PROJECT FINAL REPORT

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Final Summative Report

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Grateful thanks to our advisors and the many others who have contributed time and advice.

CONVERGE is a European Commission FP7 Research Project: Rethinking globalisation in the light of Contraction and CONVERGEnce.

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Key words:
Convergence; Sustainability; Equity; Globalisation; Earth System; Resources; Systems.

Executive summary

The CONVERGE project was conceived to respond to this imperative:

> *New visionary concepts need to be created to enhance the pursuit of sustainable development at a global scale, to respond to policies and international multilateral agreements in line with political commitments already made (like the Millennium Development Goals) and innovative approaches are called for to ensure the coherence of integrated policy-making at EU level.*

A new visionary concept is presented, it is called convergence and it meets this desire in the call for proposals.

The concept evolved from two booklets, one called Contraction and Convergence and the other Converging World. The idea within Contraction & Convergence™ (C&C) is central to the Kyoto Protocol and has attracted a large following who believe in the idea. The Converging World story is about the UK charity of that name, which is a practical realisation of the concept of convergence.

C&C is possible for greenhouse gas emissions as these are fungible – it matters not where in the world you save emissions the effect is the same. Implementing C&C, however, requires global agreement on the cap or limit for emissions, on allocations, on mechanism to police the processes; it is subject to compromises for local political reactions. The field is open for argument on definitions, lack of sanctions on implementation, trade-offs and difficulties over validation, excessive bureaucracy, and of course corruption.

The CONVERGE project explored whether C&C was possible and appropriate for other resources on both the input side (raw materials) and the output (capacity of the environment to absorb wastes). The lack of fungibility was a major factor in determining that extending C&C directly was not a visionary concept, it was more likely a nightmare prospect.

In a leap of faith the project stripped C&C back to its underlying values and the ethic that it embodies. This resulted in just two words: limits and equity - loaded with subjective meanings but robust enough to continue exploration. Limits are a combination of (a) planetary boundaries, environmental degradation and pollution - the capacity of the Earth to cope with humanity, and (b) resource depletion, the finite nature of what we extract for our use and quickly transform into waste – see point (a). Equity similarly has two components, (a) the issues of social justice following closely the political set of human rights and (b) the issues of quality of life, well-being, consumption and development, following the social and economic set of rights. These two main dimensions of convergence parallel the division we see between the worlds of 'Environment' and 'Development'. Convergence is about bringing these fields together. From the work on collecting case initiatives we produced the convergence Quadrant Model to map where organisations or policies fit into the convergence space defined by these dimensions of environment and development or limits and equity.

We were charged to rethink globalisation in the light of Contraction and Convergence, that light has shone brightly and has resulted in the idea of ***'Convergent globalisation'*** - an orientation of thought towards producing equity across and within all nations while remaining within the capacity of the planet to support a good life for all people today as well as for future generations. We have provided evidence and we have modelled resource depletions to support the arguments. We have discovered how community and social movements can work with convergence, we have reviewed policy making to see where convergence is included or not and we have developed methods to measure and compare degrees of convergence.

We propose convergence decision making informed by science and grounded in an ethic that can be accepted by both developed and developing nations and across different global belief systems. Convergence decision making spreads the norms of convergence using the tools and approaches supplied from the project across all levels: a convergence framework, process, case Initiatives, engagement guidance, indicators approach, and policy and research recommendations.

The CONVERGE project offers a philosophy, a vision, recommendations and guidelines, tools, and a research agenda in support of convergent globalisation - and the work will continue through the Convergence Alliance.

Summary description of project context and objectives

The changing context of CONVERGE research: the project timeline

The CONVERGE project officially started in September 2009, but it is instructive to look at what was happening before that and also to consider events that are scheduled to occur after the project end (August 2013). Appendix I shows the detailed timeline of important milestones and trends from 2007 through to post-2015.

The Kyoto Protocol was adopted in 1997 and entered into force in 2005. Its first commitment period started in 2008 and ended in 2012. The protocol only weakly incorporates the concept of Contraction & Convergence™ (C&C) and after sixteen years it will be succeeded by a new treaty. It is unlikely that this will do more than acknowledge C&C as a guiding principle.

The capacity of the atmosphere to absorb and cope with greenhouse gas emissions (and other air pollutants) is a perfect example of a fungible resource. Global governance has failed to work fully with the concept of convergence for this resource – in the sense of basing international agreements on the principle of C&C. When considering other non-fungible resources (water, forests, minerals etc.) the prospect of a Contraction & Convergence™ based set of international agreements appears remote.

The CONVERGE project suggests an alternative approach, which is to motivate and advocate for convergence principles across the world in everyday transactions and values – to see convergence as an emergent outcome rather than a top down imposition.

The realisation that the Millennium Development Goals were coming to an end, with mixed results, has spurred action for what should follow. The desire to set a target to eradicate extreme poverty is driving the Sustainable Development Goals and the whole post-2015 agenda. Within this we can clearly distinguish an emphasis on equity both across nations and within them. The increasing differentials of wealth – the growing inequalities apparent in the world - are of major concern. These are driven by the global financial crisis and the lack of any global ability to tackle the underlying cause (there is increasing speculations that the 2008 crisis was only patched up and further crises will continue until structural change occurs – one way or another).

Along with blending equality issues with environmental concerns has come a growing realisation that development and environment are two sides of the same coin and should be considered simultaneously in systemic analysis and action.

The trends apparent over the last few years, albeit subjectively assessed, point to the ideas of convergence as entirely in tune with the needs of action for both the environmental (sustainability) and for the development (social justice) worlds.

We believe that the conclusions of the CONVERGE project are important and a valuable set of resources. The formation of the Convergence Alliance has happened because these ideas need to be taken out of a research framework and into advocacy and campaigning. The CONVERGE team are committed to this Alliance and to the work of the Convergence Observatory which will continue research and in particular continue to measure, monitor and evaluate convergence across the world.

The changing context of convergence: responding to the Anthropocene

> For the majority of the Holocene, human populations were relatively low and their activities considerably muted relative to that of the last few centuries. Nonetheless, many of the processes currently altering the Earth's environment were already occurring during this period. What now appears certain is that human alteration of the Earth System radically accelerated during the Industrial Revolution. (Harris, 2010)

In the Anthropocene age of the Earth, humans have become the single biggest driving factor in earth system change (Harris, 2010). Support for the validity of this concept is being obtained all the time from a wide

number of sources (Mazur, 2010; Lynas, 2011; Biermann et al, 2009). The early results from the research programme, set in motion by broad sustainability, concerns demonstrate the seriousness of our position. We have a crisis period where reversal of certain dominant trends may be a greater priority than proceeding more directly to what could be a sustainable future. This is the relevance of 'Transition' concepts as they imply that we need strategies both to cope now, and to prepare for short, medium and long term change as well. In the global sustainability community we are not so well prepared as we might be - many areas of the sustainability research programme are under-developed and in need of urgent advancement. It is in this context that we are now summarising the results of our attempts to 'Re-think Globalisation' in the work of the CONVERGE project.

….the general scenario for the world if divergent paths are followed, forms the background to the CONVERGE project and the urgency of Rethinking Globalisation for Equity within limits. The social breakdown, massive rises in inequality, rapidly deteriorating Earth System, resource wars, and loss of hope for humanity if we do not rapidly institute real system change forms a background to all our recommendations. - D43, Parker, 2013

….our global society could contract and converge through a series of crises, such as economic failures, food shortages, warfare, dictatorial decision making, etc., that lead to an overall decline in human welfare and dignity. Conversely, with some forethought and a series of possibly difficult yet communally made decisions, we could pass through a period of contraction that leads to a converged global society where human welfare, dignity, compassion, and democratic processes are developed and maintained. We refer to this sustainable-development pathway framed by 'equity within limits' as convergence - D30, Callaghan, 2013

Science

The CONVERGE project set out to work from existing sustainability science and the ethical understandings utilised in the original concept of 'Contraction and Convergence[TM]'. The concept of the global atmosphere as common 'property' of humanity was taken as a starting point for this original version 'Contraction and Convergence [TM]' informed by the state of Climate Science in the year 2002.

Since this point sustainability and Earth System Science have developed by leaps and bounds, changing the understanding of the possibilities of global per capita 'allocation' of resources and bio-capacity held in common (D10). For example, the findings of the QUEST programme (2012) and the TEEB report (2010) have shown how the complex Earth system is composed of multiple interdependencies and that human well-being depends upon these complex systems in often unintuitive ways. Assumptions about planetary population, demographics and current growth trajectories are also important here in judging the feasibility of 'equity within planetary boundaries' where fair *shares* are insinuated. The issue of the global atmosphere has been analysed as one of 'fungibility' – where the issue or resource in question, has the same characteristics regardless of geography. (D16a).

Forecasts on human population, demographics, development and associated environmental degradation and resource depletion suggest a testing period for humanity – to which convergence responds.

Convergence, though, has to reconcile factors like population and equity with resources. In his book The Future of Life, E. O. Wilson (2002) describes the 'Bottleneck' through which we all have to pass - this burgeoning global population, the limited capacity of the planet and the repercussions for its supporting society and culture today and for future generations.

This bottleneck concept is important, we have mounting evidence to support projections of resource production peaks in the medium term (within this century) and for some resources peaking may occur much earlier. The underlying fabric of our existence such as the seas, soils, freshwater and atmosphere are deteriorating. The scenario of managing and conserving resources as the population continues upwards and then declines is probably the only one that will avoid tipping into various forms of collapse. Moderating population growth, particularly in developed countries (those with the highest ecological footprint), would lessen the pressures on resources and make fairness in provision easier to achieve
D 16, Roderick et al, 2013, p75

Ethics and inequality

There is a need to consider political, intellectual, cultural and moral feasibility in addition to the more scientific and technical computations of available planetary resources. The concepts of 'equality' and 'equity' have been discussed as the project progressed and the question of systems accounts of ethics has been raised.

In terms of the context of convergence there is a rising global debate about the extreme rises in inequality both between and within countries. There is increasing debate about corruption, transparency and accountability with regard to governance, regulation and law. The financial crisis has opened up more spaces for discussion of the moral ends of the economy and the conduct and responsibility of financial institutions in a context where billions of people suffer the adverse consequences of out-of-control financialisation.

Discussion of the ethics of discounting has also begun in earnest – particularly with regard to climate change and ecosystem services and the effects of discounting on future generations.

Economy

Contraction and Convergence™ was developed, and had influence, at a time when the creation of carbon markets was a dominant policy trend. The fungibility of carbon (the fact that it is the same everywhere) is the key reason that this seemed suited to a monetary and market calculation as described in the extract below.

Beyond Emissions Trading: the key issue of fungibility

The fungibility of greenhouse gas emissions enables the concept to work - in principle. A tonne of CO_2 equivalent becomes a tradable commodity, the idea of an overall global limit is feasible, the allocation per capita by nation makes sense – it is all a tractable calculation. C&C is a goal seeking process where the goal is a fixed state (until revised by agreement). The target is to reach total global annual emissions of about 2.5 gigatonnes by the end of the century and to reach allocations by country equal to population by a certain date such as 2030.

As we have seen in additional output *D16a - An exposition on convergence principles*, the characteristic of fungibility is essential for any similar scheme to C&C for greenhouse gas emissions. Resources that are only fungible in local areas do not lend themselves easily to the idea of equal allocations at a global scale. Goal setting for convergence is constrained from this basic approach by the nature of most of the resources that we should wish to reduce to within planetary limits, in ways that are fair. Convergence becomes a matter of dealing with outcome qualities rather than input quantities to be allocated.
D 16. Roderick et al, 2013, p14

Some key problems of the market approach to the environmental commons and to sustainability as a whole have been addressed in the project by a specially commissioned discussion paper (Anderson, 2013).

Project aims and objectives

The aim of the CONVERGE project was for a 'new visionary concept' for 're-thinking globalisation'. The project was inspired by the C&C approach to greenhouse gases but called for ways that go beyond emissions trading, which was the initial, seminal idea. The ethical concepts of equity in 'allocation' of planetary resources held in common by humanity (the global commons) was the starting point for the CONVERGE project.

The research has explored what it might mean to extend the fundamental ethical and practical ideas behind emission trading, clean development (CDM) and general cap-and-allocation mechanisms. In the process the project worked from sustainability science and from concepts of ethics that included attention to the rights of future generations – inter and intra- generational equity. The transdisciplinary ambition and inherent nature of the project meant that we inquired into how convergence might be brought about – and what a convergence approach might look like – across different areas of human knowledge and practice.

The CONVERGE project suggests a framework for equity within limits. It is a framework that is supported by

sustainability science and is also acceptable to progressive social movements. The project coherently links the scales across the study in the policy context – from local, to national, to global-regional and global. This is vital to ensure integration between policies at the different levels and to lead to more global policies that enable Convergence and actions for sustainability at national and local levels – an inherent concept of subsidiarity.

The project objectives were to:

- explore convergence across social, economic and ecological systems, in the context of globalisation
- test cnvergence as a platform for holistic, sustainability indicators
- evaluate how policies and agreements conflict with or support processes of convergence by testing the convergence platform with policy communities and stakeholders
- investigate how different methods of community engagement can contribute towards building sustainable communities, testing the convergence platform with local stakeholders
- identify processes of convergence through case initiatives
- recommend how to integrate convergence into the internal and external policies of the EU
- communicate and disseminate the findings to different end-users through a range of media

The CONVERGE project has addressed all these objectives and has produced as set of tools and resources that can support or create processes of convergence, assist policy makers, and indicate further developments with stakeholders that seem particularly promising. Over the course of the project we have:

- Demonstrated transdisciplinary approaches to synthesis bringing the project outputs into close relationship and providing thematic synthesis from different perspectives.
- Indicated the opportunities for knowledge transfer and development to different stakeholder groups.
- Deepened our understanding of the processes of convergence, including opportunities to create new or supporting processes of convergence (WP2 and WP3).
- Identified gaps in current policy, which limits or prevents the occurrence of convergence (WP4).
- Developed methodologies for engaging communities in convergence (WP5).
- Learnt many lessons from case studies that looked for convergence thinking (WP6).
- Produced interdisciplinary, multi stakeholder critique (WP7) to support convergence concepts.
- Written recommendations for convergence, these were made to the EU and national and global governance – but also relevant for social movements.

