5 The liminal paracommons of future natural resource efficiency gains

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Introduction

The study of the commons continues to proliferate metaphors, labels, and concepts better to convey understandings of natural resource and environmental governance. Updating Hardin's 'Tragedy of the Commons' (1968) has produced many examples, including: 'commons and anticommons' where under or over regulation is tested (Brede 2009; Heller 1998); 'inverse commons' (Raymond 2000) where both greater consumption and sharing leads to greater good (as with, say, open source software); 'new commons' (Hess 2008), identified as those without developed rules and institutions; 'invisible commons' (Bruns 2011), covering the specific challenges of groundwater; and the 'semi-commons' where overlapping ownership regimes in water exist (Smith 2008). To this list I have introduced the term 'paracommons', to describe a hitherto neglected commons, that of resources freed up and salvaged by future efficiency gains.

Why is this neologism needed? A changing context of increasing scarcity (whether perceived or real), resource recycling, allocation/reallocation, and so-called green growth establishes new urgencies that drive up an interest in the role of efficiency (Bretschger 2011; Keys *et al.* 2012). The tracking, accounting, and ownership of 'saved', once-inefficiently-used resources will be of paramount importance, as exemplified by Norris's (2011) commentary on a recent water dispute that revolves precisely around these efficiency gains, and to whom these gains accrue: '...the United States Supreme Court's recent decision in Montana v Wyoming brings to the forefront one of the most complicated and contested facets of irrigation efficiency: who owns the rights to the conserved water?' Here, and I will return to this exemplary case, Norris is asking about access and ownership over something – a kind of 'commons' – that has *become* apparent but has *not yet been* claimed: a 'paracommons', in my usage.

Using this idea of a resource freed up in the future, this chapter introduces three key ideas. First, it explores more fully the idea of the 'paracommons' of yet-to-be salvaged natural resource surpluses, losses, wastes, and wastages. The savings of increased resource efficiency can be viewed as a common pool problem, asking the pertinent question: 'in a given socio-technical system (e.g. an irrigated river basin) who gets the material gain of an efficiency gain?'

Second, the chapter examines a defining feature of the paracommons, which is its 'liminality'. Liminality, or 'in-betweenness', exists because any paracommons arises out of the temporal difference between a perceived inefficient *today* and the promise of a more efficient *tomorrow*. Such promissory notes do not of course always hold their value. Liminality accordingly signals the in-betweenness of systems caught between overly optimistic prefigurations of future efficiencies and disappointing or even paradoxical paracommons outcomes.

Third, and closely related to liminality, this chapter explores salvageable resources via an *exteriorising* phenomenon, of 'something-hidden-inside-coming-out'. Part of society's conceptual struggles with waste and wastage is not so much due to their visibility (for instance, as refuse/waste products) as their invisibility or near visibility within the changing consumption of resources driven by societal and environmental trends in turn driven by physical scarcity or new information such as health advice and prices (an example being a reduction in household meat or sugar consumption). What is central here is the manner in which resources potentially surplus to consumption, and previously not even seen as waste or wastage, shift towards being observable and externalised as surpluses to the new lower demand (and thus in the 'new now' as waste).

The chapter briefly concludes on the distinctive technical, ethical, and political problems in governing the paracommons, particularly the distribution of the material gains, drawing attention to: (a) the disparate 'commonist membership' that make up the parties interested in the paracommons; and (b) the powerful advantages held by the proprietor of the socio-technical system making the efficiency gains.

The paracommons

In a resource-scarce world, society is increasingly interested in the efficiency of resource use; how to get more (or the same) from less. The efficient use of natural resources lies behind the idea of a green economy, as for instance embodied in recent initiatives by the European Commission in their Horizon 2020 research programme (European Commission 2014, 2015). The combination of burgeoning demand, fears regarding resource shortages, and the increasing variability of supply as a result of climate change have raised the profile of efficiency within environmental policy (Barrett and Scott 2012). These challenges have expressed themselves in a variety of efficiency and ecological thinking that has arisen in the last twenty years, such as eco-efficiency, industrial ecology, industrial metabolism, and x-factor production (Socolow *et al.* 1996; Reijnders 1998; Schmidneiny and Stigson 2000; Anderberg 1998; CIAT 2012), to which can be added ecological modernisation theory (Warner 2010; York and Rosa 2003), and green growth (OECD 2011).

Concerns regarding efficiency are not new however: Sax (1990) wrote in reference to resource limits on 'spaceship earth';

> It is not by accident that we are turning towards the control of waste and water marketing as ways to reallocate existing supplies and meet new demand. There is also increasing interest in reuse of existing water supplies and in technical means to achieve equal output with smaller inputs of water.
> (Sax 1990: 258)

Efficient resource use implies that the current level of efficiency is increased to one that is more efficient in the future. In a current or previous state, these losses, wastes, and wastages hold either no value or value to some parties but if salvaged in the future they become assets to new or existing parties. For example, a farmer who consumes less water this year than last year and produces the same yield as the previous harvest is improving both his productivity and 'water-use efficiency'. A necessary condition for an efficiency improvement at a given unit (e.g. field for farm) is that consumption of the natural resource is reduced and this lower consumption allows more of the resource to be 'saved' for other purposes.

For example, when the physical efficiency of an irrigation system goes from 64 per cent to 69 per cent (this is the performance gain), it means that the irrigation system is now consuming five centile units more (the irrigation system 'got' the material gain). However, those five units could have gone to someone or something else. The paracommons is about the competition for the five units 'freed up' by the efficiency improvement.

