The **CLIMSAVE** Project

Climate Change Integrated Assessment Methodology for Cross-Sectoral Adaptation and Vulnerability in Europe

Report on the third CLIMSAVE European stakeholder workshop

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SEVENTH FRAMEWORK PROGRAMME

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1. Introduction

Participatory scenario development processes have played an increasingly significant role in major climate change and environmental studies over the past few decades and already play a crucial role in adaptation assessment by providing a glimpse of the different socio-economic trends that will form the back-drop to long-term adaptation measures. Moreover, planning an adaptation measure successfully will have to take into account the uncertainty of future climate impacts. Participatory scenarios have been shown to be a useful method for incorporating this uncertainty into decision-making (Alcamo, 2008)[1].

The CLIMSAVE methodology for participatory scenario development and analysis is specifically geared towards interactive climate impact and adaptation assessment. After two previous workshops, this third workshop focused on:

- Developing climate change adaptation strategies per scenario;
- Identifying workable options across scenarios; and
- Discussing learning points from CLIMSAVE.

CLIMSAVE scenarios have been developed up to the 2050s, with an intermediate time slice in the 2020s. The time horizon of 2055 is considered sufficient to include the impacts of climate change and the effect of several adaptation options. The methodology has been developed within CLIMSAVE and is tested in two case studies: a European case study and a regional case study based on Scotland.

The careful selection of stakeholders for a participatory scenario development process, such as undertaken in CLIMSAVE, is an important factor in the exploration of plausible futures. This selection took place before the first workshop. In order to safeguard continuity, the same group of stakeholders was invited to the second and third workshop. The group of participants who took part in the third workshop consisted of those who had already participated in Workshop 1 and/or Workshop 2 and some new participants. New participants were nominated as replacements by stakeholders who could not make it to this workshop – and were briefed by them before participating. When no replacements could be found by the previous participants, new participants were researched, selected and invited according to the principles laid out for selection earlier on in the project.

This deliverable D1.4a presents the results of the third European CLIMSAVE workshop, which was organised in parallel with the third regional CLIMSAVE workshop, and is described in D1.4b. The workshop was organised in Edinburgh on 3-4 December 2012.

[1] Alcamo, J. (ed) (2008). Environmental Futures: The Practice of Environmental Scenario Analysis. Amsterdam: Elsevier.

2. Overview of the workshop

This section provides a summary of the activities that took place during the third workshop for the European CLIMSAVE case study. A detailed agenda can be found in Annex I and a list of participants in Annex II.

DAY 1:

The workshop started with registration, followed by presentations (re)introducing the project and the state-of-play to the participants:

- Welcome and reintroduction of the project by Professor Mark Rounsevell, University of Edinburgh;
- Overview of the workshop by Dr. Marc Gramberger, Prospex.

Following these presentations the participants were split up into four scenario groups and familiarised themselves again with their scenario. They discussed the outcomes from the Integrated Assessment Platform (IAP), reviewed the adaptation options identified during workshop 2 and discussed which options to apply in the IAP.

After lunch the participants received more information on the IAP by means of a presentation by Dr. Ian Holman (University of Cranfield). After this presentation, the participants returned to their scenario groups to further improve their strategy and explore the corresponding results of the IAP.

DAY 2:

On day two each scenario group presented their selected set of adaptation options, main strategy line and experiences of working with the IAP to the rest of the European stakeholder panel and the CLIMSAVE research team. These presentations provided the basis for the panel to identify the candidates for robust adaptation options. After further exploration of these options in the scenario groups the group settled on a shortlist of robust options applicable to all scenarios.

After lunch, the European stakeholder panel was united with the regional stakeholder panel. One European scenario group was teamed up with one regional scenario group and could explore each other's scenario.

The workshop ended in a plenary session with a comparative analysis of the CLIMSAVE process and results for Europe and Scotland, informed by a small group discussion of their CLIMSAVE experience. After an extensive feedback session, the CLIMSAVE research team presented and discussed with stakeholders the next steps towards the finalisation of the project.

3. Scenario-specific strategies

3.1. Scenario logic

In the European case study participants developed four scenarios. These are described below and illustrated in Figure 1:

- We are the World is characterised by gradual economic development and effective solutions by innovation to the depletion of natural resources.
- Icarus is characterised by gradual economic development and ineffective solutions by innovation to the depletion of natural resources.
- Should I Stay or Should I Go is characterised by a rollercoaster of economic development and ineffective solutions by innovation to the depletion of natural resources.
- Riders on the Storm is characterised by a rollercoaster of economic development and effective solutions by innovation to the depletion of natural resources.

Figure 1: Scenario logic, with the name of each scenario in the respective quadrant.

3.2. Process

The stakeholders worked in four groups, each focussing on one of the four scenarios. The stakeholders that attended previous workshops remained in the group they had joined before. The new stakeholders were divided across the four groups, ensuring a multi-disciplinary stakeholder group for each of the scenarios. In each group, the process was led by a professional facilitator. A scenario supporter from the CLIMSAVE research team was present in each group to operate the IAP, provide content support and to produce background notes on the discussion.

This report contains the discussions and remarks captured, as well as the flip charts produced during the workshop.

3.3. We are the World

A number of photos of original flipcharts created during the workshop are included in this, and the following sections. These are included to display results obtained during the third stakeholder workshop, and ideas from the flipcharts are expanded upon.

3.3.1. We are the World storyline

Towards the 2020s

Europe is becoming used to global crises in the second decade of the 21st century. The financial crisis that started in 2008 continues to have strong repercussions; in Europe, national governments face the need to save the Eurozone, which is under considerable pressure since the first waves of instability in 2010 and 2011. With low growth rates in developed countries, EU leaders are gradually being forced towards further European financial policies in order to avoid breakdown and to safeguard economic development.

Due to increased turbulence and conflict Iran has closed off the Strait of Hormuz. Russia has closed off the gas pipelines after a dispute with Ukraine. This energy crisis is reinforced by more extreme weather events. The Arctic has become ice-free during summer and several Pacific island states are permanently flooded. As a result of these energy and environmental struggles there are food shortages. This leads to high prices for energy and consumption products and scarcity, even in Europe.

All over the world, people advocate for a global response to these crises in order to ensure stability and sustainability of the planet for the decades to come. These movements receive a lot of support from all layers of society as people gradually become aware that it is important to think global. A realisation of global interdependence takes the upper hand. The feeling that everybody's behaviour has to change to ensure sustainable growth for the next generations becomes stronger. There are protests against highly polluting SUV-drivers on a global scale. People want to be happy and no longer just successful. Italians lead the way of change by eating pasta instead of meat to combat climate change. Vegetarian risotto even becomes the EU's national dish. In fact, vegetarian meals are now more prevalent on the menu in restaurants than meat or fish.

Governments all over the world are being put under pressure to take ambitious measures on climate change. Parties with an ambitious programme on climate change and sustainable development do well in elections. Car traffic in cities is now restricted and work conditions have changed significantly, so that air-conditioning can be banned. Governments support innovative research facilities. In Europe, several new techniques and technologies towards a sustainable environment are developed and Scottish wind power is linked to the European power grid. Energy efficiency goes up as scientists have discovered a way to store renewable energies, such as solar energy. Solar panels have also become more effective and precious metals are no longer needed in the production process. More attention goes to protecting endangered species and a new fishing technique has been developed, which means by-catch becomes a thing of the past.

Better quality of life leads to a growing feeling of security and safety among the European population. It is again safe to walk on the streets of Brussels, even at night, because the justice systems have become efficient and actually function in all EU countries. Crime rates go down significantly, because criminals are prosecuted and punished.

On a global scale governments overcome their differences. Trade wars and crises are solved by the increased effectiveness of governments worldwide. Countries such as Iran and Russia realise the importance of cooperation for staying in power. They accept negotiations, and a global carbon capture and storage market is agreed upon by China, India, the USA, Europe and Brazil.

The change in values on a societal and governmental level has also led to more respect for other cultures. The developed countries decide to support Africa much more intensively. A fair trade agreement is signed and the African continent becomes a free trade zone. This leads to more stability on African, national and continental scales, with more reliable governance. The EU even decides to co-develop a solar plant with Africa to provide clean energy for Northern Africa and Southern Europe.

By 2025, the previous decade of crisis seems to have been forgotten. Continuous efforts to transform Europe and the rest of the world into a sustainable environment are now starting to pay their dividends. On a global scale, there is stable moderate economic growth. The well-being of people increases. In Africa growth is far stronger than in the developed countries. The changed global landscape feeds into a growing demand to reduce the UN Security Council to only seven members in order to increase its efficiency. Overall, governments follow a peaceful course of action, leading to cooperation between civilisations, which has made clashes a thing of the past.

Towards the 2050s

The feeling of being globally interdependent and working together for the same cause continues to appeal to many people. Intercontinental travel increases and people are eager to learn more about other cultures. There is a focus on welfare rather than on GDP in the more developed countries, which strengthens low, but sustainable growth. On the other hand Africa continues to develop at a quick pace. By 2030 a lasting peace is established in the Middle East. With support from the EU and China, an African Union is created. The European Union has expanded further and the implementation of global governance, such as the Kyoto Protocol and the influence of the World Trade Organisation, has increased.

In this peaceful world there is no more demand for fighter planes, so Lockheed Martin goes bankrupt. The new generation consolidates the radical value change that has been visible in the previous decennium. It is no longer just socially acceptable to think and be green, it is now cool to be green. Insects are on the menu everywhere, even in Italy, and cockroach fritters are the latest hit at McDonald's.

People also sympathize more with those in society that do not have the same standard of living. Gradually people learn to value again the importance of meeting friends in real life instead of chatting to them via social networks. Social capital increases over time and the value of things is measured by the quality of life it gives you, not by their mere monetary value. This also leads unintentionally to a much safer world. Crime rates go down even more. As a result, people feel safe to use public transportation systems and to commute to work by bike without having to worry about it being stolen. In return, this contributes to less CO_2

emissions. By now electric cars also outnumber petrol cars in Europe, which is why European greenhouse gas emissions have stopped rising.

On a technological level there is a lot more international competition by 2030. Nature and the environment remain hot topics. The technologies supporting a sustainable environment that were developed during the 2020s, such as the storage of renewable energies, are now implemented in society. Every company strives for major breakthroughs in environmental technology. Artificial meat is now produced on a large scale and organic cotton from genetically modified plants is used to produce T-shirts that can be washed a million times before showing wear and tear. More importantly, biofuels are now produced out of seaweed on a massive scale and Africa is a frontrunner in the production. The multinational company Shell hands the seaweed oil patent to Africa in return for a 30% share in the distribution network.

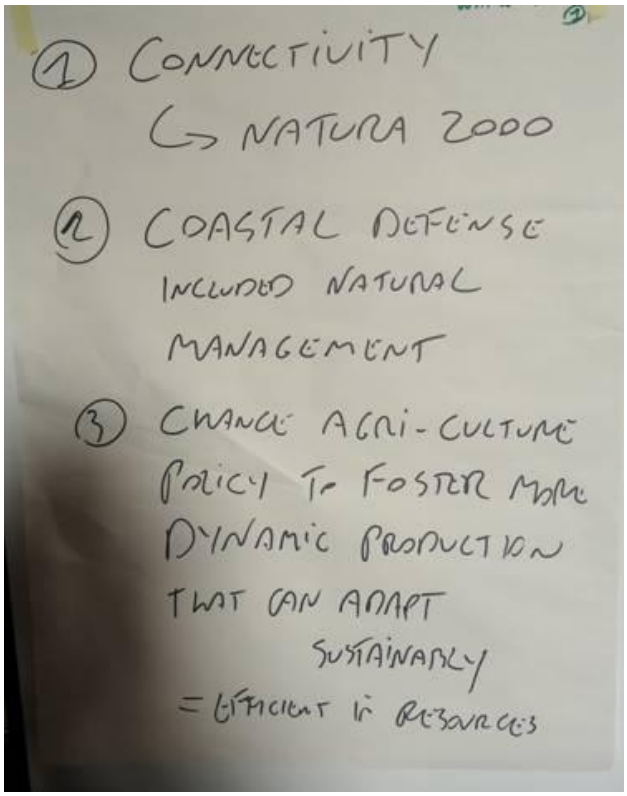
By 2035, we have moved a lot closer to a CO_2 free world. A technology is also developed to breakdown CO_2 into C and O_2. Moreover, genetically modified crops can now overcome droughts as well as floods. By 2040, air travel is finally officially declared a CO_2-neutral activity. Now people can finally travel to other parts of the world without having to feel guilty. The interconnectedness between different countries has increased even more. At the 93rd session of the UN General Assembly in 2041 a world constitution is adopted. The constitution is based on values such as equality and equal distribution of resources for all, and has safeguards in it for sustainable growth. The World Constitution also has a set of articles on how to elect a world government. The worldwide value change has in the end not led to a common language, but to a common understanding, with respect for cultural differences.

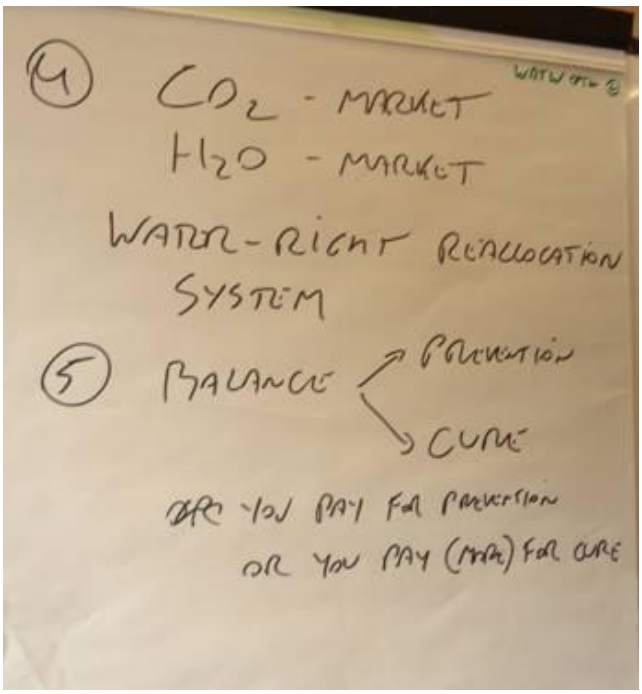
In 2050 technology has made it possible for us to live in a CO_2 neutral society. The energy problem is solved by the storage of renewable energy. The redistribution of wealth globally has led to less inequality, more cooperation and a conflict-free world.

3.3.2. We are the World main strategy line

Since global interdependence leads to social trust, in We are the World, cooperation plays a big part. Flexible and dynamic management can integrate prevention measures and connect habitats, while ultimately social trust can incite a proper response to restore infrastructure and develop a cure.

3.3.3. We are the World selected adaptation options

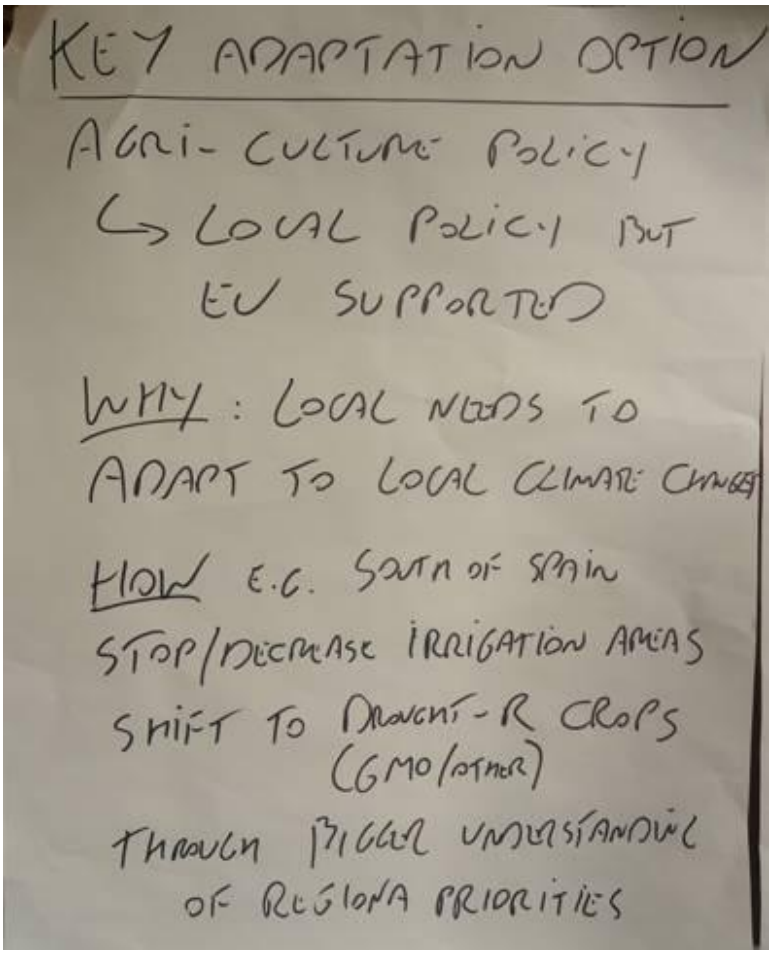




A range of adaptation options that were selected for We are the World are described below:

- Increase the connectivity of different habitats and between countries.
- Coastal defences include a natural management system.
- Enhance agriculture policy to foster more of a dynamic approach to production. This will be able to adapt sustainably and lead to efficient use of resources.
- Development of technology to breakdown CO_2 leads to a new market in the service of creating a CO_2 neutral society. A market also emerges dealing with water reallocation and companies compete with each other to come up with breakthrough environmental technology.
- People realise that it is wiser to invest in preventive technology for the future, as they will pay more when things go wrong and they need to be fixed. Thought processes extend into the future.

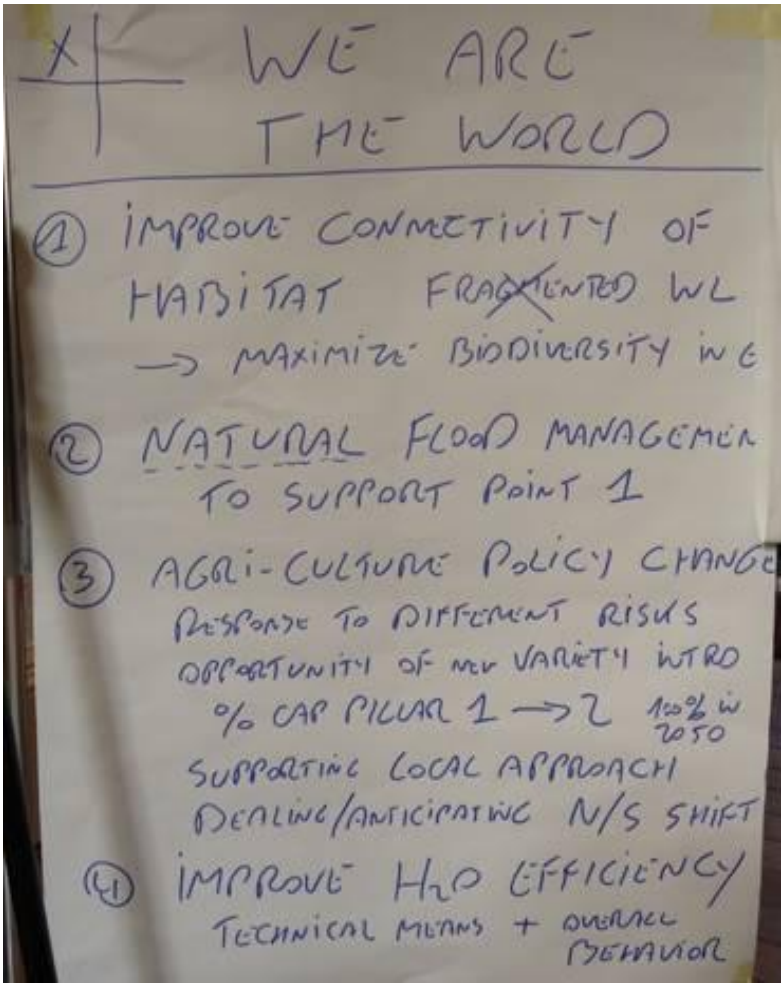
3.3.4. We are the World scope of adaptation

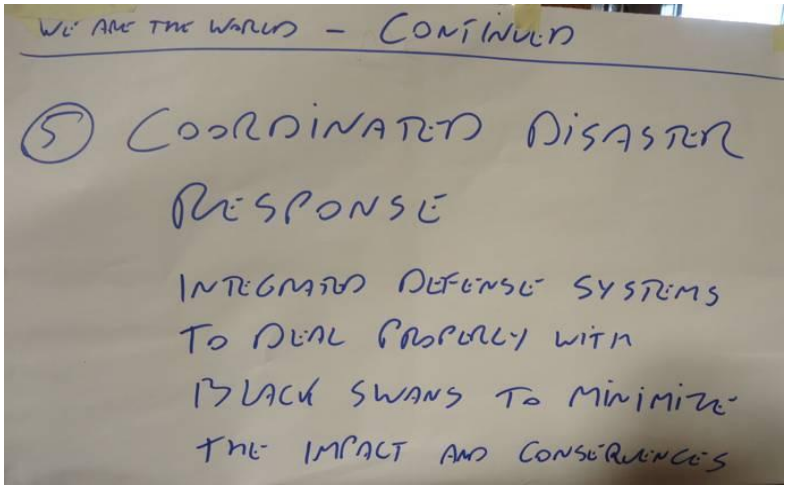


The scope of adaptation in the We are the World scenario included the following:

- The EU supports a local approach to agricultural policy.
- Local needs are not always the same as EU needs, thus local authorities are supported to adapt individually to the effects of climate change.
- Through a wider understanding of regional priorities, the EU can realise that some policies would be detrimental to certain areas even though they might be beneficial to others.

3.3.5. We are the World remaining key issues





Important issues remaining in this scenario were:

- Further need to improve connectivity between habitats in order to maximise biodiversity.
- Development of a natural flood management system, also in support of connecting habitats and maximising biodiversity.

