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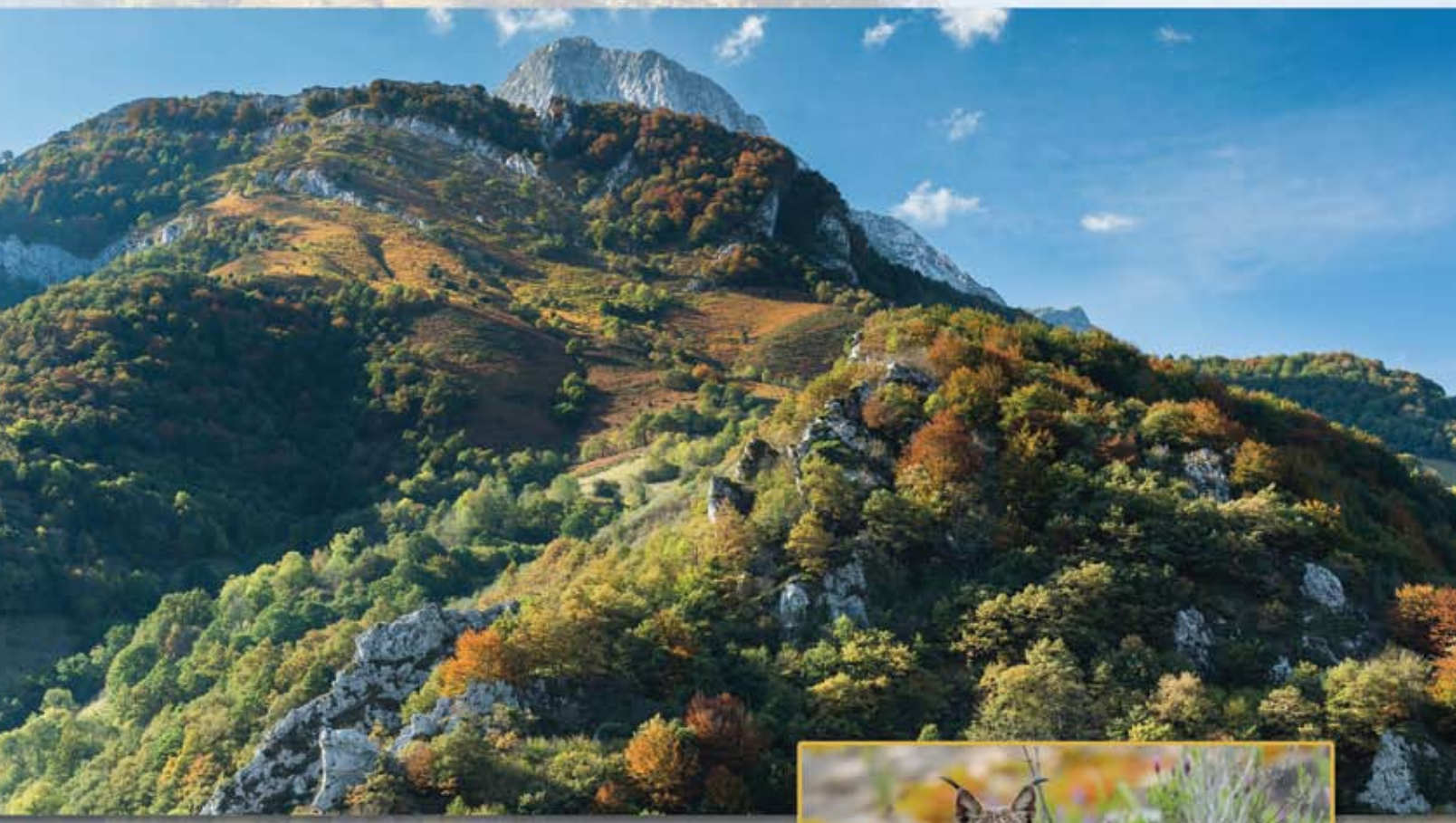

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SOUL OF THE WILDERNESS

Social HALF

The Nature Strategy for Sustainability

BY VANCE G. MARTIN and JULIE ANTON RANDALL

Social HALF is a concept that bridges the often disparate fields of nature conservation and human development. It is the human dimension complement Nature Needs Half of (NNH) – an aspirational and practical vision of sustainability (Martin 2011; Sylven 2011) based on the scientific information that keeping at least half of wild nature intact and interconnected is vital to ensuring continued life-supporting services to all species. The "half" in nature can be composed of interconnected large land- and seascapes or a connected mosaic of wild nature found in parks, forests, refuges, working lands, and waters managed with conservation as a primary value. NNH is also a cost-efficient and effective means of mitigating climate change by keeping atmosphere-altering chemicals such as carbon, methane, and others safely locked up (WILD 2009).

