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WATER AND SOIL--HYDRODYNAMICS AND GEOMORPHOLOGY: THE CONNECTING BRIDGE OF NATURAL AND SOCIAL SCIENCES

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ABSTRACT: *In the global environment, water and soil are the major resources for the lives of plants, animals and human-beings, and they are irreversible. The amounts, qualities and suitable distributions of these two resources and the degree of human disturbances on environment always determine the sustainability of the Earth. Water, called fluid, sends organics or source of nutrition and non-organic matter with flow motions, meanwhile deforms the boundaries of the geo-morphology by the hydrodynamic characteristics as the sedimentology. The interaction between hydrodynamics and geomorphology, called morpho-dynamics, reforms the boundaries as a new ecosystem for the ecology and the flood protection. In nature, environment has the ability to self-heal unless it is suffered a very unusual shock such as the human disturbance. These results will concern both natural and social science on regulations, regimes and the human responsibilities on conservation of ecosystem.*

KEYWORDS: Water; Soil; Management; Conservation; Nature; Society; Ecology; Ecosystem; Hydrodynamics; Geomorphology; Sedimentology; Morpho-dynamics;

INTRODUCTION

Water, fluid, has the flow velocity forming the discharge while flowing vertically to a given cross-section, and it can hydraulically deform the boundaries both on bed and side walls of a river channels due to flow density and viscosity with its hydrodynamic characteristics, such as primary velocity, shear stress due to the advection and convection flow, kinetic energy, and energy dissipation rate. The reforming channels change the flow in turn and the ecosystem will be affected at the same time because of the sediment translation as scouring or deposition. These are critical considerations for effective river management and rehabilitation planning. The human disturbance to river system on the morphological manifestation is often not uniform owing to the

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distribution, character and intensity of erosional and depositional processes tending to vary along a river, given the variable capacities of reaches to adjust to and absorb disturbances.

A wide range of variables, such as rainfall and discharge on magnitude, intensity, and frequency; bed slope concerned the soil rest angle; sediment supply and transport influencing the scouring and/or river bed stability and bank resistance determining the channel type while with human activity concerning the ecosystem, preconditions the sensitivity or resistance of a reach for channel change and landscapes. River ecosystems are naturally variable in time and space and this variability is largely determined by climate, geology, and topography and humans who have strongly influenced the hydrologic cycle in the basins through land-use practices in many purposes, all contribute to hydrologic change, especially river flooding. Rates of climate change and climate variability are now being influenced by human activities. Humans have altered river corridors by land overuse of river on water resources and the river bed material, and over-engineering to regime on the human purpose for land utilization on urban, industry and activities in the river basin, to product much pollution and destroy the ecosystem seriously. Rehabilitation projects are starting from annoying local or regional environmental problems especially the issue of bad water quality and unacceptable river regime and abuse of groundwater of the water environment. These interrupt the natural and social system between human and ecology, and sometimes gradually destroy the culture and ethics within human and the earth.

"Making river much more natural" has become an obvious element of the enhancement target. The concept by the habitat template can be phrased in popular terms: first comes the physical habitat, and then the species will follow. Natural physical or called hydrological and geo-morphological processes should be stimulated, and the subsequent development into full-grown ecosystems should be allowed to continue with a minimum of human interference. An effective strategy to enforce the rehabilitation schemes to become economically feasible appears to be to conclude an alliance with partners which play an important role in the physical planning and management of the rural areas. The characteristics on the coupled human–natural systems with co-epetition between river restoration and flood hazards protection are: (1) interacting of emergent and properties by human or natural components; (2) cross–scale

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interactions; (3) analytical nonlinear relationships between human and ecology; and (4) uncertain events for sensitive analysis on interaction. Resilience is defined as the ability of a system to maintain its essential functions, structures, feedbacks, and identity while undergoing changes and to hazards is the capacity to absorb hazard impacts and to reorganize if disrupted. (Walker et al. 2004; Adger et al. 2005; Berkes 2007). Flood resilience is not about flood prevention but concerns survival through flooding. Tolerance of flooding is thus important to prevent flood damage in the first place, and it depends on whether the city is adapted to floods.