- Need to change the agriculture policy to respond to different risks, start supporting the local approach to climate change by giving more autonomy of the Common Agricultural Policy to the member states / local governments.
- Improve water efficiency through technology advances and overall behaviour regarding water usage.
- Developing coordinated disaster response systems. Integration of defence systems to minimise the effect of, and deal properly with, black swans.

3.4. Icarus

3.4.1. Icarus storyline

Towards the 2020s

After the difficult years 2011 and 2012, in which the European economy leans towards a recession, the European economy picks up again gradually as of 2012. There is gradual economic growth for the next few years. With the economy gradually picking up, the demand for resources also increases. As a result the price for raw materials, such as oil and steel, goes up on the world market. Initially, it is possible for both developed, as well as developing countries, to benefit from this gradual economic growth. The EU countries and the other main industrialised countries can still afford to buy innovation from other emerging countries, but they no longer lead the development of innovative technologies. They continue to have access to relatively cheap energy sources (e.g. oil and natural gas), but the resources are running out. Extreme weather events start to affect Europe, but there is no response at the EU level.

In the meantime, Europe is accused of plundering resources in the less developed countries. The vulnerability of these countries is increasing, because of the loss of resources, and poverty is on the rise. Meanwhile India and China have become the two main centres of innovation. They invent and implement new technologies and get their resources from the continued exploitation of less developed countries in Africa and South America.

Towards the 2020s it becomes increasingly difficult for enterprises in developing countries to sustain their activities in the face of increasing prices for raw materials. Later on also industrialised economies start to struggle. The economic growth of the last decade, together with a strong demand for natural resources has been a tipping point for the state of the environment in the European Union. Severe ecosystem failures have started occurring by 2015. Extreme weather events continue to happen more and more frequently and further increase the cost of resources. This causes an economic climate in which enterprises can no longer afford the exuberant prices for oil. As of 2020, the economy in Europe is stagnating. This stagnation of the economy means the revenues of governments are going down.

In light of increasingly scarce public resources, long-term policy planning makes way for short-sighted policy measures driven by electoral gains. Populism is the new approach and there is hardly any money for education, research or innovation. Because politicians feel they can win elections on specific short-term issues, the political landscape fragments. In several European countries incumbent political parties disintegrate weeks before the elections. Political fragmentation forces political parties to form coalition governments, which weakens the position of the government. Policy short-termism equally means that politicians focus on internal, domestic issues and they no longer see the added benefits of the EU. They are now mainly preoccupied with dealing with their nation’s ageing population and the lack of

education of their younger generation. By 2025 heads of states and governments no longer attend EU summits. This illustrates that governments find it more appropriate to combat cross-border problems such as an overall economic stagnation by domestic solutions. It is each country for itself. Only a few countries decide to stay in the European Union, the others leave. Autocratic regimes take over the countries that are no longer part of the EU.

Despite these problems, there is still no will to innovate in Europe. Short-sightedness is prevalent and there is a lack of people with ambitious ideas. In the BRIC's on the other hand, the implementation of innovative technology and effective solutions moves ahead. New technology is being developed in the fields of energy, agriculture and infrastructure. The innovation starts in the urban areas, but soon spreads to all corners of these countries. A young, educated and ambitious new generation takes the lead there. However, the exploitation of the poorer classes of society has not come to a halt.

Towards the 2050s

By 2025, the stagnation of the economy has repercussions on the European population. Unemployment rates go up and because public finances are going down, social benefits also shrink. Governments can no longer afford the social pension system, which results in a widening gap between the "haves" and the "have-nots" in Europe. The richer people in society can afford to pay for the services and goods they need, while the poor cannot. Resource prices soar and with shortages in essential goods and services Europe is now exposed to a dependence on foreign resources.

People in countries with a weak economy are especially hit hard by the economic stagnation decline. People move to other countries within Europe to find jobs. However, with nationalism on the rise, labour migrants are not well received in the host country. People are afraid migrants will steal their jobs and take away their social benefits. The social fabric disintegrates further, conflicts are occurring more often and there is a massive brain drain from Europe to the BRIC countries. The European immigrants are joined in Asia, Russia and Brazil by low cost workers from developing countries also looking for a better life. The BRIC's have clearly become the economic leaders of the world, although the exponential growth they experienced in the previous decade has slowed down.

The flow of migrants is also strongly affected by the effects of climate variability. By 2025 extreme weather events cause a high burden on Europe, its citizens and its economy. There is a further loss of biodiversity by 2030. In addition to migration because of economic reasons, people in those parts of Europe that are heavily affected by floods and droughts also move to safer areas. Labour migration, as well as climate migration, leads to expat ghettos in several European capitals. The impact of extreme weather events, together with a stagnation of the economy brings about shortages of some essential goods and services; notably food and water. The economic downturn leads to agitation and frustration between different countries and Europe gets its fair share of conflicts.

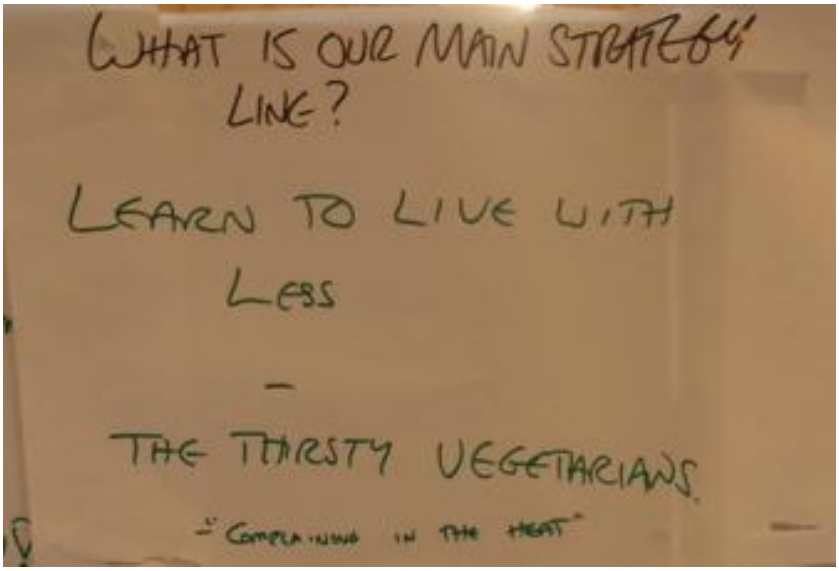
Towards the 2040s however, some counter-movements are starting to take root in Europe. Slowly society starts to realise the importance of increased education and some niches of innovation take off. The same movement arises in the developing countries, some of which start to innovate themselves. They try to become the new BRIC's, but struggle with the challenges caused by a depleted resource base.

After 2040, the increased pressure and sense of urgency leads these emerging counter-movements to voice their concerns over the current state-of-affairs in Europe more loudly. There is a new generation '68, which has learned from the mistakes of their parents and is determined not to make them again. The main claim of the movement is that people in Europe have to start living in a different manner. People begin to accept that they will have to 'live with less' and realise they have to use more local produce to strengthen their own economy. Europe has become an economic backwater, but there is an increased will to change for the better. This triggers more action. Some signs of a slight economic recovery even start to show, although it is difficult to innovate with the meagre resource base that is left.

Migration from Europe to the BRIC countries has ceased, but labourers from the developing countries do not cease to move to the BRIC countries. By 2050, the BRIC's are still the global powerhouses, but they are aware that greediness, which has caused Europe's downfall, can be dangerous. That is why some niches of "live with less" also sprout in China, India, Russia and Brazil.

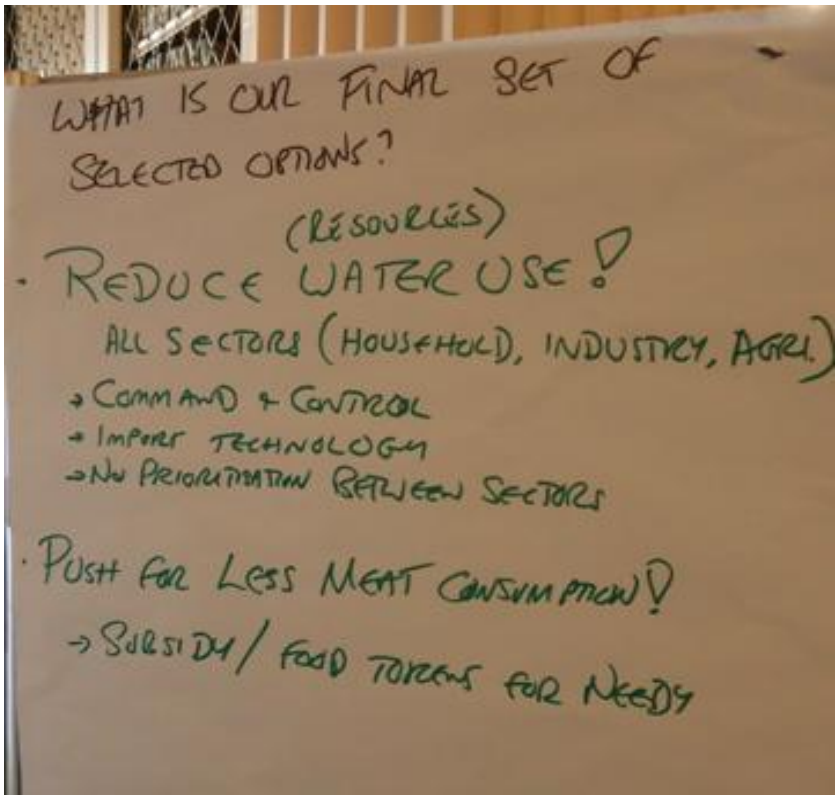
On a global scale, this means that post-modern values have become more important, but they remain nevertheless subordinate to hard economic values and the will of some to gain prosperity at the expense of others. There is more awareness, but not a complete value change. Food shortages remain common, mostly in those countries that have been affected by conflict and wars. The developing countries especially continue to suffer from a tense competition for resources.

3.4.2. Icarus main strategy line



In Icarus, economic stagnation and the increasing scarcity of natural resources mean that people have to learn to live with less. Lack of foresight and innovation mixed in with greed in Europe created the scarcities and stagnation, especially in comparison to the BRIC countries who soared at this time. Extreme weather contributed to food and water shortages and people began to realise that they must live with less to survive and come out of this downturn.

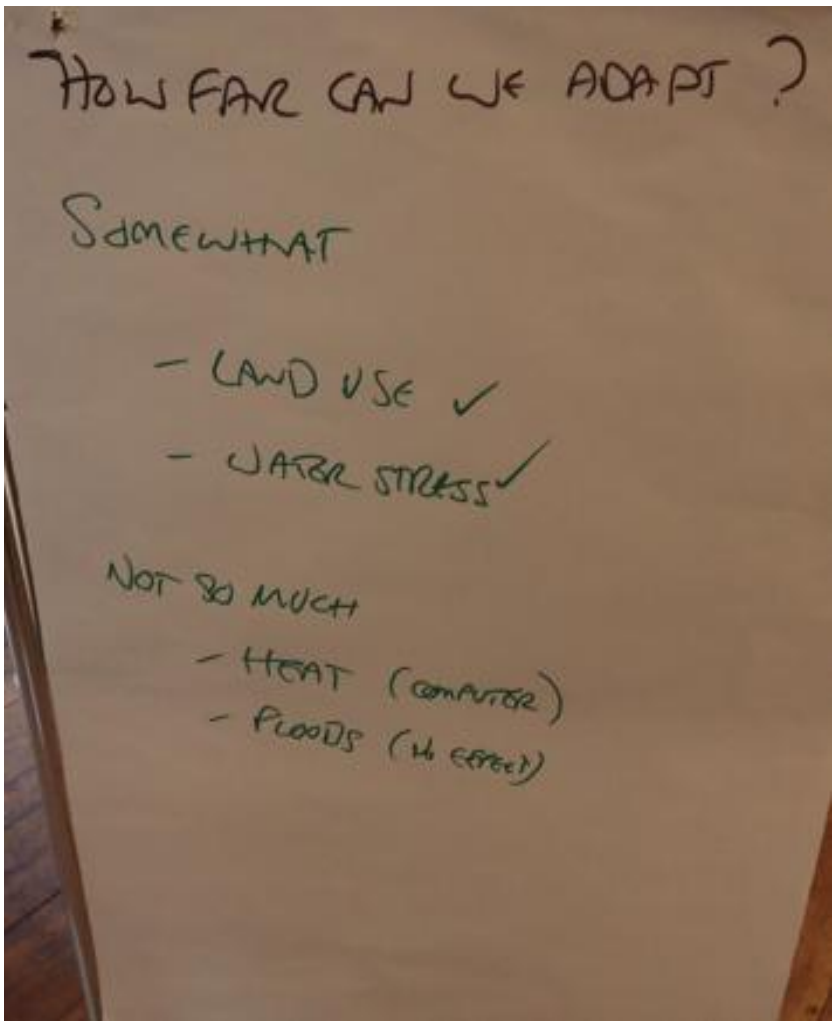
3.4.3. Icarus selected adaptation options



The adaptation measures in the Icarus scenario include the following:

- Reduce the use of natural resources, specifically cut down on water use in all sectors.
- Reducing water use specifically, can be done through command and control, importing technology and not allowing any sector to take priority over another.
- Reduce overall meat consumption.
- Subsidise and create ways to provide food to the needy.

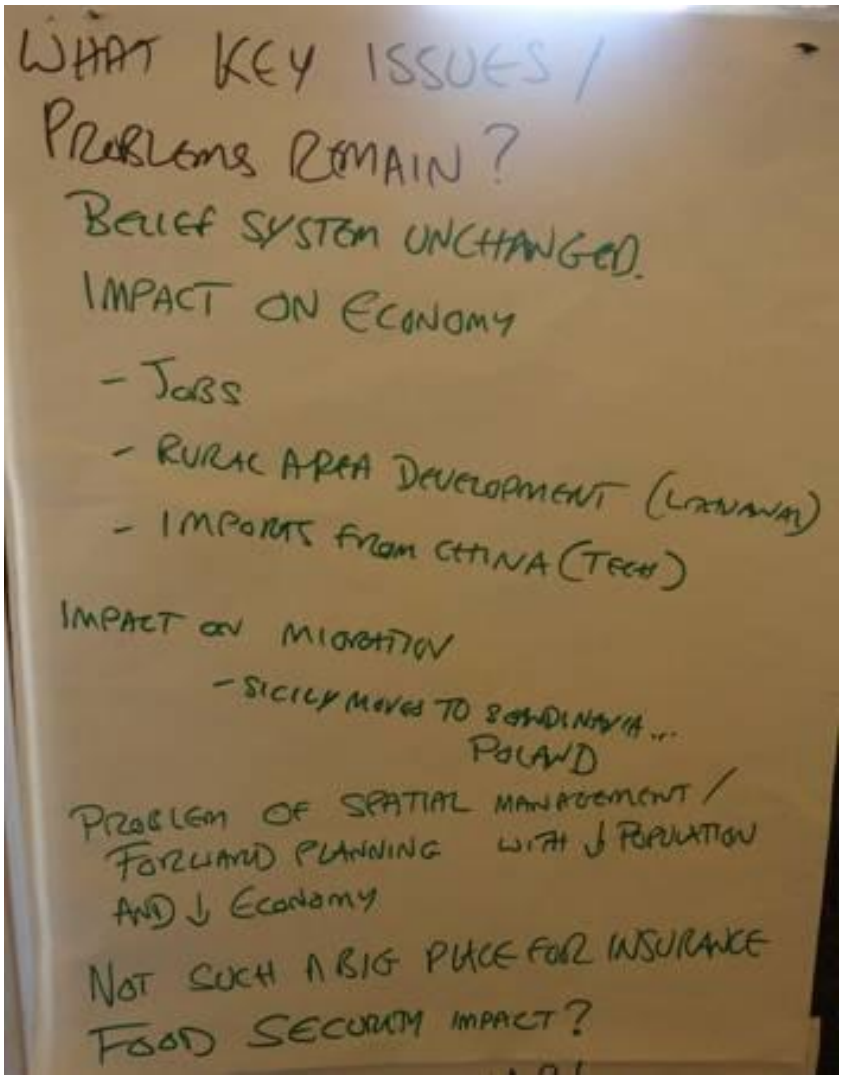
3.4.4. Icarus scope of adaptation



The scope of adaptation actions in this scenario covered:

- Scarcity of natural resources leads to some adaptation in how the land is used over time, to try to put less stress on nature and live with less in order to begin to grow again.
- The overall attitude of learning to live with less will affect water usage as well and put less stress on fresh water supplies.
- Extreme climate variations will remain unchanged due to the development of the BRIC countries as technological powerhouses.
- Flooding still remains a problem due to lack of biodiversity and the over exploitation of natural resources as people struggle to survive.

3.4.5. Icarus remaining key issues



The following are key issues which remain for this scenario:

- The belief systems of Europe remain unchanged, impacting the economy. Scarcity of jobs, the development of rural areas and technology imports from China, all have a negative effect on the economy.
- These factors have a large impact on migration, for example from the South to the North as people migrate seeking jobs and more resources.
- Spatial management and forward planning are still lacking in a world of decreasing population size and stagnating economies.
- Insurance and thinking further into the future do not feature in Icarus.
- The lack of insurance or forward planning of spatial allocations play a big role in food security in Icarus.

3.5. Should I Stay or Should I Go

3.5.1. Should I Stay or Should I Go storyline

Towards the 2020s

After the anni horribiles from 2008 until 2012, the European economy is in a bad shape. For the period of 2012 to 2015, the European economy temporarily revives thanks to innovations coming from the pharmaceutical industry. In an attempt to revamp the European economy even further European policy-makers decide to invest in innovations with a big return on investment in the short run. The military and nuclear industries receive subsidies to modernise themselves.

Meanwhile, the depletion of natural resources continues at an ever faster rate, but politicians and decision-makers at all levels turn a blind eye to these developments. The first priority for them is to get the economy back on track. Natural hazards, droughts, forest fires and heavy rains all occur, but policy-makers decide to put the limited public resources into measures for stimulating the economy and not into innovative solutions to combat natural resources depletion. These measures spark economic growth and resource depletion continues. There are no longer permanent positions in research, but scientists all work on short-term contracts. We have entered a period of short-termism, budget cuts and financial scarcity.

The effects of a depletion of natural resources become increasingly visible. Crop failures occur and also the standard of living in those areas affected by droughts, floods and landslides decreases significantly. There is less solidarity and therefore less money coming in when a region is hit by an extreme weather event. Food prices go up on a global scale and also the price of other essential commodities such as energy goes up. An oversimplification of the system of crop and animal production leads to an increased sensitivity of the system to diseases. Mad pig disease for example is spreading all over Europe. Meat and vegetables become extremely expensive, due to scarcity.

There is also a slowly growing underclass that can no longer afford the increasing prices of utility services. By 2020, some budget is available to do research on cleaning up groundwater, but the attempt to fix it fails. Also other attempts to find innovative ecological solutions to combat the depletion of natural resources are unsuccessful. Scientists do not manage to find a replacement for phosphorus, while we are steadily moving towards a complete depletion. Recycling would be a solution, but there is no infrastructure and the necessary investments cannot be made.

The whole world, including Asia, suffers from a failure of the systems that deliver technology, rather than from the failure of technology itself. Researchers look for cheap short-cuts to optimise the production process. Alternative energy solutions disappoint and therefore nations try to keep their existing nuclear power plants going for longer. This, however, has consequences for the safety and reliability of the power plants. Power cuts tend to happen more often. In the meantime transport costs rocket due to the lack of energy. Public and private transport suffers from selective shut-downs and is unreliable. Infrastructure in Europe is old and there is a tension between the wish to safeguard traditions and cultural heritage and the lack of money for maintenance.

The decreasing standard of living does not happen for all citizens in the same way. In countries / areas that are not severely affected by droughts and floods people can still

maintain their standard of living, but in areas that are severely affected people pay a heavy price. By 2025, there is a widening gap in society between those that are affected by the depletion of natural resources and those that are not. There is still access to health care, but for most people the access is limited. Only the rich receive a top-notch treatment. As a reaction local underground markets appear for food, water and energy. People try to produce food at home and be as self-sufficient as possible. This leads naturally to a struggle for land, which feeds social unrest. For example, the Scottish people accuse the English of nature exploitation. Demonstrations take place on a weekly basis. In general, people in the cities become poorer and poorer and we see a migration wave towards the countryside. This causes tensions with the local inhabitants.

This migration also takes place between regions in Europe. Northern and Eastern Europe have become popular for relocation, since natural resources and land are still available there. The race also leads to the Arctic becoming an area of tension. The world suffers from weaker top-down governance, half of the European Commission-staff is laid off during one of the severe dips of the economy and organised crime is on the rise. The world has altogether become a more dangerous place.

Towards the 2050s

Countries less affected by the depletion of natural resources, extreme weather events and rising poverty levels become frontrunners in trying to lift Europe out of an economic dip. But without sustainable, innovative solutions, revamping the economy is always based on making use of those resources that are already severely depleted. This does not create a stable situation and eventually leads to a mini economic crisis every three to four years as of 2028. Few people profit from the short ups of the economy, but every single person suffers from the downs. And even during the ups, it is only the economy that experiences a revival, the environment and quality of life constantly deteriorate. By now, 50% of red listed species have gone extinct due to land grab for food production.

Innovative solutions intended to halt resource depletion continue to fail. The short revivals only add to the increasing gap between rich and poor. Part of society just cannot adapt to this rollercoaster economy and suffers from health issues, unemployment and a loss of belief in reaching a real turning point. Food prices rocket leading to hunger marches and food riots in all world cities. The migration from city to countryside, and from Southern and Western Europe to available land in Eastern and Northern Europe becomes restricted. Farmers and local organisations in rural areas try to protect their land by force, because the government is no longer strong enough to protect them.