Social HALF is the application of NNH to conceptualize a holistic, inclusive, and rational approach to sustainable development whereby the social and economic needs of human communities are addressed by protecting a specific quantity (at least half) and quality (high-functioning ecosystems and intact biodiversity) of nature. This WILD Foundation working paper, entitled the "Nature Strategy for Sustainability" (NSS), is formulated by a network of nature conservationists and human development practitioners that prioritizes the protection of nature for its fundamental role in alleviating human suffering, enhancing human security, and promoting economic prosperity. When NSS is fully established it will support international guidelines, replicable models, and practical tools for application in policy, management, and communications worldwide.

At WILD9, the 9th World Wilderness Congress (WWC) in Mexico in 2009, The WILD Foundation and 25 early organizational endorsers presented NNH as a global vision and a new "social movement for nature conservation" to protect and interconnect at least half of Earth's lands and seas in order to support all life. In preparing for a full launch of this concept at the 10th WWC (WILD10), many collaborators have begun to organize and activate the NSS Coalition, a global network committed to Social HALF principles.

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A Vision of Half the World in Nature

The loss and degradation of nature's ecological services is increasingly becoming headline news. The Convention on Biological Diversity (2010) reports there are "multiple indications of continuing decline in biodiversity in all three of its main components – genes, species and ecosystems." Essentially all species assessed by the International Union for Conservation of Nature (IUCN) Red List for extinction risk are more threatened than ever. Extinction is most imminent among amphibian and coral species, mammals in South and Southeast Asia, species of birds and mammals used for food and medicine, and nearly a quarter of all plant species. Climate change exacerbates other human impacts, but the current international policy focus on climate change often obscures the more direct and immediate threats of land-use conversion, marine resource exploitation, and increasing consumption of resource materials.

Protected areas (PAs) are an important part of sustaining critical ecosystem services, but proposed PA areas are often selected based on anthropocentric reasons rather than on an

ecological basis. Although the global commitment to protecting nature and implementing sustainable development has deepened over recent decades, many nonprofit and governmental institutions adhere to that which is socially or politically acceptable, and corporations continue to follow quarterly profitability guidelines. We need to change this dynamic and shift our approach to human development. NNH proposes that, to a great degree, true sustainability of human well-being rests on the answer to a simple question: What does nature need to be sustainable?

An ecosystem provides the foundation for a healthy, stable, and prosperous human society and is defined as "a dynamic complex of plant, animal, and microorganism communities and the nonliving environment interacting as a functional unit, of which humans are an integral part" (MEA 2005). As ecosystem size is reduced by human development and exploitation activities, there is a critical threshold after which they rapidly lose their ability to provide life-supporting services. Many scientists (Noss et al. 2011) point out that this is when ecosystems drop to somewhere between 35%–80% of their original (pre-Anthropocene) size, depending on the system. Thus, many scientists consider a minimum size of 50% of ecosystems – intact and interconnected – to be a rational, ecologically necessary, general target. This is the basis for NNH and is a precautionary approach to buffer the many uncertainties in our dynamic, rapidly changing world. The NNH strategy for each geographical area will vary depending on its degree of physical heterogeneity, endemism, conversion to development, and other factors of human impact and development.

NNH is thus a biocentric approach to safeguarding nature essential to human well-being, while also assuring viable and diverse populations of native species and ecosystem function. Critically, in today's world, the NNH approach can enhance resiliency to the inevitable and dramatic environmental change caused by ill considered human development. Further, applying NNH would mitigate the scientifically and historically documented effects of ecosystem destruction on human health and livelihoods, particularly on those people most directly dependent on nature or disproportionately impacted by its loss – often the poorest in human society.

Figure 1 – The Kayapo of the Southern Amazon have a goal of protecting (and using sustainably) virtually 100% if their 10 million hectare reserve, with biodiversity that supports all their villages. Photo by Vance G. Martin.

Loss of Nature and Its Impact on Humans

Ecosystem transformation has contributed substantial net benefits to human society in terms of well-being and economic development, but these benefits cannot be sustained as human populations increase, land-use conversions and development continue, environmental pollution continues, invasive species spread, and climate change persists. In fact, society risks irreversible declines in productivity as resource exploitation and degradation increases and fragmentation continues. Unmitigated nature loss will continue to lead to ecosystem decline, which is far costlier to reverse than if we implement steps now to protect nature's life-support services.

Ecosystem change through human development often yields initial benefits for some stakeholders (typically the affluent) while exacting costs on marginalized groups (those without the political and economic power over

Figure 2a and b – Landscape fragmentation (loss of ecological connectivity) thru fencing that destroys the ability of wild nature to support local human populations, and usually increases dependency on less-diverse and often lower-value land use. Photos by (a) Karen Ross and (b) Joe Riis

resource management decisions). Marginalized groups are most often the local poor who have very low adaptive capacity (disempowered women and children in particular) and indigenous groups stripped of traditional rights and hereditary access to assets provided more directly by nature. These groups are like an early warning detection of problems for a wider society. Ultimately, though, everyone pays the price for externalities associated with ecosystem change.

Change within an ecosystem often negatively impacts food production. Cultivated areas where at least 30% of the landscape is in cropland, shifting cultivation, confined livestock production, or freshwater aquaculture cover a quarter of Earth's surface (MEA 2005). Agriculture expansion has plowed under forests and grasslands and converted wetlands, destroying wildlife habitats and often polluting land and groundwater with nitrates and pesticides. Although altering ecosystems has helped feed the world's 7 billion people to date, ecosystem productivity cannot keep pace with the current rate of overexploitation – climate change will challenge productivity even further. With a projected 9.1 billion people by 2050, the world demand for food crops is projected to grow by 70%–85% (MEA 2005), and to double in developing countries (FAO 2002). Demand for water will increase 30%–85% (MEA 2005). Food crop production must also compete with rapidly expanding demand for land and water for biofuels production.

Nourishing the world's rapidly multiplying human population will require growing more food with less water, and improving agroecosystem sustainability and resilience. Otherwise, with more mouths to feed with less food, and food prices increasing in response, the poorest people – who spend the largest share of their income on food – will suffer most.

The juggernaut of human development continues – seemingly without understanding the need for, and acting fully enough to protect, the ecosystem size and intactness that nature needs in order to produce the ecological services that helps to provide basic human needs such as clean water and clean air. Some 1.4 billion people already live in extreme poverty. One in five inhabitants of the planet lack easy access to clean water; one in six are undernourished (MEA 2005). Disease epidemics are omnipresent. Climate change is increasing the spatial and temporal variability of agricultural production, and with it the magnitude and frequency of droughts and floods. The United Nations (UN) projects an exponential increase in environmental refugees – 50 million by 2020. More social and political conflicts will ensue as ecological services decline, natural resources grow more scarce, and human suffering intensifies.

Health, security, and prosperity of nations are affected by the loss of sustainable ecosystems:

- **Health** – The negative health effects of degraded air and water quality can affect all societies, especially the poor who are least able to replace health benefits provided freely by nature with those purchased from health-care systems. Many diseases erupt from malnutrition (especially childhood and maternal) and contaminated water (e.g., infectious diarrhea and vector-borne diseases such as typhoid and malaria, worsened by flooding).
- **Security** – Land degradation, overharvesting, and invasive species from unsustainable resource management are significant threats to human security, particularly in arid or semiarid regions – regions that often have more fragile governance. The world is less secure from impacts of climate

change (MEA 2005; CDC 2009), including higher temperatures; increased drought; accelerated erosion; variability in weather patterns affecting crop and forest production and contributing to more frequent pest and disease outbreaks; conditions conducive to invasive species; higher coastal storm surges and degradation; salinity; flooding; ocean acidification and bleaching of coral habitats impacting fisheries; and the adverse impacts on human health of increasing vector-borne pathogens and infectious diseases thriving under warmer conditions. Direct negative and destabilizing impacts are felt by local people and some will even become ecological refugees. Increasing waves of "land-poor refugees" into cities and across borders strain economic resources, political stability, and national security.

- **Prosperity** – Almost half of all jobs worldwide depend on fisheries, forests, or agriculture (UNEP 2008). Forest areas alone directly provide livelihoods for 1 billion people, and the benefits from healthy ecosystems are well documented; for example, the fishing benefits from healthy coral reefs are a potential US$5.7 billion annually (Convention on Biological Diversity 2008). As greater numbers of people abandon rural areas for supposedly better prospects in the cities, they shift from subsistence living to reliance on a money economy. Tragically, urban employment for these people (untrained and often uneducated) is scarce and low paying, and poverty is exacerbated instead of alleviated.

NNH: The Ecological Foundation of a Social Solution

The NNH vision is based on ecological conditions determined by scientists (Schmiegelow et al. 2006) to maintain biodiversity and ecological processes in large, interconnected land and marine areas:

- **Representation** – all the native ecosystems represented;
- **Viability** – viable populations of all native species maintained and allowed to fluctuate in a natural way;
- **Intact processes** – ecological and evolutionary processes (e.g., free-flowing rivers, wind, fire, herbivory, and carnivory) ensured; and
- **Resiliency** – resilience to both short-term impacts and longer-term change (such as climate change) rendered.

Achieving a NNH goal of "at least half intact and interconnected nature" requires human collaboration in order to scale up our thinking, policy, and action. NNH also requires a wide range of land and sea conservation scenarios, including formally designated protected areas (parks, refuges, forests, biospheres, tribal and community protected areas, and marine protected areas), easements, zones of limited sustainable use, and working lands, forests, and seas managed with goal of the protecting nature and its services.

The Social HALF concept helps integrate conservation and development policy and fieldwork, and it has a clear and unequivocal role in meeting the UN Millennium Development Goals: eradicate extreme poverty and hunger, ensure environmental sustainability (reverse forest loss, improve drinking water in urban and rural areas, improve lives of slum dwellers), improve maternal health and reduce child mortality, promote gender equality and empower women (especially in rural society), and combat malaria and other infectious diseases related to water and nutrition (UNDP 2013).

The Social HALF case for protecting nature rests on three factors: human health, security, and prosperity – the factors of human well-being most directly linked to what nature provides:

- **Health –** clean air and water; nutritious food**;** water for sanitation and disease prevention; fuel sources for energy to keep warm and cool**;** botanical medicines and pharmaceutical

Figure 3 – "Fair Trade", community-grown, organic coffee (here in Sierra de Juarez, Oaxaca, Mexico) is one of the best, most recent examples of integrating biodiversity conservation and sustainable rural development. Photo by Jaime Rojo.

Figure 4 – Clean, easily accessible water (here being fetched at long distance in KwaZulu Natal, South Africa) is one of the first things lost when a high-value landscape is overgrazed or otherwise converted. Photo by Vance G. Martin.

ingredients; and source of spirituality, inspiration, aesthetics, and recreation.

- **Security** – personal security (basic needs met); access to natural resources; protection from natural disasters (including those attributed to climate change); sustained social networks (especially those indigenous communities inhabiting or directly reliant on nature); avoidance of human-human conflict over scarce water, food, and raw materials; and avoidance of human-wildlife conflict.
- **Prosperity** – secure livelihoods; preservation of traditional ecological (ecosystem) knowledge; source of genetic resources for food crops (improved quality and yields) and medicines (efficacy and quantity); contribution to national economy via traded commodities and trickle-down effects; and fish and bushmeat – wild-caught protein sources.

Nature Strategy for Sustainability

Social HALF addresses basic human rights and social equity through an NNH strategy of protecting ecosystem services that provide for human health, security, and prosperity. Social HALF objectives are

1. Alleviated human suffering – Nutrition and sanitation, keys to health, decline readily when water becomes scarcer and agriculture less productive. Healthy natural ecosystems underlie agriculture and provide clean water and fuelwood. Basic necessities of food, drinking/cooking water, and energy provided by nature give especially rural people (women in particular) more time to work for income and to care for family.
2. Enhanced human security – Natural resource scarcity spawns human conflict at a local level. The physical, economic, and social impacts of nature loss flow easily across political jurisdictions and country borders. For example, poverty and war in one country can slow regional economic growth and drive conflict and refugees into neighboring countries. Dust storms and fires diminish air quality in nearby countries. Greenhouse gas emissions affecting the global climate erupt from deforestation (van der Werf et al. 2009). Wealthy countries with efficient, stable governments and strong civil societies might maintain freedom and choice for a period of time while ecosystems decline, but because forest, agriculture, fishing, and ecotourism industries are tied directly to ecosystem health, stability will deteriorate unless nature decline is reversed the world over.
3. Nature valuation in the economy – National capital asset accounts typically lack measures of renewable resource degradation and depletion. A country chops down its forests and fishes out its waters, and this shows up as a GDP gain despite loss of the natural capital. The non-market benefits of ecosystems (e.g., soil formation, water purification, flood regulation, and more) are often lost because there is insufficient incentive to invest in ecosystem maintenance and little apparent penalty for misuse. One of the first results seen is insufficient renewable fresh water per capita.

Our current economic development pattern is reactive: it requires increasing investment to restore and repair ecosystem damage. This is despite the clear evidence that, virtually always, the cost of ecosystem restoration is higher than the cost of preventing degradation and fragmentation (and, once destroyed, not all services can be restored and reconnected).

The NSS strategy for development, based on the NNH vision and Social HALF principles, is proactive and cost-efficient through safeguarding life-support systems at their source. Livelihood strategies that benefit, protect, and regenerate natural systems can create jobs while preventing ecosystem decline. Markets for ecosystem services (water, carbon, and even biodiversity) may eventually evolve to pay for conservation, while in the mean time, more immediate and essential measures are taken to protect and interconnect the needed half of Earth's land and waters.

NNH Strategies for Human Activity and Ecosystem Impact

Achieving HALF will require measures beyond formally designating protected areas (parks, refuges, forests, biospheres, and marine protected areas) and include

working lands managed with nature as a primary value. Protecting nature in such a mosaic is the only way to provide ecological and cultural services essential to meeting human needs.

Thus, the proposed NSS will require landscape-scale, complementary approaches to sustainable development that account for the impact of human activity on ecosystem function connected to these areas: agriculture, forestry, water management, marine policy, biodiversity conservation, valuing indigenous people, gender equity, ecotourism and recreation., and areas with special vulnerabilities:

Figure 5 – Oyster culture in Marismas Nacionales Biosphere Reserve, Nayarit, Mexico. Photo by Jaime Rojo.

Agriculture – Agriculture compatible with sustaining ecosystem functions and services is needed to create multifunctional ecosystems that can produce more food with less water and artificial inputs. Tenure-system constraints on the participation of women, smallholders, youth, and indigenous farmers cannot be ignored. NSS strategies will need to incorporate the benefits of sustainable intensification and methods of water-use efficiency, crop rotation, tillage, integrated systems (crops, nitrogen-fixing trees, livestock, and aquaculture), resources reuse for feed/fodder and soil fertility (crop residue, manure), integrated pest management. and use of local and adapted drought-tolerant cultivars that increase reliable yields and nutritional quality while decreasing monoculture (Conniff 2012).

Forestry – Forest covers about a third of the Earth's land surface (TEEB 2012). Experts predict that 20% of grassland and forestland may be converted primarily to agriculture by 2050 (MEA 2005). Negative hydrological consequences of deforestation include decreased rainfall (accelerating additional loss of forest), salinization, soil loss, and waterlogging. Forest clearings create vegetation edges, where pathogen, vector, and host interaction amplifies with deadly consequences for humans, livestock, and wildlife alike. NSS strategies will need to incorporate protection of existing and ecologically healthy forests (which is the most cost-efficient strategy) as well as multispecies reforestation.

Water management – Modern agriculture uses 70% of all managed freshwater sources. However, subsistence agriculture (95% of agriculture in sub-Saharan Africa) is rain fed, with low productivity because of limited or no precipitation at critical growing periods, making soil nutrients less available and increasing the occurrence of pests and diseases. NSS strategies will need to protect natural areas at river headwaters for quality and quantity water flow, while also regenerating fish habitat and stocks. NSS water management strategies in food production will need to employ low tillage methods, rotating pasturage, restoring shelter, selecting appropriate species, and more.

Marine policy – About half of all humans reside in coastal communities reliant on marine resources. Across much of the world, about 90% of the biomass of fish targeted in fisheries (including bycatch) has been lost to industrial fishing; the fish harvested are increasingly from less valuable, lower trophic levels, as higher trophic level species are depleted (MEA 2005). NSS strategies will need to protect coral reefs, sea-grass beds, and mangroves to provide coastal residents with food protein and also buffer them from climate change impacts. NSS strategies will need to include marine wilderness management areas (Randall 2012) designed to regrow fish stocks and other marine species devastated by fishing practices on the high seas.

Biodiversity conservation –Critical habitat and stopover areas for wildlife important to human communities as well as pollinators (insects and birds) essential to natural and cultivated plant propagation need to be protected. Plant genetic resources banked in NNH areas can provide fresh genetic material that is resilient or has wider

tolerance as changing conditions increase (drought, extreme temperatures, salinity), particularly those wild relatives of globally important food crops such as barley, maize, oats, potatoes, rice, and wheat. NSS strategies will need to engage local stakeholders in directly addressing the escalation of illegal harvests of wildlife, trees, plants, and marine products.

Valuing indigenous people – Currently inhabiting or holding traditional land claims for almost a quarter of the Earth's surface –roughly 36 million square kilometers or 14 million square miles – indigenous peoples currently steward approximately the same amount of wild nature as all governments and private conservationists combined. NSS strategies will need to support, assist, and involve indigenous communities whose cultural identities are tied closely to particular habitats or wildlife (e.g., artisanal coastal fishing communities, Arctic populations, traditional forest societies, and pastoral nomadic societies) and whose traditional knowledge and management can be instrumental in protecting the resources and services.

Gender equity – NSS strategies will need to empower women to participate equally in policy development, organizational development and financial assistance, and the education, training, and information and technology transfer opportunities afforded by it.

Ecotourism and recreation – Beyond a utilitarian approach, Social HALF treasures the existence, inheritance, and intrinsic value of wild nature that brings happiness and satisfaction to all people and provides unique experiential opportunities for the human body, mind, and spirit. With these values and practices in mind, NSS strategies will need to create these opportunities for personal value and local community revenue.

Areas with special vulnerabilities – Drylands comprise more than 40% of Earth's land surface, and across almost 100 countries, many dryland inhabitants depend directly on this highly variable natural resource base land for subsistence (UNEP 2013). About half of dryland inhabitants account for half of the world's poor. Pressures on dryland ecosystems already exceed sustainable levels of soil formation and water supply (MEA 2005). Also, Small Island Developing States particularly susceptible to climate change effects need targeted support. NSS strategies will need to recognize that certain communities have less capacity (e.g., political, economic) for designating protected areas but are closest to the edge of survival or sustainability.

The Social HALF concept makes the case for integrating international development and conservation objectives.

Conclusion

Because of an inherent lag in the response of ecosystems to disturbance, the result of nature's degradation will mostly impact future generations. Moreover, impacts of ecosystem degradation are often felt some distance away from where they originated (e.g., changes to the headwaters affect water flow and quality downstream, and destruction of a fish nursery results in reduced harvests out at sea). Both the inertia in ecological systems and the time and physical separation of costs and benefits of ecosystem changes mean people experiencing harm are not the same as those gaining the benefits. Increasingly, the poor will feel the impacts most profoundly.

The NNH movement needs momentum, and the Social HALF concept makes the case for integrating international development and conservation objectives. Implementing an NSS can take advantage of three international trends: (1) **digital technology** makes it easier for governments to share information with the public, and for the public to hold decision makers accountable; (2) **business and industry** have a demonstrated self-interest in advancing a green economy (UNEP 2013) for a marketable, triple bottom line of profitability for profit, people, and planet (Anonymous 2009); and (3) an **expanding international policy arena** provides more opportunities to apply NNH.

The NNH vision and the Social HALF concept, implemented through the NSS, uses science – and is the best business model – for achieving a more healthy, secure, and prosperous life for all people. It both banks and generates natural capital to meet human needs and sustains the ability to respond to economic opportunities. It is the right social contract with nature.

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