from being destroyed by logging companies. The communities have negotiated a steep learning curve and shifted their perspective from originally taking care of just their community to safeguarding the indigenous peoples as a whole.

The physical health, culture, traditions, and beliefs are closely connected to the health of the ecosystem they inhabit. The sustainability of traditional practices and knowledge depends on the sustainability and biophysical health of the natural resources. Indigenous peoples need support from the larger mainstream communities in their struggle to preserve the planet that we share. Their future is also our future. The resources they depend on are the same resources we depend on, but they value their importance more highly. They feel the weight of their responsibility to struggle, not only for indigenous people in the forests but also for the downstream communities, because deforestation will affect everyone in various ways, such as the loss of access to clean drinking water and flooding in downstream catchment areas. Their love and intimacy with the forest allows them to see the significance of protecting this critical ecosystem which is a key to combating climate change.

The way forward

Prevention is better than cure. Protecting the resources of forests, rivers and seas is fundamental to the protection of other elements of the ecosystem, as well as the cultural heritage such as the traditional knowledge accumulated by traditional communities. The wisdom that indigenous knowledge embodies is universal – total interconnectedness (man-man, man-nature, man-creator), harmonious co-existence, sacred, respect, humble, ingrained, reciprocity, deep ethics – these are all inherent values of humanity. Traditional knowledge is a key to climate action, a guide to the protection and wise use of resources to ensure their survival. This knowledge needs to be mainstreamed from the individual level, to the community, to local, state and federal government, to the global community. The following are some suggestions for the way forward.

Practice and apply a holistic ecosystem approach to natural resource utilisation and management. The *Tahud* calendar is aligned with the complex processes of nature across the whole cycle. By analysing and understanding this calendar, better strategies can be applied to land and resource development, utilisation and management.

Introduce systemic and ideological change or reform at all levels of governance. Environmental sustainability and climate change are systemic problems, hence, require systemic solutions. Re-engineering of the whole system is needed to be effective. Traditional knowledge has survived thousands of years without harming ecosystems or causing extinctions. Unlearning conventional knowledge and relearning traditional knowledge can give us an insight into our errors and recalibrate our development paths for the next generations.

Undertake continuous advocacy and strategising to mainstream environmental issues in order to raise awareness and gain support for the protection of natural resources and assistance to indigenous communities. Most city dwellers are not sensitive to these problems. A collective voice from all walks of life and levels of society is needed to put pressure on politicians and decision-makers. More professionals and researchers are needed to collaborate with indigenous communities.

Provide more training to indigenous community groups, assist them in documenting traditional knowledge, and support their resistance against deforestation of their customary lands. More skill-based training in documentation is needed, such as video documentation, computing skills, social media, report writing, public speaking, leadership, and youth empowerment, to quickly curb further loss of remaining forests.

Recognise the land and resource rights of indigenous peoples which are essential for safeguarding the ecosystem and building climate resilience. Indigenous peoples are among the most marginalised. They are not included in policy-making on matters that affect their rights and interests, and their welfare is often neglected and undermined. Building strategies for effective stakeholder engagement can support this process.

Adopt many traditional and indigenous practices, such as ecologically conscious farming practices that take advantage of natural processes. This includes a whole-systems thinking approach of permaculture, SRI, agroforestry, and syntropic forestry. They have similarities with *Tahud*. These nature-based farming practices need to be expanded to more areas and get more people involved so that they can become mainstream.

Promote and develop biomimetic and biophilic technology for resource extraction.

Indigenous and traditional communities use nature's technology to extract and use resources. The research in these areas is still in its infancy. The process of unlearning, and relearning can help to facilitate this undertaking.

Introduce indigenous traditional knowledge in school education. There is a wealth of science, technology, art, crafts, sustainability, environmental ethics, culture, heritage, social, conservation, biodiversity, wildlife, and plant studies that could be integrated in the curriculum. Children living in cities have little connection to the forests and natural environment. Countries such as India, Canada and Australia have retrained teachers in these areas.

Include education in ethics in formal and informal education. Environmental problems result from unsound ethics and behaviour. The environmental crisis is threatening human survival through the depletion of natural resources, biodiversity loss, climate change, and pollution. These are problems of humanity. The solutions lie in fundamental human values of responsibility, empathy, justice, selflessness, co-operation, and tolerance. If we aspire towards a sustainable future, ethics will have to be in our everyday conversations.

Understanding the traditional knowledge and resource management systems of various indigenous peoples in Malaysia and around the world can help to form strategies to achieve sustainability. Traditional knowledge is the culmination of thousands of years of learning through experience about the sustainable use of resources. This knowledge protects and preserves biodiversity and ecological connectivity over time. It needs to be applied across the globe to offer new and effective models for development that are ecologically, socially and ethically sound.

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