CITIZENSHIP, SCIENCE AND RISK

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1. Introduction

Shifting science-society relationships are highly relevant both to contemporary practices of citizenship and their expression, and to questions around the dynamics of 'participation'. Just as political and economic changes are altering the contexts, spaces and ways in which people perceive and act on citizenship rights, so too are scientific and technological changes and the new risks and opportunities they present. Scientific and technological issues present particular challenges and opportunities for participation, associated on the one hand with claims to highly specialised, professionalised knowledge and expertise which may serve to exclude. At the same time, recent scientific controversies have also created new demands and opportunities for concerted citizen engagement in decision-making. At least in some contexts there is seen to be a new mood of public cynicism and critique of 'expert' institutions and their knowledges, and demands for new sorts of dialogue, and public empowerment in the scientific realm.

Today these issues are reflected perhaps most clearly in the extensive academic, policy and media debates which explore contemporary relations between risk, science and society. As part of ongoing work we have begun to explore these issues in a globally-comparative frame, through a mixture of conceptual work and synthesis of existing fieldwork experiences. The justification for this approach is two-fold. First, as this article outlines, to date these issues have been explored through distinct traditions of work focusing respectively on 'northern' and 'southern' contexts. This suggests a need both to explore the cross-context 'translateability' of theories and debates and the possibilities of cross-learning between them. Second, it allows an exploration of how citizenship and knowledge claims are emerging around different issues – from biotechnologies and water development to biodiversity and health technologies, for instance – in different settings, according to particular histories and contemporary dynamics in the relationships between science, state, international political economy, and society.

This article draws in large part on the discussions that took place at a research 'brainstorming' workshop[1], but also draws on our own on-going work in this area. We begin by considering a range of perspectives on 'risk', and the extent to which it is fundamental to a more general set of societal transformations. We go on to consider questions of participation in scientific and technological processes, and the notions of citizenship that they imply. We then look briefly at some ways in which the internationalisation of science and governance are shaping both the generation and regulation of technology and risks, and patterns of engagement between citizens and 'experts'.

2. Constructions of risk in different cultural contexts: how relevant is the 'risk society' debate?

European debates about citizenship and science have been strongly influenced by

Ulrich Beck's 'Risk Society' thesis and its subsequent elaborations (e.g. Beck 1992). Beck and others have been arguing that contemporary public critiques of scientific expertise is symptomatic of a broader, more fundamental set of social transformations – requiring new forms of sociological theorising. Some important elements of the thesis (and there are others) are that in late modernity the institutions of industrial society both produce and legitimate hazards that they cannot control. The scientific and bureaucratic apparatus charged with knowing and managing risk continues to operate according to ideas of predictability, so there is a mismatch between the character of hazards and what Beck terms 'relations of definition': the legal, epistemological and cultural power matrix in which risk politics is conducted (Beck 2000: 224). In the process, society has become 'reflexive', compelled by this mismatch to question its foundational principles (including ideas of scientific rationality) in an automatic, boomerang-like reflex. Reflexivity can in turn lead to (but is distinct from) conscious public reflection, scrutiny and dissent, drawing attention to ways that public institutions with inadequate procedures more often legitimate than counter hazard.

Despite Beck's own claims that this is a global phenomenon – a 'world risk society' (Beck 1998) - much contemporary writing on science and society focuses on Europe and N. America, and on 'high tech' examples such as biotechnologies, nuclear risks, late industrial food chain hazards, new reproductive technologies, genetics, or transplants using animal organs (xenotransplantation).

In contrast, rather different traditions of work have examined the knowledge, science and policy surrounding environmental, health and livelihood issues in low income areas of the global 'south'. On the one hand, this parallel research track has recently come to converge in some remarkable ways with contemporary concerns around publics, science and risk in the 'north'. On the other hand, though, a number of questions arise about similarities and differences between the pre-occupations of 'southern' and 'northern' -focused debates over changing relationships between publics and expertise; about possibilities for cross-fertilisation between them or indeed deconstructing the divide altogether. They ask to what extent is it useful or appropriate to speak of a universalised or 'world' risk society, and how might this square (or not) with diverse, socially-located experiences and constructions of 'risk', and with diverse modernities, whether within the 'north' or 'south'. Central to these questions are notions of citizenship, for the degree to which societies have their reactions to various forms of risk reflected in broader political and socio-economic processes is dependent on the institutions and processes available to them to react in reflexive ways in the first instance.