Thus if we 'save' a resource, what does that mean and who gets the 'saved' resource? In other words who gets the material benefit of an efficiency gain? In my recently published book, this question of competition over resources newly 'freed up' by efficiency gains is considered via the concept of the 'paracommons' (Lankford 2013). Using the example of irrigation, Figures 5.1 to 5.3 introduce how the paracommons arises and how it relates to the commons. All three figures provide a connected sequence and should be read together. Figure 5.1 begins with a common pool in the upper left-hand corner. In this example it is a body of freshwater in a dam, aquifer, or stream. Moving to the next part of Figure 5.1 (upper right), we see four irrigators or farmers competing over this common pool of water, facing competition and rivalry. In the bottom left of Figure 5.1, the farmers' water demands are shown as four segments (A, B, C, and D) of a water allocation pie, leaving some remaining in the common pool. In the bottom right of Figure 5.1, part of these irrigation abstractions have efficiency losses. These losses arise for example via evaporation of water from bare soil instead of through useful crop transpiration. The four farmers each have four different efficiency levels and thus varying sizes of the 'waste/wastage' fraction of their pie segments.

Moving to Figure 5.2, the first part in the upper left imports the final bottom-right 'pie' from Figure 5.1 to continue the story. The net demands (the beneficial crop transpiration part) and the inefficient fractions are teased out into two separate diagrams in the upper right and lower left of Figure 5.2 respectively. Thus we can now begin to see the inefficient fractions more easily as a resource to be 'regained'. Finally, by collating these losses, wastes, and wastages together as

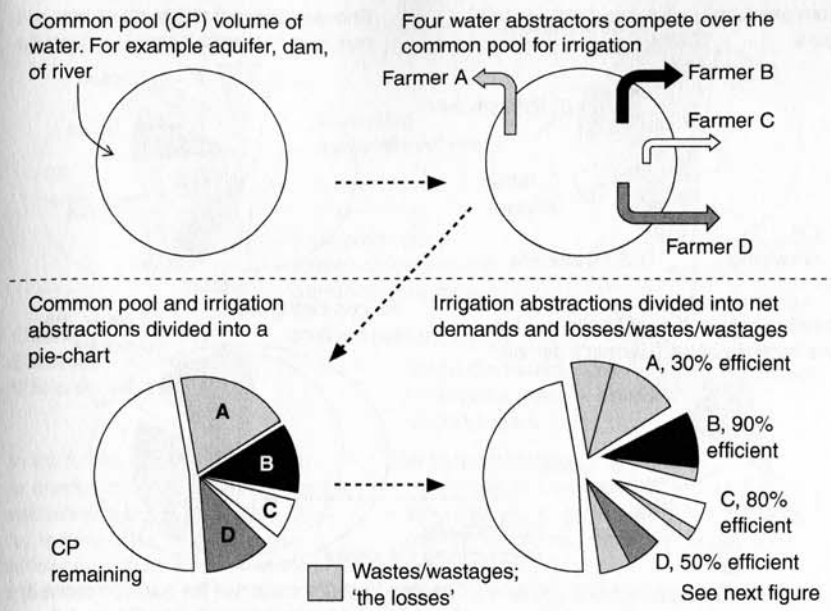

Figure 5.1 From the commons to abstraction and inefficient fractions.
Source: B. Lankford.

one combined segment, we can show in the bottom right of Figure 5.3, how 'the paracommons of losses, wastes, and wastages' begins to arise, showing that it sits alongside the commons (or within depending on how you view it – a point returned to below).

Using the prefix 'para-'

To clarify, while the 'commons' is about competition over existing resources, the 'paracommons' covers competition over salvaged resources from yet-to-be-conserved and more efficiently consumed resources (see Figures 5.3 and 5.4). The prefix 'para-' usefully signals a number of meanings. It indicates first that the paracommons sits *alongside* 'the commons' (typically fish/fisheries in seas or trees in a forest). In this case, 'para-' has a similar meaning to 'parallel': that the paracommons stems from the commons. This new commons arises because parties currently uninterested in the losses locked within the inefficient use of resources are driven by scarcity (and symptoms associated with scarcity) towards saving and freeing-up those assets and then competing over these newly salvaged resources.

'Para-' also has connotations of 'the abstract', as in 'paraphysical'. This is apt since the paracommons is not a physical commons like, for example, fish in a fishery or Brazil nuts in a tropical forest. Rather the paracommons is

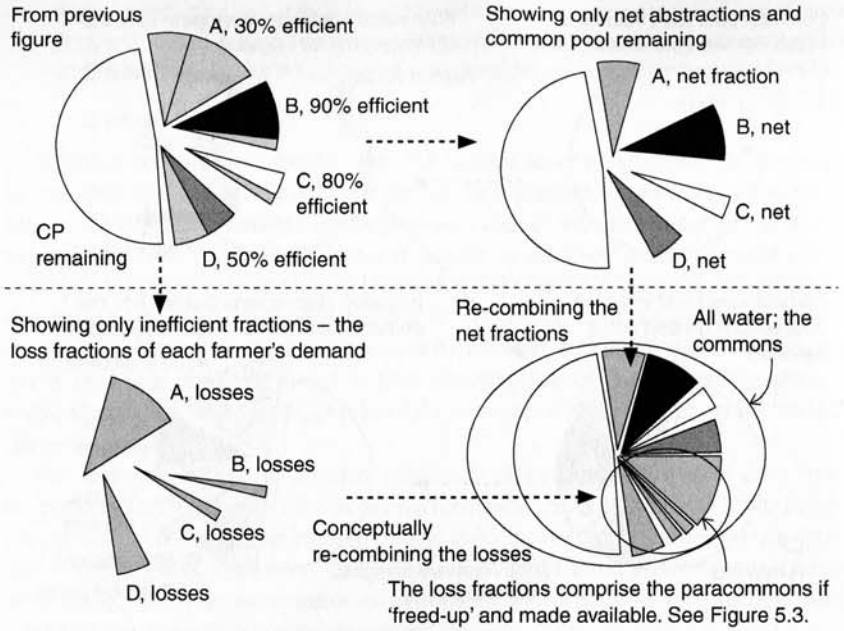

Figure 5.2 Isolating the losses from net consumed fractions.
Source: B. Lankford

pending subject the resolution of where the losses, wastes, and wastages end up. This in turn arises from a human ability to simultaneously observe today's waste and wastage and yet believe, via efficiency improvements, that these losses can be reduced. Once that action has taken place (once the losses have been salvaged) the paracommons condenses or reverts into the commons. This abstract pending characteristic of the paracommons is discussed below under the topic of liminality.