CLIMATE CHANGE and UNCERTAINTY on the FLUVIAL ECOSYSTEM

The Fluvial ecosystem, common platform for mankind and nature interaction (Luo 2020a), has own the high sensitivity and uncertainty on the climate change (Luo 2020b, c). Fluvial ecosystems have many features, a colorful platform of the interactions between human being and environment which including inorganic and organic resources. Forest hydrology and thestream/river hydraulics make the ecosystem alive. Aquatic lifecycle depends deeply on the flows, such as water depth, width of channel, flow velocity, material of channel bed and slope of stream/river, to transport nutrient. The hydraulic characteristics of flow through channels are an important component of aquatic habitat evolving in stream systems in which water velocity and flow depth vary spatially within the watershed and temporally on a daily, seasonal, and annual basis. Spatial variability enhances species diversity by creating a variety of habitats within stream reaches. Two important components of fluvial ecosystem are the flow environment and the fluvial geomorphology. Velocity, channel morphology, and discharge vary through time, and creating additional variations of hydraulic conditions. Whether sufficient water of the streamflow available at the appropriate time to meet the needs of both people and the ecosystem is the strategy point on management. Flow analyses, climate situation, vegetation on floodplain, geology, geography of the terrain constrain broad limits on natural flow regime to maintain their ecological integrity and a wide range of human influences. further alter flow regimes by changing flow pathways and response times, and even by altering climate.

Some items of statistics, such as *confidence, divergence, error, exactness, expectation, equifinality, precision, repeatability and Risk* are used to describe the properties and the

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corresponding complex degrees of uncertainty. Uncertainty might also be considered along a continuum that reflects our ability to quantify it (Figure 1). Since uncertainty is so hard to define, a classification of uncertainty is often used (Van Asselt and Rotmans, 2000, 2002; Joseph M. et al 2008) (Figure 2).

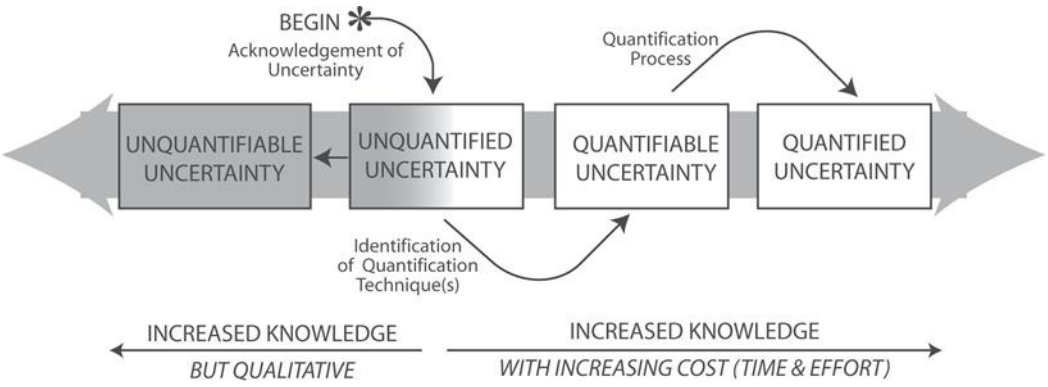

Figure 1 The quantifiable continuum of uncertainty (Once uncertainty is a knowledge as unquantified uncertainties, increased knowledge about the uncertainties will determine their position on the continuum.) (Joseph M. *et al* 2008).

The utility of any typology or classification is ultimately dependent on its application. In reality, there is no unique relationship between uncertainty and knowledge (Van Asselt and Rotmans, 2002), nor is uncertainty a fixed quantity that will always be reduced by scientific research (Jamieson, 1996). It is a highly contextual relationship dependent on the type of uncertainty and the specific circumstances under consideration. The choice of a passive versus active approach will depend very much on the specific social, political, economic and environmental contingencies of individual river basins as well as the extent to which initial conditions matter and how best to proceed with restoration. When we meet uncertainty, we will ask "Is all the uncertainty bad thing?" Uncertainty which always exists is a fact of life as well as an inescapable feature of scientific research and decision making for river restoration, and it is increasing rapidly due to the frequent human activities on the fluvial ecosystem. Uncertainties on the social and cultural fronts of stream restoration can be viewed as signifying forward progress in the field, rather than simply further impediments in implementing projects. To the uncertainty, four current attitudes will be chosen: (1) Ignore uncertainty; (2) Eliminate uncertainty; (3) Reduce uncertainty; and (4) Cope with uncertainty.

