

Article

# The Fourth Regime of Open Space

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**Abstract:** This article reinterprets open space as the theatre of adaptive regimes in the interfering wakes of two major waves of transformation: the agricultural and the urban transformation. The aim of the wave regime concept is to accommodate traditional and emerging land uses in a logical scheme of co-existing regimes separated by transition waves in space and time. Each wave corresponds to a transitional stage from one set to another set of value regime, which by the agents of the transformation is interpreted as a major value increase. The current struggle for space and the difficult interpretations of quality and sustainability can be explained as expressions of competition between value regimes. These value regimes tend to be driven and perpetuated by customary paradigms of land-use planning and management (urban planning, ecology, agronomy, etc.). Land-use sectors ask for rather unambiguous definitions and clear use rights of land use categories and zoning, leaving limited possibility for interaction, mixed regimes and innovative multifunctional land-use. New service demands, new sustainability and resilience urgencies challenge these customary land-use planning paradigms and their rules and instruments. This paper acknowledges a third wave and consequent fourth regime. This regime seeks overall increased sustainability and resilience in open spaces, stressing the strategic importance of unsealed soils and other life conditioning substrates. Different existing land-use models, such as “transition towns”, “agroforestry” and many more, can be interpreted as fourth regime examples, but altogether there is a need for more coordination or integration to turn the third wave concept into a real “wave”. A specific target is to scan territories for characteristics and values according to the prevailing regimes, and assess each unit in terms of third wave transition opportunities, even within active uses that may be at odds with customary rules and expectations. This is illustrated for cases of illegal intake of farmland for non-agricultural activities and for domestic gardens as a missing category in customary rural and land use policy.

**Keywords:** open space; waves of transformation; land-use regime; value; planning

## 1. Introduction

The buoyancy of challenges related to, or positioned in, open (non-built-up) space generates questions about the validity of the currently used categories, discourses and policies of land use and land-use planning. Traditionally and put in coarse traits, open space research and policy are marked by conceptual divisions, mirroring the cultural perception of major “realms” of humanised terrestrial systems. At a general level and traditionally, a distinction can be made among urban, rural and natural systems and their subcategories, each having their proper areal position, paradigms and

value sets, societal sectors, census systems and databases, and schools of spatial organisation and management. We live in a time of rising worry about the sustainability of Planet Earth, and with this, more specifically, of land and land-use systems. The unsealed fraction of this land, for which we use the general expression “open space” in this paper, faces major challenges. It is consumed at an unprecedented pace by urbanisation worldwide [1,2]. Then, over long periods already, indicators show a negative evolution of this land in terms of fertility, biodiversity, visual quality, accessibility, water resources, etc.; and the traditional stakeholders of open space, including agriculture, forestry, and nature conservation are also in conflict and competition with each other for the use of scarce land.

In contrast to these “old worries”, open spaces and its land base are increasingly being rediscovered as an economic capital, as the “ultimate resource” for maintaining or even restoring the earth’s capacity [3] to fulfil material and non-material needs. Diamond [4] analysed the delicate balance between cultures and their resources and Heinberg [5] depicted a dramatic end to economic growth in relation to natural resource depletion. This unpretty scenario fuels the necessity to reconsider our intimate use relationships with land, natural resources and their spatial organisation.

A host of new demands enters the scene, such as bio-energy, buffering against extreme weather events, and carbon sequestration. These demands in one way or another find their substrate in unsealed soils or open spaces [6,7]. Moreover, there are manifestations of land use that are not necessarily a response to the challenges mentioned, but that may be driven by specific socio-economic demands. Examples are ecotourism, windfarms and keeping horses for recreation. [8].

A major challenge for land-use policy is that all these rapidly emerging demands and uses often do not fit the traditional interpretations of land use and land cover, and their associated policies. It suffices to look at current land use categorisations, maps, and allocations to realise that the prevailing nomenclatures are inadequate to accommodate many of the new demands and uses. Current land-use planning models try to solve this partially by draping these “unorthodox” categories across the allocations and demarcations of customary land use categories.

Land-use planners, economists and politicians, now more than ever, should regain attention for open space as fundamental capital. There may be a need for reversing of the order of priority in planning categories, putting services such as protection and regenerative resource use on top. Classical functions such as farming or forestry would not lose importance, but should be designed, modulated and managed according to the sustainability priorities.

Open space, corollary to unsealed soil and non-urbanised land, is squeezed between the challenge of reduced availability and increased responsibility for much diversified land use and for enhanced sustainability and resilience. This certainly asks for alternative concepts of open space and its land use. The current discourses are strongly moulded by the prevailing urban–rural polarity, and by the predominant agricultural interpretation of rural spaces. Few attempts have been made to look for other paradigms of open space. Leinfelder [9] advocated the public character of open spaces in highly urbanised areas such as Flanders (northern Belgium), in discontent with the classical sector-bound discourses and land-use demarcations. The “neo-rural” concept proposed by Gulinck [10,11] is an attempt to break through the classical rural-urban dichotomy and to redefine rurality as sets of recursive values and functions applicable to any open space, irrespective of its geographical relation to urban features. Hidding [12] presented alternative discourses to reconsider the relationships between town and country to circumvent the limitations of analysis in terms of power and of prevailing paradigms. A popular paradigm to soothe the tensions between competing land uses is “multifunctionality” [13]. This paradigm certainly has triggered innovative planning and management schemes such as ecotourism, or cross-compliance payments to farmers to preserve conservation values in agricultural landscapes. In essence, however, the key basic categories (nature, rural, and urban) remain upright, and multifunctionality then strives, if not for “win-win” situations, at least for compromises which minimise mutual conflicts and damage in land use.