The concept of the paracommons also encompasses 'paradox'. Here, 'para' means 'against' (where 'doxa' refers to 'belief'). The reason that paradox is so central to the theme of efficiency is because without careful planning and forethought, the material gains of the efficiency gain rarely end up where want them to. In other words, the material savings do not return to nature and therefore, paradoxically, do not reduce natural resource consumption. A version of this paradox was described in the nineteenth century by William Jevons (Polimeni *et al.* 2008), but the difference between the two is that price and economics shape the Jevons paradox while resource cascades and pathways during consumption affect the paracommons of natural resources.

Finally, the behaviour of losses over time and space sets up relative and changing viewpoints as in 'parallax'. Put another way, new perspectives on the

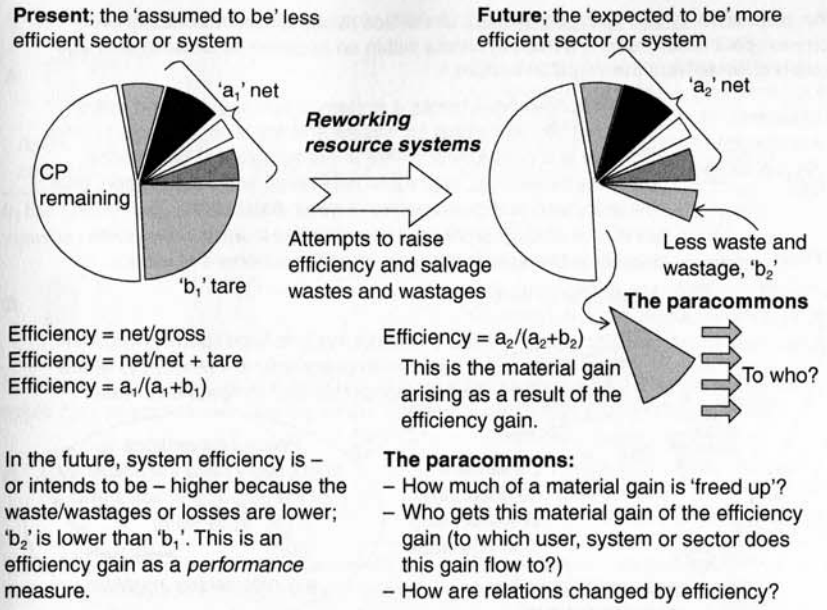

Figure 5.3 Deriving the paracommons by being more efficient in the future.
Source: B. Lankford

efficiency of a system come from those dependent on efficiency changes and salvaging wastes from that system. These changing and alternative perspectives are illustrated in the example of the apple core that follows.

Exemplifying the paracommons via the fate of a household apple core

Figure 5.5 reveals these aspects of the paracommons by looking at the fate of an apple and its 'to-be-discarded' apple core which ordinarily goes to the city garbage, where it might be picked over by people whose lives depend on households throwing away food and goods. Usually for both the apple on a kitchen table and the apple core in the city dump there are two commons: the household members competing over the apple and the city dump 'harvesters' competing over the discarded apple core (e.g. Gutberlet 2008). However, between these two positions are options that might or might not transpire. The household deciding to eat more food (case B in Figure 5.5) or to recycle the apple in garden compost (case C) deprives the waste pickers at the garbage dump of their sustenance. The waste picker fears the outcomes of a household drive to be more efficient and 'green'. Alternatively, a newly installed waste furnace requires waste to generate electricity depriving the householder, the waste picker and the compost of 'their' core.[1]

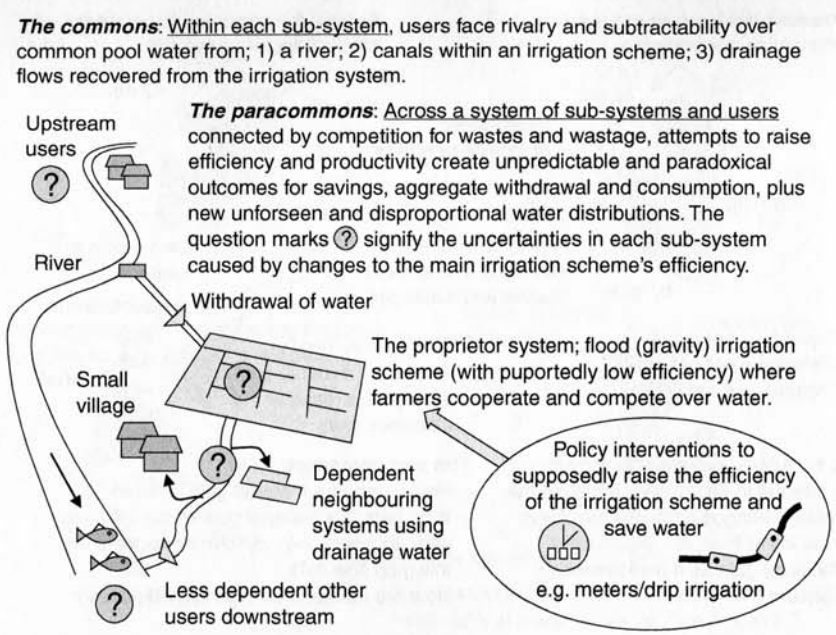

Figure 5.4 The commons and paracommons of water in a river basin with irrigation.
Source: B. Lankford

Using the apple core example, we can now unpack various aspects of the paracommons.

Rivalrous or agonistic conditions revealed by the apple core exist between four types of groups: householder, garbage picker, furnace operator, and those who speak on behalf of apple tree populations (from seed germination). The four destinations (or dispositions) of the paracommons in the same order are: the proprietor, the usual or immediate neighbour, the wider economy, and the common pool (or environment). Yet the final destination of the apple core depends on switches and changes in interests and technology within the household/proprietor. The city dump, furnace, and compost are all 'downstream' of the household's decision-making.

