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On the notion of ecological justice

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Abstract: The increasing loss of ecosystem services severely affects life perspectives of today's poor and future persons. Thus, governing the use of ecosystem services in an intragenerational and intergenerational just way is an urgent issue. I develop a conception of *ecological justice* that establishes the specific link between justice and ecosystem services, and argue that specific demands on a conception of ecological justice follow from determining ecosystem services as objects of justice. Showing that Rawls' "A Theory of Justice" (1971) can consistently meet the identified demands, I verify that it is an appropriate theory for deriving a conception of ecological justice.

Keywords: ecological justice, ecosystem services, global justice, intergenerational justice, environmental ethics.

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"Changes in ecosystems typically yield benefits for some people and exact costs on others, who may either loose access to resources or livelihoods or be affected by externalities associated with change" (MEA 2005: 62).

1. Introduction

Climate regulation, flood protection, pollination, fertile soils, clean freshwater - the Earth's ecosystems provide a large variety of socially, economically and culturally valuable services to humans (Costanza *et al.* 1997, TEEB 2010). Yet, humans degrade today's ecosystems faster than ever and cause the loss of important ecosystem services (MEA 2005: 26*ff.*). The harmful effects of diminishing ecosystem services either appear as negative externalities, as in the case of climate change or soil erosion, or they appear as loss of access to natural resources, as in the case of fish, fertile land or fresh water. Today's poor, women and indigenous communities as well as future generations are, respectively will be, disproportionately affected by the negative externalities of ecosystem degradation and by loss of access to essential ecosystem services (MEA 2005: 62).

Still, the conception of ecosystem services has not been explicitly applied to questions of intragenerational and intergenerational justice. Most research on justice with regard to ecosystem use and conservation focuses either on the intragenerational dimension (environmental justice discourse, e.g., by Schlosberg 2004 and Schroeder *et. al.* 2008) or on the intergenerational dimension (ecological sustainability discourse, e.g., by Goodland 1995 and Neumayer 1999) although these dimensions are interconnected (*cf.* Glotzbach & Baumgärtner 2010). I address these conceptual gaps by developing a conception of *ecological justice* that establishes the specific link between justice and ecosystem services, and that integrates the intragenerational and the intergenerational dimension of justice regarding ecosystem use.

The paper is structured into six sections. In Section 2, I argue that ecosystem services are core objects of justice with regard to nature. In section 3, I identify specific demands on a

conception of ecological justice that follow from determining ecosystem services as objects of justice. In Section 4, I hypothesize that Rawls' "A Theory of Justice" (1971) is an appropriate theory for deriving a conception of ecological justice, and prove this hypothesis by investigating whether the Rawlsian theory can consistently meet the demands on a conception of ecological justice. In section 5, I apply the Rawlsian theory to the object of ecosystem services to derive principles of ecological justice. In section 6, I give a conclusion.

2. Ecosystem services as objects of ecological justice

In my proposed conception of ecological justice the *objects of justice* (*cf.* Dobson 1998: 63) are ecosystem services. In terms of natural capital, ecosystem services are the services generated by living funds (e.g., animals or trees), possessing the characteristic of self-reproduction, and by non-living funds (e.g., soil or air), possessing the characteristic of regeneration (Faber, Manstetten and Proops 1995: 44*ff.*, Georgescu-Roegen 1971: 224*ff.*). According to the Millennium Ecosystem Assessment (MEA), ecosystem services are „the benefits people obtain from ecosystems“ (MEA 2003: 53). The MEA conception of ecosystem services only includes the benefits of ecosystems to human wellbeing. But there are also ecosystem "disservices" which decrease human well-being: "Environments don't act for the benefit of any single species. There are myriad examples of what might be labelled 'ecosystem disservices'. Trees take water out of watersheds; forests may be contributing to global temperature increases; wild animals kill people and destroy property; and wetlands can increase the risk of disease" (McCauley 2006: 27). Because of that, the notion ecosystem services, as used in this paper, encompasses all benefits and harms that living and non-living ecosystem funds contribute to human wellbeing.