This paper continues the quest for schemes to categorise current views, values, drivers, and functions of open spaces, better adapted to new realities and demands. It tries to put the existing

as well as the emerging views on open space in a joint and innovating historical, categorical and spatial framework. The framework of “waves and regimes” is meant to match the customary land use issues and the urgent and newer questions raised in a time of much transition. The paper ends with some cases of land use transitions and conditions for which current land use policy has insufficient attention. A diagnostic scheme is presented in which these cases are scrutinised for their potential to insert a third wave/fourth regime logic, in which open space and unsealed soils are rehabilitated as fundamental capital.

## 2. The Waves-and-Regimes Model

The activation of functions and services of open space is driven by carriers of value sets of different kinds: survival needs, financial speculation, technology, etc. These value sets emerge from paradigms of development and progress and are turned into action by societal sectors, industries and authorities. Qualities (value-related characteristics) of open space are defined and turned into principles for land use policies, planning and management [14]. Shifts in value sets can therefore be interpreted as the key drivers of physical, tenure and functional changes operational in a tract of land [15]. With increased solicitation of open space for newly explicit functions and services, the basic question is: which values and qualities should be acknowledged in a specific area, and how can concurring or competing values be reconciled in a comprehensive framework for land use policies and planning?

We start with a basic scheme of land use dynamics: an area is being used under a specific “regime” (say: agricultural production), under a prevailing set of values (productivity, a consumption market, the culture of a rural community, etc.). Then, suppose some major transition occurs, for instance a major technological innovation, followed by a rapid demographic influx from rural to urban areas. This “revolution” is driven by a perception of a strong opportunity for value increase, and is similar to a “wave” of physical and functional transformation (agricultural modernisation, urbanisation, etc.). This wave is logically followed by an altered or a totally new regime of use, economy, culture, land management, etc. A wave is a progressing space and/or time frontier in which rapid transformations take place. The frontier concept is well known in literature as the geographical and socio-economic leading edge of major transformations [16]. The urban frontier has different spatial forms, from compact growth at city edges to the incoherent phenomenon of urban sprawl [17]. Other words that express a wavelike transformation frontier are colonisation, expansion, and encroachment. The waves themselves can be seen as temporary regimes in which value-generating forces are strongly at work, e.g., speculation by land grabbing, by the commercialisation of timber before the cleared land is occupied by farming, or through influx of capital and physical development. The regimes occurring for longer periods (decades to centuries) in the wake of the waves, in principle should take care of the maintenance or enhancement of their value levels. Soil erosion, rural emigration, loss of heritage elements, and neglect of old urban quarters are a few examples of loss of regime value.

Looking through history and across the world, one can identify two major regime–wave–regime transitions. The pristine regime was characterised by the state of spaces, which we now call “nature” (some generations ago we could call this “wilderness”), and in which we recognise an extensive regime of use and management in terms of inputs, outputs and modification of its components. It may correspond to a nostalgic image in industrialised societies, it still is a (dwindling) reality in parts of the world.

Firstly, came the agricultural wave, in Europe active in different phases in history, in tropical and subtropical areas very active, such as the intake of farmland at the cost of the Cerrado savannah in Brazil [18]. Seen from a rural perspective, spaces are by definition “open” and are the physical carriers of functions such as agriculture and forestry, operating according to specific logics of allocation, layout and management. The consequent agricultural regime can last for centuries if not millennia, but it is characterised by “afterwaves” (in analogy to the word “aftershock”) such as the “agricultural invasion” at the end of the 19th century in Europe, the rapid mechanisation transition during the 20th century, the “green revolution”, or the introduction of transgenic crops. The contrasts between

traditional small-scale labour intensive farming and high-tech farming may be extreme and generate very different land use policy requirements; the constant factor is the use of the soil as capital substrate for biological production.

Secondly came—or comes—the urban wave, in Europe very manifest from the early 19th century on, pushed by demographical growth and by novel models of industry and economy. Globally, farmland is the major land reservoir for urban, infrastructure and industrial development. This second major wave of land occupation is in full swing all over the world, not only physically, but also culturally. From an urban perspective, rural spaces tend to be seen as the developable stock of land, substrate for uses and economies with much increased value per unit area, compared to traditional agricultural or related land use. The urban regime might be interpreted as some “climax” regime of society and space, a virtually irreversible condition in which a major proportion of open space is sealed off. Urban renovation programmes are secondary manifestations of the urban wave. The urban wave has penetrated deeply into rural areas, in sequestering land for essentially non-biological functions such as wind energy production, second homes, or specific types of recreation.