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Running waters are perhaps the most impacted ecosystem on the planet as they have been the focus for human settlement and are heavily exploited for water supplies. A lot of factors cause the climate change meanwhile affecting the eco-human interaction.

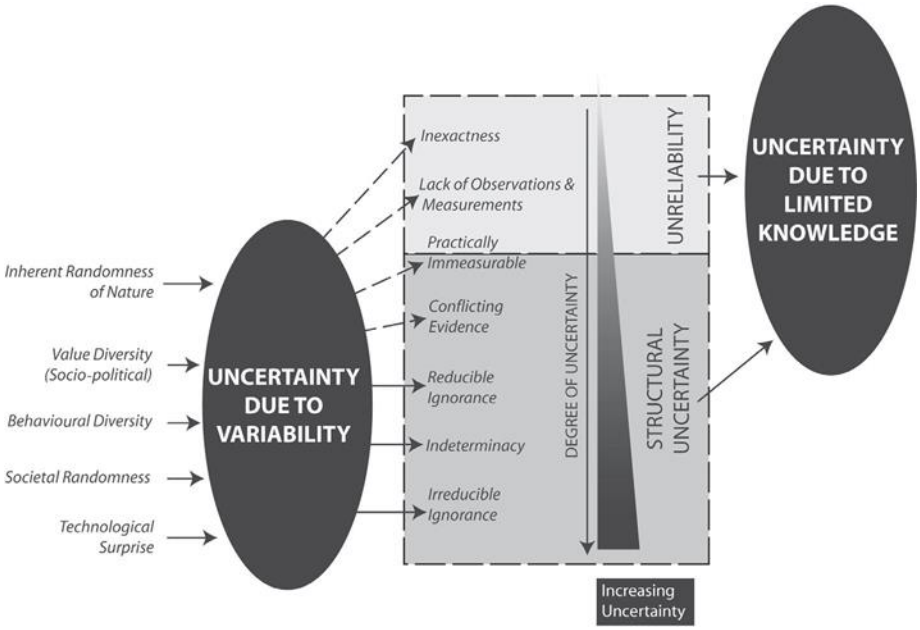

Figure 2. Typology for sources and degree of uncertainty (Adapted from Van Asselt's (2002) proposed typology for uncertainties in integrated assessment.)

ENVIRONMENT—THE PLATFORM OF NATURE AND SOCIETY

Earth, the unit environment as the platform of nature and society, is the only celestial body in the universe where life is known to exist and that also with such a huge diversity. Widespread interference of human related activities has resulted in major problems including environmental pollution, land degradation, global warming/climate change, paucity of potable water supply and biodiversity loss. Global climate change is directly hampering the biodiversity and causing degradation of habitats. Environmental conditions are changing in a drastic and non-sequential manner that can have serious consequences on the ecosystems around the globe.

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POLICIES AND MANAGEMENTS

Broad uncertainties in river restoration and environmental management has been mentioned. Instead of being expressed simply as uncertainties due to limited knowledge, we ignore and miscommunicate through the restoration process in a manner that prevents transparent decision making. There is an increasing recognition in environmental management that ethical and social dimensions are the primary driver, thus, an emerging challenge which the restoration community is faced with is combining these dimensions to "do right things and do things right".

Policies

A. Definition and measurement of the health on the river catchment

Webster's dictionaries define "health" as a flourishing condition, well-being, vitality, or prosperity. An environment is healthy when the supply of goods and services required by both human and non-human residents is sustained. Several arguments are advanced against "health" as an ecologically useful concept. Societal values also enter the discussion, sometimes as an essential consideration, sometimes as an inappropriate consideration. Granted that we must "operationalize" the term — define it and find ways to measure it — but as a policy goal, the protection of the health and integrity of our landscapes and rivers has at least some chance of engaging public interest and support. "Integrity" applies to the condition of places at one end of a continuum of human influence and with minimal influence from modern human society.

