Genetic Conservation in a Climate of Loss: Thinking with Val Plumwood

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In February 2008 the Svalbard Global Seed Vault had its official opening. The vault is a co-operative project: while its construction was largely funded by the Norwegian Government, its management also involves the Global Crop Diversity Trust and others, and its seed samples are being provided by governments and organisations all over the world. The vault is located in the Svalbard Archipelago, and has been dug into a mountainside. The project's architects hope that the location's remoteness—alongside a thick layer of rock and permafrost—will ensure the survival of the seed samples in the face of any political conflict or environmental catastrophes that may occur elsewhere in the world. In short, the facility aims to provide seed insurance in a time of uncertainty, instability and change. According to accounts in the press, this bank is a 'doomsday vault carved into a frozen mountainside on a secluded Arctic island ready to serve as a Noah's Ark for seeds in case of a global catastrophe' (Mellgren).

This paper explores this practice of gene banking, which has become increasingly important to conservation efforts—particularly for agricultural diversity—in recent decades. In the current 'climate of loss', in which biological diversity of all kinds is disappearing—whether it be Asian vultures, polar bears, or varieties of vegetables—how we do conservation has taken on a new level of importance. Informed by the life and work of environmental philosopher Val Plumwood, this paper takes up her work in an effort to think through these important issues.

The dual imperative

One of the central themes of Val's work was a rethinking of what counts as nature for us today. In particular, Val sought to undermine the many dualisms on which a great deal of Western thought has been based, dualisms that she argued were responsible for our hyper-separated conception of 'nature' and human beings—and consequently our failure to 'get on' successfully and sustainably in our more-than-human world. In place of a view of nature as, by definition, the non-human, Val's work attempted to include humans within the sphere of nature—while being very clear that this was always going to be far more than a linguistic project. That is to say that this redrawing of lines was not just about changing what we mean by the term nature, but rather about challenging how we both think about and live in the world. Centrally, for Val, I think that this project aimed to resituate 'humans in ecological terms at the

same time as it resituates non-humans in ethical and cultural terms' (Plumwood, 'Animals' 2). In current work I am interested in how we might do conservation like this, a question that this paper begins to take up with specific reference to *agricultural* plant diversity.

Seeds as genetic resources

Agricultural conservation efforts really began in a formalised way in the 1960s and 70s after it was internationally acknowledged that crop diversity was being lost at an alarming rate. Although crop diversity exists in all agricultural environments, it is heavily concentrated in several 'centres of diversity'—often called Vavilov centres, after the Russian botanist and geneticist Nikolai I. Vavilov who identified these various sites. [1] It is important to note that these sites are entirely within what is today the 'developing' world, and as such often (but not always) within areas that are dominated by less industrialised, lower-input agricultural systems—perhaps even those of subsistence or semi-subsistence farming communities. In a climate of crisis, the conservation efforts that began in the 1960s primarily took form around the *ex situ* storage of germplasm (primarily in the form of seeds) in genebanks, as opposed to attempting to conserve plants within these environments and farming communities—called *in situ* conservation (FAO, 'Report' 20). This banking-work is still the central part of international agricultural conservation efforts and in its genetic form is becoming an increasingly influential practice for conservation more generally (Haraway, 'Cloning'; Turner).

Today, there are an estimated 6.1 million agricultural plant accessions held in approximately 1,300 facilities worldwide. These accessions are primarily seed, but some are also held as pollen, DNA samples, or *in vitro* tissue samples. As the UN Food and Agriculture Organization's 1996 report on the *State of the World's Plant Genetic Resources* has pointed out, however, there are numerous problems with these facilities around the world. In particular, many of them do not have long-term storage capabilities, and a large percentage of the accessions (perhaps as many as 1 million) held by many other facilities are in desperate need of regeneration—the process whereby seeds are planted, cultivated and recollected to keep them viable (FAO, 'Global Plan' Art. 10a). It was in large part to serve as a backup to these problematic facilities that the Svalbard Global Seed Vault was designed and built. In reality, however, there are a variety of problems with seed banking in general that will not be overcome even by this new facility—for example, the fact that plant varieties whose genetic material is banked are in some sense 'frozen' and so not able to adapt to changing climatic and other conditions (Hawkes *et al* 13).