Still and in most planning theories and applications, the trilogy of three “master regimes” (nature, rural, and urban) is reflected in socio-economic sectors, disciplines, and allocation and zoning categories. In addition, the current changes in the terrestrial systems of the planet are interpreted in terms of the triplet urban, rural and green [19]. The clarity of this scheme does not preclude some doubt about its lasting significance for future land use policy and planning.

### 3. The Problematic Coexistence of Regimes

The above model of a chain of regimes and waves suggests a chronology and the substitution of one regime for another. A key challenge of spatial planning, however, is the coexistence of multiple regimes and their underlying value sets, each requesting a share of the land resource, and often being hindered by the use regimes of their competitors. Ultimately, the struggle for space, and the difficult interpretations of quality and sustainability can be explained as expressions of rivalry between the value sets of distinct regimes. These value sets are nourished by established disciplines and their paradigms (urban planning, ecology, agronomy etc.), and by powerful stakeholders (retail market and building industry, agrochemical industry, the conservation movement, etc.).

The opposition between nature and heritage conservation and scale enlargement and environmental pressures in agriculture can be interpreted as a reaction against the secondary flows after the first wave. The consolidation of distinct and defensive farming, forestry, conservation, and development sectors is to a certain degree a response to such latent or effective frictions. However, different sectors may also be each other’s objective partners: farming, forestry and nature sectors together faced and face land speculation for urban development, in a struggle against the second wave.

Another factor of friction can be found in the distinct “spatiality” of competing regimes. At the onset of the second regime, natural factors of climate and soil conditions constrained and partly determined the way in which farming landscapes could be organised [20]. The organisation of an integral rural economy was based on local resources, leading to traditional typologies of landscapes [21,22], human structures, and specific spatial organisation models of farming systems [23]. Whilst in many parts of the world spatial issues such as property fragmentation remain a major obstacle to rural modernisation [24], in other areas aspatial themes such as genetics, hydroponics and soil fertility provide the paradigms for progress.

A major sector of competition with agriculture is nature conservation, that in contrary has adopted major arguments of spatiality, for instance in the well-known landscape ecological principles of patches, matrix, corridors and networks [25]. This spatial drive is one factor of conflict because it often requires trespassing on the territories of other major stakeholders to develop well-connected ecological networks. The remnants of the pristine state are nowadays the core elements of nature conservation. The impacts of the first and second waves on these remnants may last a very long time,

as for instance in the so-called “extinction debt” of natural species surviving in isolated habitats, and as the long-term consequence of the fragmentation of the natural landscape [26].

The concern about uncontrolled urban expansion and sprawl urged the “official” planning actors to set aside land for farming, nature and forest as one of key acts and principles of spatial planning. Seen from the perspective of urban and industrial functions, this setting aside is a counterweight for the negative impacts of urbanisation. On the other hand, this perception of open space planning is “urban-biased”: open space provides services (amenities, etc.) to an urbanised society, and so the development of urban areas should be contained for their own sake, hence the notion of “containment planning” [27]. Such constraining attitudes are also expressed in the overall reluctance by planning authorities, justified or not, towards such developments as onshore windfarms, large-scale greenhouse units, deforestation, big animal husbandry operations, or the re-use of obsolete farm units by non-farming actors.

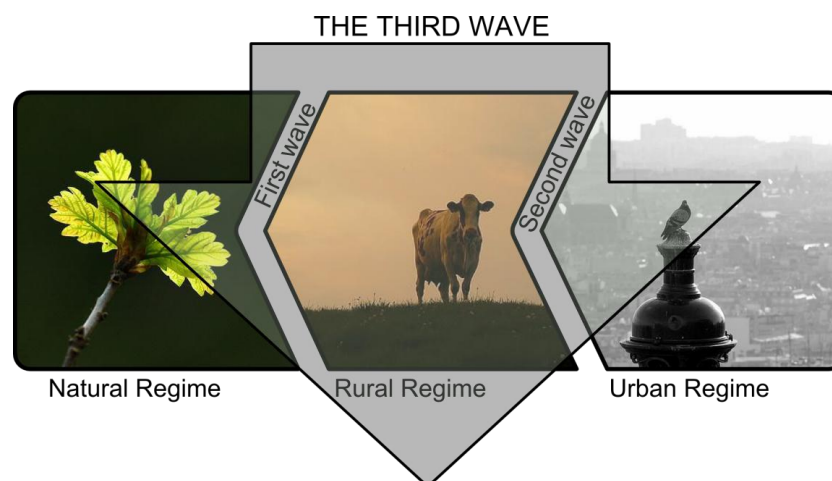
#### 4. The Third Wave and the Fourth Regime

Traditionally, the growing demands for shelter, food and resources could be satisfied by tapping “new” land, whether pristine (first wave) or rural (second wave). The boom of fossil fuel energy did not stop but rather trigger the relentless progress along agricultural and urban frontiers. However, from the perspective of global unsustainability, the general outcry is: “there is no more land reserve”. Open spaces and unsealed soils should be interpreted in the context of a third wave: functional, cultural and spatial principles and transformations, with the explicit objective of maintaining or regaining sustainability and resilience, even in those sites and landscapes thoroughly transformed by man. “Third wave” is a metaphor that accommodates many past and current concepts, initiatives, and policies that, irrespective of their apparent diversity, share for the aim of attaining much increased sustainability.