Citizenship, participation and risk are thus conceptually linked, albeit in ways which are specific to time, place and environmental circumstance (Thompson, 2001). Similarly, the ways in which communities make the transition from reflexive to reflective reactions to environmental risk are embedded in a broader frame of local, national and global knowledges, institutions and power relations which share similarities but are not easily generalised with regard to specific 'risk' issue areas. As will be touched on in more detail below, what may be a 'risk' to one group or community in a specific geographical setting, may, in another, be a major contributor of widespread human insecurity.

Work in developing country settings underlines that public dissent and lack of trust in expert institutions is not so new, and not uniquely a feature of late industrial modernity in the West (Latour 1993). For instance long-term anthropological/ecological/historical research in low income countries of Africa, Asia and the Caribbean, whether concerning pastoralism, forest management, soils or water, has frequently exposed major disjunctures between the knowledge and perspectives of land users, and those underlying and reproduced through national and internationalised science and policy (e.g.Leach and Mearns 1996). Local people have reflected on, responded to and resisted 'inappropriate' technologies and development plans in a variety of ways. Public experiences and critique of science and of risk-framing as being part of the legitimation of powerful institutions dates back to early colonial times, and now thrives for instance on concerns around forests in West Africa (Fairhead and Leach 2000), or water and dam development in India (Mehta 1998).

Beck's work can also overstate the novelty of the risks faced by late industrial society, and the incapacity of 'relations of definition' to recognise them. Risks, hazards and uncertainties have long been experienced in developing country settings in the constant interplay of ecological and bodily processes, capricious markets, government politics and international engagements (Mehta et al 1999). Here too, they have long been inadequately appreciated by the sciences informing management of public health, rangelands, watersheds, soils and vegetation, which have frequently been premised on ideas of predictability and managerial control.

While these points might suggest the pertinence of a 'world risk society' notion, it is also the case that a scientised, instrumentalist concept of 'risk' overlooks quite other ways of understanding such issues. Many works in the northern science and society/risk society traditions have emphasised 'risk perceptions', engaged dissent from 'official' science, and 'citizen science' to pursue alternatives (e.g. Irwin 1995); with rather little attention to how public responses might be rooted in diverse and located lay knowledges and social/cultural understandings of environment or health .

In contrast, such embedding of knowledges in diverse socio-cultural frameworks has lain at the core of work on rural issues in the 'south', albeit addressed through a different theoretical line and vocabulary around 'indigenous knowledge' (IK) or 'ethnoscience' (e.g. Scoones and Thompson 1994; Warren et al 1995). This work has emphasised the inseparability of knowledge and beliefs about 'technical' issues from ideas about cosmology and the maintenance of social order. In this context issues might not be constructed in terms of 'risk' at all, and knowledges, rather than engaging, might speak past each other or remain incommensurable. In this vein, it is notable that in many cultural and linguistic settings, there is no equivalent concept to 'risk'. Thus for instance Banyole people in Uganda tend to talk in terms of outcomes, consequences and misfortunes (Reynolds-Whyte 199x), and people in rural India, of dealing with unpredictability and uncertainty (Standing, workshop discussions; Mehta 1998).

Such diverse 'framings' are not only a feature of rural knowledges in the 'south', however. Anthropological and social constructivist works which now deny theoretical divides between both 'northern' and 'southern', and 'expert' and 'lay' knowledges, emphasise how all expressions of 'risk '(or alternative framings) are socially-located and shaped by experience and culture: a set of plural, partial perspectives (e.g. Douglas 1992 Caplan 2000;).

This, in turn, raises issues concerning how notions of 'risk' are constructed and deployed by scientific and policy institutions. The technicist, instrumental, calculative risk discourse which predominates among public institutions in late industrial society is only one among many. It helps uphold technocratic power and managerial control, but in the process also avoids or 'banalises moral dilemmas' (Visvanathan, workshop discussions). This is evident in debates over GMOs, for instance, where powerful public institutions have used instrumental risk discourses to avoid having to address more fundamental ethical questions (GECP 1999; Levidow et al 2000; Jasanoff 2000; Wynne, workshop discussions). Other contrasting risk discourses include those of international development institutions (e.g the World Bank) about 'helping others manage risk better' (Standing, workshop discussions); those which would equate risk with 'evil' (Visvanathan, workshop discussions) and those which see risk in positive terms, as about opportunity, possibility and agency (Stirling, workshop discussions; Mukhopadhyay, workshop discussions).