Effective and adequate multimetric index should to be identified and tested first. Then analyze data to reveal biological patterns by combining effects insight with statistical power in ways that enable us to understand how a resident biota has been altered by human actions with good analytical results after the sensitivity and uncertainty for the controlled parameters.

B. Defining environmental river flow for requirements

River flows are set to achieve specific pre-defined ecological, economic or social objectives. *Objective-based flow setting and scenario-based flow setting are selected* based on the available data. In fact, the former one is used on planning, while discussion for the latter. For most river systems of the world, no specific ecological objectives have

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been set. Furthermore, many regulatory authorities have to balance the needs of water users with environmental concerns. Therefore, the *scenario-based flow setting* is much selected, because these scenarios provided the basis for discussions between stakeholders (including water companies, farmers, local people and fishermen) of acceptable abstraction strategies. No method is necessarily better than another; each may be suitable for different applications. Not any simple figure can be given for the environmental flow requirement of rivers, thoroughly, it is related to a number of factors.

C. Benchmarking habitat quality on river habitat survey of near-natural streams and rivers

On the growing demands for water, more intensive agriculture in floodplains, expansion of urban areas and transport networks always increase the water use. Assessing the quality of river habitats and understanding both the impact of in-stream and catchment-wide pressures and the effectiveness is an important requirement for river basin management and conservation. Benchmarking rivers of known high quality across a wide range of rivers is essential for calibration purposes. A coordinated and systematic benchmarking exercise, preferably using hydrological and morphological methods, is needed for rivers. Selecting suitable benchmark sites depends on a variety of information sources, notably historical and contemporary maps and aerial photographs and equally important is expert opinion and local knowledge. Empirically derived accumulation curves for features associated with rivers of different size, hydrological character and landscape type would provide a good basis for determining a sampling strategy.

D. Applying fluvial geomorphology to link policy on river restoration planning

River management strategies and activities reflect policy directives. The combined influence of factors such as population pressure, urbanization, climate change and land use impacts, among many considerations, are currently subjecting environmental systems to greater pressure. Integrative approaches to natural resources management build upon scientifically informed policy frameworks. Landscape templates provide a physical platform for developing and enacting coherent measures on balance concerns for ecosystem health and economic development. The River Styles framework (Brierley & Fryirs, 2000, 2005) is a geomorphic tool that feeds scientific information

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into river management applications and prioritization, striving to ensure that actions reflect the values of a given place. Regional-scale conservation planning activities are applied using reference reaches for differing river styles. Catchment-scale investigations into river character, behavior and evolutionary trajectory frame site/reach considerations in their catchment context. On-the-ground activities are explored, highlighting ways providing an integrating platform for catchment action planning, water management planning, vegetation management, water quality assessment, conservation and rehabilitation planning and implementation, and monitoring programs. The use of Geographic Information Systems as a cross-scalar spatial analysis tool to guide coherent management applications. (Gary Brierley *et al.* 2011). From examining the pattern and connectivity of reaches of different river style within the context of catchment-scale controls, then analyzing geomorphic river condition in the context of river evolution and responses to human disturbance, further interpreting river recovery potential at the catchment-scale based upon analyses of the key drivers and stressors that limit system functionality, finally management applications of the information generated based on the prioritization of reach rehabilitation activities within a catchment-scale vision will be the logical concepts.

Linking catchment action with water planning, using river styles condition information to analyze action with water planning, analyzing risk based on river styles recovery potential and fragility: developing a risk to riverine value layer, and using river styles information in monitoring and evaluation combining with ecoregion scale, reach scale and site-specific scale, the policy for management can be made.