The emergence of environmental and biodiversity awareness in the past century initiated the third wave by designing policies to improve air and water quality, to restore or conserve sites for nature restoration, and to induce biodiversity friendly management rules in farming and forestry. Rural policies began to depart from a strict productivist logic and assume a post-productivist logic as well [28,29], in which new arguments, considering landscape, heritage, environment and communities, became important. Global impacts of society on nature, resources and climate had become clear, leading to the actual storylines and scenarios of demography, food security, climate, biodiversity decline, pollution and erosion, and energy shortage and supply. These problems and the new demands and planning challenges they trigger are macroscopically aspatial in the sense that they affect all classical space categories and sectors. They are truly spatial, however, at the smaller scale (finer grain) levels, at which for instance the distribution of land use is tuned according to the patterns of soils, water systems and other ecological factors. These functions and services urge us to rethink the values assigned to open spaces and to eventually reconsider the design and management of the open space itself.

In contrast with the first and second waves, the “third wave” does not progress along new frontiers but is rather a cross-flow over existing natural, rural, and urban areas, while the other two waves may remain active (Figure 1). The core idea is to fully promote the “ultimate” value of open space and particularly its unsealed soil component as basic capital for future economies and societies. This third wave (and fourth regime) approach helps to put the first, second and third regime manifestations and their driving regimes (first and second) in perspective to the overall sustainability and resilience concern. On the line of the above sketched sequel of regimes and waves, the third wave leads to a “fourth” regime. Future land use, irrespective of its eventual attested “first-purpose functions” in land use planning (e.g., residential development, energy crops or windfarming), should be interpreted in its capacity to work as a fourth regime expression, in which the stakeholders have turned their mind to a full sustainability goal accompanying the apparent first target. It is not necessarily a physical or spatial change, but certainly a “turning-of-mind” that is the essence of the third wave.





**Figure 1.** Interacting waves of transformation and land use regimes. The third wave as an “awareness wave” rolling over dominant regimes.

### 5. Third Wave/Fourth Regime Manifestations

For strategic planners it is useful to reflect on the position of current and envisaged policies, instruments and their driving forces and actors, in relation to this third wave/fourth regime model. Thus, for example, the conservation of heritage landscapes is a reaction against first and second wave, but still a relatively weak expression of third wave/fourth regimen since it is about keeping past qualities rather than fully going for future sustainability needs. According to standard agricultural practices in a global market logic, growing food is a second regime manifestation, whereas the production of niche farm products with sustainability labels has a fourth regime characteristic on top of its second regime characteristic. The expansion of hobbyhorse farming [8] in the countryside is largely driven by urbanites and should be seen as a second wave manifestation, despite its rural appearance. The installation of windfarms can be interpreted as third wave since it is equivalent to an industry operating through a construction, and does not depend directly on the living soil substrate. Fine-tuning spatial allocation and organisation for reduced resource depletion or other measures for enhanced sustainability can be interpreted as third wave. Some current innovations within agriculture can be interpreted to have some third wave characteristic, such as in the case of specific linkages to urban-industrial complex (greenhouse clusters and heat power coupling). Likewise, the current struggle for nature conservation is not just about maintaining terrestrial environments in some pristine-like condition, but can in many cases be interpreted as a third wave phenomenon, in its expanded interpretation for direct and indirect functions and services for humanity and for the global environment.

There are more explicit examples of third wave/fourth regime manifestations riding on a variety of paradigms, models, technologies, instruments and policies, all sharing a common concern for maintaining or improving the quality, sustainability and resilience of both the resources and substrates they are based on, and for adapting the operational systems of development, production and management. Let us call these different manifestations “models”. The introduction of such a model is a manifestation of “third wave”. If successful and sustained, the consequent land use systems are in the “fourth regime”.