In short, there are multiple languages and discourses around risk and uncertainty, associated with a variety of cultural experiences and institutional positions. Provided this richness is retained, this makes it an illuminating fulcrum for exploring shifting relations between citizens, science and policy institutions. At the same time, it is important to explore how and why narrow instrumentalist concepts have come to predominate in so many contexts, and the issues of power and legitimacy which allow some to define 'risk' for others (Gaventa, workshop discussions). Notably, public critique and demands for inclusion in decision-making about technology have sometimes focused precisely on expanding and enriching these narrow notions to encompass a broader range of ethical and social concerns, as in the case of GMOs in Europe. In other areas the introduction of technologies, in particular those which are coupled to concepts such as development and modernisation, are frequently 'marketed' by governments, donor agencies and private businesses as 'safe and good' - even where the intrinsic contribution of such technological innovation to human security in its most simple form (i.e. the right to safe drinking water) remains questionable. Dam building is but one example of this point, as are water offtake schemes from shared catchment areas (Thompson et al 2001).

A related comparative question concerns how and why public debate and controversy around science and technology emerges around some issues and in some settings, and not others. Here again, 'northern' and 'southern' traditions of work present different perspectives. In an influential body of work on 'citizen science', the former has shown publics engaging critically with the perspectives of 'expert' institutions either through funding or orchestrating their own scientific investigations, or lobbying to transform research questions, for instance in 'popular epidemiology' around issues of toxic waste pollution (e.g. Brown and Mikkelsen 1990; Fischer 2000) or HIV/AIDS in the US (Epstein 1996). In contrast, the IK literature has frequently presented a more autonomous relationship between 'local' and 'expert' knowledges, dwelling on the difficulties of establishing effective 'knowledge partnerships'. However evident differences in forms of public engagement or non-engagement with science and policy by no means follow the north-south distinctions that some literatures seem to construct. Rather, they reflect a range of other cross-cutting factors, differentially important to particular issues and settings. These include the historical and institutional processes which have shaped the social relations of science. Comparing

public engagement with biodiversity science/policy in Guinea (West Africa) and Trinidad (Caribbean), for example, shows the significance of Guinea's colonial scientific legacy and strong foreign aid dependence in generating a high degree of disengagement among rural land users whereas amidst Trinidad's strong national, highly literate population and active participatory media, public engagement has been both active and critical (Fairhead and Leach forthcoming). In the same way a comparison of policy making processes around land management issues in Ethiopia, Mali and Zimbabwe sees historical legacies interacting with contemporary influences, from within and outside, to influence the degree to which spaces for citizen engagement in environmental policy change are evident (e.g. Keeley and Scoones forthcoming).

3. Citizen participation and deliberation in science/policy processes: what does this mean in different cultural contexts?

In the context of apparent crises of trust between people and experts over risk issues, it is now commonplace to call for the democratisation of science. Risk society debates explicitly link theory and practice, exploring possible ways of moving from expert calculation to mediation and negotiation between various experts and publics (Adam *et al* 2000). Such a shift is required, it is argued, where risk is defined and perceived by different people in very different ways, and where issues are pervaded by complexity, uncertainty and multiple, socially-diverse perspectives. What is suggested is providing channels for citizen engagement in science/policy processes through various forms of participation and what have come to be termed deliberative and inclusionary processes, ranging from stakeholder involvement in planning to citizen's juries, consensus conferences and others.

This chimes with longer established traditions of participatory learning and action in development praxis in 'southern' settings (e.g. Chambers 1997; Cornwall, 2001). Here particularly though, some (though by no means all) work has emphasised how power relations and dominant problem- or risk-framings tend to pervade participatory processes and events, including particular people and their perspectives, while excluding others (Holmes and Scoones 2000). As many studies of science/policy processes have found, international and national social relations and practices of science and policy, often in conjunction with traditions of mass-media and education, shape the framings of all science/policy processes, mediative or otherwise. In this context, far from being a panacea, deliberative and other participatory approaches they have sometimes extended the influence of existing managerial forms and analytics.