In cross-scalar applications of river styles information, some scales are important for determinations: (1) ecoregion scale; (2) reach scale; and (3) site-specific scale.
To connect the river style framework with policies, some rules are listed: (1) linking catchment action with water planning (Figure 4); (2) using river styles condition information to analyze riverine value; defining instream “value”. (3) analyzing risk based on river styles recovery potential and fragility: developing a risk to riverine value layer. Risk is defined by likelihood (from Table 1) assessed against the consequence as defined by the instream value spatial layer (described above). (4) using River Styles information in monitoring and evaluation. The river condition index (RCI) provides an

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overall measure of aquatic ecosystem condition. The risk layer is used to guide water access rules and strategic priorities for on-ground investment and incentives. Each plan also has its own performance monitoring program. The development of the RCI is based on the Framework for building upon a referential condition assessment to generate an overall picture of river health (Table 1). Table 2 provides an example of the reach-scale prioritization framework that is applied using this information.

Adaptive management is an iterative process in which baseline understandings gained from tested theories, and lessons learnt from applications, promote knowledge advancement that enhances scientific and management applications in a positive feedback cycle.

Table 1. Reach-based measurement of risk (resilience) based on vulnerability and threat.

		THREAT *River Styles Recovery Potential – based on condition*					
		Conservation	Strategic	Rapid	High	Moderate	Low
VULNERABILITY *River Styles Fragility*	**High**	Very High	Very High	High	Moderate	Moderate	Very Low
	Medium	High	High	Moderate	Moderate	Low	Very Low
	Low	Moderate	Low	Low	Very Low	Very Low	Very Low

Table 2. Reach-scale prioritization framework.

Risk rating	**Very High**	Very High Priority - Rehabilitation	Very High Priority - Rehabilitation	Very High Priority - Protection
	High	High Priority - Rehabilitation	High Priority - Rehabilitation	High Priority - Protection
	Moderate	Medium Priority - Rehabilitation	Medium Priority - Rehabilitation	Medium Priority - Protection
	Low	none (low risk)	none (low risk)	none (low risk)
		Poor	**Moderate**	**Good**
		RCI sub index rating		

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Managements

A field of research asking a series of complex questions related not just to science but also to society. Two particular aspects of restoration which require further discussion: (1) the increasingly complex definition of the reference state, and (2) the progressive replacement of a reference-based strategy by an objective-based strategy.

Due to their high ecological value, fluvial corridors are a common focus ofseveral gradual strategies to counteract the negative effects of development, including preservation, impact limitation, mitigation, restoration and dereliction. The goal is not to reach a fixed pattern, but to achieve a combination of processes, such as flooding, sediment reworking, ecological succession or species migration and nutrient exchanges, that are by definition highly variable and partially unpredictable.

Usually human actions are perceived as "unnatural to the extent that they rely on technology to transform natural ecosystems". Indeed, man is a part of river system evolution and in many contexts going back is impossible or at least difficult within a single lifetime. We clearly need to find some technical and political solutions in order to maximize ecosystem integrity and human well-being without affecting our future, which supports conservation of ecological values of fluvial corridor as well as their sociological and economical functions in a sustainable way. Restoration actions are a way to achieve this, but they are just a way and not the goal.

Stretching the limits on environmental compensation, habitat creation and sustainable development managements

To maintain "environmental capital" with many interpretations incorporate the compensating for the adverse impacts of development with environmental benefits of equivalent worth, thus maintaining the "stock". This is the national planning policy and the negotiation of compensatory habitat creation for a specific development scheme and the impacts helping legitimize particular patterns of economic growth. "What are the meaningful values?"; What are "Material" and" non-instrumental" environmental values with culture consideration? "What will be the processes of the environmental compensation?" are all need to be integrated.

The planning system provides institutional arrangements of structured malleability

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which serve to mediate technical claims about environmental management expertise, the forms of knowledge on which they are based and environmental values. Planning itself is an activity infused with values. While there exists flexibility to respond to new social and environmental priorities, several features of planning processes may prove to be particularly important in shaping the ways in which sustainable development is defined and translated into practice. There are also strong institutional imperatives towards defining 'stocks' of environmental capital within the predominantly site-based approach to environmental protection. The law and guidance of planning allows relatively little scope for considering non-locational alternatives to development proposals or broad growth patterns. The importance of this for debates about sustainable development is that the perceived feasibility of environmental compensation affects the elasticity of environmental constraints with engineering abilities, governmental and non-

governmental conservation organizations duties on sustainability as maintaining environmental capital or 'environmental capacities. Concepts of "critical environmental capital", environmental features for which any damage would be serious and irreversible, have provided a powerful intellectual justification for strengthening the protection of existing designated areas and other "irreplaceable" environments.

Cooperating rivers and their social relations on the critical step to advance environmental water management

For generations, water resource management has construed freshwater as a natural, asocial substance that can be objectively known and in efforts to maximize its potential as a resource controlled and regulated for human welfare. The modern conception of water as a substance abstracted from social, cultural, and religious context has come under heightened scrutiny. The quantity, timing, and quality of freshwater flows and levels necessary to sustain aquatic ecosystems which, in turn, support human cultures, economies, sustainable livelihoods, and well-being. Environmental flow assessment—also sometimes referred to as environmental water allocation or environmental water management—is a critical step in establishing a societally-acceptable threshold between water available for off-channel allocations and water to be retained within or returned to a waterbody to sustain ecosystems and the social significance of flowing water and alteration. By emphasizing the relational character of human-river

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interactions, the concept and practice of environmental flows can provide a framework for improving our understanding of rivers as social- ecological systems.

There are many examples of other ways of knowing or seeing rivers that are insightful for developing more sustainable and just interactions between societies and rivers. In these and other water knowledge and management traditions, riparian communities are keen to hold on to their custodial rights and responsibilities and would like to maintain their relationships with each other and with the river. A crucial step will be for researchers and water managers to reflexively acknowledge the diversity of ways of knowing, relating, and utilizing rivers, to move towards more locally or contextually situated assessments and negotiations of environmental flows. This will lead to better recognition of the mutual interdependencies between humans and rivers, and support the development of effective approaches to foster more mutually beneficial modes of relating to rivers in situations where water extraction and river regulation threaten to undermine the health of rivers and their dependent human communities. Achieving this requires that assessment and negotiation processes allow sufficient time for full inclusion of all interests and for disempowered groups to be afforded opportunities to influence project scope and methods.

In view of the influence of extreme global climate change in recent years, the frequentoccurrence of severe flood events with short-duration heavy rainfall and extreme water shortage events (Henk O. 2019) are very sensitive to the temporal and spatial differences in the supply of water resources, and the uncertainty of the stability of water supply has increased significantly. The daily projected water demand per person should be gradually reduced, and the water price should be appropriately adjusted to increase due to seasonal and regional differences (Luo C. R. 2017; Luo C. R. *et al.* 2018). Also due to the impact of climate change, rainfall may not necessarily be in the catchment area, and the rainfall collection in the metropolitan area utilization (Luo C.R. 2012) will be a hot spot. The recycling of low-polluting wastewater desalination (Luo C.R. 2021) and changing domestic water habits will all help reduce the risk of water shortage, diversify the peak flow and increase the value of water resources in use for stable water quantities, adequate water qualities, and Reasonable distribution of water rights on people's livelihood, agricultural and industrial utilization

with the water conjunctive strategies (Jayanta Bandyopadhyay, et al. 2016; Luo C. R. 2017 Figure 3).