A systematic review and classification of these models is beyond the scope of this paper, and would deserve a separate study. An example of an older of these models is the *Garden City* concept developed at the turn of the 19th to the 20th century by Ebenezer Howard [30], an ideal of urban layout for self-sufficient communities. Models in the urban sphere are *Regenerative Design* [31], *Landscape Urbanism* [32,33], *Urban Ecology* [34], *Climate proof cities* [35], and the increasingly popular concept of *Transition Towns*, about which it is hard to find scientific literature so far. In the agricultural

sphere, *Agroecology* actually scores high in public and political attention. This term was introduced by Altieri in the 1980s [36] to emphasise a balanced view on ecological and socio-economic aspects of agricultural systems. Recently, the concept of agroecology has been broadened to more fully integrate social, cultural and geographical dimensions, to stress the multifunctional role of farming, and to provide a baseline for farm design [37]. Concepts of modern forestry, increasingly focusing on the multifunctional values of forest, are close to the idea of the fourth regime [38–40]. *Permaculture* [41], *Agroforestry* [42], *Urban Agriculture* [43], *Community Gardens* [44], *Vertical Farming* [45], and others are all specific models as alternatives and complements to the mainstream agricultural models and their emphasis on specialisation, scaling, independence from fossil fuels and from global markets. *Landcare* [29,46] has been presented as a success story about community based adoption of sustainable resource management. Types and targets of *restoration or regeneration* (of land, forest, soils, natural habitats, etc.), as well as the uncountable actions and projects flagged by the adjective “sustainable”, could also be added to the list of third-wave-like actions and programmes or fourth regime expressions.

As these examples show, there is room for interpretation, and third wave/fourth regime manifestations are not exclusive, and not necessarily “pure”. Take the case of rural policy. Should rurality be kept in its traditional interpretation (second regime), or should one allow functions and structures that are considered as “urban” (second wave and third regime), or do we need a thorough rethinking of this policy in terms of long-term sustainability strategies (third wave/fourth regime)? Is agriculture still the standard rural activity (second regime) or can it also be considered a completely redefined activity to enhance sustainability of both urban and rural settings (fourth regime)? Reversely, the effort in labelling according to waves and regimes adds to clarify the difficulty to upkeep old categorisations such as urban and rural.

## 6. Developing a Tool for Analysis and Diagnosis of Spaces and Discussion

Many new land use expressions and needs do not match standard land use policy categories. By the third wave/fourth regime concept, our aim is to accommodate traditional and emerging land uses in a logical scheme of co-existing regimes separated by transition waves in space and time. An analytical tool can be derived to interpret current land use manifestations toward their opportunities for enhanced sustainability and resilience. The key to assessing the wave/regime interpretation to land use is to search for its actors, functions and opportunities. Essentially, this corresponds to questioning the “official” values and functions assigned to land and to land use, the “effective” values and functions underscoring an existing regime and the “potential” values and functions for enhanced sustainability. The logic of the third wave is not to downgrade first, second or third regime value sets, but to explicitly question the effectiveness of the co-occurring operational value sets in promoting such overarching qualities such as resilience, social acceptance, landscape quality, low foot printing, and other qualities that are part of the umbrella concept of sustainability. In other words, the third wave invites lines of thought concerning the current land use dynamics, and to search opportunities for much increased sustainability in the many co-occurring ambitions and expressions in the real world. After a thorough social and political evaluation of such lines of thought, true policies should be developed to launch a real third wave and fourth regime.

Planners may first do more efforts in accommodating the different rather independent fourth-regime-like models into a comprehensive scheme of land use planning and management, and in expanding the “vocabulary” of land use. In addition, planners should be stimulated to scan all land units for their characteristics and drivers in relation to third wave/fourth regime ideals and opportunities. Such scan corresponds to the search of the underlying value sets governing the use and dynamics of the area in question.

The diagnosis of any tract of land corresponds to the following key questions:

- Which are the sets of value operational in a specific area, and more specifically to which wave/regime can they be assigned?

- Are the operational value sets and their physical expressions conform to normative categories and frameworks?
- What are “third wave opportunities” in this area, and in how far do the operational value sets meet such opportunities?
- What kind of frameworks should be developed for a fourth regime planning and management of open space?

Finding cases to illustrate this scheme is easy, but it may be useful to first select cases in which a certain deadlock in the current regimes and policies of land use can be detected. The following cases were selected from different research topics of the authors, to illustrate the relative unfitness of current land use definitions and planning discourses to accommodate specific phenomena in the open space. These cases illustrate how to probe the capacity of the waves-and-regimes model to grasp the conflicts between value sets. Furthermore, these cases illustrate gaps in land use policies that currently refrain to give them a interpretation twist towards a sustainability interpretation matching the fourth regime paradigm.

### 6.1. Case 1: The Non-Farming Re-Use of Obsolete Farm Units

The traditional description of a farm is an enterprise that gains value from the land substrate. It is the ultimate expression of a second-regime condition. In subsequent pulses of the first wave, modern farms have kept up their capacity to cope with new produce demands, new technology and new market conditions. However, in many industrialised countries, many farms, still operational until a few years to few decades ago, have not persisted, but were either incorporated by existing farms (continuation of second regime) or were removed. Many were assimilated in the fabric of growing villages or cities (second wave and transition to third regime). A study in the western part of Belgium [47] gives quantitative insights in the re-use dynamic of rural buildings and their immediate surroundings by non-agricultural actors. Functional intake of farm units by non-agricultural activities is an ongoing transformation of rural areas, and can at first sight be interpreted as a second-wave phenomenon: the open space and the living soil have little contribution to such activities, except as spatial setting or physical substrate.