Furthermore, the four parties only 'sense' or know of each other once changes in the re-routing and amounts of apple core waste begin to happen. Other than that and depending on where the apple core ends up, there are normal 'commons' competing over the waste once it stays or arrives at a given destination (e.g. the apple eaters in the house and the waste pickers in the city dump). Furthermore, these four destinations cannot easily communicate with each other over who gets the core as do the normal or standard commons harvesters inside the house and at the city dump. This disparity means that a 'commonist constituency' is absent or, at best, weak.

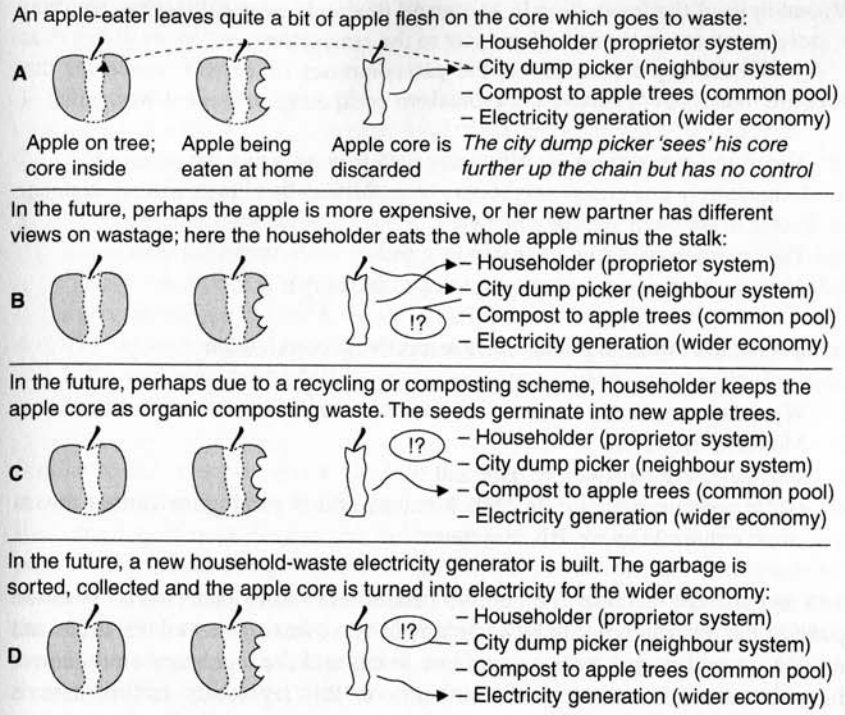

Figure 5.5 Who gets the externalising apple core if and when less or more is wasted?
Source: B. Lankford

Critically the common pool nature of the apple core is related to changing perceptions within the household about today's waste alongside 'savings' to be made in the future. Yet the household is in turn reflecting wider societal beliefs regarding acceptable waste and pathways for waste to take. There are both spatial and temporal transitions involved.

Exemplifying the paracommons via case study: Montana vs. Wyoming

The question over who gets the benefit from an efficiency gain was recently writ large by the US Supreme Court decision in 2011 regarding Montana and Wyoming. The Court backed Wyoming's defence that their prior appropriation water law enabled them to use the water freed up by introducing more consumptive irrigation sprinkler systems. The previously 'inefficient' flood technology spilled drainage water that downstream neighbouring Montana had become accustomed to. In the case of Montana vs. Wyoming, the simple expectation was that more efficient irrigation systems would provide more water to downstream

Montana. Paradoxically, it resulted in less water flowing to Montana because Wyoming used the freed-up gain to expand the area under cultivation, resulting in more water evapo-transpired and lost to the atmosphere.

As with the apple core above, the paracommons framework conceives that there are four types of parties or destinations competing over efficiency gains:

1 The proprietor making the efficiency gain (e.g. an irrigation scheme);
2 Immediately connected neighbours (e.g. farmers or villagers using drainage water from the irrigation scheme);
3 The common pool (the river system); and,
4 The wider economy (other users such as industry).

In the Montana/Wyoming case, these respectively correlate to:

1 Wyoming irrigators;
2 Montana irrigators;
3 The Yellowstone River system; and
4 Other economic sectors in both Montana and Wyoming, or further downstream in the Missouri River system.

It is in the light of these competitive parties and forces that Norris' question given in the introduction can be understood: who owns conserved resources and how do we understand these competitive forces and the regulatory environment that arbitrates this competition? Furthermore, this regulatory environment is further undermined by society's inability to accurately monitor resource withdrawal, consumption, and losses at different locations, scales, and times. Clearly though, the key reason that material gains tend not to flow back to nature is because the proprietor and/or their neighbour rapidly appropriate the 'new' resources often backed by legal frameworks ill-suited to dealing with fast-moving and pressing concerns regarding efficiency and scarcity (Neuman 1998;[2] Shupe 1982).

Exemplifying the paracommons with an example from fisheries[3]

One part of managing common pool fisheries might include the establishment of a marine protected area (MPA) where no or little fishing is allowed. The theory is that these benefit fish populations in both the MPA and in a spill-over zone surrounding the MPA. Spill-over is a 'waste' from the MPA point of view but a gain from the point of view of surrounding areas. The phenomenon of spill-over from an MPA to surrounding areas frames the paracommons very well.

Although the paracommons is a relatively abstract idea, as it deals with perceptions of yet-to-be-salvaged-gains, these can be clarified in this example. The term 'salvaged' captures many ways of changing the efficiency of a system and need not mean the active running around with nets trying to grab things. It can also for example mean a change in MPA boundaries so that the

newer, larger MPA keeps the spill-over within its new boundaries. So, in keeping with the four destinations or parties identified in my book, these can each get/or share the gain:

1 The proprietor – the MPA. They could do this in two ways: increase the boundaries of the MPA, or put up some kind of barrier (nonsensical to be sure);
2 The immediate neighbour – this would be fishers/ecology within a very narrow strip close to the MPA;
3 The common pool/natural capital – where fish flow to a zone beyond the immediate spill-over zone and therefore replenish stocks in the wider seas (in other words, if there was no or poor immediate neighbourly capture, then the reefs outside the MPA would benefit); and
4 The wider society – via an economically utilised restored reef within the MPA and outside the MPA, giving benefits to other newly arrived fishers, tourists, or food-stocks more generally.