In European settings, while having roots in older notions of bringing modernist 'science to the people', a new lexicon has emerged about citizenry and science, convincing lower-level civil servants as much as top government policy-makers and scientists, about the need to consult and engage the public. However in many respects this lexicon is still science-led, with the point of engagement seen as removing obstacles to science and innovation (Irwin, workshop discussions) – as well as 'fire-fighting' in cases of extreme controversy, such as over GMOs. Other developments, such as the re-emergence of 'science shops' in continental Europe, are framed in similarly dominant-scientific terms. Often, the language of participation is used to

mean consultation about the applications of science, rather than trying to construct a joint research programme in science (Marris, workshop discussions). Thus the much-discussed 'construction of scientific citizens' gives people voice, but it is voice within a very restricted framework with an overwhelming tendency only ever to see citizens as consumers (Wakeford, workshop discussions).

In stark contrast to these attempts to engage a (certain construction of) consumer-citizen in science, are processes through which scientific/technological engagement becomes part of a process of constructing citizenship. Paul Richards (workshop discussions), for example, describes the joint work of Sierra Leonean rice farmers and crop scientists in generating and adapting crop biotechnology to address farmer agendas, which include uses of rice not just as a commodity but as a re-builder of social relations in a conflict situation. In this context, biotechnology becomes a resource for 'creating citizenship among the radically socially excluded, and in places where there is no state or perhaps even no nation'. The overall aim is to increase the power of what people are doing already, and out of that they will then create memberships where no memberships yet exist. This example alludes to a form of citizen science where genuine participation in knowledge generation becomes a form of citizenship right, i.e. the right to hold and use knowledge. As a new form of citizenship rights in themselves, knowledge rights might in turn lead to the claiming of other rights, such as those associated with material claims over resources, which in turn help to create new citizenship rights.

These debates over forms of citizen participation in science in turn reflect distinctions which have been drawn in the wider literature between people as 'users and choosers' (a clientelist, consumer model) vs. 'makers and shapers' who set agendas (Cornwall and Gaventa 2000). The 'users and choosers' model is based on an idea of a 'rational' citizen who possesses a clear checklist of opinions; in other words, on a highly static notion of knowledge which fails to capture the broader meaning of science/technology issues in terms of people's lives and social relationships. The 'makers and shapers' model sees knowledge (and citizenship) in more processual terms as realised through participation. Critical questions concern the interlinkages between these two models, and how people may move from engaging with policy as 'users and choosers' to engaging as 'makers and shapers.' These distinctions have particular salience in the scientific context where the power of scientific institutions and professionalised expertise to construct people as mere 'users' may be particularly great, yet the importance for people in having a 'shaping' role in decisions about the science, technologies and risks which affect their lives is particularly important.

Whatever the setting, participatory procedures can also become part of 'technologies of governance' that in practice serve to contain and channel public discourses and diminish the space for their expression. In some respects the more 'designed' participatory procedures become, the more they move towards this more technocratic end of the spectrum (Stirling, workshop discussions). These tendencies have been much in evidence perhaps reflecting both powerful interests in government, corporate, or international science remaining 'in control', and the ease with which highly technical approaches to managing risk elide with technical procedures for managing participation. In contrast, building real scientific citizenship through participatory processes may require that such processes are kept much more open-ended.

As an apparent alternative to such 'managed participation', there are many instances where citizens have staked knowledge claims and dissent around science/technology/risk issues through more direct forms of mobilisation and advocacy, including through legal and political systems. In the case of GM foods in Britain, for example, effective consumer action, operating in an often disjointed, uninstitutionalised way, succeeded in effecting real policy change. In Trinidad, successful opposition by farmers and hunters to national biodiversity and protected area policies has taken place outside numerous donor and government-co-ordinated participatory procedures, via media campaigns and direct political pressure (Fairhead and Leach forthcoming). Numerous other examples could be cited. Yet to pose an opposition between 'participatory procedures' and 'mobilisation/advocacy' is to miss the ways the former are influenced by their wider context: the broader social and political processes which shape the extent to which deliberative policy spaces can open and become a means to effect change. Equally, while many discussions of citizen science and participation focus on the 'demand-side'- on mobilising people to become involved in science - critical questions concern 'supply-side' issues of how scientific and institutional cultures might become more open and responsive to citizen perspectives. Here, important questions extend to the contemporary internationalisation of science/policy processes, and the effects this is having on processes of public engagement in different places and around different issues.