*Which value sets?* Activities such as building contractors, ground workers, and transport firms, as well as wellness and children’s day care centres are moving into farmsteads and other rural buildings. It is clear that these obsolete farms are carriers of alternative locational and infrastructural values that may compete not only with other function in the traditional rural setting, but also with actors in urban and industrial locations. Parts of the surrounding farming land is either taken over as well, as a kind of “garden”, other parts may be taken over by continuing farmers. Most of the new activities taking place in these former farm units are of third regime nature, because fundamentally unrelated to the soil ecosystem.

*Conformity to norms?* These activities are in conflict with the official land allocation rules because the area in which it takes place is designated for agriculture. Leakages in the legal instruments, or even barely hidden illegal initiatives, allow new speculative sets of value to override the legitimate farming values. Research further revealed that these activities have increased over the last five years. The non-agricultural re-use is an example of the urban wave breaking the dyke of the legal framework and rapidly colonising a (peri-urban) rural area.

*Third wave opportunities?* At first sight, there is little contribution to the third wave/fourth regime characteristics in these new activities. There is no explicit policy, there are no strong signs of grassroot movements that explicitly advocate long-term sustainability and values linked to the open space and soil characteristics. However, an enquiry among local dwellers reveals a detailed picture about the public perception of the transformations taken place, unveiling the germs for a fourth regime strategy. Measuring the appreciation/perception (as proxy to “value”) of the spatial impact of these illegal activities thus illuminates that in some cases this transformation carries the capacity to reinforce [47] the quality of rural areas and that re-use in reality is not per se a threat



to sustainability. On the contrary, re-use may also be seen as an opportunity to preserve and give a continuity to highly-valued sites, and an opportunity to preserve and reinforce the quality of the surrounding open space. The safeguarding of this setting is at least one condition to stimulate creative ideas for promoting regenerative use of the free soil, hopefully not in too distant future.

*Fourth regime frameworks?* The current restrictive legislation does not support this potential win–win strategy. Understanding the policy deadlock about economic diversification of rural areas requires evidence-based insights of all the transformations in rural areas. Future land use policies aiming at bridging the gap between legislation and the reality on the ground therefore needs a sound understanding of all, planned and autonomous, transformations. Only then can one continue to adapt novel planning options, and fully “draw the card” of the third wave and fourth regime. Next to policies stimulating regenerative use of the unbuilt soil with increased capacity for absorbing climate and other effects, a policy might promote the conversion of obsolete farm buildings to decision centres or enterprises for such “green economy”, rather than tolerate any deliberate functional intake.

## 6.2. Case 2: Solar Mirrors Encroaching Arable Land

During the last years, solar mirrors have covered significant portions of agricultural lands—mostly arable—in southern Europe. Such a change took place with an exponential pace in term of surface. A recent work [48] showed that, in a single region (Marche) in central Italy, 12,000 new facilities were installed in less than five years for a total power of more than 784,000 kW, spoiling 600 ha of arable lands. Many of the installations were not initiated by farmers seeking to broaden their business or to penetrate the renewables market, but by external companies seeking the rich flow of national subsidies, in constant search for farmers and landowners willing to sell parcels. Considering the spatial entity of the phenomenon, the integrity of farming landscapes and their potential suitability [49] is certainly at stake. That is why the spoiling effects of the sprawl of solar mirrors across the territory cannot be in any way underrated or misunderstood.

*Which value sets?* Compared to the case of re-use of farm buildings, this case depicts the re-use of agricultural field for activities that according to current interpretations are of non-farming nature. This growing interest of farmers for solar energy could be interpreted at first glance as a third-wave manifestation (green energy) leading to a fourth regime and taking advantage of current innovations and farmers creativity. This phenomenon is largely speculative in nature, substituting more lucrative solar energy farming for less profitable traditional farming. It is more correct therefore to interpret this “solar panel encroachment” as a second wave issue.

*Conformity to norms?* As in other countries, policy makers and planners have based their reasoning on the conceptual vision that considers three “classic” typologies: nature conservation spaces, rural and productive agricultural spaces and the urban environment as sharply separated and where zoning has been the usual tool for planning. The solar mirrors do not fit easily in the existing legislative and planning frameworks, making it difficult for regional and local authorities to interpret the phenomenon.

*Third wave opportunities?* The use of renewable sources of energy opens a new possibility of farming income. The current problem is the void about ideas concerning the future of the rural area itself, particularly the natural resources, agricultural soils, etc. The expansion of these fields is certainly a “wave”, but currently it is rather a second wave issue, because it is at service to urban and industrial consumers in the first place, and using the available space just as cheap physical substrate. Solar mirror fields should be picked up as a challenge for expanding and completing a sustainability strategy at a regional scale, and seek carefully for locations in the landscape to accommodate these features in a regenerative way, so as not to lose definitely the capacities of the soil substrate.