Similar to the examples above, the four different parties involved in deciding on the rivalrous nature of fish spill from an marine protected area may not ordinarily come together to discuss the dynamics and dimensions of their 'common pool'. What would bring together these four parties to consider their paracommons of resources regained would be a programme to reduce waste spillage from the MPA.[4] Unless conjoined over the shifting patterns of the paracommons, they instead remain materially interested in their separated extant commons of fish in their respective domains.

Liminality and the liminal paracommons

Central to the idea of the paracommons are attempts to raise efficiency between a current (and assumed) inefficient system and a future (and expected) more efficient system. These attempts, also aiming to free up a resource, create systems in transition; they put systems on a threshold of change between two states – 'now/today' and 'future/tomorrow'. I have applied the terms 'liminal' and 'liminality' to the paracommons for the manner in which the terms capture the uncertainty and 'in-betweenness' created by multiple options arising when attempting efficiency/productivity changes. Liminality also applies to the idea that losses sit between a state of being salvageable potentially claimed by many parties and then salvaged by a known and specified party – perhaps paradoxically so depending on prior expectations.

The term liminality arose through the social studies of Van Gennep (1909) who explored rites of passage in various societies. The term has, among other applications, described the transitory period between stages of human experience (Buckingham *et al.* 2006), the change within communities (Lawrence 1997), and also in geographical histories of rapidly changing nation states 'being between positions' (Yanlk 2011). In these literatures it is the potential transition-in-waiting, rather than tangible outcomes and new states, that interests scholars.

Liminality is thus very relevant to those studying the promise of a future more-efficient world where we seek to control and place the benefits of efficiency.

How does liminality arise with the efficiency and the paracommons? There are six ways that this question may be answered.

First, efficiency as a performance indicator creates the implicit expectation that performance is to be raised by attempting to rework and improve the technologies and management of systems – though the means and consequences of that may not be fully understood. Murray-Rust and Snellen (1993: 7) in discussing irrigation performance explain: 'Performance indicators, by providing information on past activities and their results, help in making informed judgements which may guide our decision making about future activities.' It is possible to interpret this view more critically; for not only do performance indicators help guide decision-making, they encourage the pre-emptive judging of systems often without measurement (or without accurate measurement), in turn creating the conditions for a perceived efficiency deficit between the system's harshly hypothesised current performance and the future system's expected step-up in performance. This is arguably the story of sustainable development (Hedrén and Linnér 2009) or, more appositely, of Spain's investments in irrigation efficiency in the 2000s – that trustworthy records of existing and future irrigation performance did not exist; instead it was self-evident that a switch from gravity irrigation to drip irrigation would result in the performance gain (Lopez-Gunn 2012).

Second, as Table 5.1 suggests, scientists working on efficiency are unsure about the boundaries in time over which efficiency improvements take place. The gains are transitory (almost ephemeral) because we fail to pin down the start and completion date through which efforts and outcomes can be more exactly tracked and traced.

Third, one can interrogate the implications of the vinculum (mathematical threshold) at the centre of an efficiency ratio. The vinculum is the line or threshold that sits between a denominator and numerator in a ratio. Both in the real world and in the calculation of efficiency, resources in the denominator 'move' across the threshold (or not) to the numerator depending on whether and how benefits are generated.

Fourth, it is important to emphasise that the paracommons is an abstract rivalrous state (as if paraphysical) sitting between a today with real, extant 'commons' features and a transpired tomorrow with its real, extant commons features. Thus, a common pool resource sits as a pre-liminal whole (beneath the vinculum), then is subjected to management and harvest as it 'separates' into many possible streams (with many avoided, forestalled, productive, recovery, and consumptive possibilities) and then re-assimilates post-liminally into a few environmental outcomes or dispositions; depletion, the common pool, or the product (leaving losses beneath the vinculum and 'goods' above it). In this regard thus, the calculation of efficiency contains both useful information but yet also information-loss about today's usage of resources together with a promise of future efficiency gains and movements.

Table 5.1 Different start and end points for comparing efficiency over time

Starting point – the 'today'	*Explanation*
Design and build	Assumed or designed parameters for efficiency and behaviour are taken from the design specifications. If design assumed very low efficiency then expected gains might be higher than otherwise foreseen.
Average climate; past 'x' years	Records from the last 5–10 years might comprise either real or assumed parameters. For example, if the previous 5 years were reasonably 'wet', and the future time window falls in a dry period, then efficiency gains cannot easily be computed without correcting for moisture differences.
Last year's events	More clearly etched in the memories of farmers, engineers, and policy-makers, the 'today' starting point significantly draw upon recent events such as a drought.
Now, this year	With sufficient measurement, system managers might track current water use and discern current levels of efficiency and losses.
Assumed now	Probably the most likely scenario is to guess the current status of the system without reference to measurement, design, or recent behaviours.
End point – the 'tomorrow'	*Explanation*
Expected future	Policy intended future. This is the prefigured future, without reference to detailed and accurate measurement.
Actual future – end of this season	With sufficient measurement, tracking of losses and efficiency might be possible contemporaneously.
Actual future – a point 'x' years in the future	Again with measurement, it should be possible to generate a post-project evaluation of impacts of efficiency improvement programmes.
Actual average future; average future 'x' years	Ideally impacts should be assessed on the average of a number of years allowing climate variability to be corrected for.

Taking the earlier example of the household apple, one observes a physical transition of the apple core from one location to another, but critically it is the uncertain futures that determine liminality. One compares the reactions of the city dump harvester between her witnessing simply a longer delay ('the discarded apple will now take four hours instead of two hours to make it to the garbage dump') with a new waste policy ('all householders are to throw away less food or to recycle more food waste at home'). The latter is accompanied by much higher levels of uncertainty and worry. So while there is always one apple core, the insertion of an efficiency drive at the household gives the city dump recycler greater concern regarding what is about or not about to transpire. While the apple core remains physically one thing, there are now two expectations for the core: the housekeeper responding to new instructions about waste and the waste picker concerned that less food will arrive at the dump. Previously the unvalued apple core formed only one expectation (or no part of any expectation) as it simply wended its way from the house to the dump as it had many times previously. This dimension of 'expectations' of multiple possible outcomes renders the paracommons liminal.