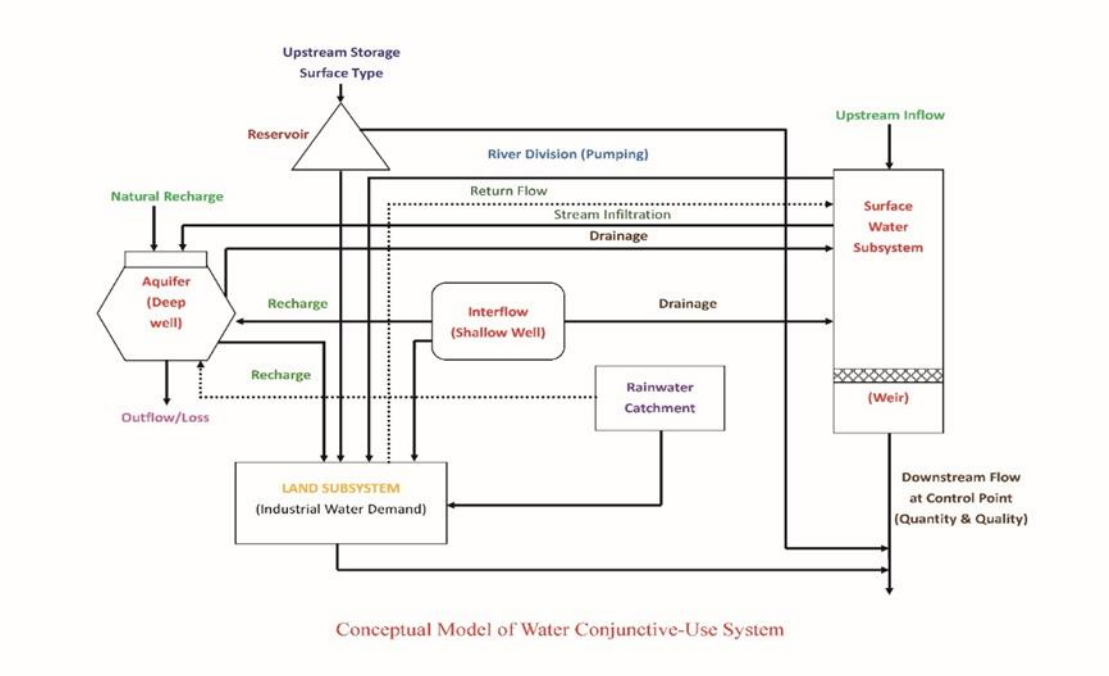

Figure 3. Conceptual management model of water conjunctive-use system (Luo C. R. 2017)

Having something to do with the entrepreneurship organizations to response the environment challenge on the friendly innovation managements

Entrepreneurship is seen as an alternative to unemployment and poverty which could be the panacea for development. Observing the positive social impact of entrepreneurs catering to basic needs, this study recognizes the important role in efficiently contributing to the achievement of sustainable development (Figure 4). Moreover, possible reasons of why entrepreneurs should be involved in sustainable development (Banerjee, 2008) to reveal the motivations for sustainable development and underlying dimensions in decision making. Sustainable development could be defined as "the development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Managing the resources rationally ensures a natural and societal environment for the next generations by conducting an integrative approach with economic, social and environmental politics.

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Figure 4. The Dimensions of Sustainability

The need for global collaboration has emerged from the realization that most problems facing contemporary society are increasingly complex, dynamic, and cross-cutting; hence no amount of research effort within one particular country or discipline or theoretical perspective can be sufficient to produce adequate or durable solutions worldwide. (Obamba & Mwema, 2009). Sustainable entrepreneurship (SE) is a concept that combines both sustainability and entrepreneurship, and has been defined as "an innovative, market oriented and personality driven form of value creation by environmentally or socially beneficial innovations and products exceeding the start-up phase of a company" (Schaltegger and Wagner, 2007). Some important assessment on "SE" could be done: (1) *Assessment of environmental issues of corporate social responsibility by enterprises;* (2) *Reinforcement on environmental entrepreneurship*

One important question is "Under what conditions can entrepreneurship reduce environmental degradation?" Approaching the question of environmental entrepreneurship from an economics perspective, such as devising ways of marketing environmental values; finding ways to increase the value of recycle materials; creating technology which allows property rights to environmental goods to be enforced; or creating new property rights. environmental entrepreneurship is necessary because governments cannot be properly incentivized to protect environmental goods; they do not face the "reality check of profitability." Through illustrative examples of mismanagement of national forests and other public lands, they show the inefficiency of government management and argue instead for market forces and property rights as the means to preserve natural resources. Environmental entrepreneurship is the application of entrepreneurial action to directly addressing issues concerning

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sustainability as follows: (a) uncertainty; (b) innovation; As societal needs evolve within a capitalist society, the entrepreneur provides the innovation or "creative destruction" that moves towards a new way of addressing problems: (1)Resource Allocation: governments and NGOs actions are limited within the free market system, but entrepreneurs, seeking to reduce uncertainty and foster innovation, can find the best use of available resources. Because market controls allow for entrepreneurial solutions, environmental entrepreneurship is a free-market, for-profit activity. (2) the motives and processes of Environmental Entrepreneurship: entrepreneurial motivation has long interested scholars in the broader field of entrepreneurship. While findings have been far from conclusive, scholars of entrepreneurship have found three recurring motivations for entrepreneurship: (a) a high desired for independence, (b) high need for achievement and (c) passionate love of work (Shane, 2004). If motives are divergent for environmental vs. traditional entrepreneurs, it would seem logical to reason the process of initiating and sustaining a new venture may be different as well. (3) what the institutional contexts influence Environmental Entrepreneurship: new institutional theory focuses on examining the hidden forces which shape the actions of bounded rational actors. The realm of environmental entrepreneurship offers a rich and fascinating view into how individual beliefs, economic incentives, and broader societal forces can interact to bring about ecologically sustainable practices. We must begin to view environmental entrepreneurship as embodied within larger fields. By seeking to impart empirical rigor and broader theoretical contributions, this field stands to address some of the most pressing and interesting issues faced by management academics, but also by our broader society.

CONCLUSIONS

In this paper we have discussed some difficulties for conceiving of sustainable development in terms of maintaining environmental capital. Problems arise from conceptualizing how created or recreated environments may be seen as 'equivalent' in value to what is lost when existing environments are the source of a wide array of values. Dilemmas that are obscured by the reductionism of the "capital" metaphor become clear when such concepts are applied. Discussion of "acceptable risk" is apposite. It relates to the social setting in which the risky activity is judged, to the technical alternatives, to its management, and to the processes and institutions by which all these assessments

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are made. The "acceptance" of compensatory habitat creation need not imply accepting that the measures provide equivalent substitutes for environmental losses, not least when there is perceived to be limited policy support for outright objections to the loss of irreplaceable environmental features. The apparent indeterminacies of assessing environmental compensation often results, in practice, in the definition of environmental problems being ceded to interests well represented in the institutional framework of the planning system. Outcomes are not determined – the political, technical, analytical and creative skills used in negotiations are important.

However, the powerful position of major development interests helps them to define 'reasonable compromises' between economic development and environmental protection. The discursive and technical practices of devising environmental compensation are not mere 'outcomes' of social environmental values of a "linear rational" policy process with definitions of environmental capital. By taking a precautionary view of resource substitutability and ecosystem resilience, it has been argued that the "maintenance of environmental capital" requires a major change in current patterns of economic activity and the management of environmental change. Interpreting sustainable development in terms of maintaining environmental capital can place emphasis on whether a given environmental change is "reversible". Combining environmental management and social development together is essential. The dilemmas of environmental compensation should be viewed as integral to the politics of development – to definitions of "the public interest" and to the codified and presumptive rights of developers. To couple with the creative processes of devising and producing environmental compensation can serve to present a 'win–win' picture of the way in which economic and environmental concerns are reconciled. An agenda for natural and social science research is to explore and interpret how environments are changed by "compensatory" environmental creation and to identify what it is that recreated or restored environments are actually sustaining. Sustainable entrepreneurship requires a holistically and equally contributions to economic, social and environmental sustainability. Sustainable entrepreneurs can act as the catalysts for transitioning from current economy to a sustainable economy and fill the gaps left by businesses and governmental agencies in providing critical social and environmental goods and services by evolving from focusing on only one sub-area of sustainability

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and starting to include all.

There are three items for water, such as quantity, quality, and price, and three functions on people's livelihood need, agriculture, and industry. Because of its irreversibility, the recycling becomes obviously important for sustainability. For solving water quantity, we need focus on both surface water characterization and groundwater interaction management. It is important and urgent to establish an integrated water resource management strategy to make more efficient use of water resources to play its greatest benefits. Rainwater collection and utilization can give urgent substitution of water shortage and its cost is cheaper. Of course, changing daily habits of water utilization by adequately raising the water prices and cultivating water conservation is what everyone has to do. Laws and regulations that reasonably increase water prices and advocate user fees should be enforced by the government. In this way, a multi-pronged approach can truly respond to the crisis of water shortage.

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