[1] The Vavilov centres of diversity are often thought to have been the sites at which these crops were domesticated, but this is a somewhat problematic position (Smith 5-6). They are nonetheless the sites that contain the greatest amount of genetic diversity of crop plants.

One of the last conversations I had with Val was about Svalbard and gene banking more generally. We talked about the inadequacies of the 'reductionist' understanding of nature that underlies this kind of approach to conservation-as-banking. As in so many cases, my thinking on this issue is informed by both conversations with Val and readings of her work. Stated simply, my position is that in *ex situ* banking projects genes, seeds and reproductive material more generally, are being used as a kind of 'proxy' for the plant varieties or species that are being lost. As Bronwyn Parry points out—drawing on Bruno Latour's work on 'inscription devices' (Latour, *Science in Action*)—by definition, a proxy is not equivalent to that which it 'stands in' for. For Parry, a proxy is a representation or a part of an object or organism that is more readily useable for a specific purpose (i.e. storable, tradable, transmissible) and that reproduces some aspect/s of that thing in a reliable, or at least acceptable form (Parry 22-3). In other words, the proxy is a 'good enough' embodiment or representation of something else for some given purpose. If *ex situ* collections of genetic and reproductive materials are being utilised as proxies—as 'good enough' representations—of organisms, varieties, and species, the question remains: *what exactly are they 'good enough' for*?

In an effort to answer this question I have turned to the two relevant international conservation agreements, namely: the 1992 *Convention on Biological Diversity* (FAO, 'Convention') and more specifically in the case of agricultural plants, the 2001 *International Treaty on Plant Genetic Resources for Food and Agriculture* (FAO, 'Treaty'). The first thing to note about the Treaty is that what it explicitly aims to conserve are not real embodied organisms involved in processes of growth and evolution (called 'biological diversity' in the CBD (Art. 2)). Instead, the focus of the Treaty is on conserving and providing access to the *genetic materials* found in organisms. In both the CBD and the Treaty, genetic materials are clearly distinguished from the biological components of the organisms within which they are found. Both agreements define 'genetic materials' as any material containing 'functional units of heredity' (FAO, 'Treaty' Art. 2; FAO, 'Convention' Art. 2). It is these materials that the Treaty aims to conserve and equitably share (Art. 1.1). In contrast, 'biological diversity' is not even defined within the context of the Treaty. The term is only used twice, and then only in the context of its relevance to the sustainable use and conservation of *genetic* resources (Art. 6).

In contrast to *in situ* conservation projects in which genetic resources are conserved within the 'biological diversity' that they represent, the dominant *ex situ* strategy reduces what must be saved down to its most essential features. Partly for reasons of cost, partly for ease of access, and partly because we cannot hope to conserve all of the world's vanishing agricultural diversity, the way in which *ex situ* genebanks 'do seed' highlights a series of priorities. In particular this approach to biodiversity separates off what must be conserved from the expensive and unnecessary biological components within which it is normally

found. Seed, pollen, vegetative propagation materials and DNA are all utilised as vessels for genetic resources in these *ex situ* projects. These tangible vectors are used to embody or 'capture' the genetic information of the plants that they come from or will grow into, in various forms that are reasonably easy and economical to store and access. Bert Visser *et al* clarify an important part of this situation when they point out that the CBD:

> distinguishes three integration levels of biodiversity, including agrobiodiversity, i.e. '*the diversity within species, between species and of ecosystems*' … Only genetic resources, i.e., the biodiversity at the lowest integration level, can be conserved ex situ, at a site distant from the original occurrence of the conserved material. Diversity between species and of ecosystems, as well as the indigenous knowledge relating to agrobiodiversity can only be effectively maintained in situ, in the agricultural production context in which these are functional. (13)

In the banking of seeds, therefore, it is not biocultural, or even biological, diversity in its fullest sense that is to be conserved, but rather genetic diversity. The meaning of the term 'diversity' changes here in a subtle but important way. Within the context of *in situ* conservation, diversity is a relational concept that captures co-evolutionary interactions within a field of biosocial complexity. In the case of genetic conservation *ex situ*, however, diversity has become purely a numbers game. More types equals more diversity. Thus, even while genes are conserved *ex situ*, both biological organisms and the relationships which comprise these environments cannot be. There is clearly something important missing here. In addition, as Visser et. al. acknowledge, in the case of agricultural diversity these are *biosocial* environments that include humans and non-humans in relationships built around evolving sets of knowledge-practices, none of which can be conserved *ex situ* either.