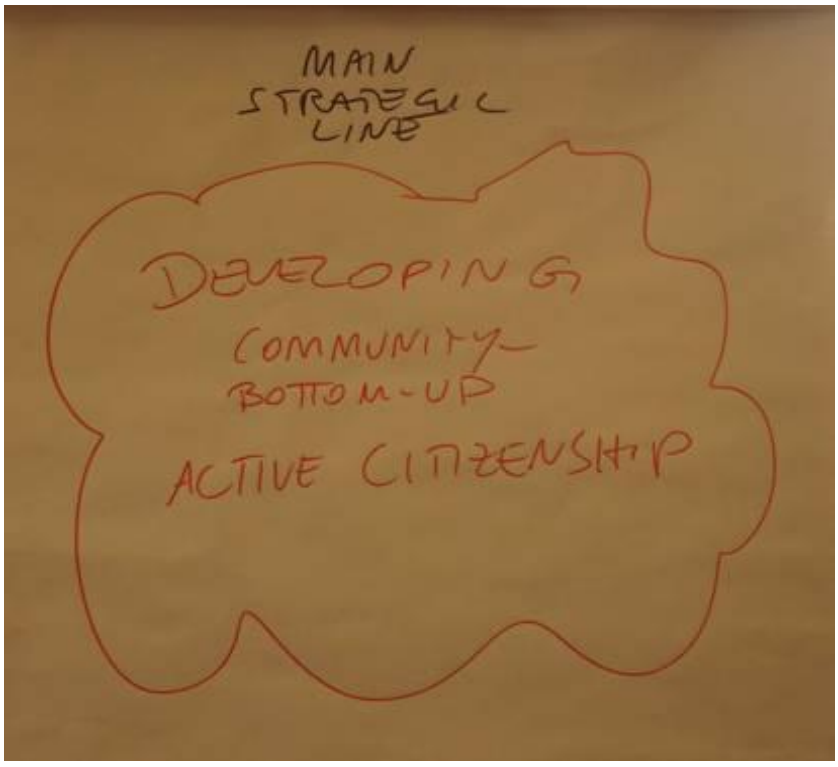
The divide between the “affected” and “not affected” not only leads to an increasing inequality, both within the EU as well as within countries, but also to conflicts. Conflicts over scarce resources take place at many different levels and have many different faces. Internally, inequality leads to political instability and government failures. Some states outside of Europe fail because they don’t succeed in distributing resources equally within their nation. The rulers of failed states try to sell ecosystems assets, while the governments of China, India and the United States decide to introduce a resource export ban. By 2040, inequality and resource redistribution leads to geopolitical instability and tensions all over the world. Eventually this leads to armed conflicts by 2045. The EU splits into pieces and has a lot less influence. They now focus solely on transnational issues. Conflicts on the local, regional and national level are a feeding ground for extremists. Some religious groups do not shy away from violence in order to spread their ideology throughout Europe.

The unstable situation has exhausted the population. They feel insecure, unsafe and lack positive prospects. In an attempt to bring the rollercoaster of short exponential economic growth and deep economic crises to a halt, governments in Europe attempt to regulate the use of resources very strictly. A case in point is the regulation of food distribution and limited land use. They also instigate power cuts and water rationing in order to initiate a behavioural change among the population. Investments, however, are still mostly short-term and governments tend to make popular decisions that are not always sustainable. The biggest counter-movement comes from the poor themselves, as they unite in solidarity groups as a reaction against both the rich and the government, which has not succeeded in improving the quality of life for all people. There is now less respect for rules and regulations and less control of the establishment. "Living with less" movements begin to emerge, but they are still far and few between.

By 2050, there is a lot more space for corruption. The rich manage to buy all the large country houses and many of the poor are forced to move back to the cities. The struggle for land continues and people just grab land and cut down the last remaining forests without government permission in order to grow food. Growing crops has also become increasingly more difficult, since power cuts are frequent and authorities have restricted water use to only 2 hours per day. People therefore have to rely on wastewater for irrigation. Metals in this water inevitably cause a loss of fertility of the soil.

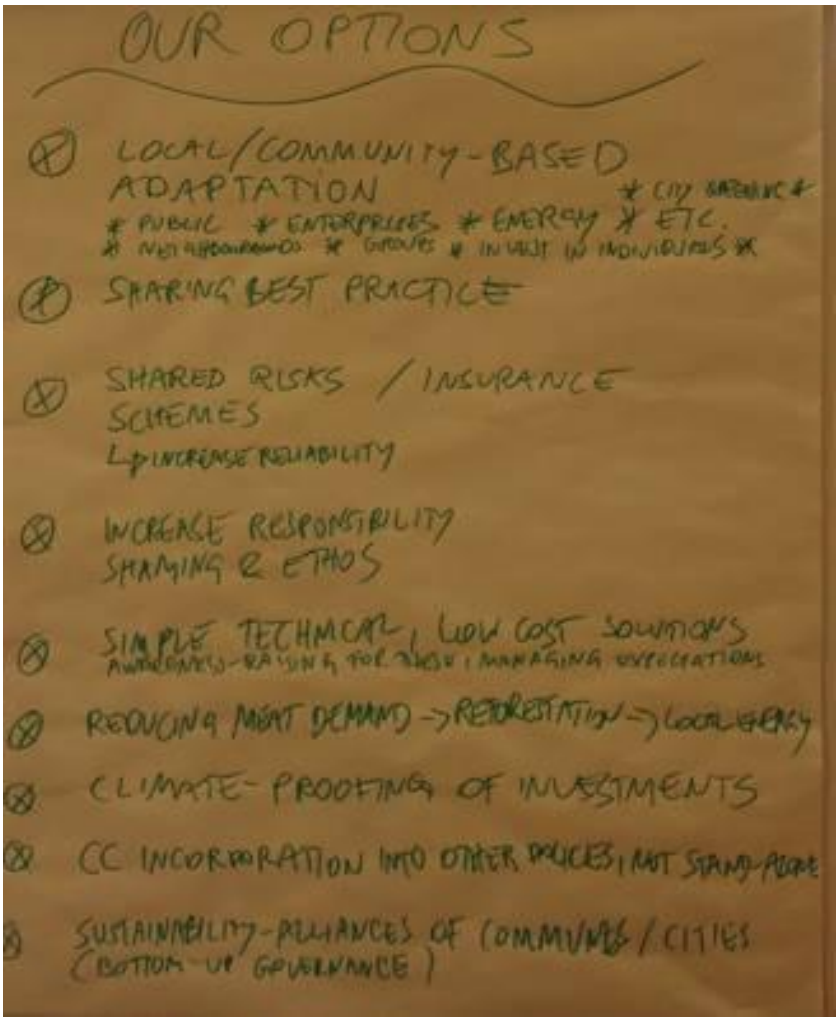
Trade has also changed dramatically over the previous decades from a global market to local markets where the currencies we knew no longer count. People exchange goods, work or services for other goods or services, rather than for money. Apart from these local markets, there is also an extensive black market for natural resources. Organised crime has by now reached an all-time high. It has put the rule of law under pressure and people live in an insecure and instable world.

3.5.2. Should I Stay or Should I Go main strategy line



The main strategy in Should I Stay or Should I Go is developing a bottom-up approach to community building. In this scenario, the governments are weak and ineffective and there is a large disparity between rich and poor. Active citizenship is a strategy to be embarked upon in order to turn things around.

3.5.3. Should I Stay or Should I Go selected adaptation options

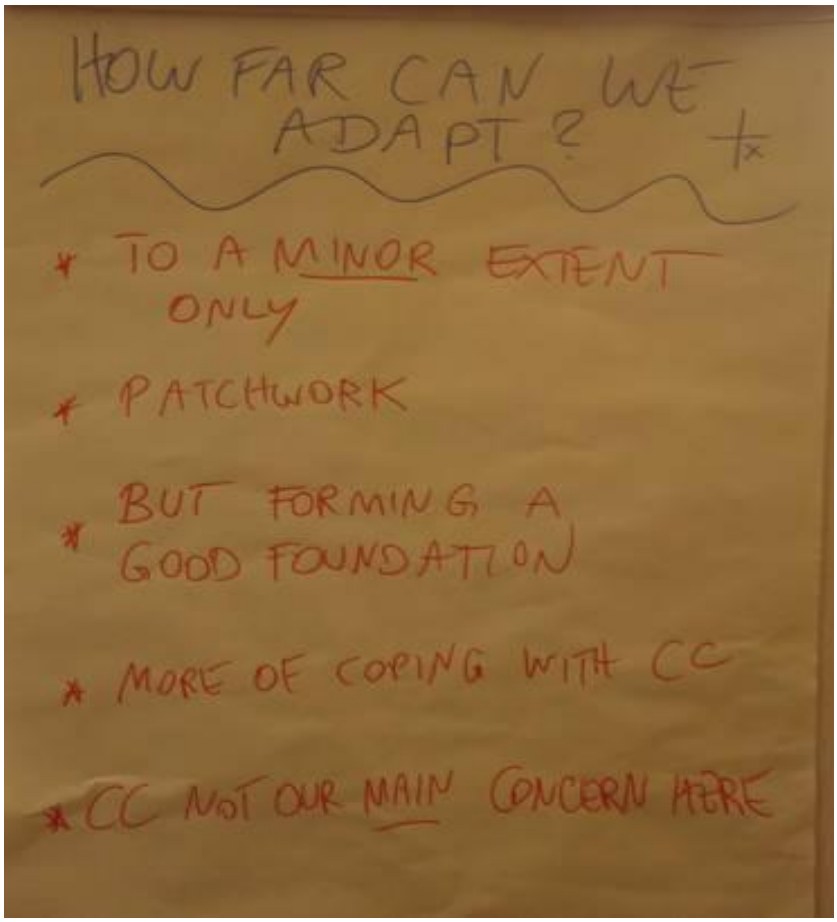


The following describes the range of the adaptation options covered in this scenario:

- Due to the fact that national governments, and in fact the EU leadership is ineffective in Should I Stay or Should I Go, the dependence shifts on to the shoulders of local communities to adapt to the various situations that they face.
- The sharing of best practices is a good way to build trust and solidarity from the bottom-up among individuals and the local community.
- Through the process of providing shared risk schemes or insurance, the reliability of these systems is better.
- In Should I Stay or Should I Go, there is a need for increased sharing of responsibility for all aspects of life, which can be done through shaming others to act.
- Increasing awareness for the development of simple, low cost solutions and innovation.

- In this scenario, meat demand needs to be reduced which will lead to reforestation, which in turn can enhance the production of local energy.
- Investments need to be able to withstand changes in the climate. Taking this into account and safeguarding investments are key.
- Climate change is incorporated into other policies and does not stand alone.
- Bottom-up governance is very important and alliances for sustainability are made among cities / communes.

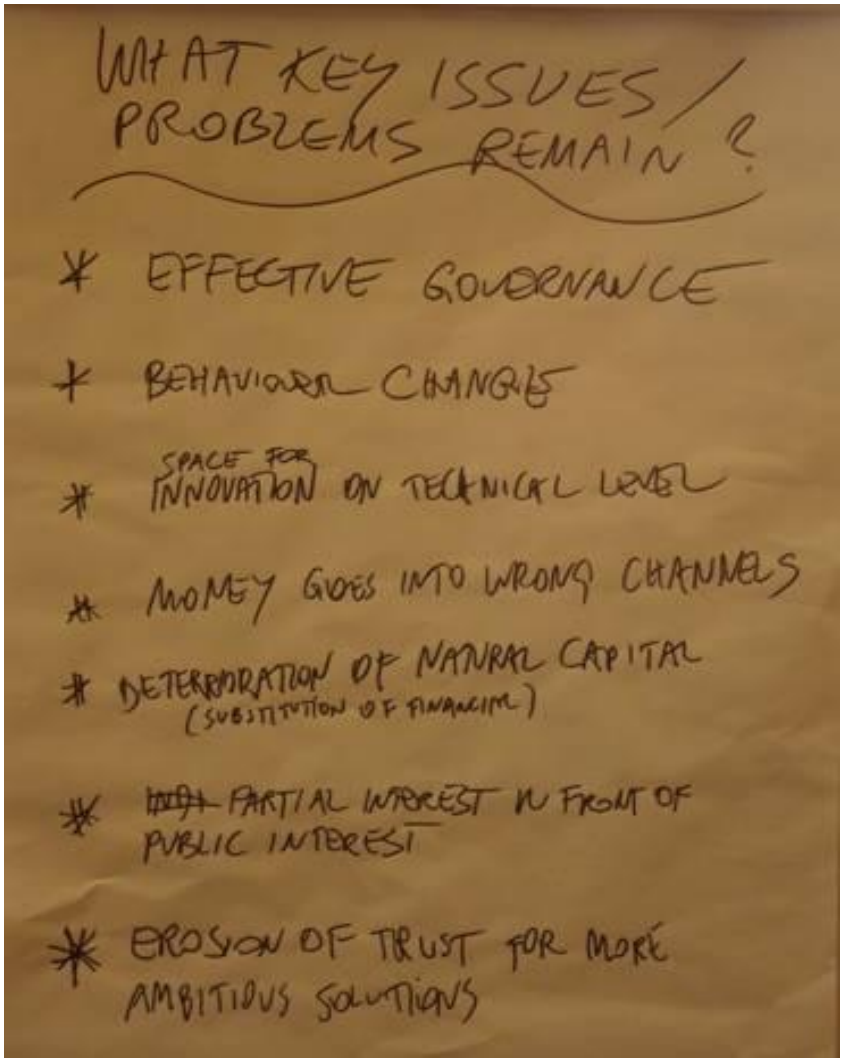
3.5.4. Should I Stay or Should I Go scope of adaptation



The scope of the Should I stay or Should I Go scenario adaptation options is briefly described in the following bullet points:

- In Should I Stay or Should I Go, the outlook for adaptation is not very positive. Adaptation can be seen to a minor extent and mostly in patches, rather than on a grand, encompassing scale.
- Slowly, as bottom-up governance takes effect, the basis for a foundation of adaptation begins to form.
- As climate change is not the main concern in Should I Stay or Should I Go, it is more about coping with this than preemptively combatting it.

3.5.5. Should I Stay or Should I Go remaining key issues



Key remaining issues for this scenario include:

- Effective governance - the bottom-up approach needs to take hold.
- A definite change in behaviour must also take hold.
- There is a lot of space for innovation on a technical level.
- Money is going into the wrong channels.
- There is a lot of deterioration of natural capital and financial capital is substituted in its place.
- Public interest is not taken into wide enough account.
- Trust is being eroded in favour of more ambitious solutions that are ineffective.

3.6. Riders on the Storm

3.6.1. Riders on the Storm storyline

Towards the 2020s

Since the financial crisis of 2008, the European economy has been fluctuating strongly. This trend, which originally people thought would only last a few years, is becoming the general pattern of development for Europe for the next decades.

In 2012, world leaders fail to reach an agreement on the successor to the Kyoto protocol. However, extreme weather events in Europe demonstrate that adaptation measures are needed more than ever. Droughts in southern Europe lead to large-scale failures of harvests in large parts of Greece, Italy and Spain. Because those countries supply a lot of fruit and vegetables to the rest of Europe, the scarcity of fruit and vegetables leads to food shortages and inflation. Alternatives to fruit and vegetables from southern Europe become very expensive. This is exacerbated by the production cost of fruit and vegetables in greenhouses in western and eastern Europe going up because of high oil prices.

Hence, the droughts in southern Europe have a knock-on effect for the rest of Europe and its economy. Governments from southern Europe have to bail out those sectors that have run into trouble. They make use of the permanent European Emergency Fund, which was set up in 2012 during the Euro crisis. For the first time, newspapers speak of climate change unemployment. These problems have a strong negative influence on people's morale. Strikes and marches happen frequently in all the capitals of Europe as supplies go down and prices go up. The droughts, however, are not limited to southern Europe alone. They cause water quality to go down on a continental scale. There is less water available for irrigation, rivers tend to dry up in the summer and this has an enormous impact on some of Europe's fragile ecosystems.

In Europe, people become more and more aware of climate change and environmental issues. They unite themselves and support the NGOs, who get more attention in the media because of the distrust of government. Because of these strong bottom-up initiatives, the EU continues to put a lot of effort and resources into climate change adaptation measures. In its adaptation strategy, the EU is wholeheartedly committed to finding innovative solutions to the depletion of natural resources. Key to this strategy is public-private collaboration. In eastern Europe, however, not all countries agree with this strategy and governments dissuade consumers from buying 'green' cars. This scandal leads to a public outcry and protest marches are held in no less than 15 EU countries.

Despite difficult economic times, the EU and national governments do not cut funding schemes for private initiatives. They see the environment as a key priority and feel the need to be pro-active with regard to the challenges to come. On top of this, they want to avoid brain drain at all costs in these difficult times. "Private initiatives for public solutions" becomes a very successful funding scheme.

Due to the increasing degradation of ecosystem services, education continuously focuses on awareness-raising and on the importance of sustainable solutions. Governments support this by setting up new research institutions and providing continuous funds that are not dependent on the fluctuations of the global economy. They are convinced that innovation and technology

are the only answers to a crisis. This constructive approach makes the EU stronger and more influential. It becomes a beacon of security in instable times.

The funding scheme sets in motion a whole era dominated by the will to find innovative solutions to the depletion of natural resources. One of the first milestones of this era is the exponential growth of renewables. In 2020, when the peak of the global financial crisis is reached, the energy costs and resource prices soar and renewables finally become cost effective. More and more countries, also outside of Europe, begin to adapt their policies regarding green enterprises and support them financially. On a local level green initiatives have been successful for a few years now. They receive media coverage and governments support them with subsidies.

By 2025 the green economy is seriously booming. Managing the effects of extreme weather events becomes a new challenge in this era. The strong focus on eco-technology together with dynamic, instable global markets generally feed a rollercoaster GDP development in Europe. In the meantime the morale of the European population has gone up. They have collectively made a behavioural change and are happy to live with less.

Outside of Europe the economic and social landscape is mainly unstable. There is a tendency towards populism and this causes tensions. Because the world economy continues to decrease, global politics have become very unstable. Due to such instable conditions, Europe cannot export much of its innovative products.

Towards the 2050s

By 2030 it seems that the counter-measures in the EU are successful. Europe has successfully implemented new irrigation techniques to combat droughts. New irrigation techniques make it possible to reduce water use. People have become used to their lower standard of living and enjoy the outdoors more. Having your own vegetable garden has become very popular, as are local markets and fairs. The focus is on self-sufficiency and local trading, rather than on globalisation. People have more trust in local authority, rather than in national governance. The European continent has learned over the years to be a lot more energy efficient and renewable sources and green technology have reduced our dependency on natural resources. The EU also maintains its permanent funding of green research projects and continues to stimulate technological innovations.

In 2035, water use in London is reduced for the 10th year in a row. In light of ever more disastrous effects of climate change, the resistance against geo-engineering eases off. Albeit still being very costly, geo-engineering picks up by 2040. A new milestone comes in 2042 when fusion power makes it possible to overcome the energy crises. New bio-technologies also drastically reduce the demand for natural resources. At an EU summit, it is proudly announced that the EU no longer depends on resources from outside the continent. On the contrary, Europe can now start exporting green solutions since the world economy and geo-political stability is increasing.

By 2040 the impact of climate change once again hits hard. Europe, with its long and continuous investments in innovative and green technologies, is prepared for this crisis. The developing and emerging countries, however, are not. They now have to pay the bill for the unsustainable and unlimited development of the last decades. Millions of people express the wish to immigrate, but Europe does not allow it, since it would put too much strain on the already fragile ecosystems. The world economy suffers from the crisis in the emerging

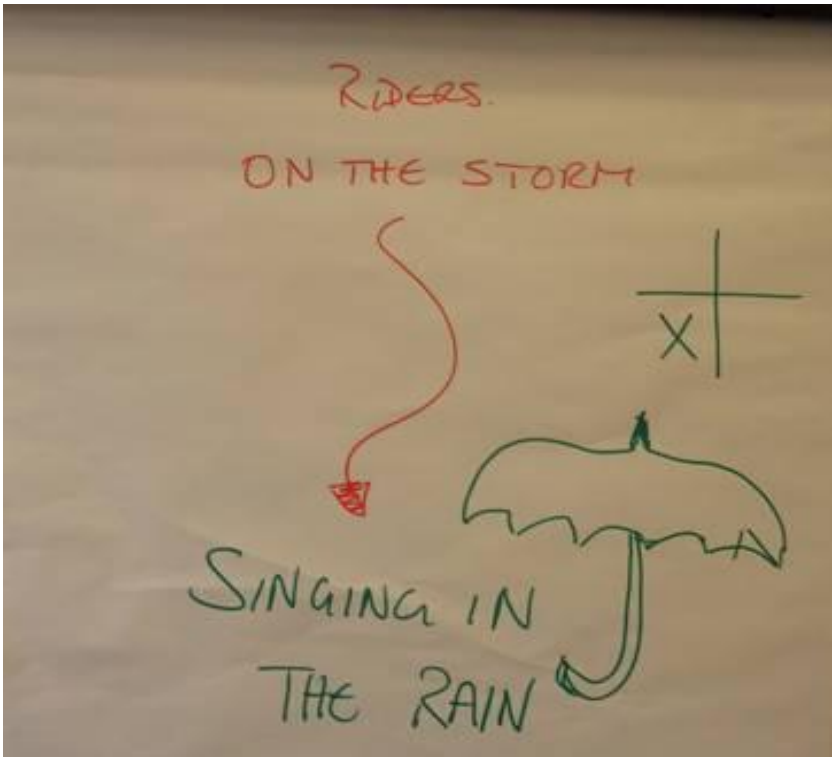
countries. The euro is not strong, but has stabilised and the EU works hard in gaining global trust for its research outcomes and education programmes.

By 2045-2050, a global change in attitude is noticeable. Europeans have learned to master some of the negative effects of climate change and the decline of ecosystem services, but this does not make them reckless. Together with learning to master the effects of climate change, Europeans have also learned to have more respect for natural resources. Adaptation policies pay off, not only because there are technological solutions at hand, but also because the population is very supportive. Hence there is a high increase in social capital. Europe exports the technology to help restore degraded ecosystem services and to rebuild the economy more sustainably in developing and emerging countries.