To put it another way, liminality arises because of the way that humans observe and sense changes in the pathways, amounts and dispositions that can take place alongside changes to resource efficiency. Thus it is via scarcity and the expectation of competition over to-be-salvaged resources that the abstract paracommons arises. But it is because the paracommons revert or condense into the commons once those changes have taken place that the paracommons is a state of in-betweenness between a current normal commons and a future normal commons once a future has transpired (but often not the one expected).

Fifth, liminality arises because, due to the complexity of managing the efficiency of natural resources at different scales, we are not able to fully control how, when and where efficiency within natural resource usage plays out. Although paradox captures the uncertainties of liminality, there is more beyond the 'paradox' characterisation found in efficiency literatures to consider the distributive elements of efficiency via interrelated systems connected by resource recycling and savings. It is these opportunities for competition in the shadow of forthcoming changes, that suggest in-betweenness, transition, and liminality. Liminality produces and is produced by the multiple potentials and uncertainties that sit between policy intentions to raise efficiency and 'real' aggregate outcomes.

Finally, the term 'paragains' (also introduced in Lankford 2013, and defined as material but uncertain gains) signals another kind of in-betweenness, for resource efficiency science does not simply involve a binary distinction between two outcomes: (a) resources are always freed up by efficiency gains; and (b) no resources are freed up by efficiency gains. These two camps have their respective protagonists – for example, see the recent heated debate in the journal *Water International* (Gleick *et al.* 2011). In the pages of this journal, two separate camps went head to head, with one party, led by the Pacific Institute arguing that spare water for California was to be found in currently inefficient irrigation systems ('the next million acre feet' went the future framing headline). An alternative view (see, for example, Frederiksen *et al.* [2011, 2012]) was that no such water existed 'spare' as it was already being recycled via nature through aquifers and drainage lines. This example tells us that the paracommons is about the hopeful expectation that considerable spare water exists within inefficient use for future allocation provided it can be managed, 'freed-up', tracked, accounted for, and delivered to the desired destinations.

Exteriorising: an inside-resource-coming-out

The third section of this chapter argues that the complex nature of paracommons stems from waste/wastage-type resources which, in the face of natural or artificial scarcity, are undergoing value judgements regarding their degree of wastefulness and how this then has a bearing on the visibility of that 'waste/wastage'. Returning to the example of the apple core, we see this very clearly. First, people who eat the apple core without thinking/blinking do not see the apple core as waste; they see the core as food. This contrasts with people who eat the apple flesh but always leave the apple core as waste/wastage. In this latter case, the waste/wastage of the apple core is immediately visible. It is less visible in the case of the person who eats the whole apple.

But these differences in individual behaviours gives us an insight to the second, more important, insight about at which point or stage the apple core becomes visible. For the householder who does not eat the apple core but discards it, nevertheless in the supermarket is 'only' buying an apple – in the act of buying she or he does not see the apple flesh and apple core as two separate items. Similarly, a person well-used to eating the entire apple except the woody stem does not in the supermarket 'see' or buy the apple core as a separate item. For both types of apple eaters, the apple core in the supermarket (further up the chain than the household eating patterns) is hidden and does not feature in the purchasing decision.

Now we get to the third and most important point: the householder who changes her ordinary practice of throwing away the apple core to eating it (or putting it in the compost, or putting it in the bin going to a biomass incinerator) is adding to the visibility of the apple core. For now the ordinary pathway of the apple core is disrupted. The waste pickers at the dump are consequently bereft of 'their' resource. Thus paradoxically, with their survival and livelihood in the balance, it is the city dump harvesters who are more mindful of the apple core's existence, even to the extent of realising its presence prior to its manifestation as a part of the consumption of the apple flesh. In other words, of all the parties, and precisely because of the risk of changes to the routing of the apple core, it is the dump harvesters who are most aware of the apple core sitting in the supermarket.

Drawing on Strathern's interest (1998, 2000) in fluid boundaries between the internal and external regarding the metabolism of villages within Papua New Guinea, I consider that the paracommons *exteriorises* and then valorises previously hidden wastes and wastages under such changing circumstances. In fact, in Lankford (2013) I argue for the word 'tare' or 'loss' rather than wastes and wastages

because the latter two words describe resources that are already recognisable or have become visible. The predominant literature on the topics of common pool studies of waste materials rejected by urban populations (Gutberlet 2008) and recycling in the study of industrial ecology (Bourg and Erkman 2003) simply cannot comment on this aspect of externalising what will become 'losses' because they are already dealing with and then valorising extant waste materials.[5]

There are a number of mechanisms by which resources reveal or make tangible their inner or hidden loss (a topic treated in more detail in Lankford 2013). First, losses can be identified and then forestalled or recovered. For example, the non-beneficial evaporation from standing water in an irrigator's field can be forestalled in the following season by either reducing the amount of water added to the field or recovered by adding drains to drain off the excess water. More significantly, society can also decide to free up a gain by shifting the consumption of a current resource to a surplus 'loss'. Put another way, society can forestall and forego consumption, and it can do this in three ways:

1 By de-materialising a resource. Dematerialisation takes place via the reduction in size, density, and weight of goods which then gives rise to a reduction in net demand (or amounts of material consumed in per unit production). Using bread as an example, smaller loaves of bread exemplify weight dematerialisation and less nutritious or less dense bread represent density dematerialisation.
2 By retrenchment of a resource. Retrenchment results in the decrease in consumption of the number of units or goods. An example is the reduction in the number of bread loaves or bags of sugar purchased and eaten within a household or village or other unit of interest.
3 By substitution of a resource. Here one resource is swapped for another. A number of approaches exist depending on which part of the chain of production is substituted and effects can be very similar to dematerialisation and retrenchment. An example is when bread is substituted for rice crackers, or when wheat flour is substituted for rye or bran, or sugar is swapped for sweeteners.

Taking the effects of all three options together (substitution, retrenchment, and dematerialisation), we can work through an example of the conservation of wheat flour to make loaves of bread. Say a head of a household that previously used 3 kg of wheat per week to bake bread now only uses 2.5 kg. Thus 0.5 kg wheat has been 'freed up' and made exterior to their core need (which has changed from 3.0 to 2.5 kg). The paracommons argument says that the destinations for the saved 0.5 kg comprise: (a) the household head (proprietor) who then bakes, for instance, pies with the left over wheat; (b) her children (the immediate neighbours) who bake, for example, cupcakes using the wheat; (c) the wider economy, for the wheat remains in the supermarket bought by other housekeepers; and finally (d) nature, as the 0.5 kg wheat is not grown in the first place and so nutrient depletion from farmers' fields is reduced.

This example also tells us about how wheat external (the 0.5 kg) to the new need (2.5 kg) becomes visible. While this example might seem clear enough, one has to understand that this 'making visible' sits alongside many other factors and drivers regarding consumption, price, and existing wastes. Moreover, the English language deals poorly with this process of exteriorisation. While we readily have words and terms for the wastes and wastages, such as crumbs on the chopping board, flour spilled during baking or as dried crusts thrown away at the end of the week, we struggle with terms and expressions to capture these 'newly exteriorised excesses regained' (a convoluted but accurate term, which makes the point about the limitations of our language and conceptualisation).[6]

Discussion: society and the commons

Evolving commons thinking provides the prism through which to see the richness of nature–society. Examining enclosures and exclusion has done much for opening up inclusionary and encompassing deliberative and metaphysical spaces (Amin and Howell: Chapter 1; Cutcher-Gershenfeld and Lawson 2015). The paracommons introduced briefly via the ideas discussed above provides another means by which we can comment on this evolving space. Four ideas may be selected, starting with complexity.

Commons complexity

First, the paracommons emphasises an emerging and increasing complexity of the commons – a topic that is recognised within the commons literature (Berge and Van Laerhoven 2011) including this edited volume. In other words, the boundaries, content, and cross-linkages of the commons are increasing. Research on environmental issues increasingly recognises that complexity is a defining character of the sustainability, conservation, and governance of common pool resources (Manson 2001, 2008; Scoones 1999; Underdal 2010) and that, if anything, this complexity appears to be increasing not only through more refined understandings of nature–human interactions (Norgaard 2010) but because scarcity, innovation, and rising population disturb the balance of environmental protection and economic development (Tainter 2011).

Clarifying reasons for rebound; the utility of efficiency

The paracommons forewarns us that greater efficiency can lead to a 'rebound' of greater consumption (Polimeni *et al.* 2008). However, the 'paradox of rebound' envisaged by Jevons occurs for different reasons. The Jevons rebound takes place because of the changing prices, economics of production, and consumption driven by efficiency. On the contrary, a more complete expression of the paracommons, exemplified by irrigation, apples, and bread, deals with the changing and nested material pathways of 'losses' flowing to different pathways destinations when the system undergoes efficiency changes. An efficiency rebound of

water higher consumption in river basins (Crase and O'Keefe 2009; Ward and Pulido-Velázquez 2008) takes place because of the poorly controlled materiality of efficiency.

Nature–society boundaries and directionality

The paracommons also throws light on a critical revisiting of the modernisation of nature started by Hays in 1959 and continued by Clark and York (2005) and others: that one of the great aims of environmental governance is to protect and sustain nature while meeting the economic needs for the growing human population of the planet. This implies a building up of the comprehensiveness with which we govern the commons utilising resource efficiency and its implied technologies and institutions. There is much that can be said here on the problematic mechanisms for achieving sustainable environmental governance such as green capitalism. By problematising efficiency and productivity within this modernisation trajectory, the paracommons points to profound and multiple sources of 'systems uncertainty'; that we are no longer certain what the system is, who represents it, and how and in what direction resources flow. In contrast to the (in my view) conventional framing of nature-serving-society as through an ecosystem services prism, it is possible to see that resource and waste/wastage flows create a complicated nested and recursive embedding of social-ecological-technological systems. In these systems, resources and paragains flow, cascade, interact, and switch; are attractive to some and neutral or harmful to others; and are in quantities and qualities that change rapidly over time and space.

In contrast to a linear interpretation that views services flowing from nature to a system of use (which I believe is underlying message of the Millennium Ecosystem Assessment [see MEA 2005, Figures A and B]), in an increasingly scarce and populous world, resources are recovered, forestalled, and competed over in the shadow of efficiency-driven redistribution. A more cyclical industrialised yet embedded model of nature may be the more appropriate. In short, it is my view a linear ecosystem services interpretation, while acknowledging complexity (Ruth *et al.* 2011; Norgaard 2010), does not fully speak to the reciprocity between realms and redistributions of resources, surpluses, losses, wastes, and wastages.

Going further, if industrial ecology covers the web of interactions between industrial units, then an increasing 'industrialisation' (for reinventing of nature, see Banerjee 2003; for ecological modernisation, see Bailey *et al.* 2011) of the natural world arises from society's rising interest in the reuse previously discarded or minimally regarded resource wastes. Livestock excreta used as biogas and fish waste used for animal meal exemplify the shifting patterns of consumption and recycling in response to supply, demand, and ingenuity but nonetheless are extant waste products. On the other hand, the paracommons is interested in society's as yet unrealised savings and considers this ever tightening cycle between consumption and re-consumption to the extent that nature's provision of resources is increasingly a function of how humans cascade resources within society.

Fluid fugitive resources; outpacing regulatory instruments

Resource users might also observe that normal regulatory instruments (legal, market, and customary) for the ownership and regulation of consumption, allocation, recycling, and losses are being outstripped by fast-moving events driven by scarcity, necessity, and technical ingenuity. This is one way of interpreting the escalation of the Montana vs. Wyoming case to the US Supreme Court – that prior appropriation US water law seemed unfit to adjudicate upon the question of who owns regained losses.

If not regularly updated and reformed or dealt with via a more relaxed hybridisation of approaches (Smith 2008), normative procedures for managing resources also sitting within disciplines such as engineering and law will fail to advance equitable allocation and productivity gains while attending to environmental, social, and sustainability criteria. With this regulatory 'lag' in mind, Hooper and Lankford (2016) discuss how resource allocation is perhaps more a function of hidden influences than of standard and normal tools.

Outmoded or fixed instruments for governing resource consumption and allocation may additionally not help if we become overly interested in more rosy future scenarios driven by expectations and assumptions (or 'the political economy of promise': Leach *et al.* 2012) more than the governance space of today or of the transition itself between the today and the tomorrow. This desire to consider 'futures' as an alluring topic of study over the messy today characterised by a multi-spectrum mosaic of actors, scales, technologies, institutions, and interventions (Halsema and Vincent 2012) is a risk highlighted and forewarned by the liminal nature of the paracommons.

Conclusion

Echoing the agonistic nature of the commons, the paracommons is an idea describing the competition over future resources 'freed up' by efficiency gains in the face of or driven by increasing scarcity. The paracommons argues that 'savings' of the inefficient part of resource use become a matter of competition between stakeholders found in four different types of destinations. Furthermore, by using this term I hope to capture the sense that resource efficiency is highly complex and that attempts to create more efficient socio-technical systems result in unexpected paradoxical outcomes.

As well as this liminal character of today's wastage and waste being reduced in the future, a closely related feature is the manner in which a reduction in consumption frees up resources ordinarily not yet seen as waste or wastage. The future continuously externalises the 'tare' and it is this increasingly large 'to be regained' resource that is then subject to competitive interests. The paracommons can thus be seen as a 'politics of externalisation and expectancy' (or 'of promise' – Leach *et al.* 2012) framing the uncertain differences between: (a) the prefigurations of the promise of efficiency and productivity gains; and (b) the extant and often unforeseen material, productive, and distributive physical and

social outcomes for users and resources following attempts to make savings and reduce consumption of natural resources.

At a more conceptual level, and how rethinking the commons may tell us about nature–society and questions of resource justice, the concluding message of the paracommons is that resources found by savings and efficiency gains present a highly unusual 'commons', and for three reasons. First, efficiency gains are rivalrous but between parties that ordinarily do not meet in the village, ocean, field, or forest. Simply put, commonist membership is highly disparate. Second, the gains are subject to what a proprietor of a particular system does, being particularly advantageously placed to appropriate those gains – in turn aided by legal, economic, and technological doctrines better suited to a standard commons model. Third, the material gains are and will be 'liminal' and hidden, pending the resolution of many different context-specific factors, such as technology, terminology, social learning, scale, and measurement (to name but a few). In summary, achieving a more equitable distribution of efficiency gains between the four separate parties/destinations will present extremely difficult moral, ethical, and political questions requiring perhaps new and governmental regulatory frameworks especially since a communal solution is unlikely (because there is no community in the ordinary sense). A fundamental rethink of current governance instruments (such as water rights) which sustain the advantages of the proprietor may be needed if society is to redistribute material efficiency gains out of the proprietor's existing 'enclosure' to immediate neighbours, the wider economy, and to nature.

Notes

1 That the establishment of a waste incinerator plant deprives waste dump pickers of their livelihoods, see: www.guardian.co.uk/world/2012/jul/02/future-for-india-waste-pickers (accessed 18 January 2016).
2 Neuman contends that entrenched water abstraction law (and water markets) in western USA: 'has revealed itself to be woefully inadequate at eliminating waste and encouraging efficiency. Beneficial use affirmatively protects inefficient water use customs and practices' (Neuman 1998: 996).
3 With grateful thanks to Eny Buchary (Stockholm Resilience Centre) for her part in drawing my attention to this system and for assisting me in explaining this correctly.
4 In a natural environment such as an oceanic reef, I do not envisage such a programme being economic.
5 Much of the valorisation thinking around waste describes dealing with products that have little value at present but which can be made more valuable (Luque and Clark 2013). This is not the same as dealing with an exteriorising process that brings to the foreground materials not yet witnessed as waste.
6 This lack of ready terminology remained a problem in the writing of the Lankford 2013 book – hence use of the words 'tare' and 'paragains'. In an email to me with reference to my conference presentation in Cambridge (email dated 11 September 2014), Marilyn Strathern wrote:

> I still think the idea of waste not as some kind of surplus or excess but as an irreducible internality (aka 'externality') is thought-provoking. When I went back to the Mekeo material I realised, though, that probably the most interesting lesson to get from it is that we have to stretch our language – as you do with the term paracommons.

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6 The right to not be excluded

Common property and the struggle to stay put[1]

Nicholas Blomley

shout here we are
amazingly alive
against all long odds
left for dead
shoutin this death culture
dancin this death culture
out of our heads
amazingly alive
Bud Osborn, 'Amazingly Alive',
(Osborn 1999: 10)

Introduction

Private property, and the right to exclude is territorialised through the multiple 'zones of exclusion' that hedge out the urban poor, such as residents facing the displacement generated by inner city gentrification. Any stake that such residents may have, if acknowledged at all, is rarely seen in terms of a right, let alone a common property right. On what basis might such a right rest, and how might we think of it in terms of property?

Residents in Vancouver's Downtown Eastside make powerful claims against exclusion, and for inclusion. C.B. Macpherson defines common property as the right to not be excluded. My goal here is to place the two in conversation, drawing the lessons of both to enrich the theory of commons, and the praxis of urban struggle. Macpherson points us to the exclusionary logics of private property in relation to a common property right to not be excluded. He argues for an enriched reading of human liberty that should be served by property, including common property. In so doing, he reminds us that the experiential force of exclusion and the salience of the right to not be excluded are socially differentiated. His recognition of common property as a relation also points to the need to attend to the practice of commoning, avoiding the ethical and analytical dangers that arise when we posit 'the commons', with its resultant boundedness, fixity, and zero-sum membership.