We have tested the convergence concept for acceptability by key stakeholders and assessed the perceived usefulness of convergence as a concept and approach across social movements and community sustainability projects, policy communities and stakeholders, and measurement and indicator regimes.

Within the CONVERGE project we have tried hard to work with the big picture, the wholeness of global issues, aware all the time that every ‘thing’ has some connection to everything but everything is too much to handle. But what can we do? We can continue to forecast and predict - we can paint pictures in words and numbers of what is to become of it all and then we can present our imaginings. We make emotional films and try all forms of artistic expression to show the future in meaningful ways. We attack the heart strings with stranded polar bears and huge brown gashes through rain forests; we show the dying fish, the dead lakes, the appalling slums, the lives broken by poverty and disease and the list goes on as we try to stir people to make change before this worst of all worlds happens to them. Playing on fears only leads to shutting out the world; we erect barriers and fences in our minds. Inside these boundaries it is just us, we are different and special, outside is the Other: nature, foreigners, and future faceless people - they will be the ones who have to cope. Our fences keep us safe and the greater the threat from outside the more we reinforce the barriers. It is the vast mass of global activity, of transactions and contracts from which the qualities of life emerge – the aesthetic, the morals, the equalities and justices and above all the care for our planet and people. It is by changing the nature of action that we can effect a change in what emerges.

Small actions, multiplied millions of times, towards equality and frugality will move the whole towards equity within the limits of the planet.

The main results

The CONVERGE projects demonstrates research achievements in a number of areas:

- System approaches and patterns
- Methodologies
- Worldviews
- Policy
- Measurement
- Participation and engagement
- A mapping tool
- Other tools
- Recommendations

These are all covered below in this summary of the project's outputs and impact. However, it is important to appreciate first the context in which convergence is offered as a visionary concept.

The significance of the Anthropocene

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In the Anthropocene age, humans have become the single biggest driving factor in Earth system change (Harris, 2010). Support for this concept is being obtained all the time from a wide number of sources (Mazur, 2010; Lynas, 2011; Biermann et al, 2009). The early results from the research programme set in motion by broad sustainability concerns demonstrate the seriousness of our position. We have a crisis period where reversal of certain dominant trends may be a greater priority than proceeding more directly to what could be a sustainable future. This is the relevance of 'Transition' concepts as they imply that we need to consider strategies both to cope now, and to prepare for short, medium and long term change. In the global sustainability community we are not so well prepared as we might be as many areas of the sustainability research programme are under-developed and in need of urgent advancement. It is in this context that we are now summarising the results of our attempts to 'Re-think Globalisation' in the work of the CONVERGE project.

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Since this point, sustainability and Earth system science have developed by leaps and bounds, changing the understanding of the possibilities of global per capita 'allocation' of resources and bio-capacity held in common (D10). For example the findings of the QUEST programme (Cornell et al, 2012) and *The Economic Evaluation of Biodiversity* report (TEEB, 2010) have shown how the complex Earth system is composed of multiple interdependencies and that human well-being depends upon these complex systems in often unintuitive ways. Assumptions about planetary population, demographics and current growth trajectories are also very important here in judging the feasibility of 'equity within planetary boundaries' where fair *shares* are insinuated. The issue of the global atmosphere has been analysed as one of 'fungibility' – where the issue or resource in question, has the same characteristics regardless of geography (D16a).

Forecasts on human population, demographics, development and associated environmental degradation and resource depletion suggest a testing period for humanity – to which convergence responds.

The 'Bottleneck'

Convergence, though, has to reconcile factors like population and equity with resources. In his book The Future of Life, E. O. Wilson (2002) describes The Bottleneck through which we all have to pass, this burgeoning global population, the limited capacity of the planet and the repercussions for its supporting society and culture today and for future generations.

This bottleneck concept is important, we have mounting evidence to support projections of resource production peaks in the medium term (within this century) and for some resources peaking may occur much earlier. The underlying fabric of our existence such as the seas, soils, freshwater and atmosphere are deteriorating. The scenario of managing and conserving resources as the population continues upwards and then declines is probably the only one that will avoid tipping into various forms of collapse. Moderating population growth particularly in developed countries (those with the highest ecological footprint) would lessen the pressures on resources and make fairness in provision easier to achieve. D 16, Roderick et al., 2013, p75

Ethics and Inequality

There is a need to consider political, intellectual, cultural and moral feasibility in addition to the more scientific and technical computations of available planetary resources. The concepts of 'equality' and 'equity' have been discussed as the CONVERGE project progressed and the question of systems accounts of ethics has been raised.

In terms of the context of convergence there is a rising global debate about the extreme rises in inequality both between (de Vogli, 2013) and within countries (Pickett and Wilkinson, 2009). There is increasing debate about transparency and accountability with regard to governance, regulation and law. The financial crisis has opened up more spaces for discussion of the moral ends of the economy and the conduct and responsibility of financial institutions in a context where billions of people suffer the adverse consequences of out-of-control financial speculation and gambling.

Discussion of the ethics of discounting has also begun in earnest – particularly with regard to climate change and ecosystem services and the effects of discounting on future generations.

Economy

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Some key problems of the market approach to the environmental commons and to sustainability as a whole have been addressed in a specially commissioned discussion paper (Anderson, 2013). See the discussion of question no 7 below for further points on this.

Project aims and objectives

The overall aim of the call and of the CONVERGE project was to develop a 'new visionary concept' for 're-thinking globalisation'. The project was inspired by the Contraction and Convergence™ approach to reduction in greenhouse gases but called for ways forward that go beyond emissions trading, which was the initial, seminal idea. The ethical concepts of equity in 'allocation' of planetary resources held in common by humanity (the global commons) was taken as a starting point for the CONVERGE project.

The research aim was to explore what it might mean to extend the fundamental ethical and practical ideas behind emission trading and general cap-and-allocation mechanisms. In the process the project worked from sustainability science and from concepts of ethics that included attention to the rights of future generations – inter and intra- generational equity. The transdisciplinary ambition and inherent nature of the project means that we seek to inquire into how convergence might be brought about – and what a convergence approach might look like – across different areas of human knowledge and practice.

The CONVERGE project suggests a framework for human equity within Earth´s limits. It is a framework that is supported by sustainability science and is also acceptable to progressive social movements. This framework can support the development of a joint vision for the future of humanity.

The project also coherently links the scales across the study in the policy context – from local, to national, to global-regional and global. This is vital to ensure integration between policies at the different levels and to lead to more global policies that enable Convergence and actions for sustainability at national and local levels – an inherent concept of subsidiarity.

The CONVERGE project objectives were to:

- explore the concept of convergence across social, economic and ecological systems, in the context of globalisation
- test convergence as a platform for holistic, sustainability indicators
- evaluate how policies and agreements conflict with or support processes of convergence by testing the convergence platform with policy communities and stakeholders
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- identify processes of convergence through case initiatives
- recommend how to integrate convergence into the internal and external policies of the EU
- communicate and disseminate the findings to different end-users through a range of media

The transdisciplinary synthesis of the results of the many streams of work in the project has allowed us to:

- Bring together project outputs into closer relationship and to provide thematic synthesis from different perspectives.
- Indicate the many opportunities for knowledge transfer and development to different stakeholder groups.
- Understand the processes of convergence, including opportunities to create new or supporting processes of convergence.
- Identify gaps and weaknesses in current policy, which limits or prevents the occurrence of convergence.
- Produce methodologies for engaging communities in convergence.
- Learn lessons from case studies that looked for convergence thinking.
- Demonstrate interdisciplinary, multi stakeholder participation, engagement and critique and support for convergence – using the Converge Process.
- Produce recommendations for convergence made to the EU and national and global governance – but also relevant for social movements.

In order to test the extended convergence concept, one of the key tasks was to test the acceptability and the perceived usefulness of convergence as a concept and approach across the three areas of application:

- social movements and community sustainability projects
- policy communities and stakeholders
- measurement and indicator regimes

This is developed below under the heading of ‘Proof of concept’.

1. Proof of concept across different stakeholder groups

Practitioner input to synthesis: this is provided by the research and reports carried out engaging practitioners – primarily reported in the D38b. The summary of the research results for practitioner responses to the convergence framework are provided here.

'Proof of concept' is appropriate where the nature and scale of the task is extremely wide-ranging given the time and resources available. 'Proof of concept' requires justification of the fertility and usefulness of the frame or approach to be tested. This often involves testing in the process of development – a recognised part of action research.

Convergence approach fulfils a need for initiatives and policy

…..many case studies have indicated that equity, environmental sustainability and well-being are mutually dependent and act synergistically to provide co-benefits. The deep transformation of behaviours, institutions and policies that needs to be effected in order for immediate and future social and environmental challenges to be overcome indicates the need for socially transformative ('eco-social') policy-making which can rejuvenate the development project and overcome the silo effect which has developed.

Vadovics, Background paper to D33, p21

In order to test the convergence approach the project proposal particularly engaged with the key areas below. This did not focus on business or government (politicians). Although the results of the project have much to offer in this regard, implications for these stakeholders come largely under the heading of further work and form one key element of the proposed agenda for the Convergence Alliance and Observatory (see Impact Plan).

In order to test the extended convergence concept, one of the key tasks was to develop criteria for what counts as proof of concept across the three areas of application:

- social movements and community sustainability projects
- policy communities and stakeholders
- measurement and indicator regimes

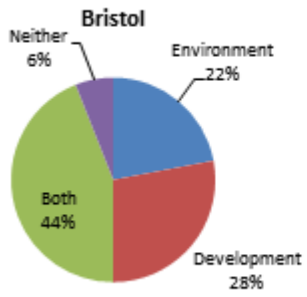
Proof of concept in the case of the first two sets of stakeholders has been demonstrated in the form of positive participant feedback from key project events – outlined further below.

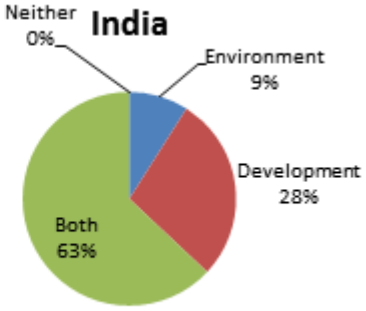
Limitations of evidence

It should of course be remembered that all stakeholders directly engaged in the project were a self-selected group. It was not part of the project to test convergence with wider stakeholder groups or the general public. These activities can be taken forward by the proposed Observatory and Alliance. However, it is also the case that the main strategic aim of the project became more fully defined as bringing together (or 'coupling') the many and diverse actors who are already engaged in Environment and Development. In this sense the fact that project events did succeed in attracting a mix of people from across these areas demonstrates that this concept does have strong resonance with both groups and with those who already see themselves as attempting to combine the two.

In the case of measurement and indicator regimes the proof of concept is provided in strong arguments and example applications but does not yet include trialing with stakeholders.

Question 1 - Do you consider your activities / your organisations activities to be primarily in the field of Environment or Development … or both?





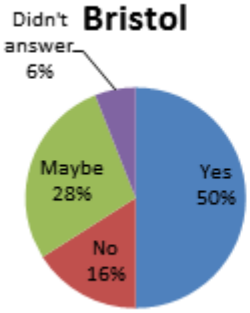
Question 2 - Do you find the Converge Approach a generally useful one?

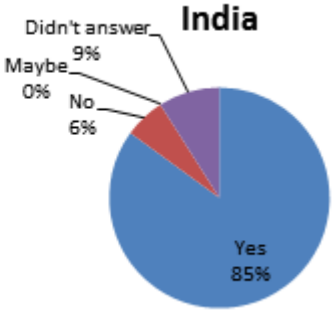
%	Bristol	India
Yes	89	98
No	11	0
Didn't answer	0	2

Question 3- In your opinion does convergence provide a useful framework for negotiations on Sustainability and Human Development goals?

%	Bristol	India
Yes	56	87
No	11	0
Maybe	27	0
Didn't answer	6	13

Question 4 - Would you be interested in participating in a Convergence Alliance?





Summary of Proof of Concept across Stakeholder Groups

Stakeholder Groups	Project Activities	Results Gained
Systems Modelling Workshop Participants (WPs 3 & 7)	Participatory Modelling of Food System	Rich systems outputs capturing information and processes (D20); Positive participant feedback for the process and its value. (see Appendices)
Policy makers at EU level	Policy engagement, Interviews and discussions	Interest in convergence and its potential as a policy tool and basis for Environment and Development joint discussion space (D27).
Sustainability practitioners from across Environment and Development	Project research and dissemination events, including thematic conferences applying convergence to current sustainability questions	Rich results from events including Bristol and Tirunelveli Declarations (see Appendices) Critical endorsement from participants in questionnaire feedback as shown above.

1.1.System approaches and patterns

In the CONVERGE project we have brought soft and critical systems thinking into the analysis. We have developed a cogent critique of ranking and the development of convergence DPSIR model.

Systemic interdependencies and change

Understanding of systemic interdependencies is needed for the development of informed and complementary kinds of change for convergence. Considering the two dimensions, equity and limits, requires systemic thinking to appreciate the interconnections and consequence of change, to construct interdisciplinary and participative examination, and to test policy. Fully developed system dynamics models are important to explore how systems change over time and how they might respond to interventions. D41, Parker, 2013

1.2.Policy

The EU and Policy for Globalisation

The European Union aims to promote and extend peace, democracy, cooperativeness, stability, prosperity, and the rule of law. Benita Ferrero-Waldner, the European Commissioner for External Relations (2004- 2009) said, *"The future of the EU is linked to globalization...the EU has a crucial role to play in making globalization work properly..."*

In the field of policy making we have identified key gaps between national strategic thinking and global strategic thinking; we have gained an overview of some of the key relationships between global level and EU level sustainable development policies. We have gained the interest of networks of policy makers across the Environment and Development divide and developed the concept of using Convergence as a 'pre-policy plug in' to debates.

POLICY CONCLUSIONS from CONVERGE

1) Convergence policy" does not exist, only SD policy and various sectorial policies; some arguments for convergence.
2) Focus of SDGs has gradually shifted focus: human rights, development issues are better incorporated.
3) Global equity is not accepted by the EU policies. Job and growth comes first; equity and limits comes only next.
4) Imminent policy trap: toolbox extends to market-based instruments, green investments - no exit from growth paradigm in the EU policy.
5) Contraction is encompassed by the EU Horizon 2020: Strategy for smart, sustainable and inclusive growth -- crucial to better incorporate the equity within limits arguments in the EU 2020.
6) Coherence understood as new focus (conceptual hook) but not radical change in policymaking. No links between DG Environment & Development Policy coherence cannot be successful if organisational setting does not live up to it.
7) Environmental policy is successful, however reducing inequality (in access to resources) is less realistic.
8) Convergence is regarded as adequate for starting reasonable conversations with stakeholders in sustainability debates.
9) Policies address complex systemic interactions but process level of convergence is entirely missing from EU policies.
10) NGOs could be engaged for the convergence framework.
11) Further evidence is needed on successful engagement processes - how we get to the desirable future.
12) Current multiple crises offer a favourable governance context, sense of urgency for real world solutions; bottom-up, networked, participatory policy approaches.
13) Convergence as a 'pre-policy concept', a plug-in for policy-makers - crosscutting several DGs work and could offer creative space for intergroup meetings at the EU.
14) Convergence as a 'hook' captures various policy areas and invites an open debate.

Balazs, D27

Convergence and Isomorphism, Universality and Diversity

The synthesis of information about sustainability frameworks in terms of national strategies has shown up the ways that these are linked (or not) to wider global agreements. The distinction of patterns between convergence and isomorphism challenges EU policy – the former is a global concept while the latter has been bounded to the EU borders.

Universality and Diversity

The vision is of converging in diverse communities, each living according to its own local definition of sustainability but with a responsibility to the sustainability of all other communities including communities of the future. Roderick et al., D16, p 23

Convergence is primarily about what is to be achieved and why do we want to achieve it; how we achieve it is secondary, and we suggest that these 'how' methods should embrace diversity for resilience and experimentation in forms of learning process – divergence in methods. This reveals how the seeming convergence / divergence contradiction is reconciled. We need a Convergence on what we want to achieve and a divergence or plurality of ways to achieve that common purpose.

Roderick et al., D16, p51

1.3.Resources and Convergence

The dynamic systems modelling for convergence developed into a review of some of the key resources for food and for human development. The University of Lund team, working with Professor Ragnarsdottir from the Iceland team, adopted a '*focus on the dynamic modelling of the key natural resources that are common to all case studies and have crucial impacts on the food system on global level. Dynamic modelling studies looking at key minerals and metals in food production and supply chain.*

As a background to this research it is well to consider the following summary from the work of GreenDependent in Hungary (WP6).

Greener production has not led to decrease in impact of humanity

As a result of the ecological modernization of production, the efficiency of resource use has improved and its environmental impacts have decreased. However, as the consumption side has not been appropriately considered (apart from moves to increase efficiency and make it more environmentally-friendly), despite growing research evidence for this need, greener production methods have not lead to a decrease in the overall environmental impact of humanity.

Vadovics, Background paper to D33, p11

Together they comprise an overwhelming case for a step change in recycling and for the importance of this to both current and future generations. This has also changed the perspective of convergence to include resources much more centrally in addition to the bio-capacity of the Earth's system stressed in the 'Planetary Boundaries' concept.

Natural resources and how long they will last

In determining what would be a fair use of natural resources across the globe we evaluated the availability of over 40 natural resources (Ragnarsdottir et al., 2012; Sverdrup et al., 2013). While the concept of peak oil is fairly well known, (it is generally accepted that oil production is peaking now, and coal and gas will peak within this decade), we found that several strategic metals, elements and other energy resources (e.g. uranium) are about to run out in the near future under the present non-circular paradigm of use. Of note is that phosphorous production has already peaked and no other element can replace phosphorous as a fertilizer in food production (Ragnarsdottir et al., 2011; Sverdrup and Ragnarsottir, 2011).

Burn off times of resources are given in Table 1 below. The concept of burn off means that if we use up the resources at the same rate as we do today – and given that we know the reserves – we can calculate the time to depletion for each resource.

Element	BAU	50%	70%	90%	95%	3bn	1½bn
Iron	79	126	316	316	632	1,263	2,526
Aluminium	132	184	461	461	921	1,842	3,684
Nickel	42	42	209	419	838	1,675	3,350
Copper	31	31	157	314	628	1,256	2,512
Zinc	20	37	61	61	123	245	490
Manganese	29	46	229	457	914	1,829	3,668
Indium	19	38	190	379	759	1,517	3,034
Lithium	25	49	245	490	980	1,960	3,920
Rare Earths	455	864	4,318	8,636	17,273	34,545	69,000
Yttrium	61	121	607	1,213	2,427	4,854	9,708
Zirconium	67	107	533	1,067	2,133	4,267	4,554
Tin	20	30	150	301	602	1,204	2,408
Cobalt	113	135	677	1,355	2,710	5,419	10,838
Molybdenum	48	72	358	717	1,433	2,867	5,734
Wolfram	32	52	258	516	1,031	2,062	4,124
Tantalum	171	274	1,371	2,743	5,486	10,971	22,000
Niobium	45	72	360	720	1,440	2,880	5,760
Helium	9	17	87	175	349	698	1,396
Chromium	225	334	1,674	3,348	6,697	13,400	26,800
Gallium	500	700	3,500	7,000	14,000	28,000	56,000
Germanium	100	140	700	1,400	2,800	5,600	11,200
Titanium	400	400	2,000	4,000	8,000	16,000	32,000
Tellurium	387	387	1,933	3,867	7,733	15,467	30,934
Antimony	25	35	175	350	700	1,400	2,800
Selenium	208	417	5,208	10,417	20,833	41,667	83,000
Gold	48	48	71	357	714	1,429	2,858
Silver	14	14	43	214	429	857	1,714
Platinum	73	73	218	1,091	2,182	4,364	8,728
Rhodium	44	44	132	660	1,320	2,640	5,280
Uranium	61	119	597	5,972	11,944	23,887	47,500
Phosphorus	80	128	640	3,200	6,400	12,800	25,600
Legend, yrs	0-50	50-100	100-500	500-1,000	1,000-5,000	>10,000	

Table 1 Estimated burn-off times in years for a selection of important materials and metals, considering the different recycling, materials use and populations scenarios. Output estimates of burn-off times are in years. All values are years counted from 2010 and forwards. BAU = BAU (business-as-usual) with recycling as today. 50% = improved habits in the market, at least 50% recycling or maintain what we have higher than 50%, improving gold recycling to 95%. 70% = improve recycling to at least 70% for all elements, gold to 95%. 90% = improve all recycling to 90%, except gold to 96%. 95% = improve all recycling to 95%, gold, platinum, palladium, rhodium to 98%. 3bn = improve all recycling to 95%, except gold, platinum, palladium and rhodium to 98%, assume same per capita use as in Target 4, but assume that population is reduced to 3 billion. 1½bn = improve all recycling to 95%, except gold, platinum, palladium and rhodium to 98%, assume ½ of the present per capita resource use in Target 4, but assume that population is reduced to 3 billion. All numbers are years after 2010. From Sverdrup et al., 2013.

Table 1 shows that under resource use as today (business as usual – BAU) many of these resources will reach scarcity levels within this century. The scenarios in the table are based on increasing the recycling rate – first to 50% (column 2), then to 70%, then 90 and last to 95%. In doing so the time to scarcity is increased over an order of magnitude in years. However, the last two scenarios – where most of the resources last into thousands of years – assume 95% recycling and that the population is reduced to 3 billion. The last column assumes half of the use of today, 3 billion people and recycling at the rate of 95%. Note that the precious metals are mostly considered to be better recycled than the others (see Table heading) because they are very valuable. The table shows that

materials that underpin modern society may become unavailable for global mass production of goods. Since phosphorous is also a limited resource, this puts a focus on food security and how the world is going to provide food security to global citizen. It is inevitable that material volumes that can be supplied from fossil reserves will be reduced with respect to today and resources will go up in price.

Table 1 shows that future resource supply is unsustainable without comprehensive recycling. The creation of wealth from conversion of resources and work, as well as the current extensive borrowing from the future, cause concerns that peaking energy and materials production may lead to "peak wealth" and the end of the golden age we live in. We show that scarcity may lead to "peak wealth", "peak population", "peak waste" and "peak civilization", unless urgent counter-measures are systematically undertaken. The Appendix II shows the peaking time of nine resources.

The only action humans can do on a limited planet – to shift the peak year somewhat into the future - is to use less (increasing resource efficiency and/or reduce the resource consumption) and/or to recycle more. Therefore we conclude that there is little more important in a converging world than to increase recycling of materials and metals in addition to reducing resource use.

The findings of this project show graphically that we live in a world of limits and that there is important need for policy makers to take notice and formulate resource based economic models that include availability of resources.

Wider societal impact of resource depletion

Our recommendations are that governments must take this issue seriously and must immediately prepare legislation to close material cycles, optimize energy use and minimize irreversible material losses. Figure 1 shows how policies have shifted from end of pipe solutions , to clean production, and in the future policies need to focus on sustainable consumption and sustainable population.

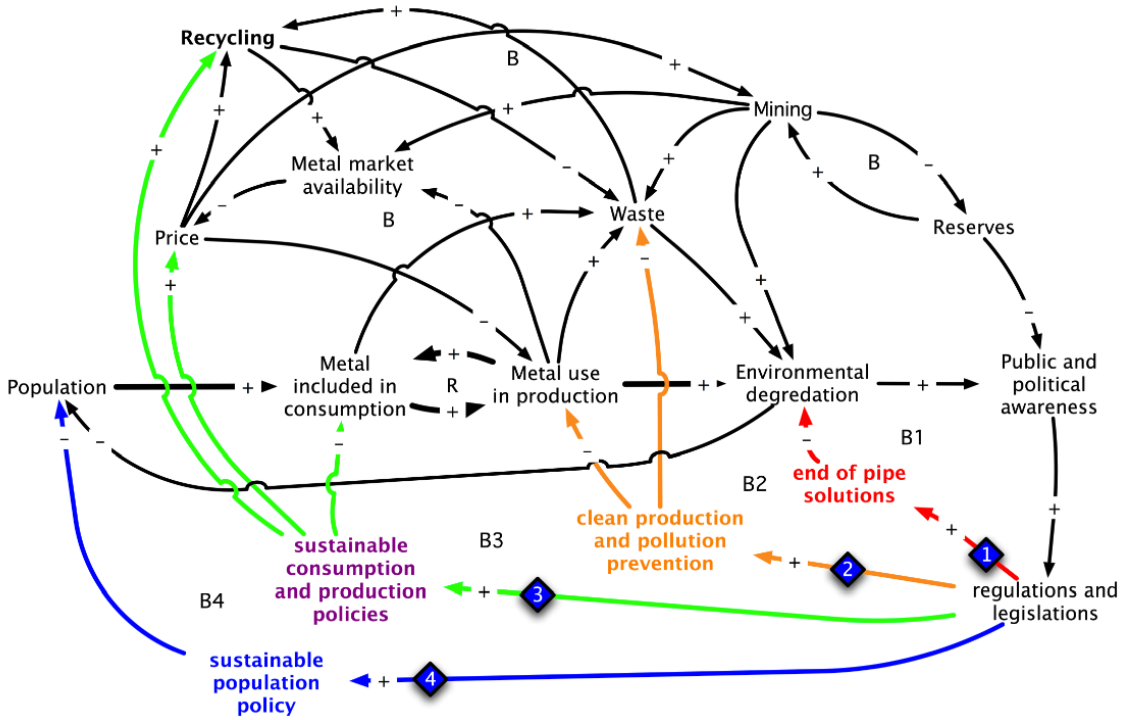


Figure 1. Sustainability of resource use has moved from end-of-pipe solutions (fighting pollution<1>) to the root cause (overpopulation<4>). Attention has over time moved from end-of-pipe solutions to

more focus on recycling, slimmer consumption patterns and sustainable production. B1-B4 are different balancing loops that can be introduced into the system by policies (Sverdrup et al. 2013).

It is imperative that we start on a path towards sustainable development worldwide. In the best of cases there will be both a convergence and a contraction necessary on a local to global scale. As efficiently as we used globalization to expand, we must now use it for the required convergence and contraction. Here we define goals for closing the present sustainability gap we observe and have described here:

- Create sustainable basic materials, metals, energy and phosphorus cycles in human society;
- Make sure that the measures that are taken are socially sustainable within the basic framework of democracy and free society;
- The sustainability principles are applied with a long-term perspective, with fairness towards coming generations without limiting their possibilities nor forward appropriating their freedom or fundamental resources for subsistence.

We need to take care that we are not just shifting the resource issue around. The whole chain from technology to effect on society must be included, as well as detailed sustainability assessments with respect to energy, materials and return on monetary, energy and material investments.

For example, biofuels are already used to a large degree; however, it is at present only 1%-2% of the total global energy production. This issue must be dealt with carefully as it interacts with other ecosystem services harvested from the forests, local fuel, food crops, biomass for pulp and paper, wood for construction, ecosystems for nature conservation and production of recreational services. People in developing countries depend to a large degree on biomass for fuel. Biomass for energy has a limited potential, and a huge downside if done wrongly and short-sightedly.

The information in Table 1 demonstrates that both resource use per capita and the number of consumers are globally too large. Soon it is not about the affluent to contract and the poor to converge, it will be about that all must contract with respect to net materials and net energy use per capita or face serious societal crisis. The concept of net use emphasizes the importance of energy and material conservation in closed loops, making recycling of everything one of the mantras for survival of society.

The sustainable population from a perspective of energy and phosphorus is on the order of 1.5-2.5 billion people on Earth, rather than the projected 9-10 billion people on Earth. The model assessments we have done suggest that there is no way 9 billion people on earth can be sustained for any longer period of time. The UN and IIASA global population projections towards 9-12 billion people on Earth in 2050 can only occur if the models have no limitation on food or energy.

We must find a way to promote prosperity without growth and within the limits of the planet. For any strategic metal or element, recycling reaching 70%, is needed at present, but the recycling rates are far below that (Ragnarsdottir et al., 2012). Significant approaches to global materials sustainability will be made when the average recycling is above 90%. The corresponding alternative measure would be to have a significantly smaller global population. Governments need to take these resource limitations and population growth seriously and start preparing for actions and legislation that can close material cycles and minimize material losses as soon as possible

These natural resource evaluations are crucial in helping to set further and more complete agendas for convergence research within the EU and further afield and further development with stakeholders is most important.

1.4.Measurement and Convergence Pathways

We have developed an outline set of convergence indicators and rationale and indicated the need for a forecast into which we can place points or regions of convergence. The project aimed to synthesise other feasibility studies and indicators (D15) and to produce a set of convergence indicators (D16).

Resource Efficiency and Equity

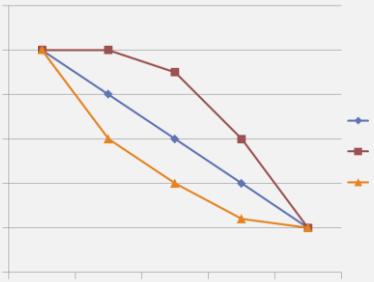
…..the concept of convergence wherein all countries aim to provide the same quality of livelihood for all their citizens, while globally we remain within the limits of the Earth to support us, is the enormous challenge that we face. Without explicitly considering equity we are in serious danger of making resource efficiency - considered in isolation - irrelevant if the social tensions of perceived inequality boil over into conflict. Similarly, though, all efforts to improve the development of economies and equalisation of provision become irrelevant if we continue to use resources inefficiently and we damage the environment or just plain run out of essential materials like water and so undo the vast progress made on alleviation of poverty and disease.

D16, Roderick et al., 2013, p 24

The above extract makes crucial links between the natural resource efficiency debate, dramatically set out above in section 2.3.3, and equity issues. **This constant coupling of material and social themes is central to the Convergence approach.**

Different Convergence Pathways

Different Convergence Pathways can be referred to as the gradient of the trajectory that we define as the degree of convergence. However, not everything is smooth and linear. Some trajectories may be concave (quick progress in the near term but then flattening off) or convex (not much change for a while but then a rapid gallop towards the goal).



CONCAVE, LINEAR AND CONVEX TRAJECTORIES TO CONVERGENCE

The convex or concave natures of the trajectory are important patterns to capture; they may provide valuable information on the adoption of changes. The convex pattern may suggest that processes of change take a while to build up and only slowly feed on themselves but eventually progress is rapid, the concave pattern suggests that there substantial 'quick wins' that are secured but then conditions get more difficult, the reinforcing feedback process runs out and the final stage takes a lot of effort. There is a well-known saying that the last 10% of a project takes 90% of the effort.

D16, Roderick, 2013, p65

Figure Y and discussion begin to illustrate the complexity of any attempted Convergence trajectory. The Convergence designing strategy and measuring progress are thus in need of a systems approach this is discussed more fully in D16.

1.5.Participation and engagement

The use of participatory workshops provided a rich set of results in systems diagrams. The engagement process helped all to participate and demonstrated the value of a broad range of stakeholder involvement. Prior to invitation of stakeholders the value chain of the system under investigation needs to be set out. At the beginning of the workshops both the state of the world and systems analysis needs to be explained so that participants can find convergence based solutions. The overall process we refer to as the Converge Process (D37). We made a key distinction between community and social movement engagements and developed different strategies distilled from literature and cases studied. We recommended conducting convergence workshops for institutions and communities to apply convergence approaches. The idea of fostering leadership for convergence appeared.

The Figure below from D35 illustrates the process of the dynamic systems modelling in the phases of workshops. The richness of the data collected and organised in this way represents a huge step forward when applied to any convergence theme (e.g. food; water; transport etc). The opportunities for expert knowledge to be complemented by a full range of more local and practitioner perspectives are crucial for both convergence practical purposes and for the ethics of participation.

The need for buy-in for solutions by all stakeholders in order to make substantial system changes is another key motivation for using the Convergence Process set out in D37. The food system workshops have demonstrated that this process can be used in a multi-level way from local communities, to cities, to small countries. One aspect of knowledge transfer will be to consider how to develop these for the global level, considered further in the discussion of the food theme below.

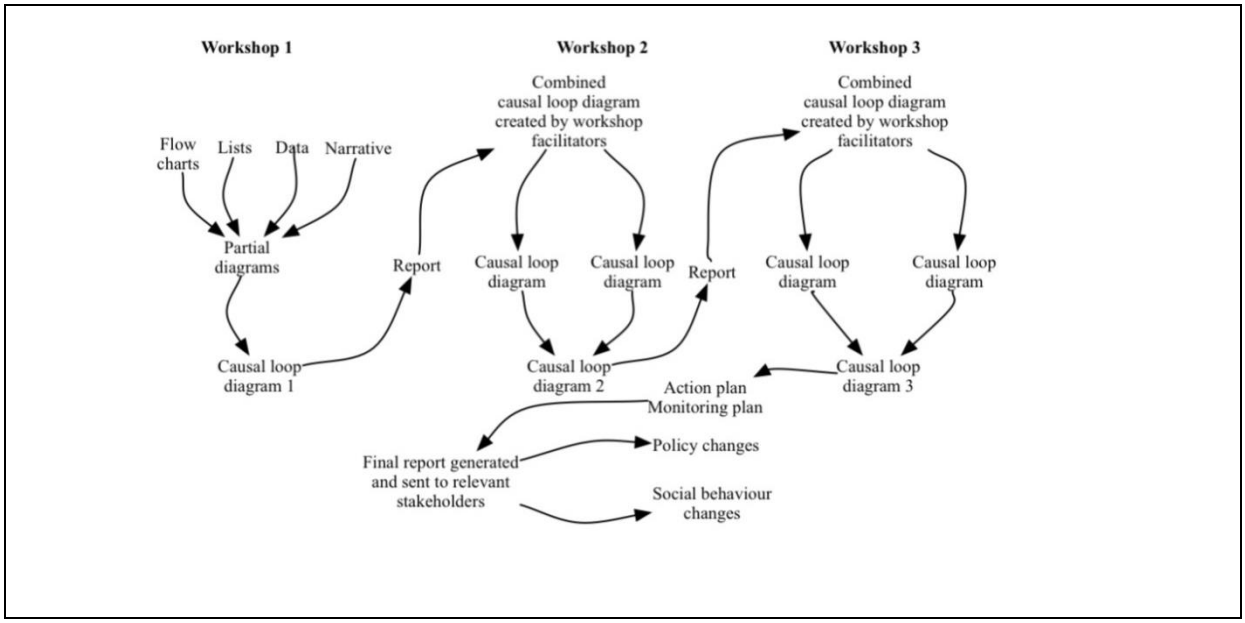


***Figure** from D 35, Kristindottir et al., p19 - **The Convergence Workshop Process** extract*

1.6.Key concepts and Mapping tool

In work with initiatives undertaken in WP6, convergence has been defined as bringing together strong and just sustainability.

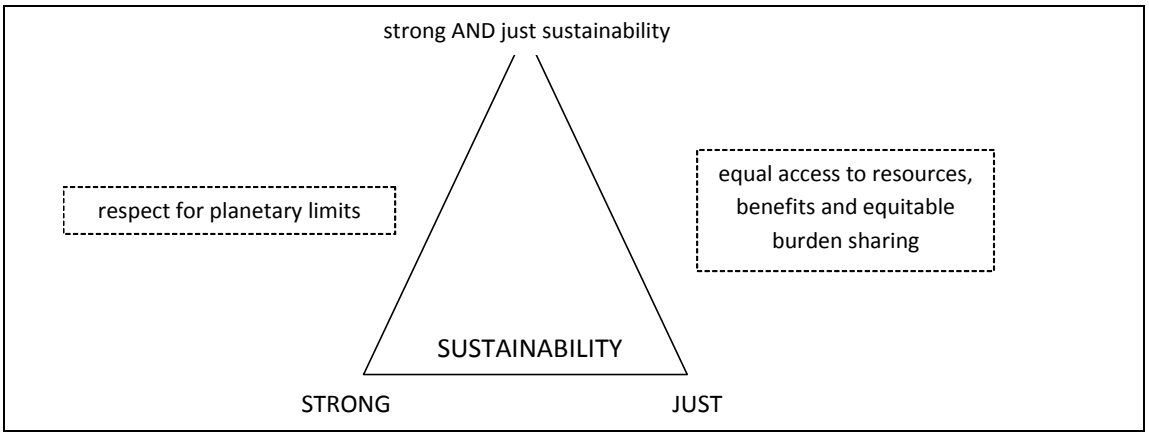


Figure from: Vadovics, Background paper to D33, p7

We have developed an innovative mapping system for initiatives using the convergence Quadrant Model approach – see figure 4 below. This allowed a consistent comparative analysis across a wide range of stakeholder groups and aims. We applied the model to many initiatives across the world to analyse and draw out conclusions and issues to inform further development of convergence. As Figure 4 shows we now reside in the quadrant referred to as Inequality and Profligacy where there is increasing resource use and decreasing equality. We need to find a pathway to the quadrant described as Equality and Frugality where there will be decreasing resource use and increasing equality. We believe that the Converge Globalization concept can help humanity to get there – but much more research is required at global, EU and national level.

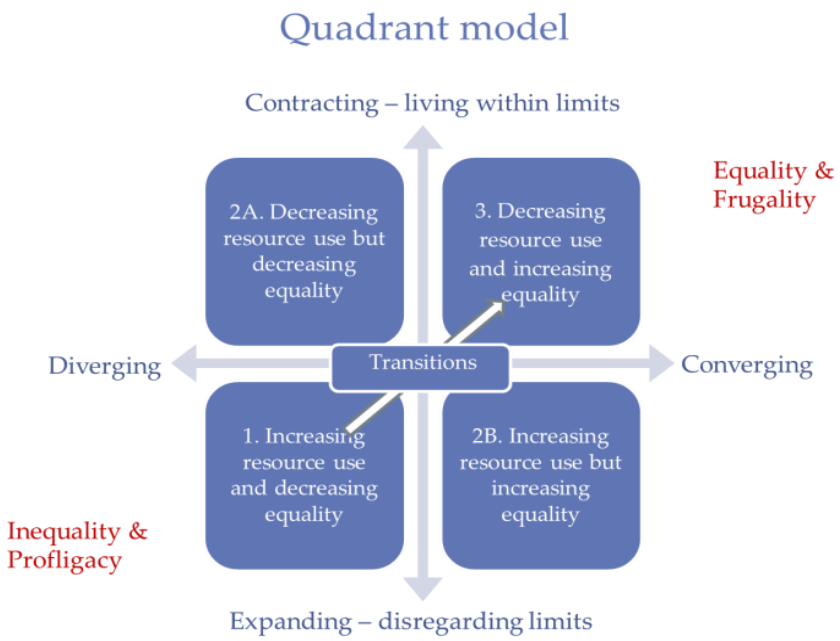


Figure 1 Quadrant Model

1.7.Other tools

We have developed and tested a set of tools and resources to take people through processes and build capacity and participation/solidarity in groups. These provide rich information for groups to take into their own experiences as they think their futures:

- The Convergence Principles
- The Enriched DPSIR process (Figure 5 below)
- The initiatives mapped in WP6

Convergence principles:
Convergence for sustainability is the progress towards equal opportunities for all people, within biophysical planetary boundaries.

- In a converging society, every global citizen has the right to a fair share of the Earth's biocapacity and social resources, to enable him or her to live a fulfilling life.

- A converging society uses its resources efficiently, recognizing the critical value of services from natural systems and limiting its harmful impacts upon them. It recognizes interdependence amongst human societies and between human societies and nature.

- A converging society invests positively in human, social and environmental resources; and cares for them, maintains them and restores.

Appendix to D35, Kristindottir et al., 2013, p 31

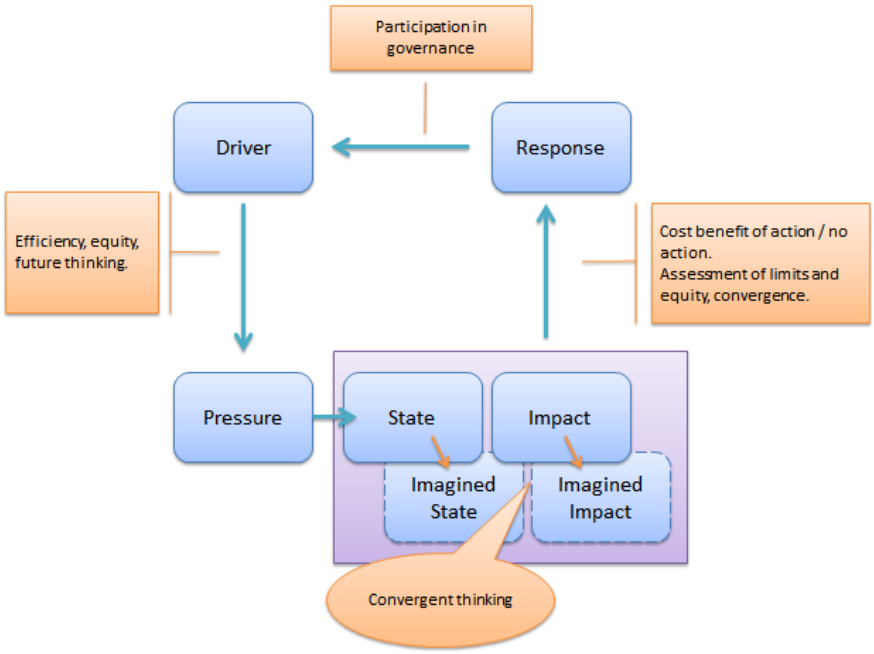


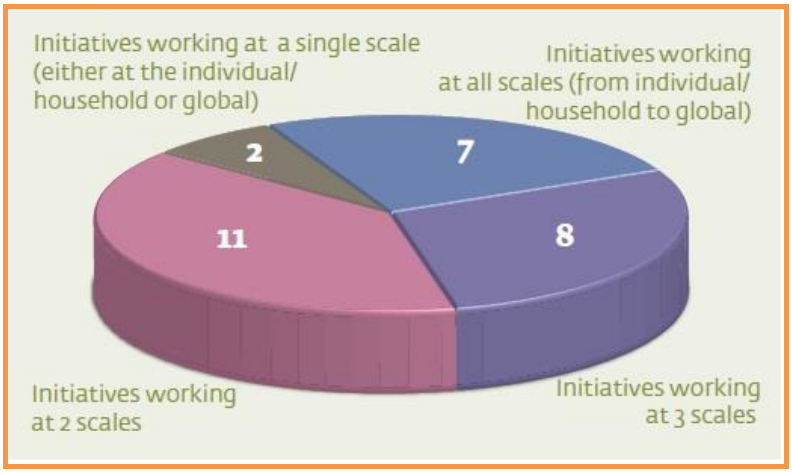
Figure 2 . The role of Convergence in DPSIR loops extract from Roderick, et al., 2013, p50

Implications for Agency and Governance – the DPSIR model

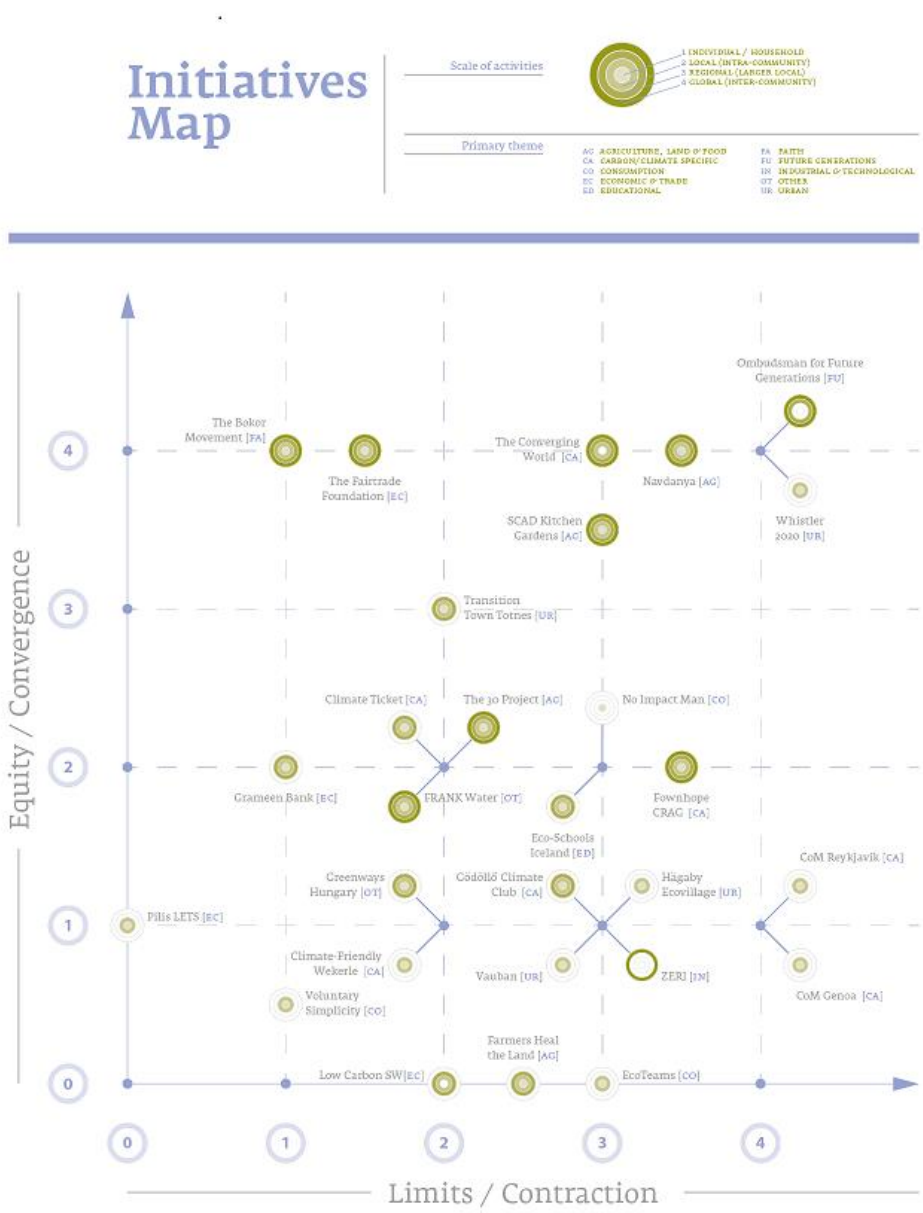
In the DPSIR model, decision making about the responses that will affect the drivers is critical and it is argued (Aria-Maldonado, 2012) that a liberal green society should emerge, a *"reframed environmentalism that ceases to be obsessed with institutionally conscious mechanisms of decision, such as deliberative democracy, and embraces a more thorough view of the ways, formal and informal, planned and spontaneous, that must lead to sustainability."* This participation in governance should also have a convergence ethos so that this plurality of decision making happens within a context of an ever closer union on a shrinking planet.

D 16, Roderick, 2013, p51

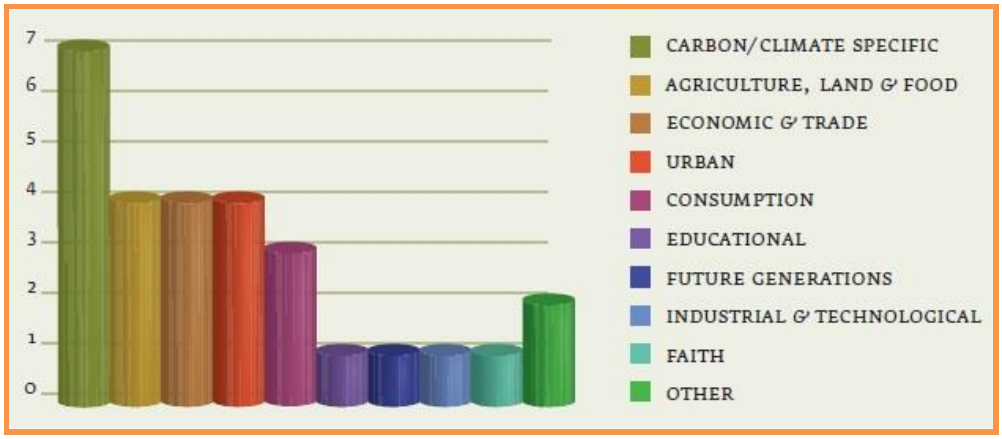
Convergence case initiatives details



Case initiatives 1 – by scale



Case initiatives 2 - mapping



Case initiatives 3 – by area of concern

1.8.Convergence synthesis in the food theme

As a process for testing the convergence framework and the indicator development process, food was very successful. As a cross-cutting theme - everybody needs to eat - we were able to bring a diverse group of stakeholders to the table in three different countries (Iceland, UK and India), and these were able to relate with the research via their own conceptual understanding and real-world interaction with food and the food system.

The cross-cutting and Transdisciplinary nature of food system enabled us to examine food threads as they pass through from many areas: politics; economics; social sciences; local knowledge and expertise; appropriate technology. Food also provided a handle with which to inspect the wider system, particularly nested global to local scales and interactions of the food system. One clear point was that though these nested scales and interconnections exist, from the perspective of convergence, they are not efficient, or fair. For example - whilst some communities suffer from hunger and malnutrition, others are obese. A more convergent set of processes and mechanisms in the food system would push for fairer allocation / distribution of the Earth's food and nutritional resources.

With regard to the global scale of food supply and consumption, the EU has a special role to play in considering global policy as argued below. The first extract considers the general need to look at any issue from multiple scale perspectives.

Issues of scale and systems-informed food policy/strategy

The issue of multi-scale is presented here: If this were an exploration of what the EU countries might do to address an issue such as food security then assessment of responses should consider Convergence at the global level; would a strategy for self-sufficiency in Europe have divergent consequences at the whole world level?; by reducing the need for food imports we would affect the livelihoods of people in exporting countries and slow down their development; perhaps we should switch policies towards encouraging low-income, potential food producers? There is always a need to look inward and outward across scales to balance short term local gains against long term global effects that might have large and serious consequences for the local.

D 16 Roderick et al., 2013, p50

The following extract discusses the global picture of food producers and importers organised into a typology.

When presenting the ideas of CONVERGE to an audience at the IFOAM exhibition (the EU Group that is the European umbrella organisation for organic food and farming) in Lisbon in 2013, the author looked at the classification of countries in terms of food calories (as a surrogate for nutrition this is a good correlation). Five distinct clusters of countries became apparent: developed food calorie exporters, emerging exporters, barely self-sufficient, developed world food calorie importers, and insecure food importers.

Category	Pop (bn)	Examples
Established food powers	0.5	USA, Canada, Australia
Emerging food exporters	0.7	Latin America, Russia, Ukraine, parts S.E Asia
Barely self sufficient	3.4	China, India, Indonesia
Rich food importers	0.5	Most EU, Japan, Oil rich states
Poor and food insecure	1.4	Sub-Sahara, Central America

Given that the ethic of Convergence is towards equity and human dignity then it would be ideal for the emerging food calorie exporters to develop rapidly to merge with the category of established food powers and for that one category to have worked hard during that process towards living within planetary boundaries. Plotting a bubble chart of food production against consumption would indicate the clusters:

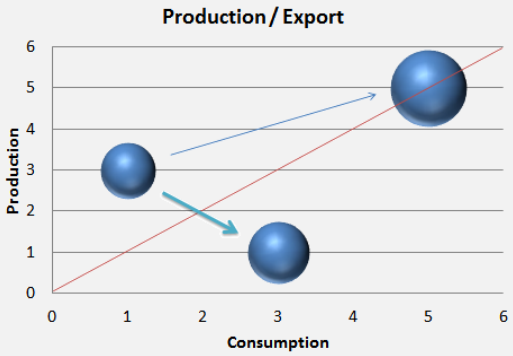


FIGURE: SCHEMATIC OF EXPORTER, IMPORTER AND SELF-SUFFICIENT COUNTRIES

D16, Roderick, 2013, p58

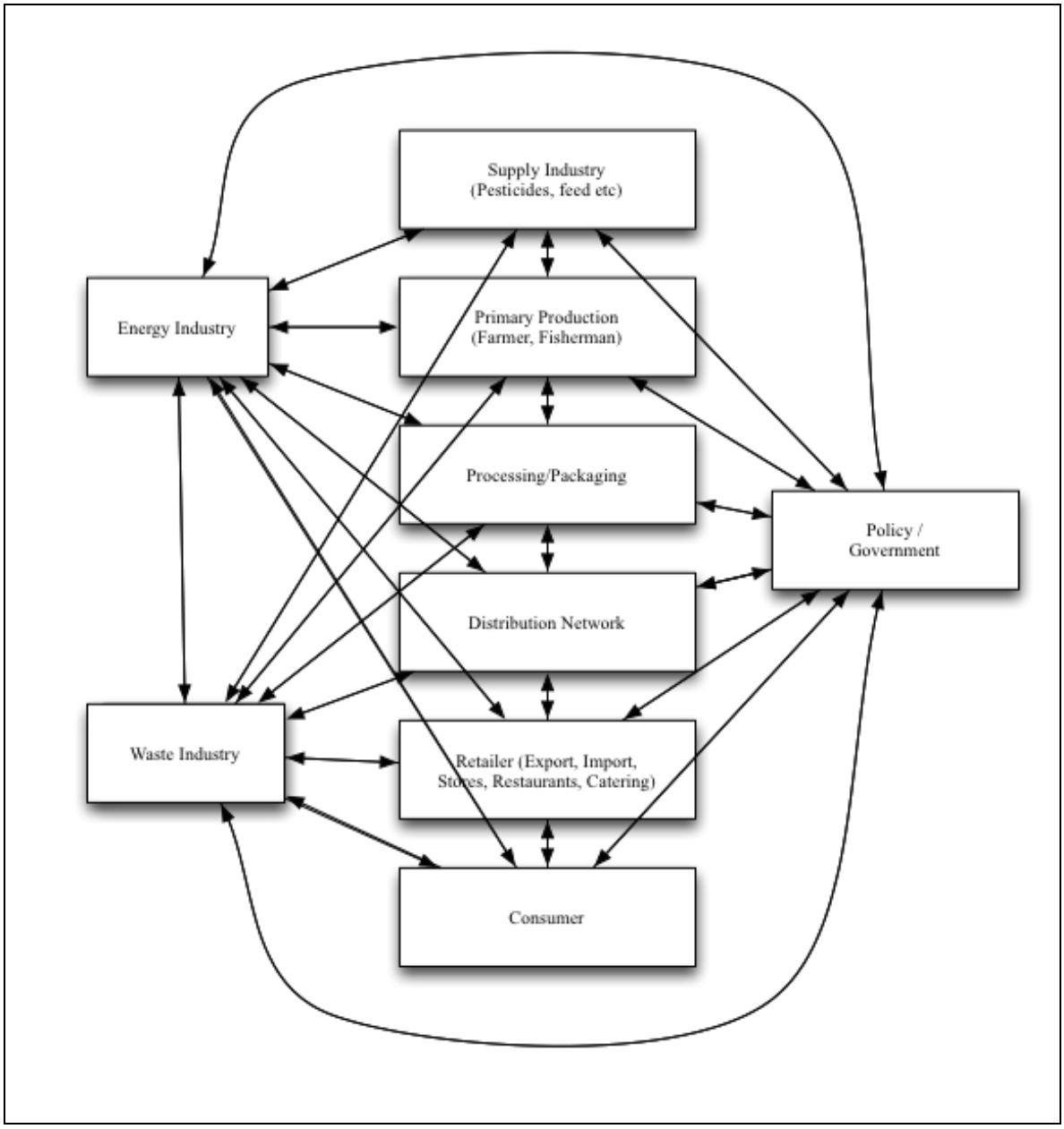


Figure extract from D 35 Kristindottir et al., 2013,p8 . The Convergence Process food value chain

The food theme work has demonstrated that any convergence theme (e.g. water, transport, shelter, etc) would bring up the issues of resource depletion. This means that indicators for the sustainability and convergence of any of these systems would necessarily be complex. This is argued in detail below with regard to the CONVERGE food theme workshops.

With regard to wider global issues, the availability of food is directly related to the size of population and this is discussed further below.

Key resources for food security

Some materials and metals are essential for food production and food security

Phosphorous and oil

The main resource prerequisites for food production aside from land and water are phosphorus and nitrogen as is illustrated in Figure A. These two rely heavily on fossil reserves of phosphorus rock and oil (for nitrogen). Animals play an important role in providing phosphorus and nitrogen into the nutrient chain. Phosphorus is essential element for growing of all plants and life, and there cannot be more biomass than there is phosphorus sufficient for. There is no escape from this rule because no other element can replace phosphorous, and food cannot be made without it.

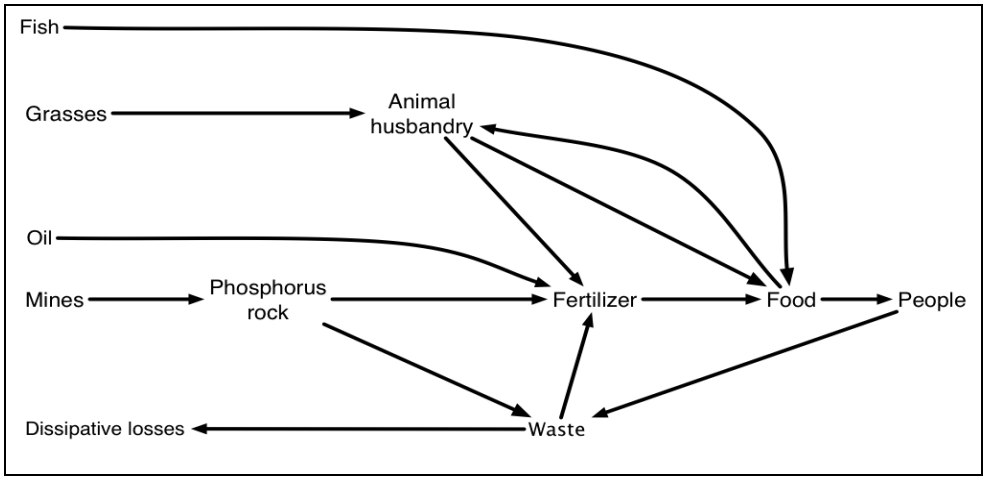


Figure A. How rocks, oil, fish and grass leads to people is illustrated in this flowchart.

Metals

Figure B shows a causal loop diagram showing the causal linkage between reserves of fossil hydrocarbons, fossil metal reserves and global population on a generalized and very simple level. There are three reinforcing loops driving the system, one involving metals and population, one involving oil and population and one between oil and metals. The one involving oil and people has food and agriculture embedded in the causal link arrows.

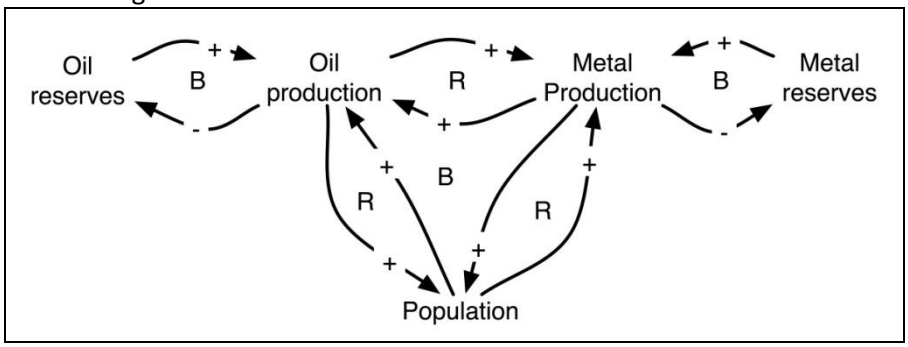


Figure B. The womb of modern consumerism society. A causal loop diagram showing the causal linkage between reserves of fossil hydrocarbons, fossil metal reserves and global population on a generalized and very simple level. R is a reinforcing loop, B is a balancing loop.

Figure C shows an expansion of Figure B. Metals are very essential for food production as a main component of tools and machines. The system is driven by two reinforcing loops, one involving global population size – metal consumption – food and another involving metal consumption – waste – recycling – metal available, both that work to make both metal consumption and global population rise. Figure C shows the basic feedback structure in metal use and consumption. The system has its own internal feedbacks leading to population growth and increase in the use of

metals. Metals are very essential for food production as a main component of tools and machines.

Koca, Synthesis input, 2013

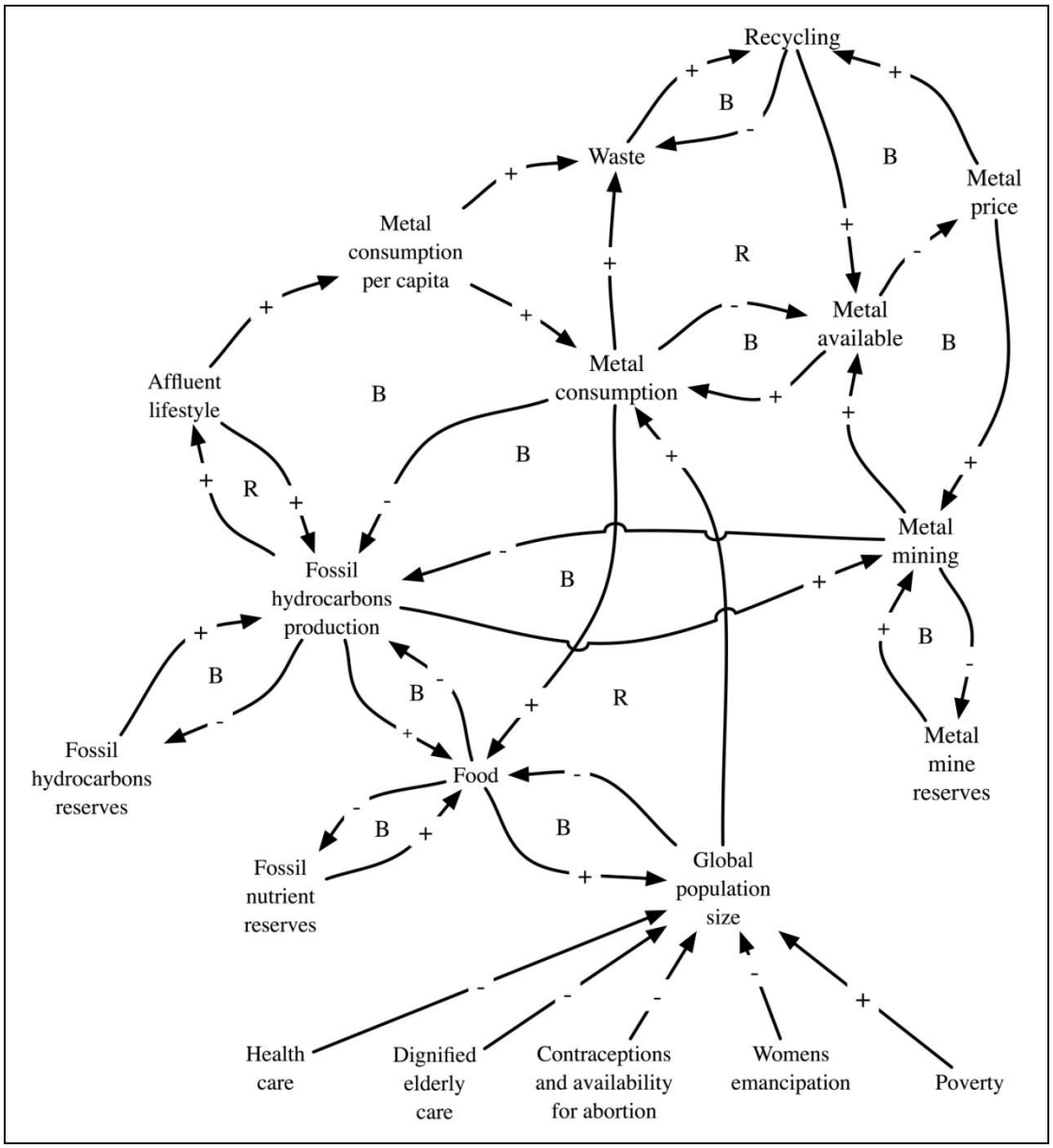


Figure C. The basic feedback structure in metal use and consumption

Platinum, palladium and rhodium are essential for producing industrial fertilizers, and of vital importance for the global food supply. The world cannot manage modern chemistry nor sufficient food supply without these metals

Koca, Synthesis input, 2013

Meta-discussion – learning about transdisciplinary (TD) research

The planning of the CONVERGE research recognised the need for review of TD as an on-going part of the research process and this has been summarised in the periodic reports. The research highlighted many issues that are generic to TD research generally and to TD research on sustainability in particular (TDRS). These issues have been the subject of project events and workshop discussions and have yielded some potential new resources for the TDRS community, but also some recommendations regarding research policy and support for the European Research Area (ERA) as detailed below.

Transdisciplinary review in the project

The transdisciplinary critique of outputs has been an on-going part of project meetings and discourse linked to the reports on the TD working of the project. These discussions have led to changes in emphasis in some activity and greater links being made between some of the project outputs. The main area of TD critique and exploration for the practitioner review has been **the extent to which convergence can meaningfully bring together environment and human development concerns in a new vision for convergent globalisation**. As discussed further below this testing has taken the form of research with practitioners attending a number of key events.

The project processes are iterative and involve constant development and review. This in turn involves re-designing project outcomes to a certain extent – mostly in terms of re-interpretation of the focus of deliverables in the light of our developing understanding of what is involved (Bammer, 2005; COSEPUP, 2004). From this perspective any review during the life of the project will be 'in process' – as the concept and its supporting elements are still in development. This methodology will therefore need to capture these process aspects, drawing on the tradition of systems and process thinking (Romm, 1998; Scoones et al., 2007).

One of the tools that was applied to the CONVERGE research activities was a framework for mapping research questions and results across the broad areas of knowledge. This framework has been developed in order to help identify the different kinds of systems with which researchers have to deal in TDRS and to assist in clarifying the issues across different kinds of knowledge involved.

The explicit attention given to TD issues in the project has assisted in the learning of the project research team, but also enabled us to engage with the wider TDRS community about the meta-issues involved. Our successful European conference on Transdisciplinary Research for Sustainability, held together with Charles University Environment Centre in Prague (2013) helped to provide recommendations to the ERA.

Limitations and Learning

All projects have research limitations to do with methodological and practical issues. CONVERGE is no exception. However, the reflective aspects built into the project have helped to transform these limitations into sources of learning that can be passed on and debated with the wider TD research community – as we began to do with our Prague conference on Transdisciplinary Research for Sustainability in 2013 (see Appendices).

The project reconsiders the systems nature of the research in D16 but also in the TD synthesis of D39. The Guidelines for the European Research Area in D40 will consider generic meta-questions of TD research for sustainability in addition to developing specific recommendations regarding convergence issues in sustainability research. This work will also feed into proposals for innovative

research in D43. Systems issues in relation to the project were discussed at the UK Systems Society conferences during the life of the project and will continue to be a source of theoretical and methodological development (see Appendices).

Parker, D38, 2013

Key points from the project discussions and the Prague conference are summarised below:

Transdisciplinary Research for Sustainability: Key points from CONVERGE research events
(see Appendices for details)

- The overwhelming need for civil society to be informed by sustainability knowledge; for that knowledge to be made relevant and accessible to civil society; for sustainability knowledge to be co-created with civil society and other stakeholders wherever possible
- The lack of progress in finding ways to build in concern and advocacy for Future Generations in TDRS and sustainability work generally
- The blocks, barriers and bottlenecks to effective TDRS work that are still very much felt by all participants
- The lack of resources to support those wanting to apply TD & TDRS approaches (patchy development so far)
- The lack of joined-up research policy across the EU on TD generally
- Review of EU and global networks identified that whilst many address components of the TDRS meta-questions and agenda - very few are mandated to concentrate upon this. This means there is a lack of consistent progress on the philosophy and methodology of TDRS
- The loss of valuable research experience and failure to share this through academic and other channels heightened by of over-personalisation of excellence and failure to develop explicit standards for evaluation of TD
- Research Ethics in TD is in great need of fuller discussion and development as a topic – currently there are contradictions and frictions across areas of ethics in the EU
- Danger the EU falling behind in global debates on this vital topic
- Need to develop TD excellence to support EU's continuing global leadership in Sustainability
- In many places throughout the world (if not all places) academics and knowledge producers are subject to pressures and sanctions to hide, or partially report controversial knowledge – usually of the un-sustainability of current activities in which some powerful groups have an interest
- Participatory Research in TDRS demonstrates the vital importance of taking local and indigenous knowledge of livelihoods and local systems into full account. This is particularly the case with the food system as researched in CONVERGE as a cross-cutting theme. Participatory research also involves key concerns of Gender and Diversity in empowering and including different perspectives to be voiced - and
- Food issues, linked to biodiversity – a key current debate in global sustainability science is currently dominated by research into corporate initiatives such as Genetic Modification. In the interests of science the proposals and practices from people's movements and from NGOs for maximising food production and protecting/enhancing biodiversity should be given at least equal research attention to test these claims.
- There is slow progress to reform the systems for policy and governance to reflect the transdisciplinary and cross-departmental features of sustainability. Efforts in the European Research Area (ERA) to support the development of TD capacity should be linked to the reform of joined-up governance and include training of researchers and policy-makers.
- The issue of governance is also important to discuss in terms of indicators as measuring progress to goals – without effective governance that is free from corruption reliable data cannot be produced or disseminated appropriately

- Reliable sustainability data and research is also crucial for the proper application of environmental law. Robust evidence supported by expertise and integrity is needed
- Environmental Law has been recognised by Transparency International as a 'paradise' for corruption owing to over-complexity and frequent changes. This implies an effort to reform environmental law to help ensure that it can be put into practice in more transparent ways.

Parker, D40, p 5-7

The recommendations can be found in the D40. We also have planned a book collection from the conference by invitation from Cambridge Scholars Press.

Section - Impact

Dissemination and Knowledge Transfer

As a 'big picture' project CONVERGE has a very wide stakeholder base in addition to the more focused stakeholder groups from which research participants have been drawn and for whom resources have been produced.

Dissemination: Dissemination activity undertaken by the project will not be referred to here in depth (see Dissemination & Impact plan and report). However, some additional activities and outputs that are planned as follow on from CONVERGE will be briefly discussed as forms of knowledge transfer. Dissemination has taken several forms:

- The production of resources made available on the project website and circulated to contacts and CONVERGE research participants
- The production of Recommendations in D40 (to the European Research Area) and D41 (to policy makers and to policy actors such as NGOs). These recommendations are supported by the many project outputs that are identified in the Recommendations' Appendices - thus encouraging further knowledge transfer.
- Many dissemination events have been held that combined Action Research, Dissemination and Engagement and in which 'Proof of the Convergence Concept' has been tested – both with formal and informal evaluation (see below)
- Presentation of CONVERGE research and results at numerous conferences, expert meetings, seminars and other professional and practitioner events
- Publication of academic papers, book chapters
- CONVERGE findings and approaches used in other linked work by members of the CONVERGE research team

This Dissemination process will continue after the official end of the project with planned further publications list (see Appendix) and planned reporting of CONVERGE findings at university centres for sustainability research and other similar venues (see Appendix).

The Dissemination and Impact plan set out the ways in which the project outputs have been disseminated to date in more detail. The key foci for dissemination were set out in the DOW list of resources to be produced. As agreed in the DOW, these have been designed for:

- Communities
- Initiatives
- Policy Makers at EU level
- EU Research organizations
- Academic research community

The impacts and knowledge transfer to these more specific groups of research participants will also be summarized. However, this deliverable is focused mainly on the wider stakeholder group consistent with the broad remit to 'Re-think Globalisation' and thus looks at the CONVERGE contribution to key general themes in sustainability. The overarching aim here is to synthesise the project results so that they can be communicated to a wide range of stakeholders in an accessible fashion – in ways that go beyond the necessarily limited project dissemination to date. This deliverable thus functions as a source document for various different kinds of additional forms of dissemination and presentation of results to peer academic, practitioner and other knowledge

communities – particularly those which have not yet been reached by the project.

Thus the concept of Knowledge Transfer employed here is one that sees Research and Development of Knowledge with stakeholders rather than direct transfer. The tools and approaches from the CONVERGE project can be used to support decision-making in many different arenas but would also need to be developed and adapted for those purposes.

Knowledge Transfer in research and development with new groups of stakeholders: adapting existing CONVERGE results/outputs to scales and actors not covered in the project and producing further customised resources for those stakeholders. This could involve working with representatives of stakeholder groups at these scales to improve and develop resources/initiatives in order to take Convergence further with these different groups. In addition working across the groups using Convergence as a unifying framework would generate yet further research, development and strategic planning and enrich the Convergence approach through reflective critique.

These products of the research is available for adaptation and transfer in relatively short time-scales and with relatively little additional research. However, in order to be effective knowledge 'transfer' should be achieved in development with the appropriate stakeholders and this is a form of applied research as indicated in the grid below.

WP and Deliverable No:	Achievements of output	Opportunities for Knowledge Transfer in Research and Development with Stakeholders
WP2: D 10	Achieved a high level of synthesis of information about sustainability frameworks in terms of national strategies and ways that these linked (or not) to wider global agreements. Identified key gaps between national strategic thinking and global strategic thinking.	Contribution to discussions and practices of multi-level sustainability and Earth System Governance. E.g the UN Sustainable Development Commission and the International Human Dimensions Programme (IHDP)
WP2: D16	Bringing soft and critical systems into analysis. Cogent critique of ranking and development of convergence DPSIR model. Outline set of convergence indicators and rationale. Distinction between convergence and isomorphism challenges EU policy. Creates a forecast into which we can place points or regions of convergence.	Creations of customised decision-support approaches for different sectors and levels. E.g. Resilience in Cities. Together with processes supplied in D 37
WP3: D20	Demonstration of engaging participatory workshops providing rich set of results in systems diagrams. Methodology developed further in conjunction with D35/37, process helped all to participate.	Model is transferable/adaptable to many contexts of participatory sustainability decision-making. With the addition of D 37 (The Converge Process) the model can support decision-making towards Convergence.
WP4: D27	Gained overview of some of the key relationships between global level SD policies and EU policies; Gained interest of networks of policy makers across Environment and Development divide. Developed concept of convergence as	Convergence approaches can be offered to policy-makers in the form of facilitated workshops with Convergence input and process elements. Similar transdisciplinary workshops can be offered as 'silo-breakers' across different

	‘pre-policy plug in’ to debates.	departments that need to cooperate for joined-up solutions.
WP5: D30	Key distinction between community and social movement engagements and strategies distilled from literature and cases studied. Recommendations for convergence workshops and for institutions applying convergence approaches. Discussion of leadership to be fostered for convergence.	Rich source of learning and debate for movements and community approaches. Key distinctions and issues identified can assist in strategic planning and capacity development as well as in planning engagement strategy.
WP6: D33	Developed innovative mapping system for initiatives using convergence Quadrant model approach. Comparative analysis across a wide range of stakeholder groups and aims. Applied analysis and drew out conclusions and issues across the range to inform further development of convergence.	Assisting initiatives at different scales to position themselves with respect to Convergence and to work out ways to take this further.
WP7: D37	Complete Converge Process with tools developed and tested. Rich results evident in D20. Takes people through a process and provides key tool at each stage. Develops capacity and participation/solidarity in groups. Provides rich information for groups to take forward.	Converge Processes available that can be adapted for many thematic areas in addition to food. E. g Resilience; Water; Economic planning; Infrastructural planning; Energy.
WP8: D41	A full set of Convergence recommendations covering policy, measurement, community, initiatives, and material sciences and resources. One overarching recommendation is for convergent globalisation to be central to all policy making and agreements for action if not then consequences may well be partial or total collapse of societies.	Provides an overall vision and multiple ways to make interventions in current discourses and practices. To be taken further in the work of the Convergence Observatory and Alliance.

Emergent Learning in CONVERGE

These areas are all additional and unanticipated learning from the project. In order to develop these for knowledge transfer more additional research and development would be required. We envisage that much of this work could be carried out by the proposed Convergence Observatory and Alliance – often working in partnership with other research groups.

WP & Deliverable No:	New Learning/Emergent Results	Opportunities for Knowledge Transfer
WP2: D 10	Identification of lack of challenge to consumption and the failure to link equity for FGs with Equity now in sustainability strategies.	Further work with cultures of consumption and commitments to equity as underpinning concerns for Future Generations (FG)
WP 2: D16	Better grasp of tensions between goals and systems processes. Convergence offers the possibility of 'dynamic goals' linked to learning loops because it is a meta-goal. Identification of gap between concept of resource efficiency and equitable distribution of those resources. FGs should be stakeholders in all convergence scenario development.	Work further on systems and learning models of strategic change. Develop concept of 'Convergence Efficiency'. Collaborate in piloting FG stakeholder approaches and processes.
WP 3: D20	Stakeholders do not spontaneously focus on equity issues in relation to workshops billed as about 'sustainability'. Methods for interaction of different scales needed to link more to issues of globalisation. Importance of corruption and governance issues highlighted. Role of local knowledge and expertise highlighted.	Work with those highlighting Equity commitments of sustainability and add Convergence data and arguments. Use nested scales concepts to highlight dysfunctional global power compromising resilience at other levels. Work on Convergence, Integrity and Governance. Build in explicit ethos of attention to local and indigenous knowledge in Convergence tools and processes.
WP 4: D27	In developed countries 'Development' is separate from in-country/region social equity issues; Gaps between Environment and Social Equity in EU policy and culture. Support for convergence as a bridging concept. Policy trap of current economic model closing down systems re-think of the kind that CONVERGE tasked to carry out.	Work on generalised Convergence approaches to human development. Monitor EU policy and culture for gaps and recommend changes. Monitor and identify economic policy traps and develop further work on Convergence Economy.
WP5: D30	Importance of framing, sense-making, and storytelling for engagement. Process ethos for convergence clarified. Different complementary strategies for organising for change.	Work with cultural 'modes'; develop stories of Convergence; Explore further the process and product ethics of Convergence;

		Develop Convergence 'mosaic' of complementary initiatives and interventions.
WP6: D33	Identified key challenges as knowledge, awareness and policy blocks (apart from the funds issue). Lower awareness of equity issues than limits amongst initiatives. Developed new approaches to self-assessment for Initiatives.	Highlight equity (as above). Work with initiatives and movements to produce Convergence materials suited to their needs. Support initiatives and movements in self-assessment and capacity development for Convergence.
WP7: D37	System training and capacity development improved results. There is a need to iterate and reiterate the linked Converge goals – limits and equity – in each workshop. Rich information generated needs to be fed back to participants for further learning and strategic planning. Role of governance emerged as a key unexpected learning point – the enabling/disabling role of policy and the corrosive effect of corruption upon agency for positive change.	Further work on systems thinking for Convergence. Work with Education for Sustainable Development (ESD) community to develop systems literacy for Convergence.
WP8: D41	A methodology for recommendations, this could be developed further.	Develop Convergence-informed systems and nested scales approaches to recommendations as part of strategic thinking. Link to development of Convergence scenarios work.

Taking convergence forward with the Observatory & Alliance

> When considering the concept of CONVERGENCE, the strength and diversity of networks of support will be critical. The movement toward a converging world will require tough conversations. Some people and organizations will have to give things up and let things go, so that others can have a little more. Encouraging the continual development of healthy, diverse, networks that hold the principles of CONVERGENCE and strong sustainability as core concepts will help us move through these conversations with as much grace as possible.
>
> D30, Callaghan, 2013, p4

The Convergence Alliance and Convergence Observatory are linked projects that have emerged from the CONVERGE project. These initiatives are sponsored by the Schumacher Institute for Sustainable Systems based in Bristol, UK, GreenDependent Institute based in Godollo, Hungary, and Social Change And Development (SCAD) based in Tiruneveli, India.

The CONVERGE research project provides proof of concept and the Convergence Alliance will engage people and organisations in a multi-scale, global effort for convergence. This alliance is an international, campaigning network to advocate convergence as a platform for change for sustainability and equity. It is an association of individuals and organisations to:

- Advance convergence ideas and continue to test them in practice
- Match “Environment” with “Development” to bring these fields of study and practice together
- Deliver education and opportunities for systems thinking on complex global issues
- Form partnerships for research
- Campaign based on perspectives drawn from convergence philosophy

Simultaneously the Convergence Observatory will research and monitor information and policies with a convergence perspective. This observatory is starting in the EU and India but is planning for full international participation. The aim is to research and advocate for policy interventions using a convergence approach to equity within planetary limits. This is a way to:

- Collect and present examples of convergence in action
- Measure degrees of convergence and publish metrics
- Continue research into the concepts
- Influence policy makers from an evidence base
- Inform the Alliance members

The Alliance is non-political, i.e. it does not support any political party. It will be ‘political’ in the sense of engaging in conversations on politics and will intentionally lobby politicians and policy makers to promote Convergence ideas.

Convergence Alliance proposal

The CONVERGE project involves partners from the UK, Iceland, Sweden, Hungary and India rethinking globalisation to produce equity within planetary limits – how to share fairly what the Earth can safely provide without damaging its potential to do so. It has already had a deep impact on

how transdisciplinary collaborative research can aid the EU in conceptualising and confronting the challenges of climate change, resource constraints, population dynamics, and economic development in member states and around the world.

The deepest and most important contribution that CONVERGE has made to European policy making is highlighting the extent to which democratic and consensual bargains are already being made across the world between publics and governments balancing the competing needs of 1. economic and social development with 2. environmental sustainability and the equitable management of limited resources.

The main idea of the CONVERGE project is balancing social, political and economic equity within planetary limits. The challenges in relation to these 'super-wicked problems', are especially difficult to resolve as they directly pit competing needs for action and freedom against each other in ways that democratic bureaucracies are especially ill-equipped to handle[1].

The Convergence Alliance will continue to promote a number of processes identified by CONVERGE as particularly essential to a converging world:

- Sharing benefits of consumption more equitably by expanding the access to Global Public Goods, finite resources, and to the services provided by both.
- Burden-sharing of the costs of resource use based on principles of equity. That is, ensuring that the true costs of resource use are reflected in price, distribution and access.
- Participation in decision-making concerning the use and distribution of resources, and the services that derive from these.

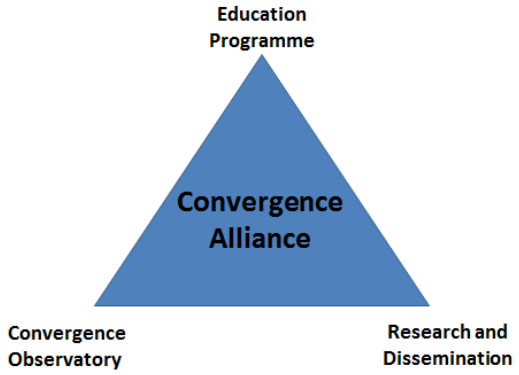


Figure z. Model of the Convergence Alliance

The Convergence Alliance is a process to connect individuals and organisations that are interested in the ideas of Convergence. One of our key findings is the need to encourage better connections between the environmental and development communities. Many people identify strongly with one direction like conservation of a particular species while others focus on issues of say fair trade or poverty reduction. We conclude that the Convergence Alliance can help to create partnerships across these boundaries, and to create opportunities for discussion and learning to share different worldviews as we explore the systemic nature of the world and seek Convergence.

[1] Unlike the 'wicked problems' identified by Rittel and Weber (1973), that challenge but do not ultimately undermine existing social, economic and political systems, 'super-wicked problems' are characterised by four features: i. Time is running out; ii. Those seeking to end the problem are also causing it; iii. No central authority responsible for the problem; iv. Policies that do exist to tackle the problem irrationally discount the future. Levin et al. use the example of climate change, but as CONVERGE shows, can be broadened out to a number of economic-environmental crises.

The Convergence Alliance will campaign for change; it will provide resources for people to use in their work and run a variety of courses blending personal contact with online experiences. It is our hope that the Convergence Alliance will form bilateral links or multilateral clusters of individuals, businesses and organisations to exchange ideas and work on common issues.

Convergence Observatory proposal

1. **Convergence Platform.** This would be an online platform allowing members to share research and new work addressing Convergence and the central problem of fitting together environmental sustainability and economic and social development. We would promote this to university, NGO and business groups, and seek funding for a news service component.

2. **Convergence Lecture Series**. A series of lectures, in partnership with a University department if possible, and featuring speakers from development and environment communities. These should be filmed for YouTube clips where possible.

3. **Human Convergence Index (HCI).** The 2013 Human Development Index included for the first time an inequality weighting, the so-called IHDI. The IHDI takes the HDI methodology and score for each country and discounts the coefficient controlling for inequality using the Atkinson method, which is often used as a more sensitive measure than the Gini distribution as it explains outliers better. Inequality is measured as a composite discount of the distribution of Life Expectancy, Educational Attainment and Mean Income, rather than the absolute value of each.

A stand-alone research project that could drive publicity and communications for the Observatory (and be highly fundable) would be a Convergence-weighted index, or a CHDI. As the HDI and IHDI methodologies are relatively straight-forward and published, and if robust and reliable sources of data for convergence indicators could be found for the weighting, a methodology for calculating a CHDI could be put together by somebody with graduate statistical training based upon the HDI methodology. This methodology could then be used to combine the Convergence indicators with national HDI coefficients in order to create a Human Convergence Index.

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Appendix I – Timeline context for the CONVERGE project

2007	The United Nations Climate Change Conference took place in Bali, it included **COP 13** (Conference of Parties to the Kyoto Protocol). Negotiations on a successor to the Kyoto Protocol dominated the conference. A meeting of environment ministers and experts held in June called on the conference to agree on a road-map, timetable and 'concrete steps for the negotiations' with a view to reaching an agreement by 2009. Strong opposition from the USA led to a weak compromise for global emissions to peak in 10 to 15 years.	The Schumacher Briefing (No 13) *'Converging World – Connecting Communities in Global Change'* was published. It suggested that the idea of Contraction & Convergence™ could be extended to other resource areas. The Converging World charity (TCW), which was the inspiration for the Schumacher Briefing, now has two turbines turning in India - the installed capacity reaches 3 Mw. Social Change And Development (SCAD) are local partners.
2008	**COP 14** was held in Poznan, Poland. Negotiations continued on a successor to the Kyoto Protocol. A global financial crisis breaks, taking economies to the brink of collapse.	Following encouragement from the University of Bristol the CONVERGE project proposal was submitted and grant negotiations commenced.
2009	**COP 15** was held in Copenhagen, Denmark. It was generally perceived as a failure with the final production of the Copenhagen Agreement. The concept of the Copenhagen Green Climate Fund was established for the distribution of $100 billion fund for developing nations. There was no reform of the Clean Development Mechanism.	The CONVERGE project started in September.
2010	**COP 16** was held in Cancun, Mexico. There was no agreement on a successor to the Kyoto Protocol. There was no agreement on how to raise the 'Green Climate Fund' to assist poorer countries in financing emission reductions and adaptation.	
2011	**COP 17** was held in Durban, South Africa. A treaty was not established, but an agreement to establish a legally binding deal comprising all countries by 2015 to take effect in 2020. A management framework was adopted for the Green Climate Fund.	

2012	**COP 18** was held in Doha. An agreement was reached to extend the life of the Kyoto Protocol until 2020. Rio + 20, the UN conference on sustainable development was held in Rio. The BBC journalist, David Shukman, reported that it has been branded insipid, disappointing, and a failure of leadership … [it] raises the further question of whether these big UN set pieces are really worth it. One outcome of the summit was an agreement for a new set of goals to succeed the Millennium Development Goals (MDGs) in 2015. A United Nations Task Force (UNTT) on Post-2015 Development Agenda was set up January 2012- September 2015: "The Global Conversation Campaign" from The United Nations Millennium Campaign is a series of online conversations that bring people across the globe together to focus the world's attention on the issues that matter to our generation: poverty and its root causes. May 2012- February 2013: United Nations Development Group. Themes of Global meetings: • Inequalities (across all dimensions, including gender) • Health • Education • Growth and employment • Environmental sustainability • Food security and nutrition • Governance (at all levels) • Conflict and fragility (including post-conflict countries, and those prone to natural disasters) • Population dynamics (including ageing, international and internal migration, and urbanisation)	The Converging World abandons carbon offsetting under the Clean Development Mechanism, new financial arrangements allow the business model to operate without this income – TCW is no longer entangled in UN and Gold Standard bureaucracy. The CONVERGE project was presented at Rio + 20 by Sigrun Maria Kristinsdottir at an EC organised roundtable on governance for sustainability.

2013	COP 19 is held in Warsaw, Poland. The focus is on the 2015 agreement, business involvement and climate finance. There is an identified need for a decision on a timeline for negotiations to COP 21 in 2015 May 2013 - at climate negotiations in Bonn, Germany there was guarded optimism that progress has been made toward laying the groundwork for an international agreement to be signed in 2015 at the COP 21 climate conference in Paris. September 2013: UN General Assembly (UNGA) held the MDG Review Summit. June 2012 - December 2014: Process to develop Sustainable Development Goals (SDGs) and integrating that into the MDGs, as well as a few other process-related benchmarks. September 2013: UN General Assembly (UNGA) MDG Review Summit.	The Converging World (TCW) wind turbine capacity reaches 13.5Mw with plans to go to 25Mw early in 2014. The CONVERGE team take part in: "The Global Conversation Campaign". SCAD ran the CONVERGE project's International Conference on Global Convergence on a Finite Planet in Tirunelveli, Tamilnadu, India. CONVERGE project conferences were held on '*SDGs Equity within Limits', 'SDGs and Cities'* and '*Convergence: A New Social Contract for Sustainability'.* The Convergence Alliance and Convergence Observatory were formed by the SME partners in the CONVERGE project. The CONVERGE project ends. Speaking to the BBC during a climate conference at Chatham House in London, Ms Figueres, the Executive Secretary of the United Nations Framework Convention on Climate Change (UNFCCC), said, *"I'm committed to climate change because of future generations, it is not about us, right? We're out of here," she said. "I just feel that it is so completely unfair and immoral what we are doing to future generations, we are condemning them before they are even born. We have a choice about it, that's the point, we have a choice. If it were inevitable then so be it, but we have a choice to change the future we are going to give our children."*
2014	COP 20 will take place in Lima, Peru. It is aiming for a global agreement on mitigating the impact of climate change as well as advancing adaptation strategies based on environmental compensation.	
2015	Countries have agreed that Paris in 2015 is the time and place to finally sign an international treaty requiring all nations to begin reducing carbon emissions by 2020, supplanting the Kyoto Protocol. This is the Millennium Development Goals target date – what succeeds in a post-2015 world?	Bristol is European Green Capital for 2015.

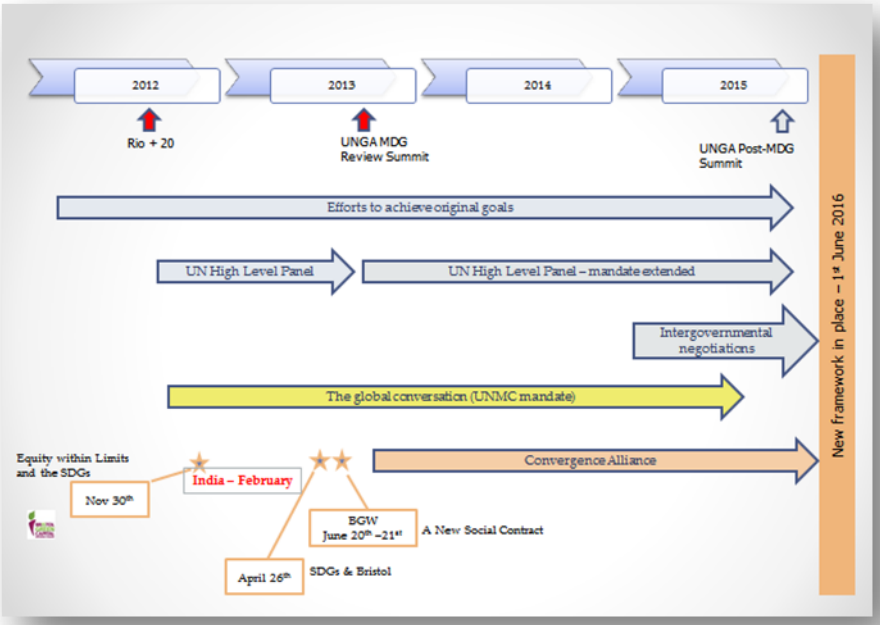

Figure 3 Timeline for SDG process with CONVERGE events

Appendix II - Resource Depletion graphs

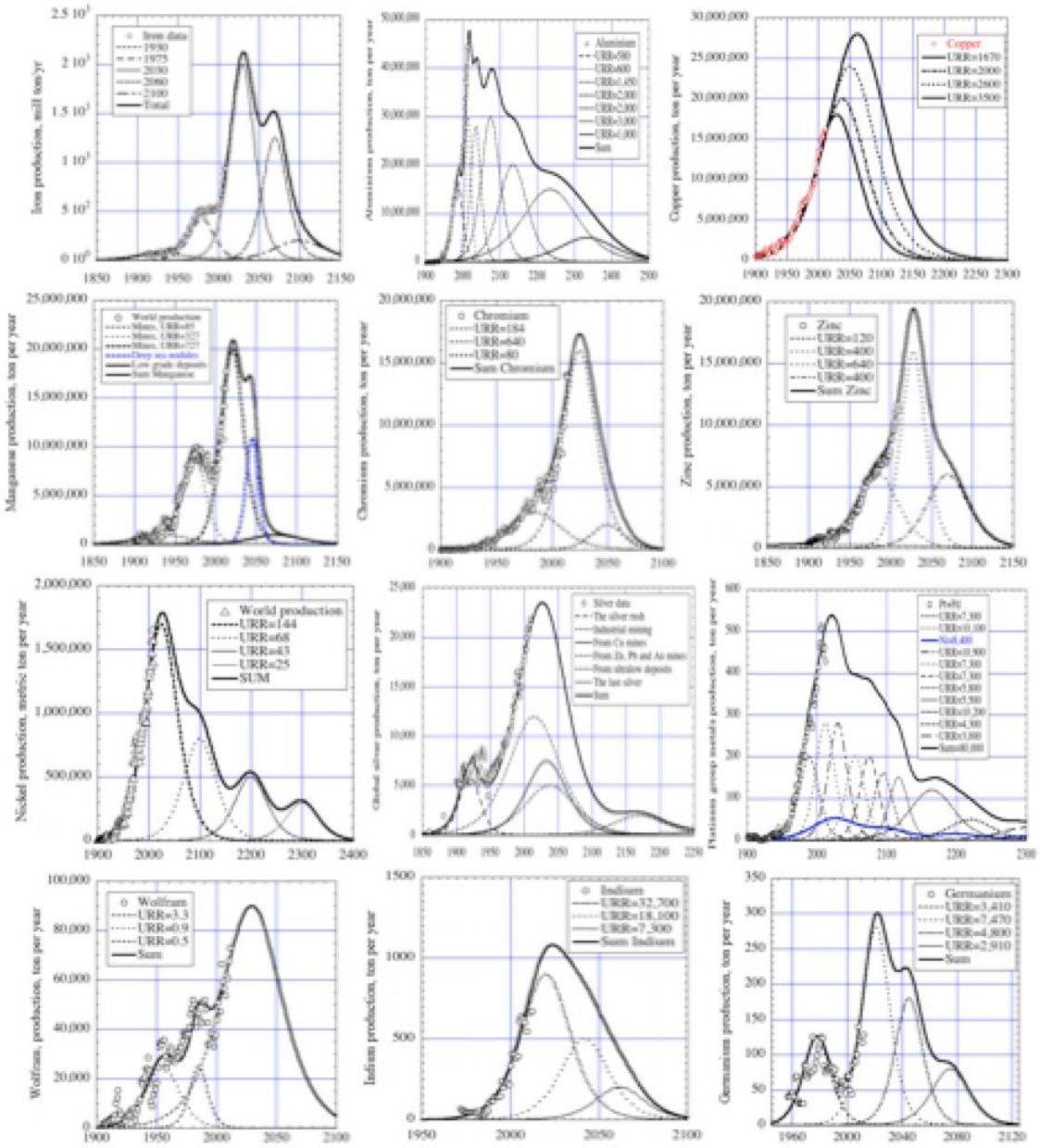

Figure extracted from CONVERGE project. The top row shows peaking of iron production in 2030, aluminium has already peaked and copper will peak between now and 2050. In the second row it can be seen that manganese will peak in 2020, chromium also in 2020 and zinc in 2030. The third row shows peaking of nickel in 2015, silver in 2030 and platinum and palladium in 2020. The lowest row gives peaking of tungsten (wolfram) in 2030, indium in 2020 and germanium in 2020.