This trend continues in the 2050s and is reflected in a steady green GDP growth and an increase in purchasing power. The fact that Europe is a good place to live by 2050 is also reflected in a population increase compared to the 2020s. The demand for green technology has also grown strongly now that the world economy has recovered once again. Other countries have copied some of the technology and now offer them for cheap prices. But Europe can take on the competition, since new technologies are constantly being developed. Research, education and innovation are the key strengths of the EU and by providing the necessary funds they manage to stay generally one step ahead of the rest of the world.

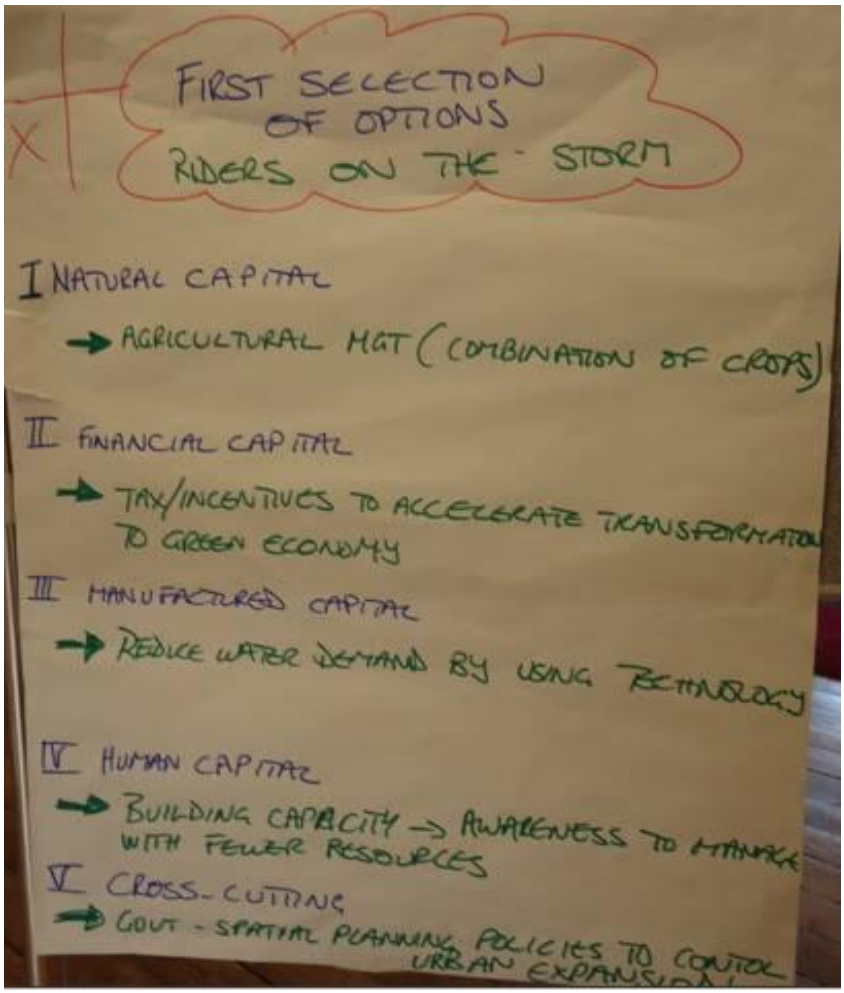
The fact that other countries copy the innovative green technologies causes a decline of GDP in Europe until the next innovation puts us ahead again. The enormous investments of the past decades finally pay off. However, the world economy remains turbulent. Europe is heavily affected by this volatility because it depends on exporting green technology. When other nations are doing well economically, so is Europe. But when they struggle, Europe struggles as well.

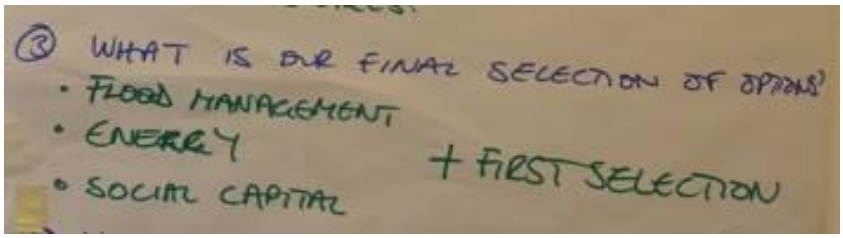
3.6.2. Riders on the Storm main strategy line



In Riders on the Storm, strong bottom-up initiatives lead to strategies for climate change adaptation. Innovation and research are supported by European governments and gradually, despite on-going climate change, Europe becomes self-sufficient in terms of resources. They have learned how to combat and cope with climate change. Despite this, Europe still remains dependent on green technology exports, which rely on global economic stability.

3.6.3. Riders on the Storm selected adaptation options



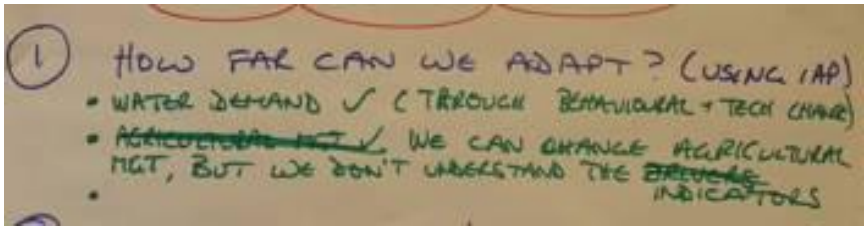


In Riders on the Storm, there is recognition of the need to adapt to climate change. Initiatives take effect from the bottom-up. These are ways in which the adaptation can be made:

- Increase natural capital through the management of agriculture, such as crop combinations.
- Improve financial capital by using taxes or other incentives to accelerate the transformation to a green economy.

- Increased developments in technology can reduce the demand on water consumption.
- Human capital can be affected through building capacity. In Riders on the Storm, it is awareness that leads to people's ability to manage with fewer resources.
- Government is better prepared and enacts spatial planning policies to control urban expansion.

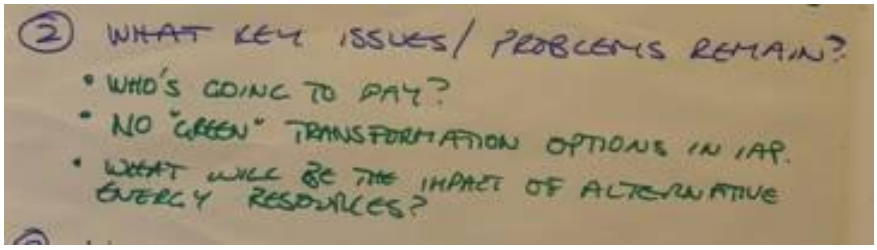
3.6.4. Riders on the Storm scope of adaptation



The extent to which adaptation can be achieved in this scenario is limited:

- Water demand can be reduced due to behavioural and technological change.
- Agricultural management can be changed to adapt to climate change.

3.6.5. Riders on the Storm remaining key issues



There are a number of key issues associated with this scenario which remain. These are as follows:

- The biggest issue remaining in Riders on the Storm is who will pay for the costs of all the innovation, research and new technological changes.
- The IAP system doesn't allow for 'green' transformation options.
- There is also no method to foresee the impact of use of alternative energy resources.

3.7. Comments and conclusions

3.7.1 Main strategy lines

- Developing active citizenship and social trust seem to be key to combatting the effects of climate change in these scenarios. Less emphasis is placed on governments over the behaviour and mindset of the population.
- Learning to live with less is also a common thread, especially with regards to natural resources. Conservation strategies become prevalent, even in scenarios that have a more positive outlook, conservation means thinking about a possible future of scarcity.
- Interdependence among populations is also a recurring trend, whether that is economically or in an academic context for innovation and research. Global connections will affect Europe in one way or another.

3.7.2 How far can we adapt

- The diversity of the European geography and climates will effect adaptation. The degree with which regional differences are understood and manage will play a large part.
- Regional differences also effect agricultural management. Again, understanding key indicators can impact the extent to which landscapes can cope with present, and prepare for future, challenges.
- The scale of bottom-up governance and social trust will also be a decisive factor across the board, although this is usually a slow process and will take effect in patches / regionally, rather than everywhere at once.
- Changes in attitude and behaviour are also very important. In all but Icarus, there is a lot of optimism as regards the potential for adaptation in this area leading to positive effects on the demand for natural resources and ultimately the economy.

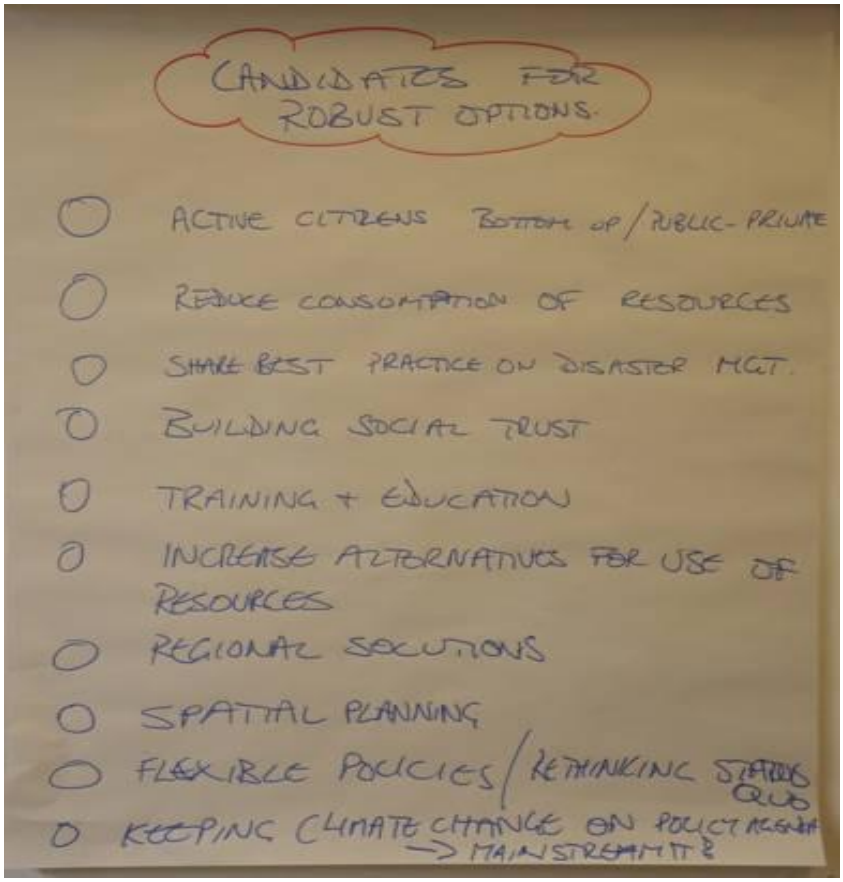
3.7.3 Remaining key issues

- Increasing connectivity between habitats and belief / behavioural implications remain key factors to deal with the effects of climate change in Should I Stay or Should I Go and Icarus. Public interest is not taken into account enough. Spatial planning and foresight are often the lacking ingredients in most of the scenarios. In Riders on the Storm, the remaining key issue is more the impact (particularly financially) and cost of the alternative resources.

4. Robust adaptation options

The participants were asked to identify adaptation options that might work across all four scenarios. They returned to their scenario groups to test the robustness of these candidates by assessing whether they can be successful in their scenario. This then led to the identification of a final list of robust adaptation options.

4.1. Candidates for robust options



The candidates for robust options were:

- A focus on a bottom-up governance approach, inspiring active citizenship.
- Overall reduction of resource consumption.
- Sharing best practice with regards to disaster management.
- Overall building of social trust - ties into the active citizenship and bottom-up governance.
- Apply training and education to have a more informed / aware population.
- Increase the development of alternatives for natural resources.
- Regional solutions to regional problems - each part of Europe must do what is best for their specific geography and situation.
- Enacting spatial planning in order to cope with future development.

- Policies need to be flexible in order that they can more easily adapt to the unexpected.
- Mainstreaming the issue of climate change to keep it on the policy agenda - allows people and governments to be more aware.

4.2. Robust options: conclusions

4.2.1 Active citizenship

Robust option across the four scenarios, however in Icarus, it only applies to certain circumstances, so not fully robust:

- We are the World: This is the motor of the whole scenario, a given.
- Icarus: Questionable whether it works to a full extent. Active citizenship in the form of responsibility for one's own family and taking care of oneself.
- Should I Stay or Should I Go: An original suggestion from this scenario group is that a bottom-up approach is necessary, so active citizenship is central here.
- Riders on the Storm: A bottom-up approach is also important here. This includes the community aspect, self-organised groups of people, and building social trust. While promoted, the only downfall is finding the funding for active citizenship in this scenario.

4.2.2 Reduce consumption of resources

Robust option across the four scenarios with remarks:

- We are the World: It is only possible to 'sell' a reduction in the consumption of resources to active citizens. Not everyone will immediately buy in to this idea, so social trust and minimal economic inequalities must be established first.
- Icarus: This will work in Icarus if it is presented as a win-win situation for self-interest. It can be of benefit both economically and ecologically.
- Should I Stay or Should I Go: Maximum reduction is already present in this scenario, so rather it is important to use resources more effectively and efficiently. Further reduction is not possible.
- Riders on the Storm: This scenario renamed this option and focused on the combination of reducing resource consumption and discovering alternative resources. They found that water reduction worked quite well with technological and behavioural changes.

4.2.3 Sharing best practices on disaster management

This was more or less a robust option in all the scenarios, but Icarus. It was strongest in We are the World and Should I Stay or Should I Go:

- We are the World: It was stressed that the sharing of best practices was important not only for direct practices, but also to restore infrastructure and to avoid long-term negative effects. It is important to have money at the ready in case it were needed if a black swan appears.
- Icarus: They don't like to share information in this scenario, even though they see the importance of disaster management.

- Should I Stay or Should I Go: Sharing of best practice works in this scenario if it is done at the local level by empowering the local community. It will not work if done in another manner.
- Riders on the Storm: Not a priority in this scenario. Could work if done at a local level or at each level individually, but they would rather sell their technology than share it.

4.2.4 Building social trust

More or less robust in all, but Icarus still lags behind on this one even though it is not completely dismissed. There was a focus on localisation in the building of social trust in all scenarios:

- We are the World: Social trust equals active citizenship, which is the motor in this scenario.
- Icarus: Hard to do, as feels like swimming against the tide. Too much going on in this scenario to worry about this option, unless it can translate into putting the family first, concentrating on one's immediate unit and hoping that generates outwards over time.
- Should I Stay or Should I Go: This works at the community level as a response to pressure, but will not work at any other level.
- Riders on the Storm: Can only get active citizenship by building social trust, but the emphasis is on the localisation of this social trust.

4.2.5 Training and education

Robust in all, but Icarus.

- We are the World: Training and education is seen as a way to teach people about alternatives, but not to solve climate change. People are well educated to make their own choices in the future.
- Icarus: They have no resources and people do not listen in this scenario.
- Should I Stay or Should Go: One of the few chances that they have.
- Riders on the Storm: This scenario takes a community-based approach to education and training.

4.2.6 Increase alternatives for use of resources

Robust in all four scenarios:

- We are the World: Technology allows it and education stimulates people to ask for alternatives.
- Icarus: Alternatives make people happier.
- Should I Stay or Should I Go: Works with a low technology level.
- Riders on the Storm: Solutions based on technology. Green technology is used in Europe and exported globally.

4.2.7 Regional solutions

Not really a robust option in any of the scenarios. We are the World and Riders on the Storm remained neutral, while regional solutions didn't work in the other two scenarios:

- We are the World: Not the thing that will solve the problems, but doesn't hurt. Eventually, regional needs might need to be met by regional autonomy.
- Icarus: Unlikely, as the people don't work together in this scenario. Possible within countries, but not between them.
- Should I Stay or Should I Go: Waste of time as local is the only thing that works in this scenario.
- Riders on the Storm: Locally based scenario, but feel it's important to share. Social media could have a regional impact.

4.2.8 Spatial planning

Robust in all, but Should I Stay or Should I Go:

- We are the World: It is inherently part of this scenario due to the connectivity of habitats and flood management systems.
- Icarus: Important when combined with architecture.
- Should I Stay or Should I Go: Too idealistic. Spatial planning might feature at the local level, but only in the beginning of this scenario. It doesn't feature long-term.
- Riders on the Storm: There is a focus on shifting away from coasts and reducing urban sprawl.

4.2.9 Flexible policies

All of the scenarios, except We are the World, were rather hesitant and reserved regarding flexible policies:

- We are the World: Need flexible policies that are not rule-based, but principle-based. This will help when it comes to regional solutions.
- Icarus: The scenario doesn't support flexible policies, as it is within the constraint of the national level. As populism is rampant in this scenario, flexible policies can easily turn negative, they are more short-term and can send the wrong message.
- Should I Stay or Should I Go: Flexible policies might help at the beginning if the local level was enabled, but they don't make a large difference as the national level is not important. Flexibility could also be seen as negative.
- Riders on the Storm: In this scenario, there is a mistrust of government. If policies are not embedded then government can easily change them.

4.2.10 Mainstreaming climate change in to the policy agenda

This works in We are the World and Riders on the Storm, but not for the other two scenarios:

- We are the World: Keeps the motor running of this scenario. It is a given.
- Icarus: More neutral, because with the populist scenario it could easily turn negative and be used to do other things. If presented as linked to economic success then it has more of a chance, but overall it is not a robust option.

- Should I Stay or Should I Go: Climate change is not the main focus. It is seen as being a waste of time and leading to a lack of resources.
- Riders on the Storm: Technological transformation is the key to growth. Policies can develop as mainstreaming is going on. It is important to embed policies to ensure a local buy-in.

4.2.11 Conclusion

Reduce consumption of resources, increase alternative use of resources and spatial planning can be considered robust options across the four scenarios. Active citizenship and building social trust are mostly robust, but highly context-dependent.

5. Meeting Europe, meeting Scotland

On the afternoon of day two, one regional scenario group was teamed up with one European scenario group to explore each other's scenario. The project team prepared a comparative analysis with the following results.

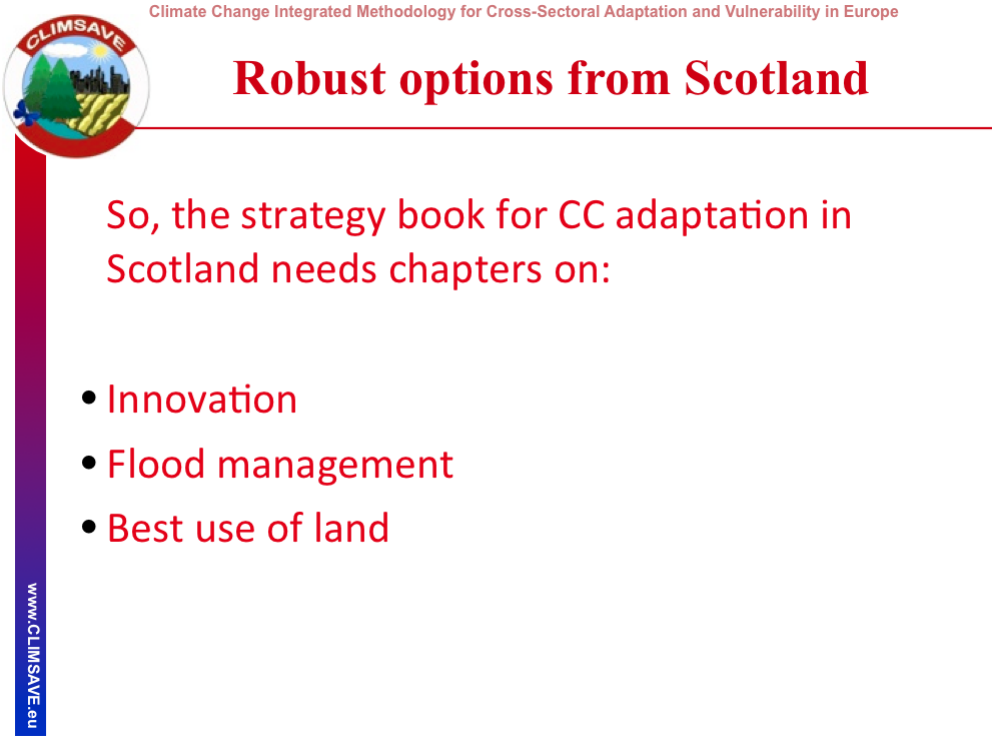
5.1. Robust options

5.1.1 Europe

Comments and clarifications from the participants

- For a scenario such as 'Should I Stay or Should I Go' the only way to survive is to build local communities as early on in the scenario as possible.
- Architecture is understood as urban agriculture, green roofs and greening cities in general.