I choose ecosystem services as core objects of justice with regard to “nature”, because they include all components and processes of nature that humans value, and thereby, all possible objects of justice from an anthropocentric view. The chosen conception of ecosystem

services, which is based on the broad MEA definition, is not restricted to according nature solely instrumental value. Its category of cultural ecosystem services also allows according nature aesthetic intrinsic value, *Heimat* value and sacredness (*cf.* Krebs 1999: 66).

3. Demands on a conception of ecological justice

From determining ecosystem services as the objects of justice follow specific demands on a conception of ecological justice. These are global and intertemporal extension of the community of justice, institutional agents as recipients of claims for justice, classification of ecosystem services as objects of justice, reference to distributive justice, distributional structure as judicandum, separability of needs and wants for ecosystem services, and embedding in conceptions of social justice. Established theories of justice, which shall contribute to build a philosophically founded conception of ecological justice, need to be tested for how far they meet these demands.

I. Global and intertemporal extension of the community of justice

The *community of justice* comprises all holders and recipients of legitimate claims for justice (*cf.* Dobson 1998: 64). The existence of a community of justice presupposes the existence of some relation created or mediated by the object of justice (Leist 2005: 1). I give three reasons why relations created and mediated by ecosystem services bind people together globally and intertemporally.

First, the specific characteristics of many ecosystem services produce the necessity to extent the community of justice beyond a national community, both spatially and temporally. Whereas some ecosystem services are provided at the same spatial and temporal scale as the ecosystem that generates them (e.g., the provision of wood by a forest ecosystem), others are provided at a completely different scale as the generating system (Elmquist *et. al.* 2010: 47*f.*). Examples include pollination, which is delivered at local scale, but depends on the

maintenance of viable populations of pollinators on the landscape level, as well as climate regulation, a service provided at global scale, but generated locally by carbon sequestration in organic matter and impacting the climate with time delay (*ib.*). Hence, human action towards local ecosystems (e.g., the clear cut of a forest) can affect the provision of ecosystem services at the other end of the globe and in remote future (e.g., climate impacts due to failing global climate regulation). Second, generation and provision of ecosystem services are separated spatially as a consequence of globalization. International trade, global division of labor and multinational corporations often go along with patterns of production and consumption that imply the harms associated with ecosystem service generation being distributed to the countries of the global South and the benefits from ecosystem service provision being distributed to the countries of the global North. Third, modern technology (e.g., nuclear power plants and GMO technology) has enormously extended human impact on ecosystems. Today's introduction of such technologies can irreversibly affect future states of ecosystems and their potential to provide ecosystem services to future persons (*cf.* Jonas 1988: 8*f.*, 54).

As the precondition of "relation" is given for both the global and the intertemporal context, a conception of justice with regard to ecosystem services needs to tackle the question how these relations across time and space should be governed in a "just" way.

II. Institutional agents as recipients of claims for justice

Recipients are the agents within the community of justice, who must ensure justice. I will give positive and normative reasons why institutional agents - with institutions being defined as all mechanisms which govern human use of ecosystem services - should be the prevailing recipients of claims for ecological justice.

The positive reasons include the cognitive, emotional and motivational overload of individuals. No single individual can overview all consequences of her own environmental behavior - because of the temporally and spatially aggregated impacts on ecosystem of myriad

independent decisions, the complexity of ecosystem processes and the interdependency of different ecosystem services. As social institutions (e.g., eco-labelling) exert an orientation function, they can help to interpret and value individual environmental behaviour (Kopfmüller 2001: 106). There are also emotional and motivational barriers, which impede constraining one's own behaviour for the sake of persons at the other end of the globe and in remote future. Social institutions shift the internal control costs of self-restraint to an external institution (e.g., environmental legislation), thereby reducing the psychological gap between the motivation to accept moral rules and the motivation to act in accordance with them (Birnbacher 2006: 21). From an economic point of view, most ecosystem services are viewed either as common-pool goods or as public goods, resulting in overuse (in case of common-pool goods) and insufficient provision (in case of public goods) of ecosystem services. To repair this market failure, the intervention by social institutions and rules, such as property rights, laws, taxes or community management, is demanded. From a governance point of view, most impacts on the delivery and distribution of ecosystem services evade an individual's immediate sphere of activity. The governance function of institutions facilitates the coordination of different agents, where cumulative effort for the conservation and provision of ecosystem services is needed. All these reasons point to institutional agents as the appropriate recipients of claims for ecological justice. By focusing on social institutions and institutional agents one needs to bear in mind that it is the individual actors, their norms and their conduct who shape social institutions and who ultimately comply with or reject institutional rules.

The normative reason for choosing institutional agents as recipients of claims for justice is founded on the communitarian value of ecosystem services. Faber & Petersen (2008) use the term institutional justice to describe a structure of a community that enables its members to lead a good life in the best possible way. Hence, institutional justice includes creating conditions that enable a good life in a community. The provision of ecosystem

services could be defined as an essential condition of a good life, in which the members of a community have a common interest. The provision of essential ecosystem services could even be defined as a basic right, namely the right to physical integrity, in its substantial form. Transferring the argumentation by Faber and Petersen to ecological justice, institutional agents would need to ensure the provision of essential ecosystem services to all members of a community. As national institutions governing the use of ecosystem services influence the possibilities for a good life of people living in other nations and in the future, its global and intertemporal impacts need to be considered (Pogge 1989: 256).

III. Classification of ecosystem services as objects of justice

Theories of justice commonly refer to certain objects of justice (Dobson 1998: 63). In the proposed conception of ecological justice the *objects of justice* are ecosystem services. Thus, it needs to be investigated whether ecosystem services can be subsumed under an object category of the general theory of justice. For example, Rawls' theory is concerned with the distribution of social primary goods. His theory can only contribute to a conception of ecological justice if ecosystem services can be understood as primary goods.

IV. Reference to distributive justice

Ecological justice needs to be further specified by deciding between *first-order and procedural justice*, and between various *domains of material justice* (Pogge 2006). I develop the argument that justice with regard to ecosystem services can best be conceptualized by referring to first-order justice and to distributive justice.

Before discussing the domains of material justice, a decision has to be made between first-order justice and procedural justice. Whereas *first-order justice* refers to the "assessments of a particular allocation of benefits and burdens" (Pogge 2006: 864) , i.e. to the consequences of certain actions, omissions or rules, *procedural justice* refers to "assessments of the way in

which such an allocation comes about" (*ib*.). The opposites first-order justice and procedural justice shall be decided in favor of first-order justice for the here developed conception of ecological justice. Consequentialism is already an inherent part of the notion "ecosystem services" as it describes the benefits to humans *resulting* from ecosystem functions. Furthermore, procedural theories, most famously Nozick's entitlement theory (1974), assume that a just acquisition of the investigated good is possible. In the context of ecological justice, this presupposes that individuals can claim the moral right to acquire (property) rights to ecosystem services. As ecosystems and their functions are given and not created by humans, it can be reasonably argued that ecosystem services are common property of humankind (Helm and Simonis 2001, Schlosberg 2004).

In his „Nicomachean Ehics", the Greek philosopher Aristotle (1998: Book 5) makes a fruitful distinction between three forms of particular justice (i.e., first-order justice), termed by Pogge "domains of material justice" (Pogge 2006). Aristotle divides particular justice in the distribution of divisible goods (*iustitia distributiva*), the rectification of voluntary transactions (*iustitia commutativa*) and of involuntary transactions such as theft and assault (*iustitia correctiva*). I will give some arguments, why justice with regard to ecosystem services should primarily be referred to the domain of distributive justice.