*Fourth regime frameworks?* Currently, there are no master and development plans in which the installation of solar energy plants is part of a comprehensive sustainability policy. There are not even rules about allowable densities and about spatial organisation patterns to avoid damaging effects on other local activities and services. At least the policies should strive towards keeping the soil substrate

as intact as possible, for instance by carefully allocating solar panels and as much as possible do this in a reversible way.

### 6.3. Case 3: Domestic Gardens

Domestic gardens are the logical followers of urban expansion, also of urban sprawl. Building lots maybe large enough to have an uncovered rest fraction that can be developed into a garden. In Flanders (northern part of Belgium) alone, 8.3% of the total area is covered by domestic gardens as part of built parcels, and this totality has been given the name of “garden complex” [50]. These gardens are “closed” as private units, but are “open” as uncovered soil surfaces.

*Which value sets?* Domestic gardens are micro-units of land use, and subject to the idiosyncratic value sets and actions of millions of individuals and households. From historical analysis and from studies of the current gardens, clear value categories emerge, however, including expression of self through among other display features, partial self-sufficiency in food and other services, recreation, etc. In times of economic crisis, gardens have played an important role as socio-economic buffer. As part of urbanisation, they are manifestations of the second wave and third regime; seen as micro-units of horticulture or agriculture, they fit better in the first wave and second regime.

*Conformity to norms?* Gardens are in principle “havens of freedom”; they are basically free of norms imposed by policies, and, as in the case of Belgium, except for some rules regarding permits to fell trees or the appearance of front gardens.

*Third wave opportunities?* Gardens are growing in attention, particularly in grassroot organisations but also in national to local policies, dealing with issues such as environmental protection, biodiversity, food production and many other services. Domestic food gardens can be interpreted as a special subcategory of urban agriculture. They are direct working fields for adopting third wave and fourth regime attitudes and actions, such as shortening food miles, recycling compostable matter and experiencing with biodiversity. For individuals and households, domestic gardens can be the interest shared with others, as a basis for joined reflection and action about opportunities for lowering footprint and generating other sustainability related values.

*Fourth regime frameworks?* A strange fact about domestic gardens is their lack of explication in most policies such as spatial planning, agriculture, environment, etc. Overall, census or monitoring of gardens and their products is lacking. This means that domestic gardens along with related categories such as urban agriculture deserve novel explicitness in political strategies concerning sustainability and resilience.

### 6.4. Case 4: Non-Timber Forest Products in the Cerrado

The Cerrado is by origin a huge savannah area in Brazil, east of the Amazon forest, and three times the size of France. This biome, one of the world’s biodiversity hotspots, has lost almost 50% of its native vegetation cover whilst only 20% of the biome can be considered as undisturbed [51]. Large scale agribusiness operations have radically changed enormous stretches of the Cerrado as a huge first wave system. Negative impacts of this transformation include biodiversity loss, pollution, depletion of surface and groundwater [52], increased heat islands and social and cultural havoc. One of the proposed pathways to help safeguard the biome’s riches is the promotion of collecting “Non-timber forest products” (NTFP) [53], such as fruits, nuts, medicinal plants, golden grass (for handicraft products), game, and others. In fact, this is a traditional practice by native communities. It could be elevated to higher importance by opening up new international markets for such products, but then many obstacles around marketing, transport, sanitary conditions, etc. need to be overcome.

*Which value sets?* The Cerrado offers a strong example of widely diverging value sets. The industrial agriculture defends itself as “feeder of the world” [54], and overall the agribusiness in Brazil accounts for a big share of the GDP of the country. Other stakeholder groups strongly advocate the environmental and cultural riches of the native savannah biome. The NTFP model

in principle draws the card of the environmental conservation of the native Cerrado coupled to socio-economic opportunities.

*Conformity to norms?* In the case of the Cerrado, this issue is quite complex. Not much of the land is under legal protection, in contrast to the Amazon, and constraints on the use of public and private land are much less expressed as well. NFTP can in principle be operated, unless agro-industrial enterprises receive a concession on the land.

*Third wave opportunities?* In its traditional forms, NFTP is situated between the first and second regime of land use (extensive use of a natural area). If generalised and practised in the spirit of safeguarding as many of the environmental qualities of the savanna as possible, it can be seen as a third wave expression.

*Fourth regime frameworks?* Strong frameworks may be necessary to avoid NFTP merely degrading into a second regime condition (production) without sufficient fourth regime ambitions (sustainability). Continued monitoring of the impact of NFTP on the Cerrado biome is necessary, as well as a host of tools including restrictive exploitation rights, fair trade labelling, etc. In addition, NFTP should be part of an overarching policy that includes introducing, among other things, the restoration of degraded land and the introduction of sustainability principles and practices in the agro-industrial enterprises [55].