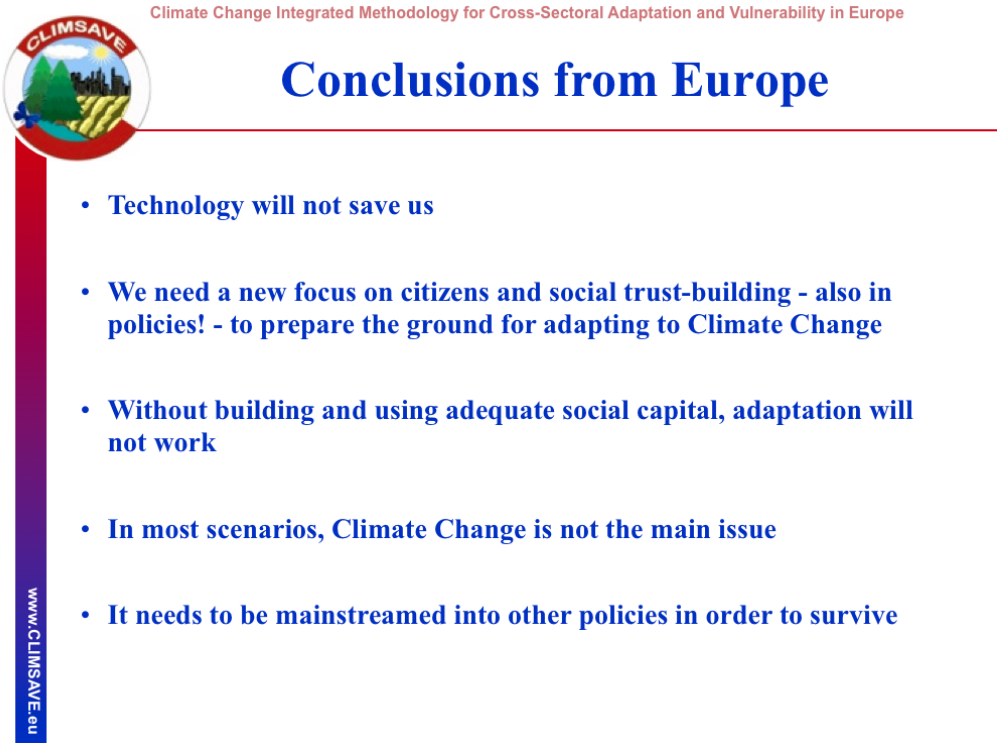
5.1.2 Scotland

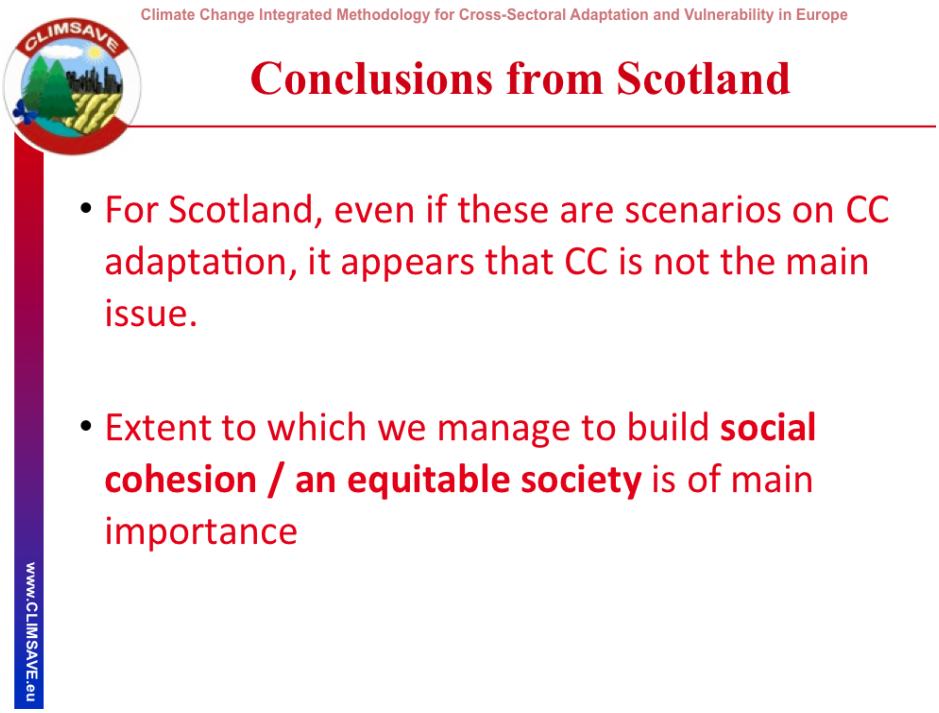


Comments and clarifications from the participants

- Flood Management did not work in Europe – maybe because it needs a more regional / unified approach. However, it has to be said that pure flood protection also did not work in Scotland. Flood management includes flood defences, but also moving people and businesses from vulnerable areas for example.

5.2 Conclusions



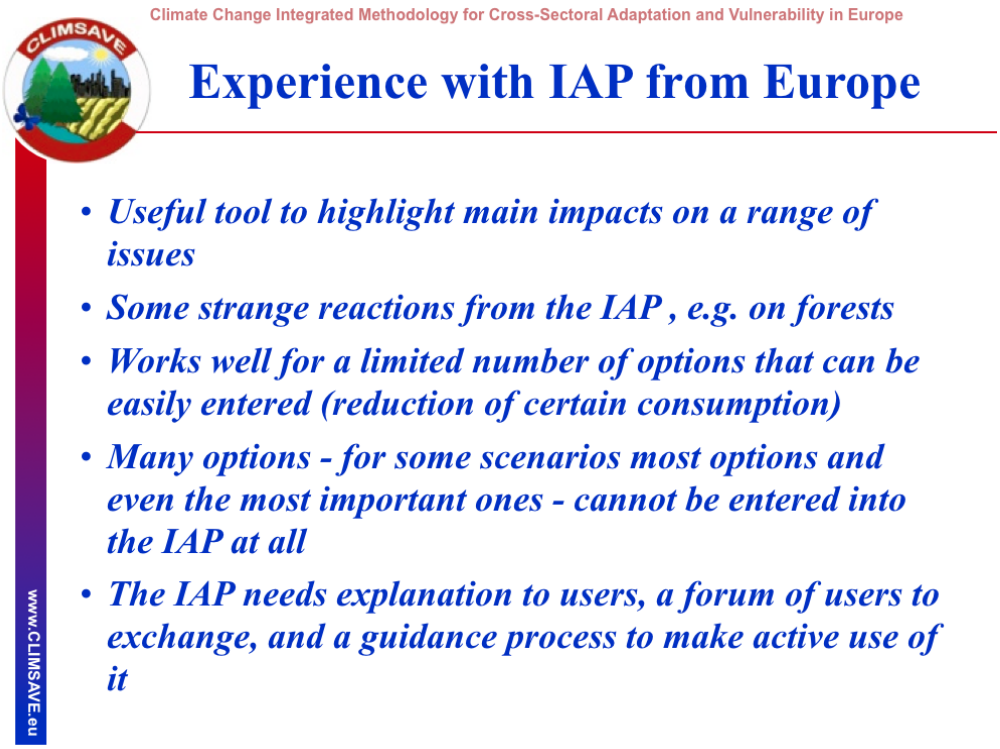


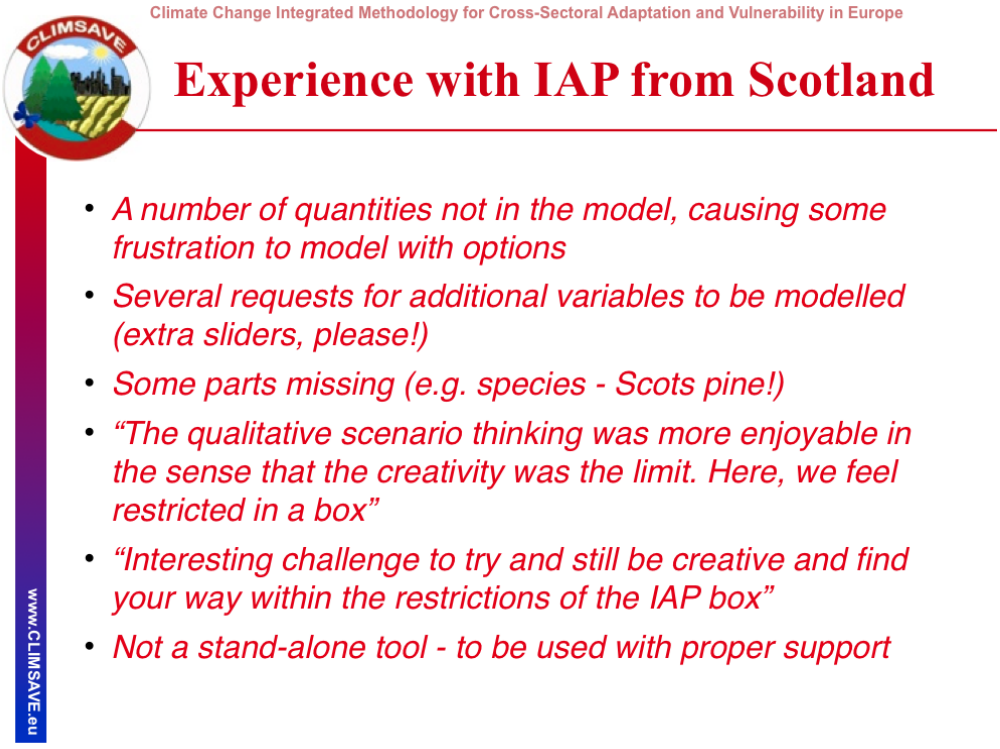
Comments and clarifications from the participants

- In Europe a change in people's mind-set is important. They have to deal with having less, simply because there is less.
- In Scotland climate change sometimes even provides opportunities, but not in the case of extreme events. Furthermore, it is unclear what happens to the supply chain.
- For Scotland, it is important to realise that economics alone will not save us, because then we will end up in Mad Max. Also, governance is really important.

5.3 Experience with the IAP

5.3.1 Europe

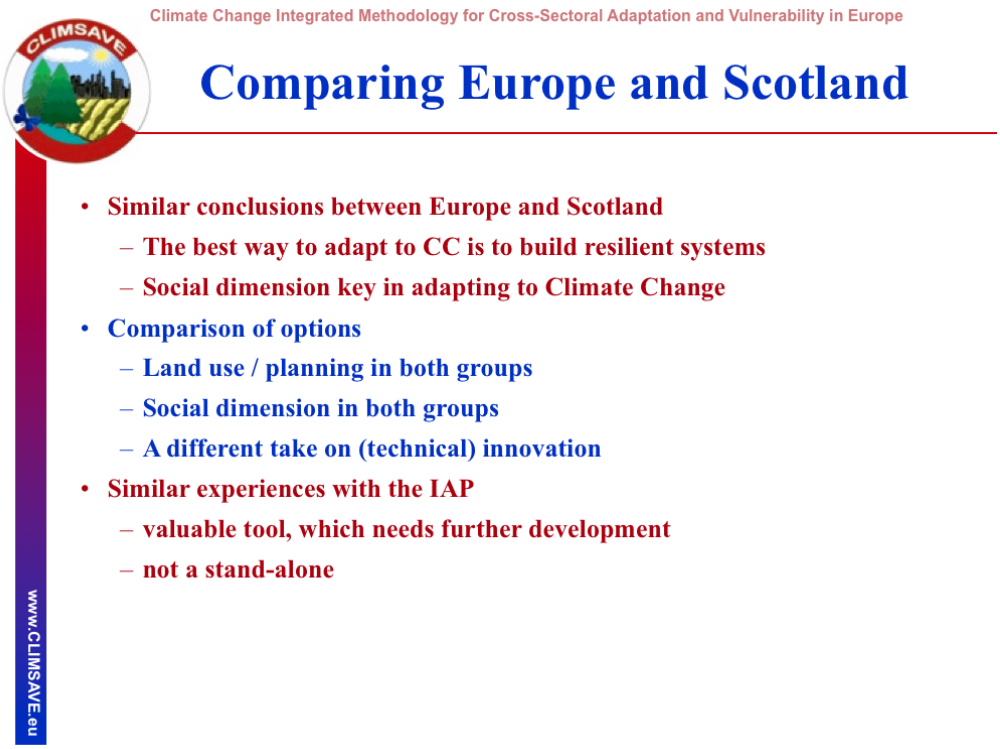




Comments and clarifications from the participants

- The social, fuzzier side of things is a lot more difficult to quantify in the model, but that is inherent to this type of tool. For these 'soft' options you need to be innovative in how you translate them into the IAP.
- The IAP is a tool to stimulate discussion and debate and not to predict the truth. It allows you to explore whether your imagination and your qualitative ideas on climate change adaptation work out.
- It would be useful if the IAP would give users an explanation of why things happen.

5.4 Comparisons between Europe and Scotland



6. Learning points from CLIMSAVE

The participants from the European and regional level discussed together in small groups their experience of the CLIMSAVE process and what applications they see for the process and results. The comments from the subsequent plenary session were as follows:

A. How was the CLIMSAVE experience for you?

- It was a very positive experience. I have met a lot of people and hope to stay in touch with them.
- It was interesting to see the importance of social adaptation. Unexpectedly it turned out to be a key issue.
- Sustainable procurement is important.
- Acknowledgement of our hard work.
- Very helpful and enlightening.

- Good facilitation.
- I felt sometimes that the groups were too small. And that there was a lack of experience or different experiences in the groups. That was not always good for discussion.
- The small groups cause too much of an individual influence.
- The integrated approach is interesting, but it would also be nice to go in depth and to find out which factors really affects the model.

B. <u>How should the CLIMSAVE material be used from here onwards?</u>

- I would like to present the project to my colleagues. Therefore a short presentation on CLIMSAVE and its results (quantitative, qualitative and how they were developed) would be useful.
- You should find ways to use the tool in the context of policy-making. I see the IAP as a tool for informed discussion, so you should not overdo it or worry too much about the results. They are mainly helpful to aid the discussion.
- I want to see the tool being more refined. That would make it more useful.
- In a Scottish context the IAP resolution is too coarse, since decision-making will be done at a regional level. The resolution needs to be finer, the climate data need to be more refined. The tool can be used practically within the National Planning Framework or Scottish Land Use Strategy, but then refinement is needed.
- Seek endorsement from the EEA. Make the UN-level and Commission more aware.
- Maybe within Horizon 2020, there would be a chance to explore the different sectors more specifically.
- A basic presentation set on CLIMSAVE would be helpful so as to present it to local NGO's.
- The IAP can serve as a basis for a larger discussion, but we really need a presentation so we can share the project.
- The tool would be very useful for Environmental Assessment Plans. It would help discussion on strategic planning and can get people involved.
- It can aid discussion by specialists on the different subsectors (e.g. agriculture or water management), but then possibilities to alter the system are necessary so that specialists can play with it.
- The IAP could be a valuable educational tool and you can give demos. It is very visual, so you can show people what happens.
- I really like the scenario development as such. We had really inspiring discussions and this is certainly something I can use in my job.
- The IAP might be a good tool to support discussion on climate change mitigation and adaptation in the Covenant of Mayors in Malta.
- Maybe we can create a LinkedIn-group?

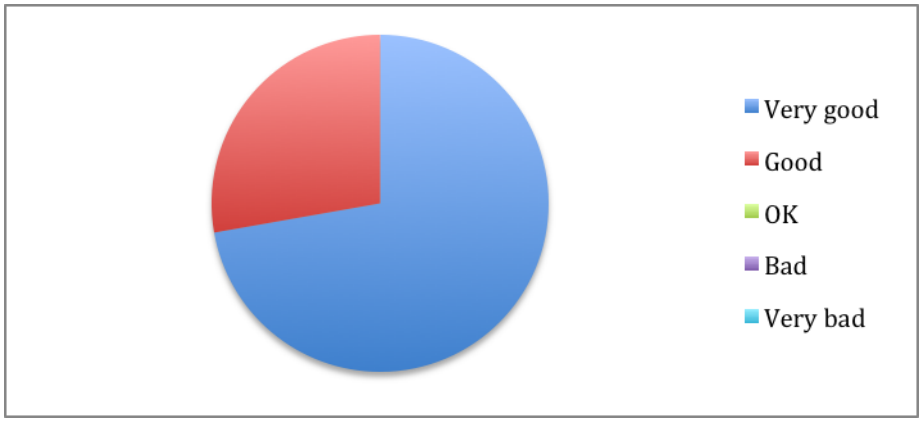
7. Written evaluation[2]

7.1 Feedback form: CLIMSAVE - 3rd Stakeholder Workshop

1. How do you rate the workshop in general?

Please mark:

13 Very good 5 Good ☐ OK ☐ Bad ☐ Very bad



Comments - Please write:

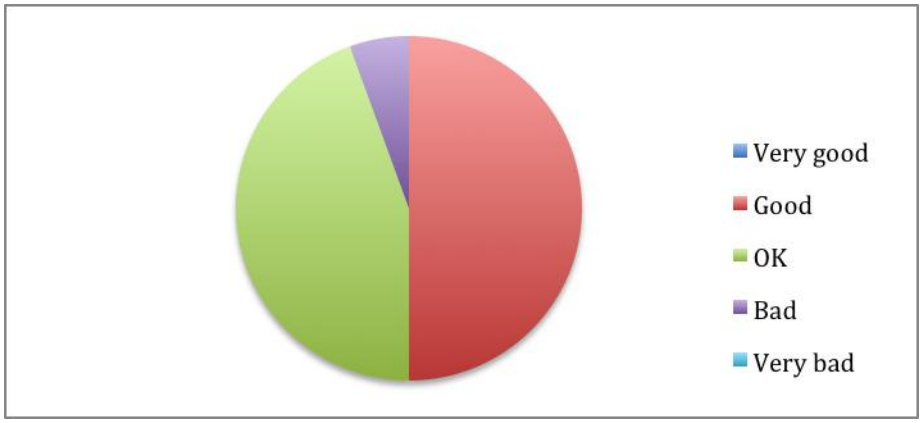
- 'Professionally facilitated to make sure it moved forward.'
- 'Very organised.'
- 'Less engaging than the scenario building workshop, but provided some unexpected "learning".'
- 'Probably be more broad range of opinions when larger breakout groups? Danger of one person taking over.'
- 'The workshop was interesting, challenging and informative.'
- 'Well organised.'
- 'Interesting, well structured.'

2. Are you satisfied with the IAP?

Please mark:

☐ Very good 9 Good 8 OK 1 Bad ☐ Very bad ☐ No opinion

[2] The data shown below are the accumulated results from the feedback forms distributed to the European and the regional (Scottish) stakeholders.



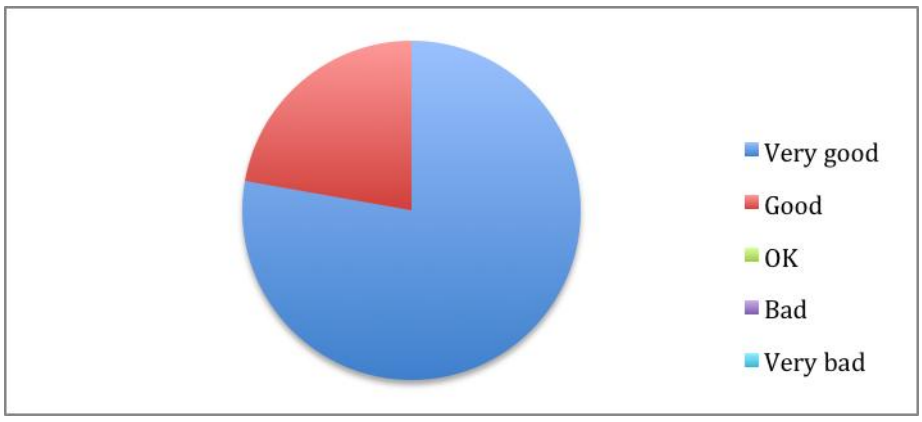
Comments - Please write:

- 'Difficulties with soft options have been well-discussed, but the scope of potential outcomes is still impressive.'
- 'Need more indicators / sliders.'
- 'Good as a heuristic tool.'
- 'A very good start at a very complex modelling problem. Am keen to see it used and refined in the future, applied to a range of scenarios.'
- 'Some technical options and limited adaptation options.'
- 'Absolutely sufficient for a good discussion.'
- 'As still in development, difficult to say. However, has potential to be extremely useful as a tool to aid discussion and develop scenarios.'
- 'Explanation needs to be clearer + operationalisation with socio-economic factors.'
- 'Model has its constraints which have to be addressed, but okay for now.'
- 'We did not have a chance to compare different options.'
- 'Still under development, but has great potential.'

3. How do you rate the work of the facilitators?

Please mark:

14 Very good 4 Good ☐ OK ☐ Bad ☐ Very bad



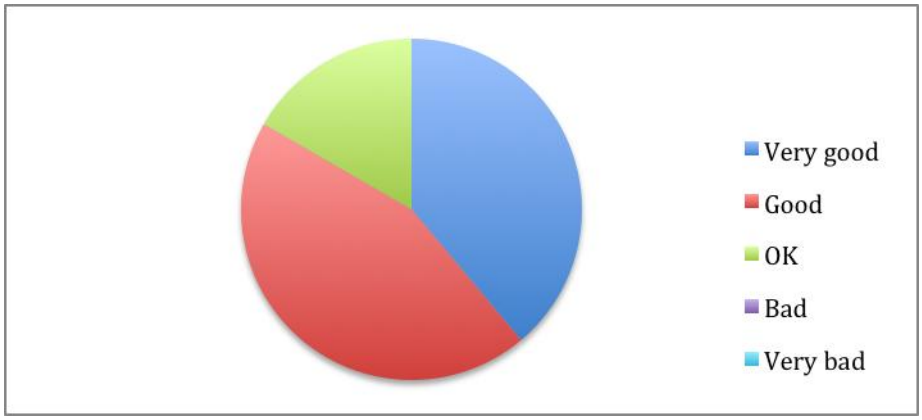
Comments - Please write:

- ‘Very organised.’
- ‘Clear and helpful for most sessions. Clarity about desired outcomes lacking in a couple of sessions.’
- ‘Be careful to make sure everyone is contributing and not give too much weight to one person’s opinions.’
- ‘Our facilitator did not fully understand the subject, but it did not matter too much.’
- ‘Facilitators were excellent, well informed, helpful and most of all friendly. Greatly impressed by their ability to keep us on track.’
- ‘Sometimes questions were not consistent amongst groups, so there was confusion when presenting.’
- ‘Professionals.’
- ‘Very well organised, but third workshop not as slick as first and second.’