Distributive justice requires that the recipients of claims for justice have common claims to scarce goods. The premise of scarcity (*cf.* Hume 1975: Chapter 3) is certainly given for ecosystem services. Because natural ecosystems are not created by any particular human or any group of humans, it seems plausible to argue that ecosystems and their services are common property of humankind and that every present and future person has a legitimate claim to use them. Further, distributive justice can be regarded as the most comprehensive type of particular justice as it does not depend on transactions such as justice in exchange or prior caused environmental harm such as corrective justice (Leist 2005: 1). Whereas

corrective justice is orientated towards individually caused environmental harm, the most pressing ecological problems such as human-caused biodiversity loss and climate change are caused by a vast number of polluters (*ib.*). Furthermore, corrective justice is commonly "backward-looking, focused on wrongful behavior occurred in the past" (Posner & Sustein 2007: 20), whereas ecosystem degradation needs to be tackled before the worst consequences will appear. By applying principles of distributive justice, both collectively caused ecosystem degradation and precautionary ecosystem conservation can be addressed. Distributive justice can address issues of corrective justice by including the distribution of costs to compensate for ecosystem degradation. To conclude, theories of justice which shall contribute to a conception of justice with regard to ecosystem services need to refer to distributive justice.

V. Distributional structure as judicandum

Judicanda are "things to which evaluative predicates are applicable" (Pogge 2006: 863), i.e. things that can be judged as "just" or "unjust". Pogge lists four different judicanda of justice: individual and collective actors; their conduct (actions and omissions); social rules including social institutions; states of affairs and events (*ib.*).

From the decision in favor of ecosystem services as object of ecological justice and the decision in favor of distributional justice follows that the distributional structure of ecosystem services is the appropriate judicandum. Hence, a state of affairs is evaluated with regard to the distribution of ecosystem services between the members of the community of justice. Intragenerational distribution relates to the distribution of the benefits from ecosystem service provision and of the costs of ecosystem service generation between the members of the present generation. Intergenerational distribution relates to the passing on of ecosystem funds to future generations as only an indirect distribution is possible across generations via the sustenance of “productive” ecosystems.

VI. Separability of needs and wants for ecosystem services

Ecosystem services contribute to various components of human wellbeing (*cf.* MEA 2005). The consumption of ecosystem services serves the fulfilment of both essential basic needs and the wishes beyond. Taken the plausible normative assumption that ethical priority should be given to basic needs, a central problem of ecological justice is that want satisfaction of few people by the overuse of provisioning ecosystem services often happens at cost of need satisfaction of many people living at present and in the future. The most prominent example is the consumption of fossil fuels by industrialized countries, accompanied by the loss of ecological climate regulation at the cost of security and livelihood both of many poor people in the global South and of future people. Another example is the accelerated demand for crops and cattle from industrialized and newly industrializing countries. This demand has drastically increased the conversion of terrestrial biomes into cultivated systems during the last 50 years, accompanied by the loss of various locally essential ecosystem services such as flood regulation, biological pest control, water filtration and groundwater storage (MEA 2005: 26*ff.*).

The ethical demand to use ecosystems in a way that gives priority to basic needs can only be addressed if a conception of ecological justice can distinguish between essential basic needs and wants for ecosystem services

VII. Embedding in conceptions of social justice

There is no sharp distinction line between ecological justice (i.e., the distribution regarding ecosystem services) and social justice (i.e., the distribution regarding human-made capital flows). Taken the ecosystem service climate regulation as an example, the impact of human-made climate change depends not only on the carbon storage and buffer capacities of oceans, forests and soils, but also on the distribution of human, social and financial capital. Is there money and knowledge to build dams, and is there the possibility to earn one's livelihood

otherwise or to live on earnings for a while in case one's agricultural fields are degraded? Beyond the passing of "natural capital", the passing of technologies, money, infrastructure and knowledge to the next generation(s) needs to be considered with regard to intergenerational ecological justice. The central question is whether, and according to which substitutability criterion, ecosystem services can be *substituted* by human-made capital flows. Substitutability is the element linking ecosystem services and human-made capital, and thereby social and ecological distributive justice. Therefore, the distribution of human-made substitutes for ecosystem services should be considered when conceptualizing ecological justice.

4. Rawls' "Theory of Justice" and the demands on a conception of ecological justice

To develop a philosophically founded conception of ecological justice, it is instructive to build on established theories of justice. I hypothesize that the "A Theory of Justice" (1971) by John Rawls is an appropriate theory for deriving a conception of ecological justice. In this section, I prove this hypothesis by facing Rawls' theory with each of the seven demands on a conception of ecological justice.

I. Rawls: global and intertemporal extension of the community of justice

Rawls' theory is a contract theory which considers the question of a just basic structure of society from an impartial perspective (*cf.* Barry 1995: 8). He attains the impartial situation by introducing an *original position* in which the contract partners decide on principles of justice from behind a *veil of ignorance,* neither knowing what makes them different from other individuals nor what conception of a good life they hold. The Rawlsian theory chooses the nation state, i.e. a "society (…) as a closed system isolated from other societies" (Rawls 1973: 8), to be the community of justice.

Can the theory be extended in a consistent and coherent way to include a global community of justice across the present and all future generations? In the following, I argue that Rawls' original position offers the potential to extend the community of justice to include all people living at present and living in future.

The original position and a global community: The philosophical debate on global distributive justice was started by Charles Beitz (1979), who proposed to extend Rawls' original position to the global level (*cf.* Beitz 1979). Rawls himself rejects a "cosmopolitan" original position, but constructs in his book "The Law of Peoples" (1999) a second original position containing delegates from different nations who decide on principles of international law. Criticism of Rawls' international original position and of the principles of justice derived from it concentrates on three aspects: The lack of reference to a globally just distribution of primary goods, the priority of national decisions and the assumed analogy between individuals and states in the original position (Hayden 2002: 89; Pogge 1989: 240).

Rawls grounds rights to basic goods in qualities being inherent to all humans (Rawls 1973: 179). Thus, persons of different countries must be assumed as morally equal. As membership to a certain state is neither a merit nor voluntary chosen, restricting the institutionally guaranteed rights for basic goods to states would be morally arbitrary and would go along with a morally unequal treatment of persons living in different states (Beitz 1979, Pogge 1989: 250, Hayden 2002, Langhelle 2000). To secure a morally equal consideration of all present people, the original position needs to be extended to include a global community of individuals (Hayden 2002: 99).

The original position and future people: Rawls discusses three models which would allow representing future persons in the original position:

1) The assembly in the original position contains only self-interested contemporaries (Rawls 1973: 287*ff*.).

2) The assembly in the original position contains only contemporaries, but they represent family lines which have an interest in the wellbeing of their descendants (*ib.* 292).

3a) The assembly in the original position contains all individuals who exist, have existed and will exist (*ib.* 139).

3b) The assembly in the original positions contains representatives from all actual generations (*ib.* 291*f*.).

In model 1, the "present time of entry interpretation", there are only persons who know that they are contemporaries, but who do not know which generation they belong to in the original position. Because of the persons' knowledge about them being contemporaries, they would refuse to make any sacrifices at all to their successors (*ib.* 292). They would acknowledge the principle that no one has to save for posterity. In contrast to Rawls' first assumption "that all other generations are to save at the same rates" (*ib.* 287), meaning that the principles decided by contemporaries are an obligation to all other generations, he later assumes that the contemporaries cannot affect the saving decisions of previous generations (*ib.* 292). The second assumption, which is consistent with his fundamental construction of the original position, prevents the representation of future persons' interests in the decisions of contemporaries.

Model 2 summarizes the solution proposed by Rawls. By rejecting the motivation assumption of purely self-interested persons, Rawls breaks his contractualist reasoning. As model 2 introduces altruistic interests of the assembly members and a *particular* conception of a good life (i.e., the idea of the familiy and of emotional familiar ties), it is not consistent with Rawls' fundamental conception of justice (De-Shalit 1995: 105*ff*., Unnerstall 1999: 409*ff*.).

Rawls rejects model 3a, i.e. a general assembly of all persons who will live at some time, because this conception would "cease to be a natural guide to intuition" (Rawls 1973: 139). This argument is not convincing as Rawls wants to show priciples of justice for an ideal society and stresses that the original position is a "purely hypothetical situation" (*ib.* 120). A philosophical argument against model 3a can be derived from the assumption of endogenous population development. If the number and individuality of future persons fully depends on actions of the present generation, who shall the future individuals included in the assembly be? As individuals in the original position do not know about their interests and abilities, it would be sufficient to assume future *persons* (*cf.* Ott 2003: 42*ff.*). But the philosophical difficulty is that there could only be *possible* future persons and possible persons do not have any interests at all (Parfit 1987: 359, Partridge 2008: 5).

Model 3b slightly differs from model 3a as it makes weaker assumptions about future generations. It takes the assumption made by Richards (1983, in De-Shalit 1995: 110) that the assembly only contains *real* future persons, who are concerned with the circumstances of their existence, but not their existence itself. More specifically, Model 3b only assumes that there will be future generations with at least one future person living and being characterized by the same human characteristics as present persons. As the assembly decides on abstract and generally agreeable principles of justice, it is not important to know the exact number of generations and of future people in the original position. Model 3b can therefore best represent future individuals in the original position.

Although Rawls restricts the community of justice to a national community of contemporaries, his original position can be consistently extended to include a global community of justice across the present and all future generations.

II. Rawls: institutional agents as recipients of claims for justice

Rawls assumes that the primary subject of justice is "the basic structure of society, or more exactly, the way in which the major social institutions distribute fundamental rights and duties and determine the division of advantages from social cooperation" (Rawls 1973: 7). In Rawls' theory it is institutions and the institutional agents who govern the distribution of primary goods. Hence, it is institutions that must ensure that justified claims for primary goods are met. Institutional agents are the recipients of claims for Rawlsian justice.

III. Rawls: classification of ecosystem services as objects of justice

Rawls' theory addresses the distribution of primary goods. For building a conception of ecological justice on the Rawlsian theory, it is crucial whether ecosystem services can be subsumed under the category of primary goods. Rawls does not thematisize the natural environment at all within his theory of justice. Thus, he also misses to discuss natural resources and intact ecosystems as part of his list of primary goods. Nevertheless, all attempts to relate Rawls' theory to ecosystems show that ecosystems and its services need to be included in a list of primary goods (e.g., Dobson 1998: 125; Visser't Hooft 2007: 88; Unnerstall 1999: 394).

Rawls defines primary goods as "things that every rational man is presumed to want" (Rawls 1973: 62). Primary goods are derived from the idea of the person and the knowledge of the general circumstances and requirements of social life. As persons in the original position know "the general facts about human society" (*ib.* 137), it can be assumed that they know about their basic needs and about their dependence on intact ecosystems and non-substitutable ecosystem services to fulfil them. Therefore, persons in the original position will commonly regard essential and non-substitutable ecosystem services as primary goods. The question whether ecosystem services which are substitutable by human-made services or not essential for human survival are primary goods is less obvious. It can only be answered by

interpreting primary goods as things enabling the exertion of *basic capabilities* (*cf.* Sen 1982: 368). Capabilities are substantive freedoms, vectors of functionings that people can achieve with certain primary goods (*ib.*). The capability approach shifts attention to what primary goods do to humans (*ib.*), and hence to a conception of the good life. Martha Nussbaum's "thick and vague conception of the good" (2003) and Martin Seel's "three aspects of a good life" (1991: 311*ff.*) are conceptions of basic capabilities that explicitly refer to nature. With reference to Seel's and Nussbaum's conceptions, all kinds of ecosystem services can be viewed as resources and conditions enabling the exertion of basic capabilities.

As ecosystem services possess the characteristics of primary goods – with those being defined with regard to a set of basic capabilities - , their distribution underlies the Rawlsian principles of justice which are decided behind the veil of ignorance.

IV. + V. Rawls: reference to distributive justice and distributional structure as judicandum

Rawls aims to provide principles of justice whereby the realized distributive impacts of social institutions should be assessed (*ib.* 55, *cf.* also Sen 2009: 78). Thus, Rawls' theory fully meets the demand for distributive justice and for distributional structure as judicandum.

VI. Rawls: separability of needs and wants for ecosystem services

Within his two principles of justice, Rawls distinguishes between "basic liberties" and "social and economic inequalities" (Rawls 1973: 60). Rawls' first principle of justice refers to a system of basic liberties of citizenship that includes political liberties, liberty of conscience and freedom of thought, the right to physical integrity, the right to hold personal property and freedom from arbitrary arrest (*ib.* 61). Essential ecosystem services[i] can be specified as resources and conditions enabling to exert the right to physical integrity. Therefore, they are to be distributed according to the principle of equal basic liberties, i.e. they must be available

equally and as extensive as possible to all present and future persons (*cf.* Visser't Hooft 2007: 89, Unnerstall 1999: 416*ff*). Rawls' second principle of justice refers to the distribution of all further economic and social primary goods. As already discussed, non-essential ecosystem services can be subsumed under this category. These ecosystem services are to be distributed according to the difference principle.

The principles of justice are set out in a serial order with the principle of equal basic liberties having priority to the principles on social and economic inequalities. A restriction of the protected basic liberties cannot be justified by greater social and economic advantages (Rawls 1973: 61). Hence, the most extensive and equal provision of essential ecosystem services, satisfying basic needs, to all present and future persons is prior to the distribution of other ecosystem services, satisfying "universal" wants. To conclude, needs for ecosystem services can be separated from wants for ecosystem services within the Rawlsian framework.

VII. Rawls: embedding in conceptions of social justice

Rawls does not explicitly discuss substitution between different primary goods. Considering basic liberties, Rawls' only specifies the aim of an extensive set of basic liberties to all contract partners. The substantial right to physical integrity encompasses certain basic capabilities which can be realized by varying sets of goods and services. For example, the capability to be adequately nourished can be realized by the possession of own fertile land, by the possession fishing rights or by sufficient income to buy food on markets; the capability to live in a safe in environment can be realized through protection from floods by mangrove forests or by artificial embankments.

Social and economic inequalities are measured by an index of primary goods (*ib.* Rawls 1973: 90*ff.*). What serves the benefit of the least advantaged is determined "by taking up the standpoint of the representative individual from this group and asking which combination of primary goods it would be rational for him to prefer" (*ib.* 94). It is rational to prefer goods in

relation to their function for individual ends. As I interpret primary goods as resources or conditions enabling the exertion of basic capabilities, ecosystem services are substitutable by human-made services in case they enable exerting the same set of basic capabilities. For example, exerting the capability to recreate can (possibly) be enabled through the recreational ecosystem services delivered by a forest or through a yoga course. But exerting the capability to be related to animals, plants and nature as a whole (*cf.* Nussbaum 2003) cannot be enabled by human-made goods and services.

Summary

Although Rawls himself does neither refer to a spatially and temporally extended community of justice nor to ecosystem services within his list of primary goods, the previous analysis shows that Rawls' "A Theory of Justice" can consistently meet the seven demands. In the next section, I therefore apply the Rawlsian theory to the object of ecosystem services to derive principles of ecological justice.

5. From Rawls' "Theory of Justice" to principles of ecological justice

A consequent extension of Rawls' original position contains representatives from the present and all actual future generations behind a complete veil of ignorance. The representatives know about their dependence on intact ecosystems and ecosystem services to fulfil their basic needs and individual life plans. They regard essential, non-substitutable ecosystem services as necessary primary goods to realize part of their system of basic liberties and all other ecosystem services as further social primary goods. Hence, the representatives would decide on the following abstract principles of justice with regard to ecosystem services, termed *principles of ecological justice* (*cf.* Rawls 2001: 42):

1) Each present and future person has the same indefeasible claim to a fully adequate set of essential and non-substitutable ecosystem services, which is compatible with the same set for all.
2) Inequalities in the distribution of all other ecosystem services are to be to the greatest benefit of the least-advantaged members of the present and all future generations.

The first principle of ecological justice has priority to the second principle of ecological justice.

Lifting the veil of ignorance

The principles of ecological justice are decided in the original position behind a veil of ignorance. After lifting the veil of ignorance, three challenges arise. First, the principles of ecological justice need to be specified for particular ecosystems and policy areas, considering uncertainty with regard to the future. Second, the specified principles need to be implemented by social institutions (Rawls 1973: 7). The principles can mark the overall aims of ecological justice that institutions should seek for, but they do not reveal institutional transformation processes necessary to achieve them. Third, individuals need to support and accept institutions which implement the principles of ecological justice. According to Rawls, the members of the community of justice have a twofold duty: "first, we are to comply with and to do our share to just institutions when they exist and apply to us; and second, we are to assist in the establishment of just arrangements when they do not exist" (*ib.* 334). Whereas the principles of justice are favorable to all rational and self-interested persons behind the veil of ignorance, they become adverse to some persons after lifting it. Therefore, justice as a virtue needs to be an integral part of a conception of ecological justice in terms of responsibility for establishing und sustaining ecologically just institutions.

Rawls himself assumes moral persons "capable of having (and are assumed to acquire) a sense of justice, a normally effective desire to apply and to act upon the principles of justice"

(*ib.* 505). Therewith, he develops a more encompassing idea of the human as a relational and responsible person, whereas in the original position the persons only show one of their characteristics as humans, their rationality. Rawls' idea of the human therefore allows the Rawlsian conception of institutional justice to be complemented with a conception of an "ecologically just person" based on virtue ethics (*cf.* Becker 2010).

6. Conclusion

In this paper, I propose a conception of ecological justice that elaborates on the specific link between justice and ecosystem services. Seven demands on a conception of ecological justice arise as a result of relating justice to ecosystem services: global and intertemporal extension of the community of justice, institutional agents as recipients of claims for justice, classification of ecosystem services as objects of justice, reference to distributive justice, distributional structure as judicandum, separability of needs and wants for ecosystem services, and embedding in conceptions of social justice.

I verify that Rawls' "A Theory of Justice" (1971) is an appropriate theory for deriving a conception of ecological justice for it can consistently meet all demands on a conception of ecological justice. Rawls' original position can be extended to include representatives from the present and all actual future generations, who decide on the distribution of rights to ecosystem services. They would agree on two *principles of ecological justice*: (1) equal rights to a fully adequate set of essential and non-substitutable ecosystem services for all present and future people; (2) distribution of all further ecosystem services and its substitutes to the benefit of the least advantaged, taking the capabilities to lead a good life of the least advantaged as reference.

Although Rawls' theory can meet all demands on a conception of ecological justice, it has two shortcomings: its focus on primary goods as objects of distribution and its focus on pure

institutional justice. The first can be addressed by interpreting Rawls' primary goods as basic capabilities to lead a good life, as applied in this paper, and the second by complementing institutional justice with a conception of the "ecologically just person" based on virtue ethics.

The *principles of ecological justice* integrate the intragenerational and the intergenerational dimension of ecological justice, and constitute philosophically founded criteria for assessing the distributional structure of ecosystem services and its substitutes. Investigating what institutional changes are needed to approach the principles of ecological justice and how the principles of ecological justice can be translated into context-specific indicators, presents a challenge to interdisciplinary and transdisciplinary sustainability sciences.

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[i] A specific ecosystem service can be essential to a certain degree and non-essential above a certain degree, e.g. the provision of crops and clean fresh water.

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