4. Internationalised contexts for science and policy: what implications for citizenship and the politics of knowledge?

While debates around participation in science frequently take place in particular locales, the world is now too connected, and science/policy too globalised, for citizenship practice to be confined to a local level. Equally, amidst contemporary globalisation it is not appropriate to characterise 'late industrial society' as specific to certain geographical locales, as the 'risk society' thesis has tended to do. Rather, relations of definition around and responses to risk are quintessentially locked into global science/policy fields. This pervasive international context creates an important common arena for study which transcends north-south divides. Yet many comparative questions arise concerning the strikingly different capacities of different countries and groups to negotiate their interests in such internationalised contexts.

The internationalisation of science includes the roles of trans-national corporations in scientific research and commerce (creating risks, defining what is risky and what is not), and the roles of international conventions, agreements and deliberations, co-evolving with scientific committees and with the politics of their operation conducted at least partly through the practices of science. In many circumstances this can have the effect of circumscribing opportunities for public debate and influence. For example in debates about GMOs, globally-organised science is being used to justify harmonising standards to risk assessment and the removal of barriers to trade. This is acting as a barrier to wider public debates about the risks and ethics of GMOs, which have been actively disciplined within these negotiating processes, driven as they are by trade and commercial concerns (Newell, workshop discussions). This illustrates a more general tension between the push toward harmonisation and universalisation of scientific and risk assessments, and efforts to maintain diversity and to engage with citizens' diverse concerns.

Even where the international political-economic interests appear more diffuse and harder to pin down, internationalised concepts can powerfully influence local debates, albeit mediated through complicated science/policy relationships and networks linking national research traditions, donors, NGOs, development projects, national and local media and so on. Sometimes the effect can be to silence local discourses, or rather for their evidence, concepts and categories to be co-opted into terms which more or less fit internationalised ones. This is the case, for example, in Guinea where the internationally-salient concept of 'biodiversity' has been operationalised in a variety of national and local scientific and policy discourses. All of these share the notion of 'managing biodiversity' as something separate from and threatened by people, thus writing-out or reinterpreting farmer's discourses about the ways they live with and manipulate plant variety in everyday life and landscapes (Fairhead and Leach 2002). In a similar way, the invention of the concept of 'sustainability' within the international Brundtland Commission wiped out several dissenting imaginations on the ground that had developed in the 1970s and 1980s (Visvanathan, workshop discussions).

However, while international concepts sometimes serve to over-simplify debates, they can also sustain local debates in powerful ways. While appearing to have a common meaning, international concepts can mean different things to actors in different local contexts, and be appropriated creatively as vehicles for localised movements, as been the case, for example, with the use of 'sustainability' ideas by activist groups in India (Visvanathan, workshop discussions).

These conceptual appropriations suggest one set of ways in which internationalism is now shaping apparently localised movements around science, technology and risk. Others include the linking of local knowledge claims and movements through international networks and organisations, with 'indigenous peoples' perhaps representing the case par excellence. In some cases, notions of 'global citizenship' are helping to forge such connections, although invoked by diverse actors and implicating diverse power relations. On the one hand, rallying calls to global citizenship can help to construct risks as global or universally felt in ways which support powerful international organisations and their harmonisation approaches, but obscure or override diverse local perspectives. On the other hand, people themselves have sometimes manifested felt positions as global citizens, in ways and at times thoroughly against the grain of policy expectations. For example in a project to translate global environmental problems into a set of meaningful indicators for Lancashire County Council (McNaughten et al 1995), it became clear against all preconceptions that people felt a sense of solidarity with Bangladeshi farmers who would be affected by rising sea levels as a result of global warming. This thoroughly contradicted the idea that people will only be persuaded to do anything about global climate change when negative impacts on them, personally, can be demonstrated (Brian Wynne, workshop discussions). In this case, more transnational expressions of citizenship challenged the construction of the citizen as individual, self-interested consumer.

What is often missing from the discussions on globalisation and risk is a careful examination of the multiple social relations which influence processes of inclusion and exclusion, as well as a more global appraisal of the range of 'everyday sites of social resistance' (Lefebvre, 1991). Alongside forms of coopted technocratic

decision-making which establishes routinised and mechanistic forms of 'stakeholder participation', there are likely to be more nuanced power dynamics at play between formal and informal institutions and actors across diverse scales (cf. Mehta et al 1999, Derman 2000). The question of 'control' over environmental issues is also central to understanding the global-local nexus, as well as how discourses on the environment relate to those of security and development (Thompson 2001).

Lastly, the ways in which science and the knowledge of experts intersect with national policies and international environmental and development discourses is arguably integral to understanding how citizenship, participation and environmental issues can better be understood. Threats, risks and uncertainties can thus be understood in the context of different actors' priorities and contexts, as well as in terms of their understandings and interpretations of individual, state and global security. The local-global nexus provides the key challenge to broadening our intellectual and more practical, policy-oriented understandings of risk and security, both drawing from, but also going beyond, Beck's 'risk society' conceptualisation.

5. Conclusions: towards knowledge rights and cognitive justice?

The demands of many citizens' movements, whether or not orchestrated through international connections, are for what one might term 'cognitive justice' in the scientific field (Visvanathan, workshop discussions). Such demands do not represent an anti-science or anti-technology agenda; nor are they necessarily anti- the particular high-tech scientific developments, such as biotechnology, which have caused such public controversy over possible risks. Rather, the demand is for the right for different forms of knowledge to co-exist, and to carry weight in the decisions that affect people's lives. It is in this respect that an emergent notion of 'knowledge rights' might be a candidate for inclusion together with the political, social and economic rights that currently comprise the rights-based agenda in development. Knowledge rights would not be confined to rights to 'possess' knowledge as if it were a commodity, but would encompass rights to pursue ways of life/knowledge systems as embedded in each other, and rights of cognitive representation in processes of scientific experimentation and decision-making around science/risk issues. This could serve to enrich innovation-oriented science – linking with the notion of risk in its positive, opportunistic sense – as well as to render protection-oriented, precautionary science and risk assessment more socially inclusive and legitimate. In turn, as some of the examples in this article have begun to indicate, such claiming of knowledge rights can be mutually constitutive of expressions and practices of citizenship, and lead also to other forms of citizenship right, such as those in the economic or social sphere.

The issues and examples discussed here, albeit very briefly, underline that the 'north-south' distinctions which have pervaded so many debates on science, risk and participation do not hold up in practice. Experiences of extreme vulnerability and marginalisation from science/policy processes are common to groups of people in Europe and the US as much as in Asia and Africa, while the latter, too, have their groups of 'scientific citizens' contesting official perspectives in Euro-American, reflective, 'risk society' style. Other distinctions – between issues, prevailing scientific cultures and histories, and positions in international political economy, for example – may be of greater significance in shaping the evidently highly diverse patterns of public engagement (and disengagement) with science appearing across the

world.

Just as 'risk' should be seen as socially constructed, with different discourses suiting the concerns and power positions of a variety of people and institutions, so diverse, discursive constructions of 'the citizen' are at play in the science/policy field. Notions of citizens as consumers or productive agents; as policy users or shapers; as local or global, or even as 'scientific citizens' or (contextually) non-citizens, both inform and are reproduced through science and technology generation and assessment. They contribute to the assumptions and justifications upholding science/policy processes and the power of certain institutions within them, shaping the types of public engagement which prove possible. Examining such constructions of citizenship within science/policy processes, and the ways in which people challenge these through their own practices and expressions of citizenship in the field of science and technology, is thus an important part of a future agenda for work on citizenship, science and risk.

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[1] 'Citizenship, Science and Risk: Conceptualising relationships across issues and settings', DRC workshop held at IDS, 10 October 2001. Approximately 30 participants consisted largely of academics from a variety of disciplinary and technology-related backgrounds, and included many whose works have been pivotal in shaping debates in this area. In attempting to reflect the debate at the workshop we have tried to attribute comments and insights to particular participants.