4. How do you rate the work of the content supporters / IAP experts?

Please mark:

7 Very good 8 Good 3 OK ☐ Bad ☐ Very bad



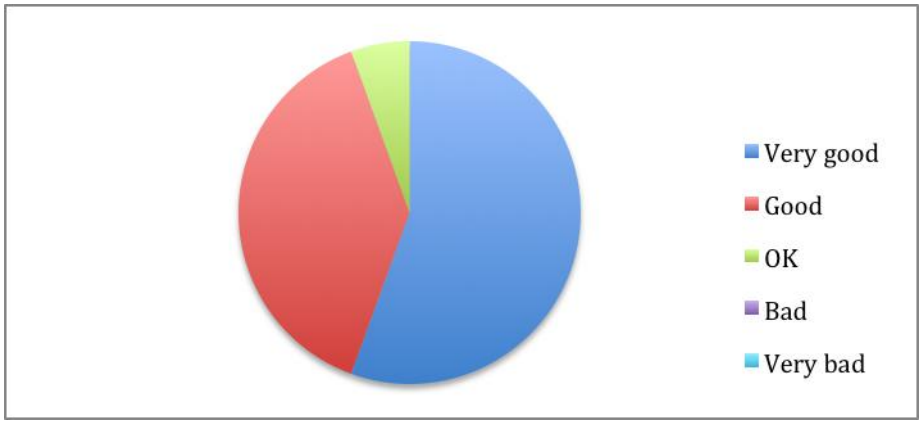
Comments - Please write:

- ‘Some more input into why particular model outcomes occur would have been useful.’
- ‘Very helpful.’
- ‘Helpful responses when required.’
- ’Again excellent. Well informed (obviously), but made a complex subject understandable.’
- ‘Not always clear what the factors were that guide the model, also not offer explanation.’
- ‘They still have a lot of work to do.’
- ‘One of them was dismissive of our comments, but others were interested and interactive.’

5. How do you rate the practical arrangement (invitation, travel, venue, hotel, catering)?

Please mark:

10 Very good 7 Good 1 OK ☐ Bad ☐ Very bad



Comments - Please write:

- 'Dinner at Spoon wasn't great.'
- 'Cannot fault it.'
- 'No wifi at hotel.'
- 'Good organisation!'
- 'Excellent as always.'

6. Any further comments?

- 'Well done.'
- 'Have found the whole process very interesting and it was good to be able to share experience of process with European group.'
- 'It has been a pleasure working with you - thank you.'

CLIMSAVE - Full workshop series

7. In how many CLIMSAVE Stakeholder Workshops have you participated?

Write number: 1 workshop: 7 2 workshops: 5 3 workshops: 6

8a. In how far is the knowledge gained during the CLIMSAVE workshops relevant for your work?

8 Very much 4 Much 6 Somewhat ☐ Little ☐ Very little ☐ No opinion

8b. What were the three most useful things you learned?

Please write:

- 'Understanding complexity + 'Soft' items as social awareness are important in climate change adaptation'
- 'Good tips for visualisation of complex model results.'
- 'Consideration of social impacts + cross-cutting learning + contacts.'
- 'Scenario work was the most important part of the CLIMSAVE experience + important to go through a creative and structured process to develop ideas about future scenarios + there are common adaptation / resilience issues in Scotland and Europe.'
- 'Consistent opinions on sustainable development + info on Scottish sectors + importance of social cohesion.'
- 'The complexity of the problem.'
- 'Scenario development + interaction between IAP and stakeholders + IAP development.'
- 'A pan-EU model could serve as a platform for planners + cross-relationships between risks + liked the EU-Scotland practical session.'
- 'Scenario development + unexpected interactions within scenario storylines - as decided by IAP + contacts with relevant people.'
- 'The importance of social capital + some options such as reduced meat consumption are effective mitigation AND adaptation strategies + natural flood defences alone can be effective.'
- 'Great way / inspiration of organising workshop + understand climate change impacts better + possibilities / limits of CLIMSAVE.'
- 'Importance of social capital + how relevant the robust options are already today + the big aid for reaching impact / connection the agricultural sector has on other sectors and systems.'
- 'The extent of the impact of reduced meat consumption + general acknowledgement of the crucial importance of social capital.'
- 'Importance of social capital in adaptation to climate change + the relative unimportance of (technological) innovation + that it is fun to do this kind of exercise.'
- 'Different ideas, views, different scenarios.'
- 'Better understanding of scenario development + new ideas on facilitation and stakeholder participation.'
- 'Social equity is most important adaptation tool + innovation is key to successful adaptation + providing similar conditions (economic, etc.) Scotland's adaptation strategies could be compatible within Europe.'

9. Did you make any new contacts during the CLIMSAVE workshops that are useful for your work?

16 Yes 2 No

10. How do you rate the finalised storylines?

Please mark:

5 Very good 11 Good 1 OK ☐ Bad ☐ Very bad 1 No opinion

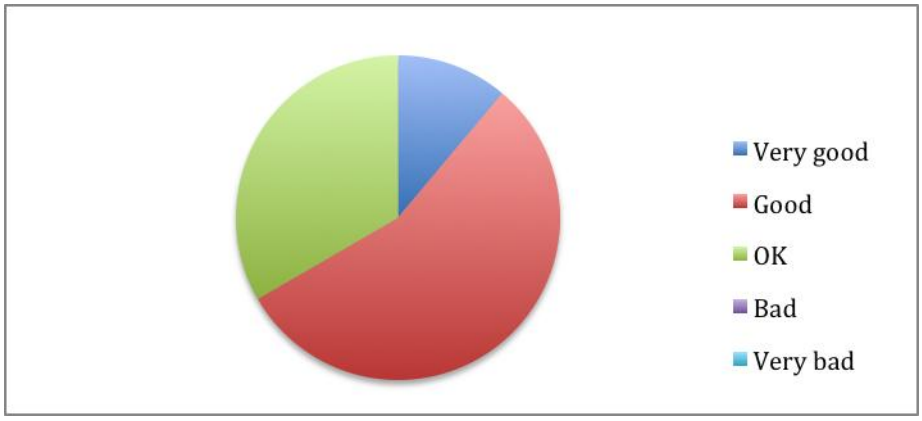
Comments - Please write:

- 'The scenarios sometimes felt a bit .... It would have been useful to interact with the people who had derived them.'
- 'Are they realistic?'
- 'Excellent fictions, practical use in context.'
- 'Useful "extreme" socio-economic pathways to distinguish social changes.'
- 'Lack of ownership as I did not contribute.'
- 'They are consistent, some aspects are plausible, most aspects hopefully never happen.'
- 'They might need some clean-up to get more internally consistent.'
- 'Conclusions are very interesting.'
- 'I think Mactopia had more detail in the post-its that we did not include in the narrative - hadn't realised ours was a bit light until reading the report from the 2nd workshop.'

11. How do you rate the set of adaptation options?

Please mark:

2 Very good 10 Good 6 OK ☐ Bad ☐ Very bad ☐ No opinion



Comments - Please write:

- 'Including additional options and interpreting existing options is desirable to refine the model.'
- 'I imagine they will look better once the project team has analysed them, less generic.'
- 'Not totally comprehensive.'
- 'I would have made social cohesion more explicit.'
- 'It can be difficult to incorporate them into the IAP.'
- 'Partly cannot be integrated in the model + not sure whether there was enough expertise in the small groups to come up with excellent solutions.'
- 'A bit vague and general, yet absolutely relevant.'
- 'Could be more specific - many policy-makers may start asking "what exactly do you mean?'
- 'In process, some valuable options fell off the cliff, hope this information is not lost.'
- 'Too soon to tell until tool is finished. Needs explanation bubbles as discussed in workshop.'

12. How much do you agree or disagree with the following statements regarding the whole CLIMSAVE scenario process?

	I disagree completely	I disagree to some extent	I cannot say	I agree to some extent	I agree completely
The scenario-building process as a whole is useful for climate change strategies	-	-	***1***	***4***	***13***
Participating in the workshops has helped me to build a more comprehensive understanding of climate change issues	-	-	***1***	***10***	***7***
Participating in the workshops has helped me to see climate change adaptation in a new way	-	***3***	***1***	***8***	***6***
Participating in the workshops has helped me in understanding the policy actions needed	-	-	***4***	***9***	***5***

The workshops have helped in finding novel linkages between factors affecting climate change adaptation	*-*	*-*	*1*	*12*	*5*
Thinking about the long-term has helped in assessing the problems faced by climate change adaptation in Europe in a meaningful way	*-*	*-*	*2*	*11*	*5*
Applying the IAP has helped me to evaluate the usefulness of adaptation options	*-*	*1*	*5*	*10*	*2*
Thinking about climate change adaptation using four scenarios has increased the quality of the resulting options and strategies	*-*	*-*		*10*	*8*
The adaptation options and strategies developed are useful for the debate on climate change	*-*	*-*	*1*	*3*	*14*

13. Any further comments?

Please write:

- 'I am unsure this will be a tool used by Scottish Water because we probably want answers; but it is valuable for our input to be included in its development and I am sure that, as it is used by those working in research and policy, it will come back to us in terms of research areas we may be interested in seeing develop.'
- 'Good luck in the future.'
- 'Excellent organisation!'
- 'Excellent work and organisation.'
- 'Discussion groups were too small.'
- 'While useful, this process needs to be contrasted / compared with other analysis.'

8. Next steps

After this third and final workshop, the CLIMSAVE project foresees the following steps to finalise the project – as presented at the end of this workshop:

- Current plan (next steps) within CLIMSAVE: model development/refinement, uncertainty/sensitivity analysis, publications (journal special issues).
- Contributing to the European Commission's Climate Change Clearing House: Climate-Adapt is a portal for the exchange of information and CLIMSAVE is already embedded in the portal.
- Some CLIMSAVE partners are lead authors on the IPCC, which supports the international dissemination of the CLIMSAVE outcomes.
- European Climate Change Adaptation conference in Hamburg – CLIMSAVE is a co-organiser and has many presentations and a special science-practitioner session on the Scottish case study.
- Exploring potential funding opportunities with the EU for high-end scenarios
- Exploring links with Scottish Environment Web (SEPA's online portal for environmental information).
- Exploring links with ClimateXChange, which is a climate change initiative in Scotland.
- Exploring various options with Adaptation Scotland, e.g. potential Parliament event to which you would all be invited. Adaptation Scotland brings together stakeholders in Scotland to address and prepare for the impacts of climate change.
- Developing network of Scottish scenario developers (within an ecosystem service context) across a number of Scottish institutions.

ANNEX 1: Agenda

Monday, 3 December, 2012

09:30 Registration and welcome coffee

WELCOME & INTRODUCTION

10:30 Welcome - Prof. Mark Rounsevell (University of Edinburgh)

Introduction to CLIMSAVE – Dr. Paula Harrison (University of Oxford)

Overview of the workshop – Dr. Marc Gramberger (Prospex)

INTERMEDIATE OUTCOMES

11:10 Analysis of intermediate outcomes of scenarios and options

12:30 Lunch

IMPROVING CLIMATE CHANGE ADAPTATION STRATEGIES PER SCENARIO

13:30 Introduction to the Integrated Assessment Platform

14:00 Presentation of climate change adaptation plans per scenario

14:45 Improving strategies – round 1

15:30 Coffee / Tea

16:10 Review of options

16:25 Improving strategies – round 2

17:15 Conclusions

18:00 Wrap-up

18:15 End of day's work

Whisky tasting and dinner

Tuesday, 4 December, 2012

09:00 Overview of the day

CLIMATE CHANGE ADAPTATION ACROSS SCENARIOS

09:10 Presentation of results day 1

10:30 Identification of candidates for robust options

10:45 Break

11:00 Addressing robust options

13:00 Lunch

LEARNING FROM CLIMSAVE

14:00 Climate change adaptation: Meeting Scotland, meeting Europe

15:30 Comparative analysis for Scotland and Europe

16:15 Break

16:30 Learning points and follow-ups for CLIMSAVE

17:20 Conclusions

WRAP-UP AND CLOSURE

17:50 Wrap-up and evaluation

18:00 End of workshop

Reception

20:00 Dinner

ANNEX 2: List of participants

Participants European workshop:

Cerne	Fedor	Slovenian Ministry of Transport
Dolmans	Constantijn	Amlin Corporate Insurance
Fernandez	Jose Maria	Ihobe
Fitzgerald	Joanne	European Forest Institute
Hagg	Joseph	Adaptation Scotland
Giovani Bastos Lima	Mairon	Ecumenical Youth Council in Europe (EYCE)
Olie	Rene	Rotterdam School of Management
Perry	Miles	JRC
Sant	Godwin	Ministry for Resources and Rural Affairs Malta
Stewart	David	Housing Europe – Scottish Federation of Housing Associations
Willekens	Koen	Institute for Agricultural and Fisheries Research (ILVO)
Wright	Julian	Environment Agency (representing EWA)
Zinkernagel	Roland	City of Malmö / Eurocities
Zrimsek	Barbara	RTV Slovenia

Observer:

Hijioka	Yasuaki	NIES

CLIMSAVE team:

Scientific advisors included: Eric Audsley – Cranfield University; Lenka Bartosova – Mendel University Brno; George Cojocaru – TIAMASG Foundation; Robert Dunford – University of Oxford; Martina Flörke – CESR University of Kassel; Paula Harrison – University of Oxford; Chris High – Open University; Ian Holman – Cranfield University; Abiy Kebede – University of Southampton; Kasper Kok – Wageningen University; Jill Jäger – SERI; Marc Metzger – University of Edinburgh; James Paterson – University of Edinburgh; Mark Rounsevell – University of Edinburgh; Florian Sallaba – Lund University; Anabel Sanchez – Centro de Investigación y Aplicaciones Forestales; Benjamin Stuch – CESR University of Kassel and Florian Wimmer – CESR University of Kassel.

The workshop process was professionally designed, prepared, facilitated and reported on by Prospex bvba. Team members from Prospex included Jill Adams, Marc Gramberger, Steven Libbrecht, Marjan Maes, Heidi Mestdagh, Peter Rakers, Peter Vandevyvere and Martin Watson.

ANNEX 3: List of adaptation options per scenario[3]

We are the World

Category of adaptation option	Adaptation options (70 + 14)
NATURAL CAPITAL	16 + 5
1. Agriculture	*Yield improvement due to plant breeding and agronomy* Food production adapted to different national conditions Change dates of seeding and harvesting Develop crops able to survive droughts Sea farms Aquaculture New business opportunities in modified agriculture Improve agricultural productivity Salt water crops
2. Biodiversity	
3. Natural resource management	*Wetland creation by moving flood defences inland* *Set-aside land* *Enlarge existing protected areas* *Increase number of protected areas* Joint water projects Efficient irrigation systems Improve connectivity nature reserves New activities in Lowlands Improve water conservation Managing catchment Improve forest management Plant new tree species in forests
FINANCIAL CAPITAL	5 + 0
4. Insurance	Insurance pool at EU level for natural disasters
5. Financial support / incentives	State/EU subsidy for scaling up new technology Subsidies for renewable energy
6. Taxes	Tax on food waste Tax on polluting/energy consuming impact
MANUFACTURED CAPITAL	24 + 4
7. Green infrastructure	Urban agriculture Urban nature Urban forests Working/building with nature

[3] These lists contain the adaptation options per scenario, meaning the 16 options that are included in the IAP and the options developed during workshop 2. The numbers (e.g. 10+5) indicate the number of options generated by the stakeholders (e.g. 10) and the number of options that are present in the IAP (e.g. 5). Options included in the IAP are shown in italics.

Category of adaptation option	Adaptation options (70 + 14)
8. Energy	Local energy grids connected at EU level www for local grids Develop new energy infrastructure Diverse energy production Joint energy grids beyond Europe Improving energy efficiency
9. Infrastructure / Technology	*Reduce water demand by using technology* *Improve flood defences by upgrading the standard* *Improve irrigation efficiency* *Take measures to diminish flood damages* Recycling systems Cycling infrastructure improved Use technology of oil to water Large infrastructure for water distribution Dunes as coastal defences New technology for water and energy Housing adaptation to extreme events New ICT technology must be user-friendly and reliable Build artificial winter sport centres Build a mountain in the Netherlands with green energy Flood defences Floating houses in low areas Large storage system for water Reliable street cameras without data leakages Infrastructure to store renewable energy
HUMAN CAPITAL	6 + 2
10. Expertise	Write a recipe book with tasty insect recipes
11. Awareness	*Reduce water use by promoting a behavioral change* *Reduce meat consumption* Light summer clothing accepted Education by internet and working from home (avoid travel) Expert-campaign how to save energy Saving water projects in kindergarten Educate people
SOCIAL CAPITAL	0 + 0
12. Social networks	
13. Socio-technology	

Category of adaptation option	Adaptation options (70 + 14)
CROSS-CUTTING	19 + 3
14. Governance / regulations	*Spatial planning policies to control urban expansion* *Discourage coastal development to reduce exposure to flooding* *Prioritise water demand* Ban/restriction on GMO in EU lifted Ban on air-conditions Bureaucracy for implementation for all measures low Menus in restaurants be 80% vegetarian Priority to locally produced food Adapt wine "appelation controllée" system Legislation on flooding at regional level Carbon footprint as part of ID obligatory
15. Emergency response	Emergency procedures Early warning system Stock for food, fuel, medicines for disasters Individual toolkit and equipment for emergency Emergency procedures at regional level (disaster) Leave Lowlands Effective flood warning systems
16. International cooperation	Joint adaptation strategy with Africa International environmental agreement International space station Most favoured trade status with blocks that cooperate on fighting climate change

Icarus

Category of adaptation option	Adaptation options (17 + 7)
NATURAL CAPITAL	1 + 1
1. Agriculture	Change crops to more resilient available crops
2. Biodiversity	
3. Natural resource management	*Wetland creation by moving flood defences inland*
FINANCIAL CAPITAL	3 + 0
4. Insurance	Insurance schemes for storm and flood Crop insurance against drought
5. Financial support / incentives	National support for migration settlement strategies
6. Taxes	

Category of adaptation option	Adaptation options (17 + 7)
MANUFACTURED CAPITAL	8 + 0
7. Green infrastructure	Green roofs as local solution Urban agriculture Trees and plants in cities
8. Energy	
9. Infrastructure / Technology	Adapted construction Floating houses Low-tech water solutions Bigger fuel reserves Cool rooms for elderly
HUMAN CAPITAL	4 + 2
10. Expertise	Disease medication development
11. Awareness	*Reduce water use by promoting a behavioral change* *Reduce meat consumption* Public awareness on heat waves Allow settled areas to flood - telling people to move on national level Early warning systems
SOCIAL CAPITAL	1 + 0
12. Social networks	
13. Socio-technology	Homecare service for ageing
CROSS-CUTTING	0 + 4
14. Governance / regulations	*Spatial planning policies to control urban expansion* *Discouraging coastal development to reduce exposure to flooding* *Prioritise water demand* *Change irrigation water price*
15. Emergency response	
16. International cooperation	

Should I Stay or Should I Go

Category of adaptation option	Adaptation options (45 + 11)
NATURAL CAPITAL	9 + 3
1. Agriculture	*Yield improvement due to plant breeding and agronomy* Dietary education Vegetarian push with some livestock for soil fertility Promoting local food supply Rainwater harvesting for agriculture Mixed farming
2. Biodiversity	Protecting biodiversity outside protected areas Pan-local flora
3. Natural resource management	*Wetland creation by moving flood defences inland* *Lower intensity forest management* Rain-water harvesting rather than big systems Multi-use landscape
FINANCIAL CAPITAL	7 + 0
4. Insurance	Taxing calories Crop insurance for heat waves New insurance for extreme events Prize for good local climate change adaptation Saving as governance focus - private and public
5. Financial support / incentives	Economic incentives have a hard time
6. Taxes	High tax on bad foods, energy consumption, none on production
MANUFACTURED CAPITAL	9 + 3
7. Green infrastructure	Compact living spaces Green infrastructure Greening the cities
8. Energy	Local energy grids
9. Infrastructure / Technology	*Improve flood defences by upgrading the standard* *Improve irrigation efficiency* *Take measures to diminish flood damages* Walls for flood protection Floating houses Retrofit houses Cheap concrete house production Quick-built infrastructure
HUMAN CAPITAL	3 + 2
10. Expertise	Professionalism at local level Sharing local best practices
11. Awareness	*Reduce water use by promoting a behavioural change* *Reduce meat consumption*

Category of adaptation option	Adaptation options (45 + 11)
SOCIAL CAPITAL	2 + 0
12. Social networks	Religious neighbourhood provides help in crises (heat waves, floods) Local self-sufficiency
13. Socio-technology	
CROSS-CUTTING	15 + 3
14. Governance / regulations	*Spatial planning policies to control urban expansion* *Discouraging coastal development to reduce exposure to flooding* *Prioritise water demand* Planning against urban sprawl Promote rural areas for migrants Simple guiding principles: low cost, low tech and simple Food regulation - minimum access Green use of house obligatory More local democracy, more local governance Increased power to basic authorities Mediators between local units Reduce food waste Engage private sector for efficiency EU as a stabilizing force - EU religion Flood defence and water = focus of EU governance?
15. Emergency response	Damage prevention policies Local post-crisis plans Invest in warning systems
16. International cooperation	