Planners, economists and others have used the metaphor of waves in different interpretations, substantially different from our vision. Bradshaw and Bakely [56] for instance, described the “third wave” of economic development characterised by among other public-private partnerships. Toffler [57] described radical changes in society, and their consecutive stages of overall societal organisation and policies, in terms of waves. In his approach, the wave’s metaphor reflects major stages of cultural and technological development in a chronology: (1) society after the agrarian revolution; (2) society during the industrial period; and (3) post-industrial society. In this paper, we also refer to three waves, but with a different interpretation. The focus is on open space and “free breathing soil”, rather than on the total human and global community in Toffler’s approach. The second more important difference is that, what Toffler calls “waves”, we prefer to call “regimes” or dominant cultures or paradigms of land use following a transition (in the “wake” of the proper wave), such as the urban and industrial condition following a natural or a rural condition. Such a culture or regime is characterised with specific structures, technologies and activities although most of them should be rearranged to meet contemporary challenges.

Metaphors, such as “waves and regimes”, have their limitations and should be handled with caution [58]. However, the utility of the metaphor of third wave/fourth regime cannot be denied, especially since increasingly this world is filled with highly altered and organised spaces with high degrees of irreversibility in physical conditions, while there is a growing perception of scarcity and urgency.

By analysing the superposition and the interferences of the three waves (and of their resulting regimes), conflicts, but also positive synergies, can be better identified and planning and management principles can be unveiled and fine-tuned. The utility of the three-waves model (and the corresponding four regimes) and especially the rationale of the third wave metaphor, should be checked by projecting it onto current dynamics in open spaces, certainly those in which there appears to be some deadlock in planning and management. Such deadlocks can exist because of reasons such as emerging functions not fitting into the existing nomenclatures and policies, or the impossibility to curb a reality of unplanned land use developments back to the state dictated by idealistic policies and legal frameworks.

Current driving forces, policies and actions may still be expressions of the first or second waves and their consequent regimes. The superposition and the interferences of the three waves (or their resulting regimes) may shake existing definitions, values, functions and policies. The three core-regimes of space (“nature”, “agriculture” and “urban-industrial”) should no longer be considered as essentially incompatible with each other. These three regimes can even be claimed at the same time, because in

many cases there is simply no other choice. The transition of cultural, political and planning concepts to such principle is the “third wave” of transformation to a “fourth regime”.

## 7. Conclusions

The essence of the third wave and the fourth regime is the transformation of a mind-set, of policies and of action, rather than an essentially physical transformation: looking on open space as ultimate resource, and acknowledging its role as “generic buffer” against different threats. Not only food production, climate buffering, biodiversity, living and working quality, amenity and health, but also visual quality, multifunctionality, regenerative capacities, low footprints and locally adapted land use and economic systems are targets/functions to be fulfilled through planning and management of open space. Many of these functionalities and services have been summarised and interpreted in the Millennium Assessment [6]. They can no longer be fit sufficiently in the simple dual urban–rural model or in the slightly more complex urban–farming–green triplet. They fit better in this third wave concept.

The deficiency in current open space policies is first of all the relative neglect of open spaces and rural environments in spatial planning. Agricultural productive lands for instance are rather categories in other policies such as the Common Agricultural Policy (CAP) in the European Union [59]. In these policies the rural environment tends to be interpreted as a soft-conservation theme, useful to mitigate urban and environmental impacts and the deterioration of nature, heritage and landscape qualities. The situation has evolved to conditions and developments that planners and policy makers have not considered before, such as the sprawl of photovoltaic units in farming land.

As Matthews and Selman [60] stated: there is need for new creativity and virtuosity for new understanding of different value judgements. The essence for land use policy is to find out at what stage value expressions have reached a level at which a new regime in political and land thinking is ripe to be fully put on the track of a fourth regime of multifunctionality linked to sustainability. From that moment on, planners and policy makers have to assume new vocabularies and rules of land use, not by superseding the older ruling principles, but by creating in the maximum way possible new positive synergies and win–win conditions.

However, the third wave/fourth regime model can be called naive. Indeed, the pace is slow in turning policy and planning spirits in the productive mood to lift concepts such as sustainability, regeneration, resilience and ecosystem services on the top shelf of planning priorities, without ignoring of course the currently predominantly economic discourses. For large tracts of land, there is no plan, vision or willingness ahead to turn their functions and management to the fourth regime. Even in cases in which these concepts are taken seriously, such as in the forestry sector, barriers to the entrance into the ecosystem markets are recognised, because of the great diversity in interpretation of such services [61]. In addition, there is the ever-lurking danger that apparent fourth regime actions and projects are no more than greenwashing. However, evolutions in certain policies and strategies illustrate how the concepts of third wave and the fourth regime may find a real foothold in planning and management policies. Future reforms of the higher mentioned CAP promise a stronger integration of farming support, rural development, and environment and climate actions. Moreover, new urban development models put a strong emphasis on green spaces and permeable substrates, as part of the ambition to turn traditional cities into “sponge cities” [62] to make them much more robust in terms of hydrology, climate and human health.

Further research is needed to probe the utility of the waves-and-regime model from both theoretical and practical perspectives. It should be matched with such concepts as adaptive cycles and resilience [63]. Certainly, a consolidated quest for such long-term safeguarding of resources and economies across sectors, zones, disciplines and stakeholder groups is not possible without a new sense of “commons” [64,65] and new forms of governance.

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