It should be noted, however, that in recent years the important role that *in situ* conservation might play in agriculture has been increasingly acknowledged—for example in both the CBD (Art. 8) and the Treaty (Art. 5.1(d)). Despite this acknowledgement and a lot of dedicated work—by both small NGOs and larger organisations—current international conservation efforts are very clearly weighted in favour of *ex situ* projects like Svalbard. In Stephen Brush's terms:

> The current [1994] status of in situ conservation policy is best characterized as benign neglect … Virtually all public resources for conservation are directed to ex situ methods. While in situ conservation might be acknowledged as possible and perhaps necessary, there are exceedingly few efforts in any region of crop evolution to plan or implement in situ conservation. (6)

While this situation may have changed a bit since 1994, it has not changed significantly, and multimillion dollar projects like the one at Svalbard highlight the ongoing dominance of this approach to agricultural diversity conservation.

In the world of biodiversity, however, this distinction between the biocultural and genetic components or organisms needs to be understood alongside another distinction, namely that between 'genetic materials' and 'genetic resources' (the latter being a subset of the former). This distinction is made in both the Treaty and the CBD. Nigel Maxted and Shelagh Kell draw out the central relevant issue here when they remind us that:

> The goal of plant genetic conservation is primarily direct use through exploitation for crop improvement. We expend resources on the maintenance of genetic, species and ecosystem diversity because of their immediate or potential utilization value to humankind. (Maxted and Kell 450)

Within this context, it becomes clear that these international agreements do not aim to *conserve* agricultural biodiversity at all, but rather aim to protect *and make readily available for use* a unique kind of instrumentalised genetic life. This focus has, however, meant that the banking of the genetic information contained in organisms now often takes centre stage at the expense of conserving the 'messy, thick organisms' (Haraway, *Modest_Witness* 246) themselves, let alone the environments and co-evolutionary interactions within which these organisms are themselves produced and nourished.` [2]

In these banking practices the biological components of organisms and their environments (the other two types of diversity noted by the CBD) are completely unimportant, and it is only genetic diversity that must be conserved. Additionally, we have seen that genetic diversity is further split into that which is of potential or actual value, and a residual and expendable category which, like the more biological members of the 'diversity community', is deemed not to be important enough (or perhaps just too expensive or impractical) to conserve. As a conservation-proxy, therefore, seed is only being used (and to an important extent only *able*) to 'stand in' for agricultural plant varieties and ecosystems in a very limited way. In other words, it isn't really 'good enough' for conservation.

Quite simply then, seed has remained a 'good enough' proxy for conservation from the 1960s to today because these banking efforts have only ever aimed to make genetic resources available for human use, not to conserve agricultural environments and diversity in any fuller sense of these terms. In order to use seed in this way, the nature that has to be imagined is one in which non-humans, or at least agricultural plants, exist solely for use in human projects. In Val's

[2] I take this usage of Haraway's notion of 'messy, thick organisms' in this context from Parry, *Trading the Genome*.

terms there is an important reductionism and 'instrumentalisation' of non-humans going on here (Plumwood, *Feminism* 52-3), one that attaches no real or essential value to their living for their own sake, or to the broader ecological relationships that comprise agricultural environments. It is only through this deficient and economically convenient understanding of 'nature' that the conservation carried out in *ex situ* banking projects and mandated in agreements like the Treaty can look like *conservation* at all.

Ecologically embodied conservation

Val and I never got around to discussing the specifics of what was wrong with this brand of reductionist conservation. I think though that Val would want to highlight what is missing in these banking projects, what *is* not and *cannot* be saved like this, and consequently what will slip out of the world despite multi-million dollar banking projects like Svalbard. As we have seen, biological organisms are missing here in an important sense, as are the relationships between them that produce functioning and resilient ecosystems.

This is a situation in which non-humans are only valued as resources for human projects. As Val argued in much of her work, there is certainly nothing wrong with—and in fact no way to avoid—using non-humans (Plumwood, 'Animals'). The central ethical issue, however, is in *how* they are used. In particular, that they be allowed to *exceed* this use. In this case, that we do not fail to appreciate all of the diverse ways in which plants and other non-humans are *more* than genetic resources for our projects. I think that this is a central aspect of the second part of Val's dual imperative that I mentioned above—namely, that we resituate non-humans in ethical and cultural terms. This project is in part about acknowledging that non-humans are valuable in and of themselves, that they very often possess their own 'cultures', their own ways of relating and living that should be respected in as much as it is possible to do so. At the same time though, this resituating is also about acknowledging the way in which non-humans contribute vitally to our own ethical and cultural worlds. In an agricultural context there are numerous examples of communities in which crop plants hold highly significant cultural, religious and even familial roles (Gudeman and Rivera; Maffi; van Dooren, 'Terminated Seed').

The second part of Val's dual imperative is to resituate humans in ecological terms. I take this to mean that we should both understand ourselves to be, and actually live with a recognition that we are, a part of the broader more-than-human community of life on which we all depend. In an important way I think that seed banking already does this. Despite all of the reductionism and dualistic thinking that underlies genetic conservation projects like Svalbard, at their core they are all about the deep interdependence between people and crops. Here, agricultural genetic conservation is not just concerned with keeping plants 'alive', it is also quite explicitly about keeping humans alive. It

acknowledges that if something should happen to our crops—a doomsday event that could include severe climate change, nuclear warfare, escaped GM traits or any manner of other sci-fi-esque, but perhaps all too familiar, scenarios—it would not be enough for *people* to make it through. Our long term survival would require that we make it through with at least a handful of seeds, with enough genetic diversity to re-seed agricultural practices. As far as acknowledgements of human/crop interdependence go, one really couldn't ask for a better one than this multimillion dollar project (BBC News; Mellgren).

This is a very techno-scientifically mediated version of human/plant interdependence, but its core is still very much focused on all of the ways in which people and crops plants need each other. Perhaps Val and I would have parted ways at this point—we never quite managed to sort out our differing tolerances for techno-science. Despite this fact, I think that we would perhaps both end up moving in a similar direction from here, to focus on the political questions raised by 'seed banking'—I can no longer in good conscience call it 'conservation'. In fact, this is one of the central movements that I have taken from Val's work; namely, her commitment to exploring and exposing the ways in which specific understandings of 'nature' and organisations of human relationships with non-humans might draw upon and reinforce particular power dynamics.

In simple terms, what I think is relevant here is the way in which this reductionist practice of gene banking ties in to modern plant breeding and engineering projects in such a way that adaptation—the possibility of dynamism in the face of change—becomes completely centralised (and in most cases is able then to be driven primarily by profit). Instead of focusing on keeping diverse plant genetic materials within agricultural communities so that they might have some breeding resources to adapt to changing conditions—caused by climate change, the market, or any number of other factors—*ex situ* banking ensures only that these resources are available to bona fide plant scientists or researchers (van Dooren, 'Banking Seed').

And yet, in the context of the current incredible loss of the diversity of life, we cannot really afford to do away with any of the 'conservation' options open to us, however limited they may be. We need these banking projects—perhaps now more than ever. We need them both as a risk mitigation strategy in a world that is starting to look more and more like a badly conducted science project, and as a resource for adaptation in the face of the massive environmental change that humankind is now causing. What this paper points to, however, is the fact that no matter how dire the situation, the need to conserve diversity cannot be allowed to cover over more critical discussions about *how* and *for whom* this 'conservation' work is to be done. These discussions must inevitably lead towards a radical restructuring of this dominant agricultural conservation agenda: a

restructuring in which the seed banks are no longer primarily stockpiles of genetic resources, but rather become central hubs in a project of conservation as diversity *sharing* (van Dooren, forthcoming). Ultimately, however, there are no simple answers here. As always though, I find Val's work instructive in thinking about what is wrong with the present, how we got here, and what kinds of values and relationships might be important in our efforts to build something better.

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