

Kristin Vala Ragnarsdottir, Debra Roberts and their team

Ecological Sustainability – summary of work in progress (June 27, 2013)

- **Establishing a system for effective and equitable governance and management of the natural commons, including the atmosphere, oceans, fresh water systems, and biodiversity**

Current Paradigm: The expansion of private market forces and allocation of property rights in the 19th and 20th centuries has led to unprecedented rates of economic and population growth across the planet. In contrast, the global atmosphere, oceans, freshwater systems and biodiversity all exhibit the two fundamental principles of a public good – non-excludability and non-rivalness. These are vast resources, ones where it is difficult to establish private property rights, and their exploitation, generally for commercial gain, cannot be prevented without concerned intergovernmental action. Environmental public goods are afflicted by the free-rider problem – individual nations tend not to volunteer conservation efforts beyond their own level of interest.

Emerging solutions: Currently countries differ greatly in their performance on carbon dioxide emissions and mitigation. The best approach politically may be to shift attention away from pointing out differences and historic responsibilities. COP should instead immediately become more of a forum for discussing how each country can lower energy and carbon intensities, and also restructure their GDP, with agreed international targets focusing on step-by-step progress on a nation-by-nation basis. The ratification of UNCLOS by the United States would send an important message concerning the seriousness of the issues involved in connection to oceans. Additionally, national policies for vulnerable coastal states need to be better coordinated and integrated, particularly in India and China. The placing of pressure on national governments by activist movements is critical to the retention and restoration of freshwater systems. Few nations embed into law a requirement for humans to receive clean drinking water supplies. By doing so, seemingly disempowered communities, especially in the developing world, can have the capacity to withstand significant commercial pressures. Implementation of the Convention on Biological Diversity has been limited at a national level, although this situation seems to be changing, following the advent of the Aichi targets and Biodiversity Indicators Partnership. In order to reverse biodiversity loss, it is important for all signatories to the Convention to develop and update national biodiversity strategies and action plans by 2015.

Structure of new paradigm: The new approach to tackling the issue of the global atmospheric commons relies upon existing structures, institutions and mechanisms, but rather stresses policy objectives in a more urgent manner, emphasizing necessary changes to productive process rather than absolute emissions cuts and the importance of financing developing countries. The new structure for ocean management takes the existing UNCLOS framework and revises it to reflect new and emerging maritime issues (e.g. rates of melting Arctic sea ice) in the thirty years since it was first scribed. The key emphasis is one of partnership and leadership across nations. The system for freshwater management places pressure on individual and local communities to stand up for an essential human right – access to clean water for drinking and sanitation. The structure for the conservation of biodiversity is the same, but the emphasis shifted towards the importance of national strategies and target-setting in line with the Convention and Aichi Targets.

Policy changes needed: a. A meaningful response to the atmospheric problem is outlined, which progressively targets carbon and energy intensity on a national scale, with targets set on a rolling two year basis and financial aid determined by GDP per capita. A key principle will be that scarce atmospheric rights are to be distributed equitably across the globe, with the political process at COP determining not only current rights, but those of future generations also. b. Regional and integrated policies for ocean management are also critical, to help focus concerns and ensure consistency, but also as a means of eventually delivering enforcement capacities. Support to developing nations is critical in terms of monitoring the sustainability of their marine environment, and facilitating empowerment capacities to ensure enforcement of UNCLOS is forthcoming. d. The new system places pressure on individual and local communities to stand up for an essential human right – access to clean water for drinking and sanitation. By using democratic power to force governments to incorporate this requirement within their constitution, the rights of individuals are automatically enhanced. The adoption of regional policy documents and advice on the issue of freshwater management leads the way, and co-ordinated cross-border action to restore large-scale watersheds is often necessary. d. In order to reverse biodiversity loss, it is important for all signatories to the Convention to develop and update national biodiversity strategies and action plans by 2015, which promote not only the greater awareness of biodiversity issues, but integrate concerns into other national policies on issues such as fishing, forestry and agriculture.

- **Engaging in a range of educational initiatives to eventually restore the natural world into the core thinking and decision-making of people and society worldwide – research not yet complete**

Current paradigm: At present 50% of the world population lives in cities and the large majority of people has lost connection with nature itself and the natural commons. This is largely because cities are large, many do not have access to green areas and the resources people use may come from the other side of the Earth. Cities – due to their vastness – invoke lack of social feedbacks at the personal if not community level. The anonymity level in a city changes the responsibility structures to wards less personal and more collective responsibility. Even if people live in rural areas, their struggle for life may be such that they need to degrade their local environment to survive.

Emerging solutions: There are now more and more environmental education programs around the world and the UNESCO Education for Sustainable Development decade that ends 2014 will have wide-reaching effects. The international Green Flag school's program is helping schools – pupils and teachers – to connect with the local natural environment – including the local community. Ecovillage education and Permaculture living puts much emphasis on nature protection and restoration. There are large nature restoration projects under way from South America to Africa to China. Nature protection is at the centre of policy in Costa Rica, sustainable development is entrenched in the constitution of Namibia and the Rights of Nature is entrenched in the new constitution of Ecuador.

Structure of new paradigm: All education levels have the rights of nature at the core of their curricula. Schools, governments, corporations and organisations work together on nature regeneration projects.

Policy changes needed: Nature needs to be given “human” rights, similar to that of people and corporations today, end the rights of nature need to be at the core of constitutions of all UN countries.

- **Investing in sustainable infrastructure, such as renewable clean energy, energy efficiency, public transit, watershed protection measures, green public spaces, clean technology, and support for green businesses – research not yet complete**

Current paradigm: At present the push for growth in GDP and consumption is leading to further exploitation and building of fossil fuel plants across the world, but particularly in India and China. The fossil fuel industry is globally subsidized at the rate of 1.9 trillion dollars/year (2.5% of global GDP) and only a fraction of that is invested in development of renewable energy. There is much talk of green energy and green business but this is largely a new way to consume more. Energy efficiency is a concept many do not understand, public transit is poor in many cities (for example in the US), clean technology lacks economic incentives and many do not understand what a green business means. Others come onto the bandwagon with “corporate greenwash”, pretending to support green initiatives on the surface but fighting against them behind the scenes.

Emerging solutions: There now are suggestions of how to move beyond green growth, based on for example the “blue” economy which has the twin aims of stimulating entrepreneurship while setting up new and higher standards towards sustainability where the good for people’s health and the environment are economic. Many energy companies help their customers to save energy, local governments subsidize insulation and many countries have green business policies. Feed in tariffs for small producers into the national grid have proven very effective in Germany and Sweden. Many believe that small scale and smart local production is the solution for energy production instead of vast energy units.

Structure of new paradigm: All political parties, governments, local authorities and corporation management teams know about the state of the planet and steer all activities away from greed to what is good for nature – including renewable clean energy, energy efficiency, public transit, watershed protection measures, green public spaces, clean technology and beyond green business.

Policy changes needed: a. All government, local authorities and corporations large and small have corporate environmental and sustainability responsibility policies that are followed. b. Feed in tariffs adopted around the world. c. All UN countries have energy efficiency policies and incentives.

- **Consuming essential non-renewables, such as fossil fuels, more slowly than we develop renewable substitutes**

Current paradigm: At present we are consuming world natural resources at a record rate and peak production of some has already passed (oil, ocean fish, agricultural soil, gold, platinum, rhodium); peak production that is coming within the next 20 years includes coal, natural gas, phosphorous, copper, zinc, indium, helium, silver and

palladium and within the next 100 years the following natural resources will hit peak production: shale gas, iron, nickel, manganese, lithium, germanium, niobium, tungsten, molybdenum, zirconium, yttrium, uranium, antimony, tin, selenium and more... Peak world energy production will occur in 2020 and by 2050 we need to have learned to live with 50% less energy than today. This presents a global system in crisis with times to scarcity of most of these natural resources (assuming business as usual) within this century and this fact is not being brought out into the open.

Emerging solutions: The most important solutions for resource conservation is recycling, building equipment for durability, going back from the throwaway culture to repairing and upgrading equipment as well as sharing equipment within communities. At present only gold is recycled at an adequate rate (98%) because it is a valuable metal. Other platinum group metals including silver and platinum are recycled at the rate of 60-70%. Hafnium enjoys 80% and rhenium 75% recycling. Nickel and copper are recycled at 50%. All other metals have recycling rates of less than 50% - including iron (20%), aluminium (30%), zinc (10%) and manganese (20%). Phosphorous, a necessary and unreplaceable element for food growing, is only recycled at 16%, the rest is dissipated into the ocean. The following materials are not recycled at all: Helium, indium, lithium, arsenic and selenium. It follows that the technology of the future will not emerge without a major effort on recycling.

Structure of new paradigm: When a metal is not recycled and is thus in a linear system 100% needs to be supplied to industry from mines. Conversely, when a metal is recycled at 90% and the system becomes circular only 10% needs to be supplied from mines. This has to be a global goal to achieve by 2030. The precious metal recycling industry has more than doubled in the last 10 years and recycling of all metals needs to continue to increase and that fast. Society is also realizing that the throw away culture has in part come from factory design for obsolescence, which started in the United States after World War II and people need to put value on equipment durability and sharing equipment.

Policy changes needed: The following legislation needs to become global before 2020: a. Legislation preventing waste. b. Legislation requiring recycling. c. Market price intervention or taxation. d. Legislation on extraction permits.

- **Creating mechanisms to reduce resource depletion, pollution, and greenhouse gas emissions so that these stay within basic planetary boundaries and resource limits – research not finished**

Current paradigm: In the current era resources are being consumed at a record rate and peak production of many have already passed – and many will reach that level in the coming decades. This means that resource scarcity will reach havoc sooner than later this century. Industry is still polluting unnecessarily – putting profit above the health of workers and nature. There are blurred boundaries around what is considered resources on private property, common property and global commons, leading to large corporations buying local resources and excluding the local people from accessing these (e.g. water) or profiting from them (e.g. metal mining).

Emerging solutions: The concept of cradle to cradle has started to become a norm in some industries, where the waste of one process is resource for another with minimized pollution being produced. Such processes are based on natural processes and also named biomimicry. It has been shown that cradle to cradle industrial

processes need less raw material, produces lower if any pollution and creates no waste that cannot be used for other industry or nature.

Structure of new paradigm: All industry is based on biomimicry and cradle to cradle concepts – including recycling, using little energy, creating low if any pollution, allowing industry to reduce pressure on natural resources and staying within planetary boundaries.

Policy changes needed: Policy mechanisms include a. a shift from income and value-added taxation to throughput taxation; b. development of additional cap and auction systems for use of common sink services, like discharge of greenhouse gases; c. implementation of common asset trusts to prevent the taking of private gain through the imposition of harm, damage and loss on the public; d. other indicators used to measure success of nations than GDP – for example GNH and GPI; e. constitutions define natural resources to be common 's property (owned by the nation collectively); f. exploitation rights to natural resources set for short periods with high payment for extraction to governments.

- **Dismantling incentives towards excessive materialistic consumption, including educating for happiness, ecological literacy and sustainability, and banning advertising directed at children – *research not finished***

Current paradigm: Currently in the global north consumption is a lifestyle. In the US 99% of everything that is consumed is thrown out within a year. Consumption was designed to become a “spiritual” practice of North Americans and this has not spread around the globe. Most city dwellers have limited if any ecological literacy and do not understand the concept of sustainability. Everywhere people and children are bombarded with advertising, and people feel “lesser” if they do not have the latest gadgets.

Emerging solutions: There are now more and more people that put focus on community rather than consumption. They have chosen to live in ecovillages or in co-housing, and feel that they are a lot happier than they were when living in the consumer society. Many people are stepping out of the highly stressed corporate life and down sizing into village or country living. There now are more and more facilitators and trainers for happiness – filling a niche in teaching people to be happy – because their consumer life-style leaves them to be unfulfilled and depressed. Books are being written about the badness of allfluency and the goodness of “enough” culture and people are keen to receive the messages of these books. Ecovillage education has emerged from the ecovillage movement that puts much emphasis on education in nature, restoration of ecosystems, social cohesion, local economies and a world view that underpins happiness through collective action. Though there is diversity in personal preferences, experience is showing that command and control is not compatible with democracy – and adoptive learning is preferred as a social process. Education is starting in stress values that change behavior, norms and standards towards consumption.

Structure of new paradigm: Polycentric eco-cities and communities are developed where people can work and study close to home. Everyone engages in food growing in their allotment or garden or community garden or they support local farmers what is called community-supported agriculture. People are happy because they are in nature and work together in communities. Meditation and spiritual pursuits are on the rise.

Policy changes needed: a. Guarding freedom of press, limiting the use of mass media for commercial gain; b. banning advertising for children; c. education for happiness included in school curricula at all levels; d. ecological and sustainability literacy in curricula at all school levels.

- **Addressing the population driver in ways that are empowering, equitable, and effective – *research not finished***

Current paradigm: Currently the population of the world is increasing exponentially at a rate of 1.1% per year has now surpassed 7.1 billion. The maximum population growth was in the 1960s where it surpassed 2% per year. Population growth is predicted to continue to reduce this century to 1% by 2020 and 0.5% by 2050 when the population is predicted to be over 9 billion and stabilize at 10 billion by 2100. The highest population increase is in developing countries in Africa and Asia. For many of these countries contraception is a taboo due to religious and tribal conventions. With knowledge of world natural resources presented here these predictions are unrealistic because with peak use and production of almost all important natural resources within the next decades the Earth will not be able to support 9 or 10 billion people.

Emerging solutions: There are many documented studies that show that the most effective way to reduce population growth is to educate girls. If women know how to read and write and also have personal freedom, they see other opportunities in life than having children. If in addition they are given access to microcredit – often with other women – they can start up small-scale businesses. Reports from India show that for a group of 10 women given opportunity for education and work, their combined birth rate goes down from 80 to 10 children.

Structure of new paradigm: The first development goal post 2015 by the UN needs to be education for all with emphasis of no girl left out of education. Nations are built up with equality and equity in mind within the Earth's boundaries.

Policy changes needed: a. UN global agreement on general education for all with fines for those nations that do not take part or comply. b. All UN developing countries have a policy of setting up women's groups in every village in order to empower women. c. All UN countries provide all sexually active human beings with modern contraception and backup abortion. d. All UN countries have sexual education for every child. e. All UN countries have respect for women's rights irrespective of religious ideology. f. All UN countries separate religion and politics (separation of church and state).

- **Moving towards sustainable agriculture to feed the earth's population without destroying its biodiversity, including drawing on indigenous and traditional agricultural knowledge to prepare for the transition to a post-petroleum agriculture**

Current paradigm: The current industrial agricultural system is in a major crisis. It is built on unsustainable input of natural resources, including oil (for nitrogen fertilizer and energy), phosphate rock (for phosphorous fertilizer) as well as soil and water (for growing). While the population is increasing exponentially and has surpassed 7.1 billion the agronomic system is inefficient with food being transported by air, sea and road across the world. In the process it is estimated that up to 50% of the food is wasted and at the same time 1 billion people are hungry. It is also important to

mention that the main seed banks are now owned by large international corporations, and their GMO seeds are often need their herbicides (e.g. Roundup). Due to resource restrictions (peak oil 2007; peak phosphate rock 2015; peak soil 2000) on a limited Earth this system can no longer continue.

Emerging solutions: There are several agricultural approaches that have been developed on the principles of working with nature. Agroecology has been set forward as being the most efficient way of feeding the world population by Olivier de Schutter, the special envoy on Right to Food to the United Nations. Citing dozens of examples, he demonstrates that agroecology can double yield globally and in some places the yield can increase 10 fold. Agroecology is the study of ecological processes that operate in agricultural production systems. While the term crop ecology is known as far back as the 1920s the term agroecology as we know it today was born in Mexico in the 1970s where researchers learned from old farmers that had up to 10 fold the corn yield of conventional farming practices. This sparked a number of Agroecology training programs in the US and elsewhere in the 1980s and today there are numerous organisations and NGOs focusing on agroecology – including FAO. The key principles of agroecology are to build up high yielding, sustainable and resilient agrosystems that can feed the masses. These systems are low on resource consumption and allow circular principles to operate. There are other important advances in agriculture that are based on indigenous knowledge and the philosophy of protecting nature. They include Permaculture (Permanent Agriculture – arose in Australia in the 1970s) which has the ethics of caring for the Earth and people as well as setting limits to population and consumption, biodynamic agriculture (from Rudolf Steiner’s anthroposophy in Germany in the early part of the 20th century), Navdanya in India (founded by Vandana Shiva) that focuses on preserving biological and cultural diversity, and what is more generally referred to as organic agriculture (with research centres in many countries that are over half a century old – e.g. the Rodale Institute in Pennsylvania, USA). Organic agriculture invokes lower CO₂ emissions, builds up carbon (and nutrients) in soils, drawing down CO₂ from the atmosphere.

Structure for the new paradigm: Agricultural growing needs to be locally run by the people for the people. It is important to undertake mass balances for nutrients (e.g. P, N, K, Ca, Mg, B...) and media (water, soil, land area, energy) for all agricultural practice to determine the footprint of each practice. There are already many initiatives across the globe where people have either started growing food in their city (e.g. Cuba, cities of USA, UK) in community gardens and orchards and where people have started Community Supported Agriculture circles – where farmers work directly for their customers within the local community. Members also take part in the farming and assist during the growing and harvesting season (examples in Japan, UK, Norway). Ecovillages are also rising up across the world with emphasis on growing food collectively within the bioregion.

Policy changes needed: a. All UN member states required to set up University Departments in ecological agriculture, and send their staff to training in Universities that already have such programs. This training will be followed by new university degree and continuing education programs in ecological agriculture. b. All UN member states set up indigenous species growing stations for seed banks. A good role model is the Arch Noah seed bank in Austria that has 10,000 members and they preserve 6000 species of plants – by growing 1/3 of the species every year. c. All UN member states set policies that ban or limit the operations of the multinational corporations that monopolize seeds, agrochemicals and food markets (e.g. Monsanto,

WTO, Nestle). d. All UN countries encourage people to become more vegetarian to lower the pressure on land and water. e. All UN countries put emphasis on city planning that includes land for food production with the bioregion. f. All UN countries support the building up of ecovillages or emphasize the change from traditional villages to ecovillages (as in Senegal). g. All UN countries go from producing non-native crops and monocultures requiring irrigation, to ecosystems of native crops requiring less water. h. All UN countries set up policies that promote food conservation to avoid wastage. i. As China every nation reserve 25% of their land as Ecosystem Function conservation areas (Natural Capital Project). j. All UN countries ban patenting of life forms that were not invented; patents allowed on inventions, but do not patent discoveries.

- **Developing linked policies to balance population and consumption with the Earth's natural, social, and economic capacity;**

Current paradigm: At the beginning of the industrial revolution the human population counted almost a billion people. Between 1930 and 2000 the world population tripled, reaching 6 billion, it is now 7.1 billion and is expected to grow to over nine billion in 2050. The prevailing economic system of the world; the constant growth paradigm, meanwhile calls for an ever increasing consumption and throughput through the economic system. At the same time ever more evidence of a global ecological decline due to human overconsumption of resources is emerging. It is clear that if we do not change course we are heading for an ecological/economic/social disaster on a global scale.

Emerging solutions: Although the problem as a whole is on the rise; the world population is growing and consumption is increasing, there are many examples of successful mitigation activities from around the globe. In the Democratic Republic of Congo and on Madagascar, education and training activities, combining family planning with environmental affairs are yielding great results. In Thailand the restaurant chain Cabbages and Condoms mixes traditional restaurant activities with family planning advice. Eighty traditional chiefs in Niger have signed a landmark statement of commitment on awareness-raising on the inter-related issues of literacy, education and reproductive health and the country, along with eleven other developing countries, is working with the UN on securing a steady supply of contraceptives to the nation. Contraceptive use in the participating countries has risen dramatically, from 5 to 21% in four years in Niger. Iran managed to cut its growth rate from 4.2% to 1.3% in just over twenty years in a government push involving education, culture and health. The use of television dramas to educate about various issues such as family planning and environmental health, have proved very successful in many parts of the developing world. A 157% increase in condom distribution in Brazil could be traced to such a programme as well as a behavioural change in 82% of listeners in Tanzania. The examples above are all from the global south. The issues of the global North are very different with consumption per capita being the main problem while growth rates have largely stabilized. Although solutions to this are emerging, mainly at a grassroots level in the form of various de-growth movements and activities, these can merely scratch the surface while the national economic policy is aimed at increasing GDP. A key component of GDP is consumption and hence there can be no official effort in curbing consumption while such a policies are in place.

Structure of new paradigm: The new paradigm calls for an active engagement of government and a commitment to curb population growth and overconsumption. A global treaty to this end will ensure the best results. The global economy will move beyond GDP, with full employment and economic stability, within sustainable limits of natural resources (within Earth boundaries), being the aim of economic policy. A basket of sustainability indicators will be used to replace GDP measurements as a guide for public policy. Education plays an important role as well as economic incentives aimed at desirable behaviour supporting targets of population and consumption. Taxes and subsidies are also required tools. A higher ecological cost of a big family will be accounted for in the tax system and universal access and possibly subsidies are necessary for contraceptives.

Policies needed: Suggested policy changes involve a global treaty on consumption and population growth, including a commitment to use a basket of sustainability indicators to guide economic policy. At a national level the changes can incorporate: Incentives towards use of services rather than consumption of goods, incentives towards smaller family sizes, changes to the national curriculum in education, incentives towards the creation of educational material on said issues etc. Due to variations in local conditions, different criteria will apply in each country/area but the key thing is to have the commitment to curb overconsumption and population growth official and real.

- **Building the capacity of the global urbanization process to ensure that the delivery of infrastructure, the provision of basic services, and the patterns of governance are sustainable, resilient, accessible, equitable, and operate within planetary boundaries and the capacities of local ecosystems**

Current paradigm: This is the century of the city; urban areas are currently home to more than half the world's population and are the location of the majority of global assets, infrastructure and economic activities. Cities are accountable for a high proportion of global greenhouse gas (GHG) emissions and waste production and their ecological footprints affect the whole planet – despite the fact that they occupy only between 0.2-2.4% of the global land surface. Current projections of global population growth indicate that the majority of growth will occur in urban areas – particularly the urban areas of the global South. It is anticipated that urban populations will double from 3.6 billion to 6.3 billion by 2050, necessitating a related increase in capital formation, economic activity, infrastructure development and will produce related increases in GHG emissions and the loss of life sustaining biodiversity and ecosystem services.

Emerging solutions: The way urban areas are planned, developed and managed will have a major impact on the accessibility and sufficiency of the services and resources (mobility, health, food security, leisure opportunities, security etc.) that are central in creating well being and happiness. With approximately over a billion people living in informal settlements in urban areas the largest existing and emerging concentrations of vulnerable urban populations, assets, infrastructure and ecosystem services are in cities and towns in low- and middle-income countries. Dealing with the informality in the urban areas of the global south poses significant challenges to the implementation of the NDP and suggests the need for a conceptualization of the NDP in a manner that engages this informality in a positive way rather than identifying it as a problem to be solved. Polycentric cities have been suggested as a sustainable solution for large cities.

Currently there is a large scale project emerging under the auspices of the Ecological Sequestration Trust that aims to retrofit old cities model and set up new cities with demonstrations low carbon development pathway for eco-cities in China, India and Africa. Ecovillages have been developed in the global North for the past 40 years and now this development is reaching the global South. A good example is that Senegal in Africa now has a Ministry of Ecovillages and their aim is to change 14,000 traditional villages into ecovillages by 2020. Ecovillages have certain ethical principles that focus on nature protection, organic food production, local economic activity, social cohesion and a world-view that supports well-being.

Structure of new paradigm: Many of the measures needed for the implementation of the NDP will fall within the responsibilities of local governments because most risks and vulnerabilities associated with the current paradigm are rooted in local contexts and because much of the risk to ecological, social and cultural systems are within their responsibilities. Local government is therefore a central stakeholder in helping to contextualize and implement the NDP locally through strengthening of local ecological and built infrastructure and services, ensuring better integrated urban spatial planning, supporting community action, and ensuring synergy with the private sector actors around issues of sustainability and resilience. It is important to note, however, that the universal provision of basic infrastructure and services will be insufficient to enable the transition to well being and happiness, and other factors such as preservation of local culture, ensuring the integrity of local communities and spiritual fulfillment are also important needs in urban areas. The importance of harmonization and synergy of poverty reduction, livelihood development, food security, universal access to adequate housing and basic services and disaster risk reduction, with climate adaptation and mitigation and the protection of ecosystem services is critical to the local implementation of the NDP. Thus implementing NDP requires local urban institutions that facilitate coordination and have the capacity to bring people together and to assist communities and institutions in responding collectively to mainstreaming well being measures. Operationalisation of the NDP will also need a redirection of current priorities, investment and capacity building plans including those that strengthen the investment capacity of urban, city and metropolitan governments as many currently are unable to extend a full range of services and the institutional support necessary for effective well being in these settlements. The optimal size for a city, its bioregion and its footprint needs to be known.

Policy changes needed: Multiple changes across legal and regulatory frameworks, jurisdictions, policies and intergovernmental flows are necessary to mainstream the NDP in urban areas. Other challenges to overcome include: reducing the lack of clarity of multi-level governance mandates; addressing the tension between local and higher-level and sometimes international agency driven priorities; overcoming the political disjuncture between short-cycle electoral, growth and competitiveness concerns and competition of local short-term priorities with long-term NDP horizons; overcoming the lack of human and financial resources and compartmentalisation and fragmentation of urban government. Since effective implementation of the NDP needs local responses and includes major roles for local governments and civil society (especially those representing those most at risk), consideration needs to be given to mechanisms by which international support for the NDP can work at scale while supporting local processes. This localization of action is critical if we are to secure a better future for our best creation: the city.