Riders on the Storm

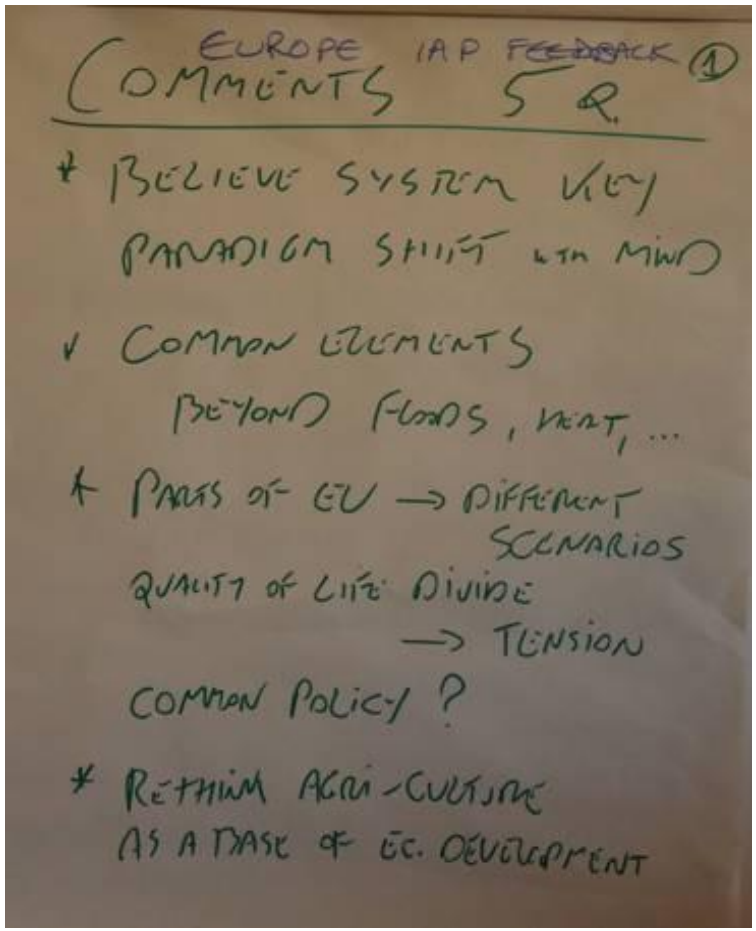
Category of adaptation option	Adaptation options (56 + 13)
NATURAL CAPITAL	13 + 5
1. Agriculture	New crops and agricultural practices Crops growing on less favorable soils Water efficiency, new methods in irrigation Agriculture: genetic technology, Irrigation, wind protection Agriculture: system to protect animals Agricultural management (combination of crops) Crops resistant to extreme conditions Storm and drought resistant crops

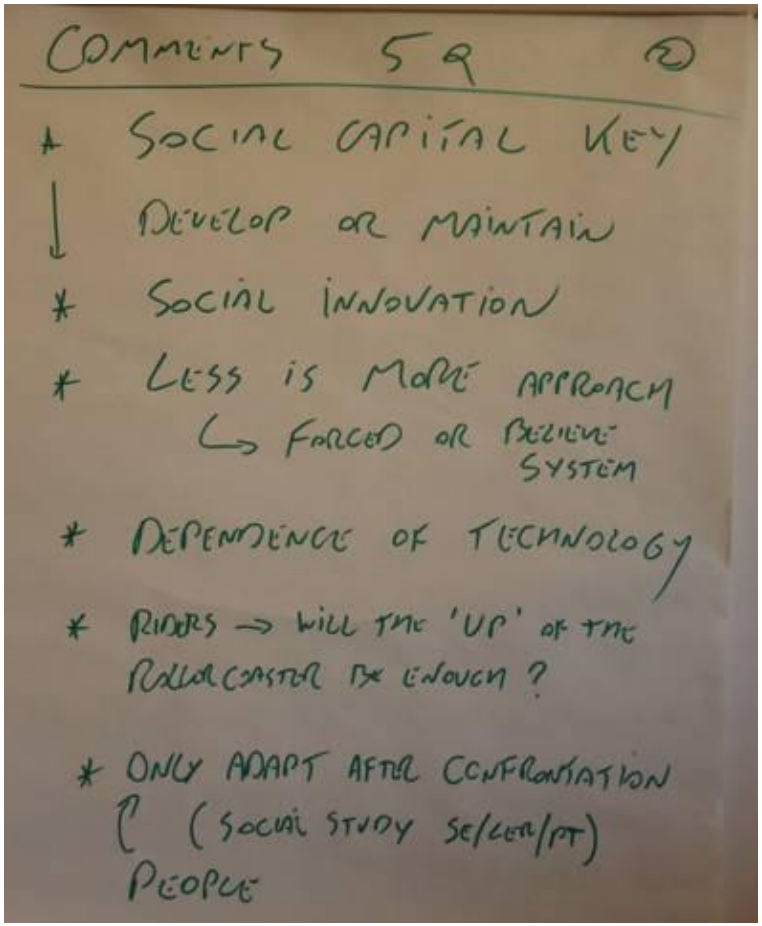
Category of adaptation option	Adaptation options (56 + 13)
2. Biodiversity	Drought and storm resistant forests Biodiversity policy - more and higher quality of protected areas
3. Natural resource management	*Wetland creation by moving flood defences inland* *Set-aside land* *Lower intensity forest management* *Enlarge existing protected areas* *Increase number of protected areas* Water supply- water storage desalination Land use management to optimize resources and improve EGS Flood risk management
FINANCIAL CAPITAL	7 + 0
4. Insurance	
5. Financial support / incentives	Subsidies for innovators Tax/incentives to accelerate transformation to green economy Banks investing in long-term research Increase capital requirements for banks Attract relevant actors (companies) to EU Financial support for research Public/private capital
6. Taxes	
MANUFACTURED CAPITAL	9 + 4
7. Green infrastructure	Increase green space in cities Infrastructure for health (green cities…)
8. Energy	
MANUFACTURED CAPITAL	9 + 4
9. Infrastructure / Technology	*Reduce water demand by using technology* *Improve flood defences by upgrading the standard* *Improve irrigation efficiency* *Take measures to diminish flood damages* Smart mobility Smart cities Sustainable cities Buildings constructed for higher temperatures Climate-proofed infrastructure Upgrade flood defence Building materials

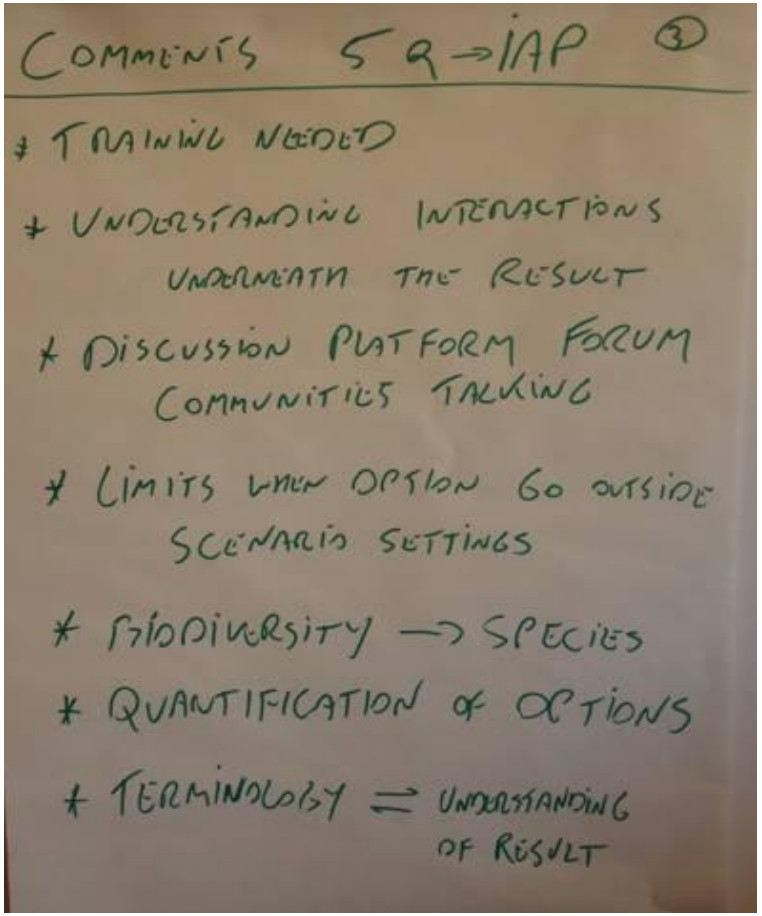
Category of adaptation option	Adaptation options (56 + 13)
HUMAN CAPITAL	12 + 2
10. Expertise	Education changes for curricula/interdisciplinarity Expert knowledge available to anticipate change research Industrial PhD EU champion in innovation EU water expert centre EU coastal expert centre Education becomes cross-disciplinary
11. Awareness	*Reduce water use by promoting a behavioral change* *Reduce meat consumption* Social behaviour Capacity building Education - awareness of vulnerability to weather Communicate to raise awareness / communicate outreach Educate people (...) and how to live green
SOCIAL CAPITAL	5 + 0
12. Social networks	Volunteering projects Stimulate cross-sectorial initiatives (value chain constellations)
13. Socio-technology	Health care Post-crisis management Accelerate recovery
CROSS-CUTTING	10 + 2
14. Governance / regulations	*Spatial planning policies to control urban expansion* *Change irrigation water price* Reduce the complexity of EU Faster implementation of directives Objective-driven directives (instead of means) More "green" food labels, different approach for agriculture Accelerate the way from idea to implementation
15. Emergency response	Forecasting linked to mobilizing social capital Forecasting monitoring alerting Weather/seasonal forecast system Modelling simulation of impact of calamities Invest in dealing with calamities (i.e. evacuations)
16. International cooperation	

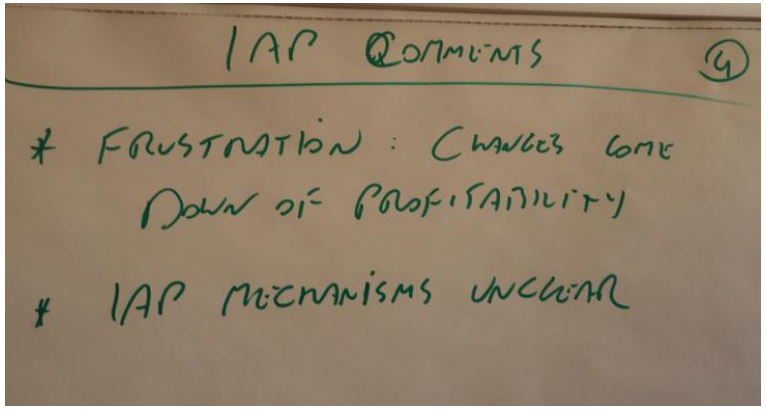
ANNEX 4: Feedback on the IAP

Original output We are the World:

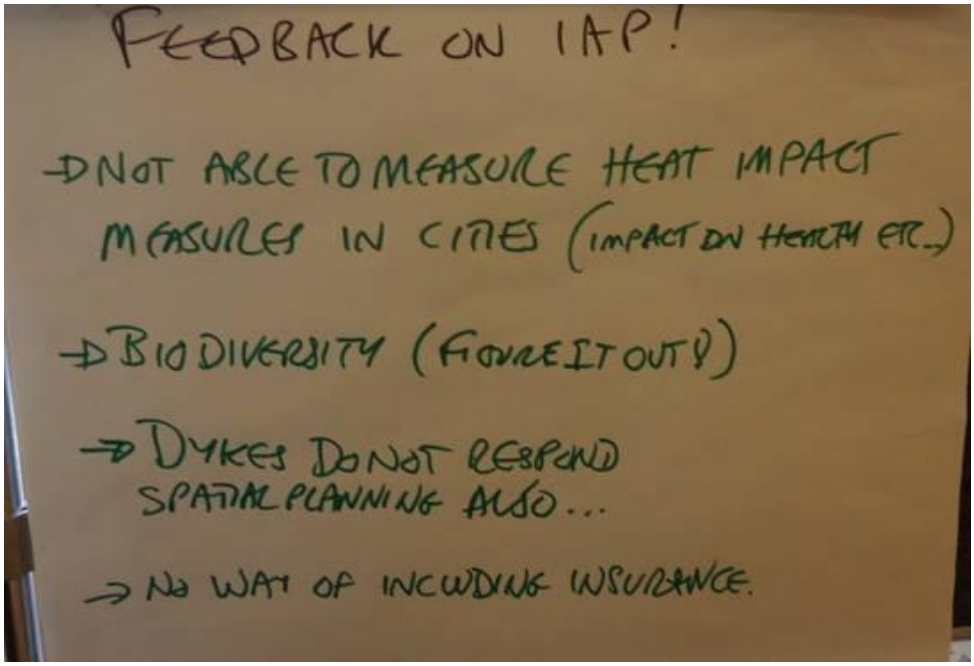




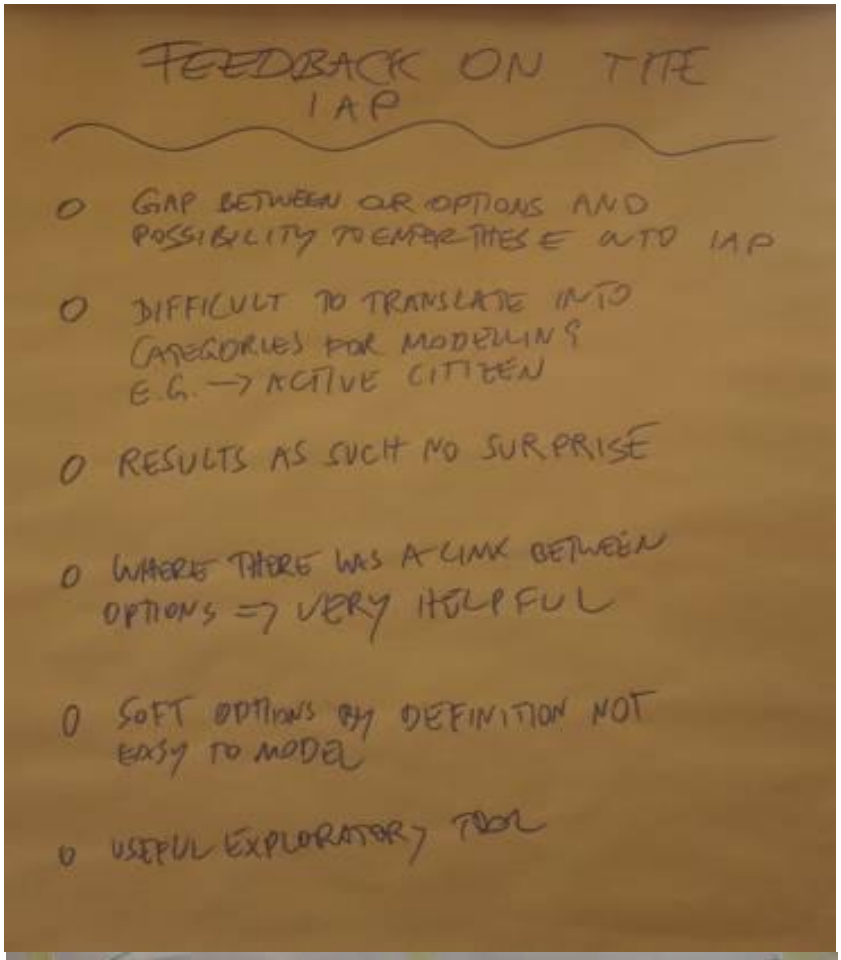

COMMENTS SQ → IAP ③
* TRAINING NEEDED
* UNDERSTANDING INTERACTIONS UNDERNEATH THE RESULT
* DISCUSSION PLATFORM FORUM COMMUNITIES TALKING
* LIMITS WHEN OPTION GO OUTSIDE SCENARIO SETTINGS
* BIODIVERSITY → SPECIES
* QUANTIFICATION OF OPTIONS
* TERMINOLOGY ⇌ UNDERSTANDING OF RESULT

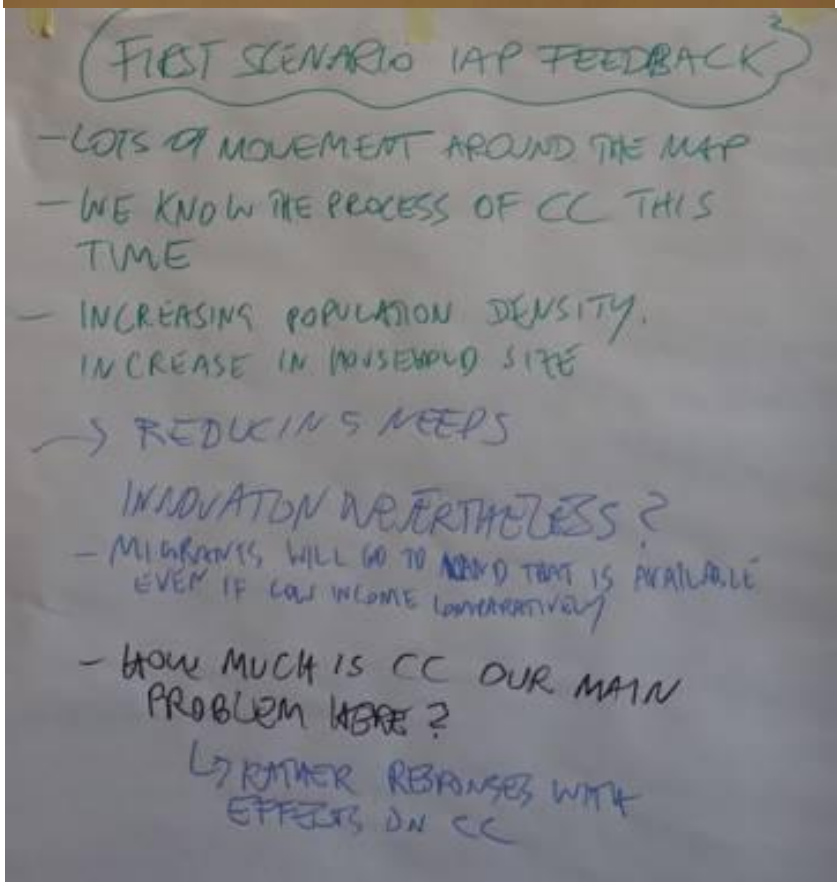

IAP COMMENTS ④
* FRUSTRATION : CHANGES COME DOWN OF PROFITABILITY
* IAP MECHANISMS UNCLEAR

Original output Icarus:

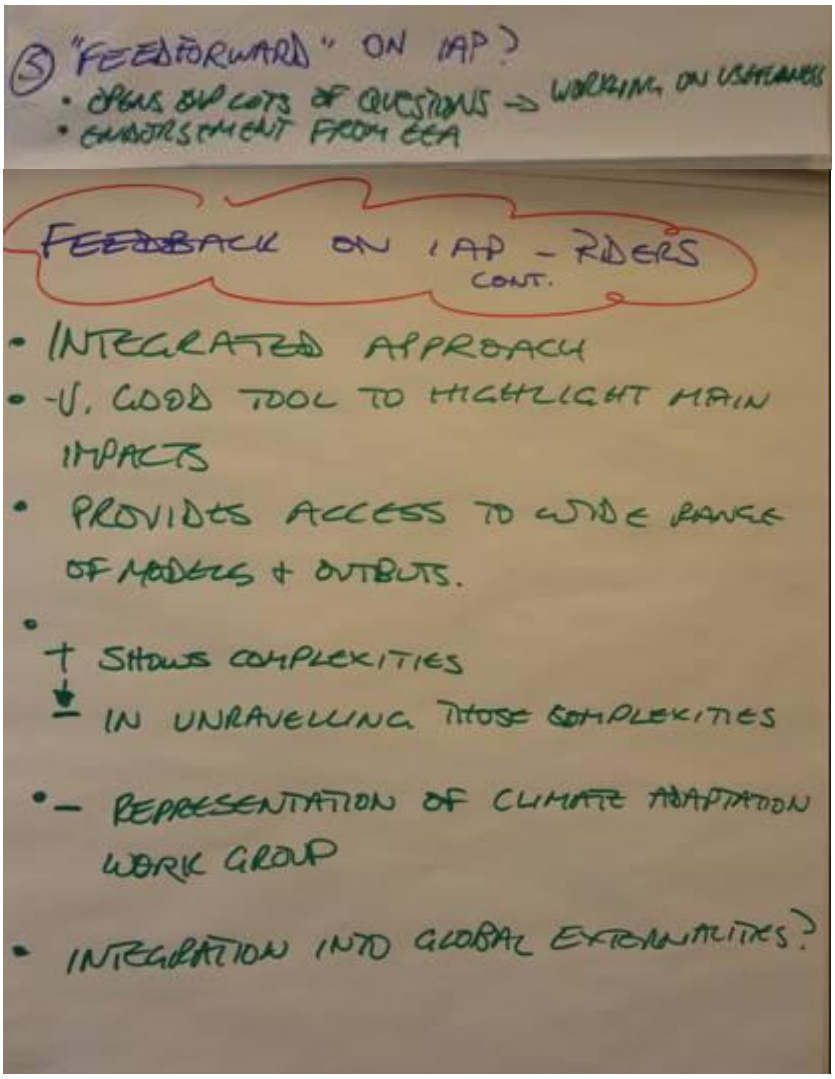


Original output Should I Stay or Should I Go:



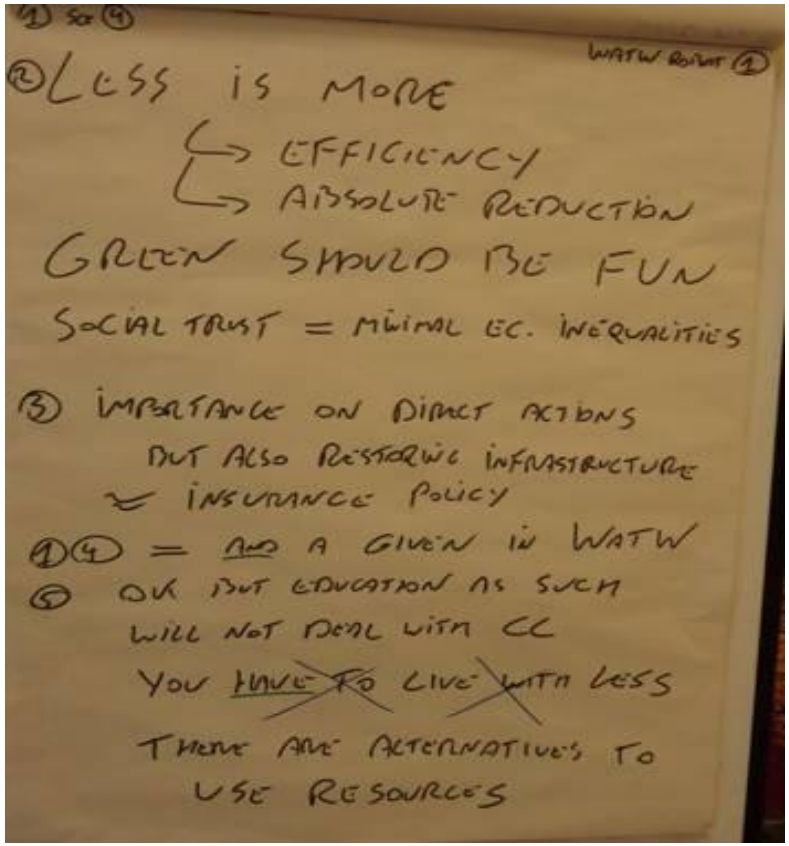


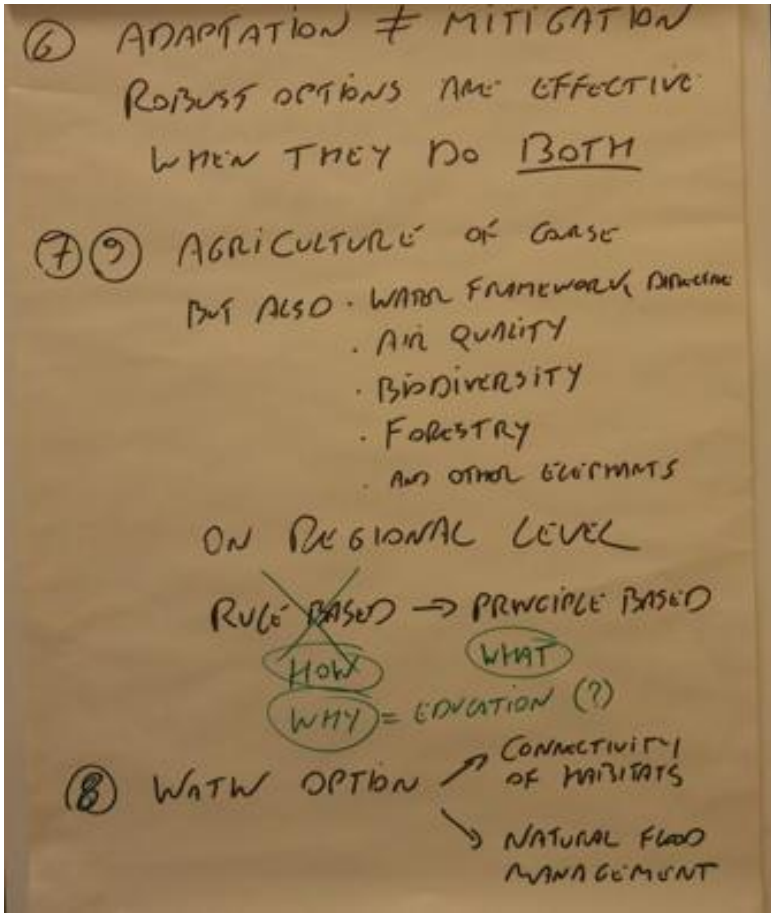
Original output Riders on the Storm:

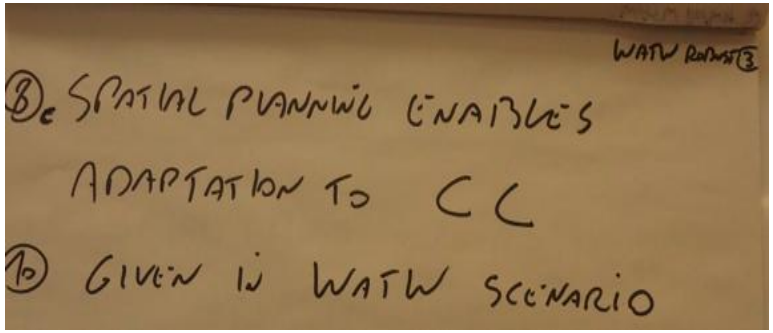


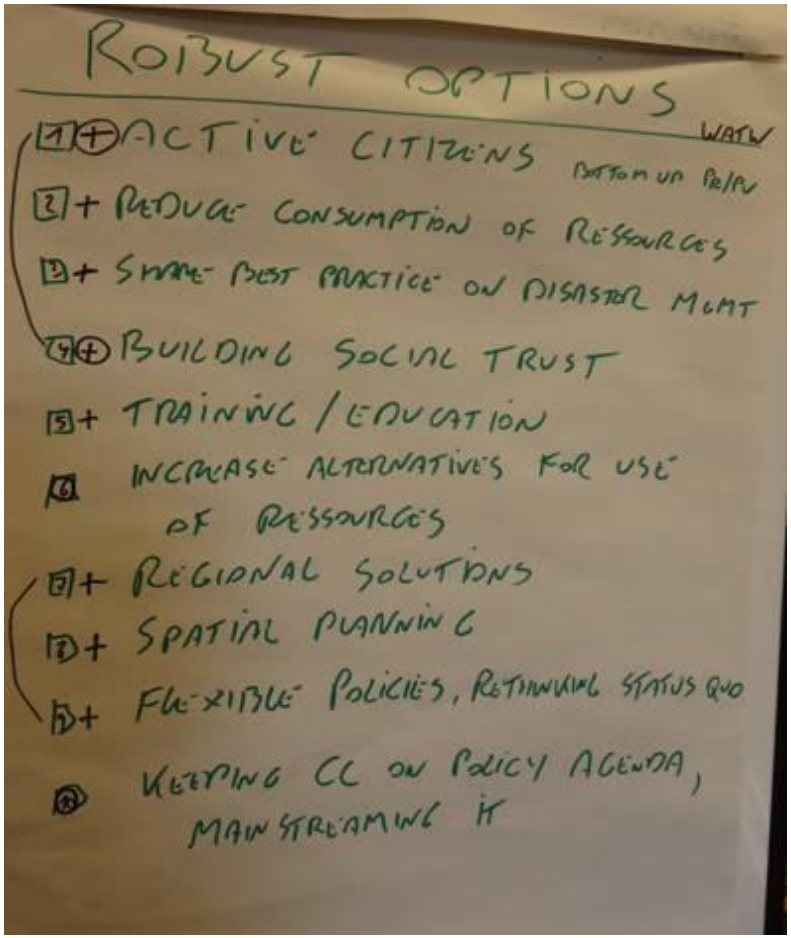
ANNEX 5: Testing candidates for robust adaptation options

Original output after testing candidates for robust options in We are the World:

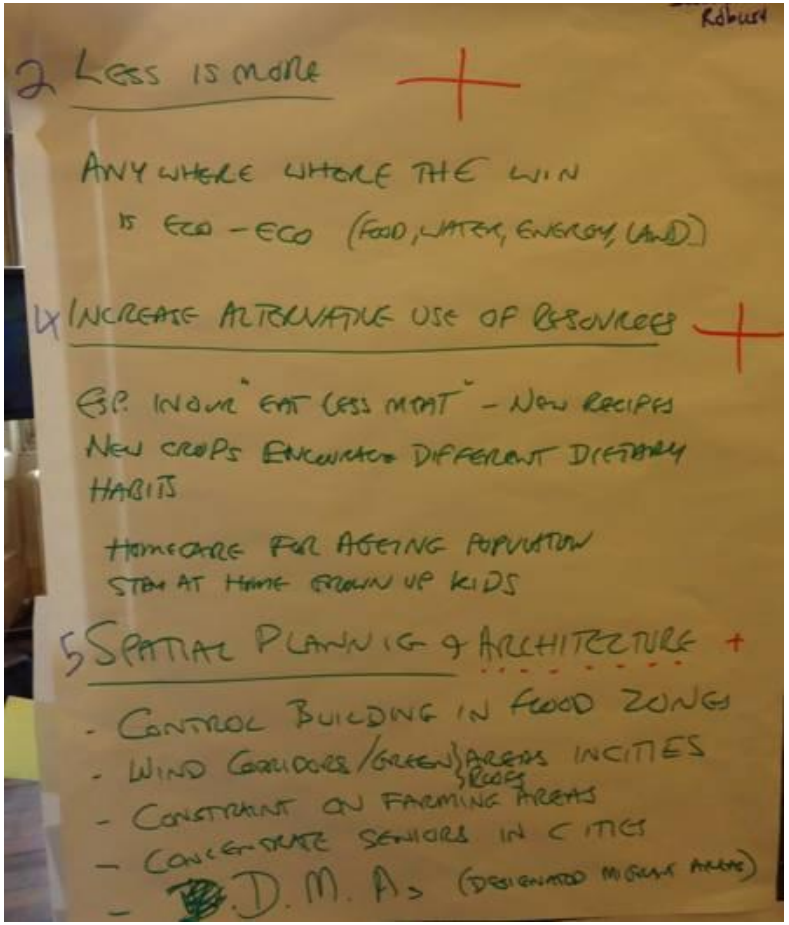


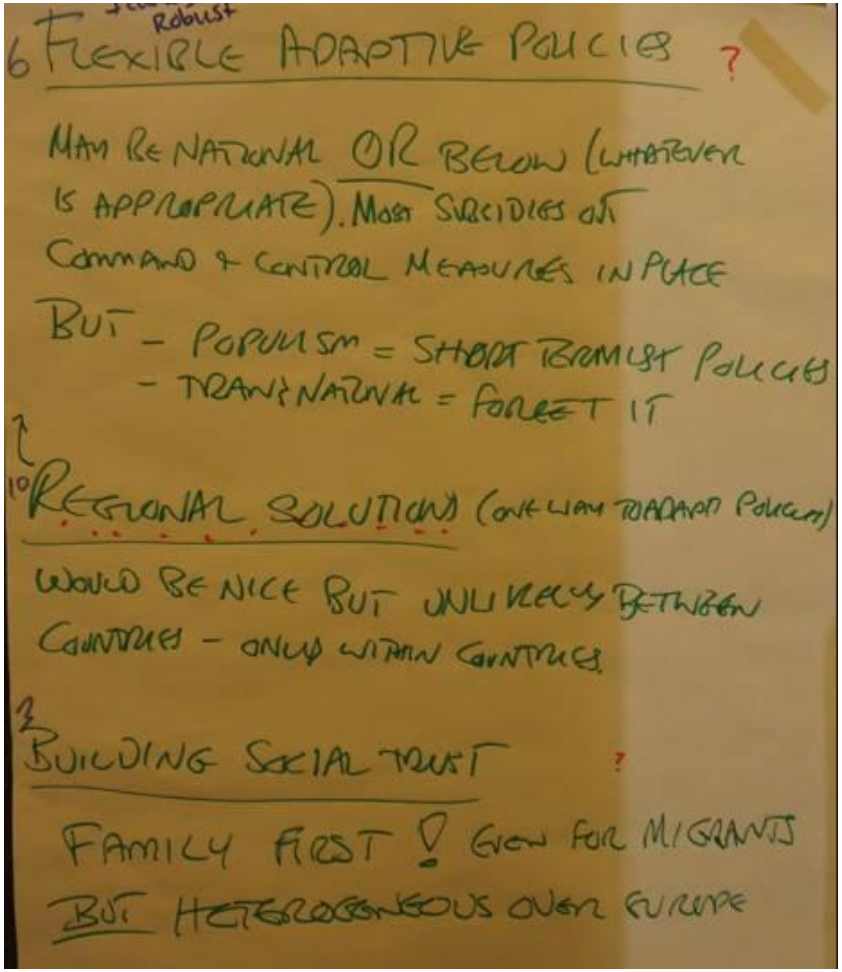


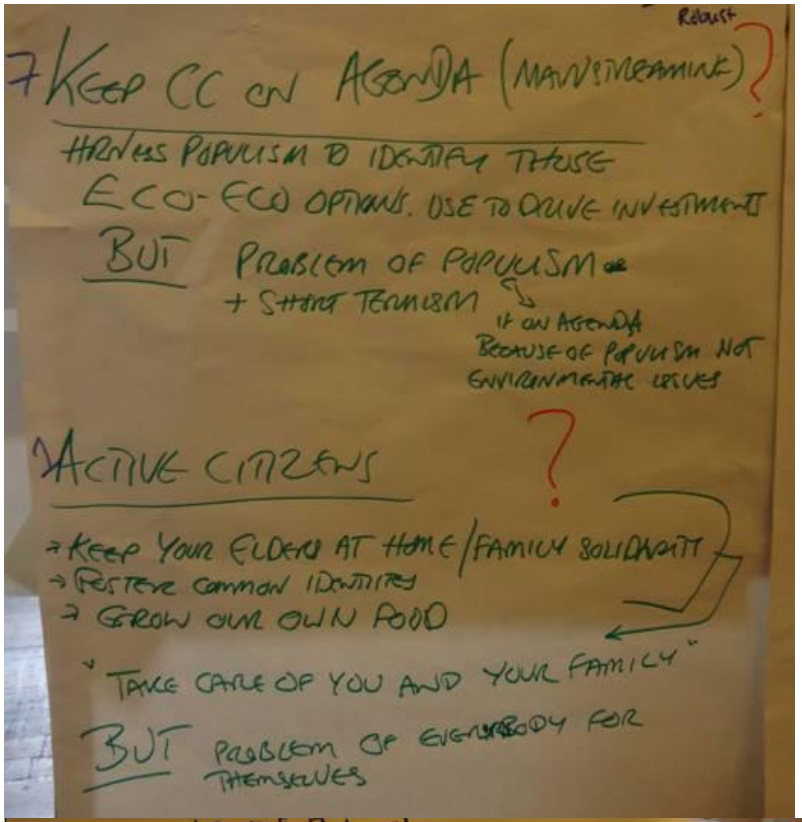

WATW
8c SPATIAL PLANNING ENABLES
ADAPTATION TO CC
10 GIVEN IN WATW SCENARIO

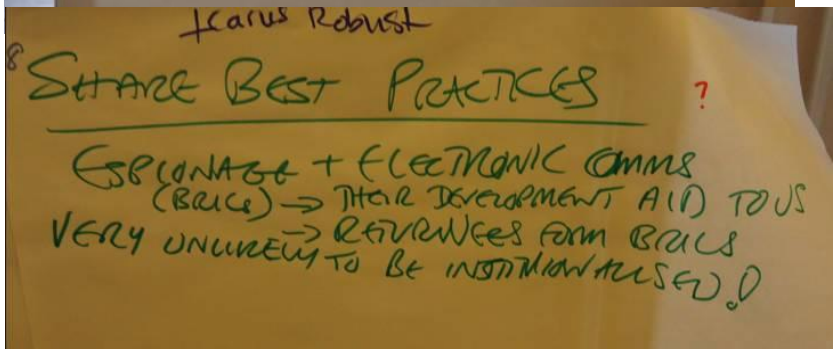

ROBUST OPTIONS
WATW
1+ ACTIVE CITIZENS BOTTOM UP POLICY
2+ REDUCE CONSUMPTION OF RESSOURCES
3+ SHARE BEST PRACTICE ON DISASTER MGMT
4+ BUILDING SOCIAL TRUST
5+ TRAINING / EDUCATION
6 INCREASE ALTERNATIVES FOR USE OF RESSOURCES
7+ REGIONAL SOLUTIONS
8+ SPATIAL PLANNING
9+ FLEXIBLE POLICIES, RETHINKING STATUS QUO
10 KEEPING CC ON POLICY AGENDA, MAINSTREAMING IT

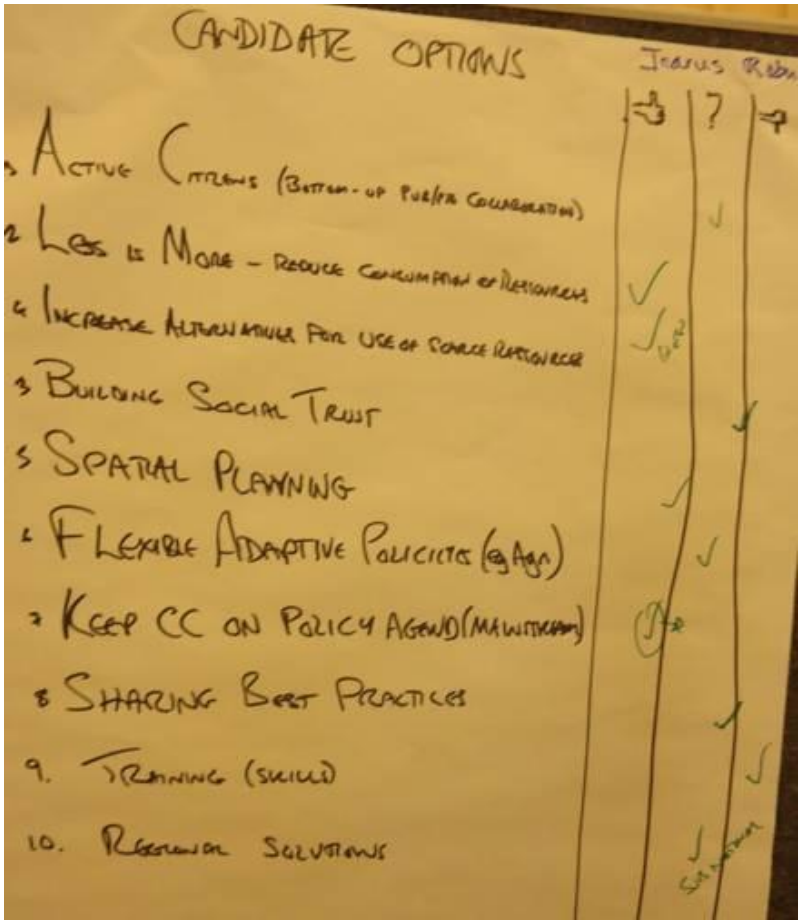
Original output after testing candidates for robust options in Icarus:



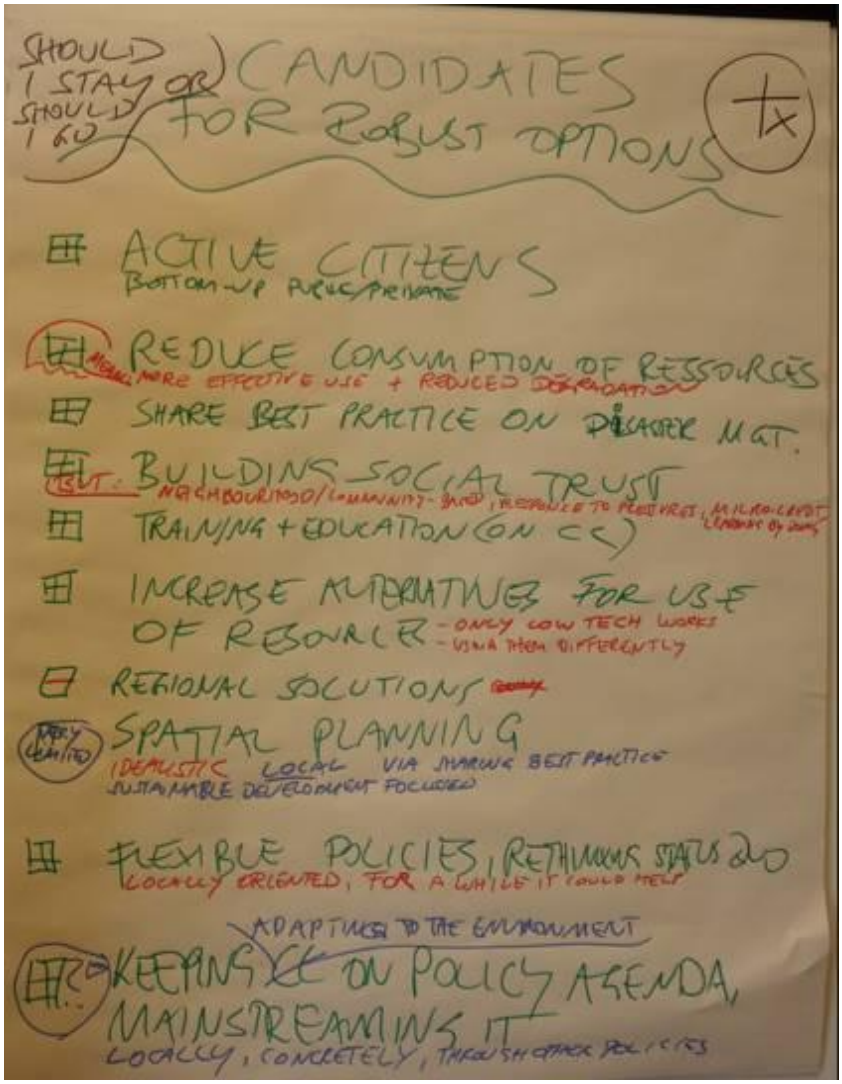



7 KEEP CC ON AGENDA (MAINSTREAMING)?
HARNESS POPULISM TO IDENTIFY THOSE ECO-ECO OPTIONS. USE TO DRIVE INVESTMENTS
BUT PROBLEM OF POPULISM + SHORT TERMISM
IT ON AGENDA BECAUSE OF POPULISM NOT ENVIRONMENTAL ISSUES
ACTIVE CITIZENS ?
→ KEEP YOUR ELDERS AT HOME / FAMILY SOLIDARITY
→ FOSTER COMMON IDENTITY
→ GROW OUR OWN FOOD
"TAKE CARE OF YOU AND YOUR FAMILY"
BUT PROBLEM OF EVERYBODY FOR THEMSELVES


Icarus Robust
8 SHARE BEST PRACTICES ?
ESPIONAGE + ELECTRONIC COMMS (BRICS) → THEIR DEVELOPMENT AID TO US
→ RETURNEES FROM BRICS
VERY UNLIKELY TO BE INSTITUTIONALISED!


CANDIDATE OPTIONS
Icarus Robust
1 ACTIVE CITIZENS (BOTTOM-UP PUBLIC COLLABORATION)
2 LESS IS MORE - REDUCE CONSUMPTION OF RESOURCES
4 INCREASE ALTERNATIVES FOR USE OF SCARCE RESOURCES
3 BUILDING SOCIAL TRUST
5 SPATIAL PLANNING
6 FLEXIBLE ADAPTIVE POLICIES (eg Agri)
7 KEEP CC ON POLICY AGENDA (MAINSTREAM)
8 SHARING BEST PRACTICES
9. TRAINING (SKILLS)
10. REGIONAL SOLUTIONS

Original output after testing candidates for robust options in Should I Stay or Should I Go:



Original output after testing candidates for robust options in Riders on the Storm: