BCPC

Promoting the Science and Practice of Sustainable Crop Production

DEFRA Consultation on Food 2030

Response from BCPC

The British Crop Production Council (BCPC) welcomes the Government's intent to develop "an overarching plan to make the food system more economically, environmentally and socially sustainable". BCPC is pleased to have the opportunity to comment on the issues that have been raised so far.

BCPC is, however, disappointed that, judging by the various background statements and the related questions in this consultation, the emerging plan shows little appreciation of the long-term effects of current practices in food production and of the potential effects of predicted changes, particularly in world population and climate. In consequence this response is mainly about the general policy and does not give answers to all the specific questions.

Food security should be at the top of the Government's agenda, taking all the relevant worldwide factors into account. Food security will be achievable only with sustainable production systems, that is, systems that are biologically and geologically sustainable in the long term. Issues of sustainability will be of increasing relevance to food security during the lifetime of the present plan and certainly in the periods beyond.

The Food System – what ***should*** we be aiming for?

To use global natural resources and existing, emerging and new technologies in an environmentally sustainable way to feed a growing global population and contribute to global health and food security.

A policy aim like this should be at the forefront of the whole Plan and should be apparent in the policies and proposed actions in every section.

A plan for "Food 2030" must deal with the changes that are likely by 2030. But it should also lay the groundwork for a food production system for 2050 and even for 2070.

In contrast, the principal aims of the Plan set out under the heading "The Food System – what are we aiming for?" all reflect a short-term view, with comparatively minor variations on "business as usual".

Some these "bigger issues" are raised in later, specific sections. However, consideration of a question like "*How will farming have to change in a world of 9 billion people?*" is absolutely fundamental to planning the food production

system for 2030 and beyond. An appreciation of the challenges such issues will present should be at the very forefront of the whole discussion and should be reflected in every section of the plan. Sadly, that is not the case.

Issues that need to be addressed

The current food production systems of the developed world, and of much of the developing world, are not sustainable. These systems depend on inputs that are not being replaced, biologically or geologically, and are not being recycled. The only truly sustainable systems are closed systems, where all essential inputs, other than energy from the sun, are recycled. Such closed systems of food production are practised in some parts of some countries, but they feed only a very small proportion of the world's population.

The most obvious inputs that are not being replaced or recycled are the major plant nutrients, nitrogen, phosphorus and potassium (NPK). For every kilogram of these nutrients that is taken off an area of land as food, a kilogram has to be brought in if the productivity of that land is to be maintained. Similar considerations apply to many of the minor plant nutrients.

Water is already a limiting input for crop production in many parts of the world. Increasing world population and climate change will both exacerbate these problems.

Food production in the developed world, and in much of developing world, is wholly dependent on extracted petroleum oil for motive power and crop processing. This applies to all systems of crop production, including organic agriculture, that are employed to produce significant quantities of food. Opinions vary widely about when 'peak oil' will occur, but it would be wise to include some acknowledgment of the challenges diminishing petroleum resources would bring, including increases in the cost of this source of motive power, as these may well take effect within the time horizon of the draft plan.

The world's population is predicted to rise to 9 billion by 2050. The increase from the present 6.8 billion is already in train and is unstoppable, barring natural disasters, pestilence or war on an unimaginable scale. The rate of increase beyond 2050 may slow very considerably and there are demographic projections for significant decreases in population. These projections; however, are predicated on the continued trajectory of global development and increases in prosperity which may falter if the major challenges relating to water, food and energy are not effectively addressed in the next few decades.

How and where will the additional food be produced for these additional people? Where will these additional people live? What implications will that have for land availability for food production? The projected increases are not uniform by continent or country: what changes are likely within the UK? What will be the effects of mass population migrations when regions at lower latitudes become too hot and dry for crop production?

Views vary widely about the likely extent of climate change within the period of this plan and within the foreseeable time horizon beyond. If sea levels rise

significantly by the end of the present century, very large numbers of the increased population will be displaced. They will lose both the land on which they live and the land that produces their food. Although these are most likely to occur in countries far from the UK, the UK food system will not be immune from the effects of these losses and displacements. If sea levels rise significantly, a substantial part of the UK's limited resource of Grade 1 agricultural land is likely to put at risk. It is this land that can profitably produce the widest range of crops, including the field-scale vegetables needed to maintain healthy diets on a national scale.

Climate change is also predicted to bring significant shifts in the distribution of rainfall: food production will decrease or stop in new areas of drought. Even in areas with more equitable climates, the distribution of rainfall between seasons may be seriously disturbed, with drier summers and wetter, warmer winters. Pest and disease pressure on crops will increase without the normal 'winter kill', and pathogens hitherto unseen in the UK may become prevalent. These factors would certainly affect food production within the UK.

Another predicted effect of climate change is to make weather patterns more variable: that in turn would make land-based food production more variable. It is unlikely that these weather disturbances could be predicted, so it will be difficult or impossible to take in-season action that would mitigate the effects on food production. Thus there will be a real challenge in how to make the system more resilient, especially in view of the other adverse factors that will likely have increasing effect by 2030.

Maintaining a thriving food economy

Without food security, underpinned by sustainability, there will be no prospect of a thriving food economy.

Ensuring Access to and Affordability of Food

In so far as it is able, it is the second priority of government to ensure that the people have access to adequate food. There are likely to be substantial challenges on this front towards the end of the Plan period because of the rising world population and the predicted effects of climate change. To some extent, these effects may be mitigated by advances in the technology of crop production.

Availability, and variability of supply, will affect affordability. It is possible that in the foreseeable future a greater proportion of personal disposable income will have to be spent on food, reversing the trends of the past fifty years. As disposable incomes have risen, it has been the near-universal experience in countries across the world that food consumption patterns have changed towards greater consumption of meat and dairy products.

These changing patterns have increased the demands on crop production and it is remarkable that over this period grain production per person has increased by 17% while the population has expanded by 117%, and yet only 12% more land

has been cultivated. This has been possible because of the advancement of technology resulting in a per hectare yield increase of over 120%. The trend of increased demand for livestock products (meat and dairy produce) is likely to continue, moderated only by market forces. This will place increasing pressure on land availability for grain production unless grass and other forms of forage begin to predominate in animal production systems. If these issues are not addressed, the divide between rich and poor in access to affordable food will inevitably be exacerbated.

Climate unpredictability may have huge effects on crop production in major exporting countries like Canada, Australia and the Ukraine. This would impact on global prices and we cannot assume that, throughout the period of this Plan, we shall be able cheaply and easily to make up for shortfalls in UK production by buying crops in a stable global market.

Reducing the Food System's contribution to Climate Change

There is undoubtedly scope for reducing the Food System's contribution to climate change, but attention must also be given to the effects of climate change on the food production system.

Reducing diet related chronic disease

The principal diet-related chronic "disease" in the UK and many developed countries is obesity, which in turn triggers or promotes several other chronic diseases and conditions. Food policy alone will not address this major health, economic and social problem, but it has a contribution to make.

Reducing food-borne illness

BCPC has no comment on this topic.

Living within environmental means

We are not "living within our environmental means" in employing the current food production systems we use in the UK and much of the developed world.

On a world scale, the availability of water is likely to be the biggest environmental constraint on crop production. Depending on how climate changes, it may have a significant impact on crop production within the UK, when the effects would likely be greatest in the main cropping areas of southern and eastern England. These parts of England are currently experiencing increases in population and hence increased requirements for water for non-agricultural purposes, with a concurrent loss of agricultural land to new development. There will also be increased demands for reduced pollution of water resources by all forms of agricultural activity including crop production.

Our present approach to essential plant nutrients, especially P (phosphorus) and K (potassium) is exploitative - they are mined elsewhere in the world and

imported to be spread on food producing land. These resources are not unlimited. The plan should include a requirement to make realistic assessments of the extent of the concentrated reserves around the world and of their likely availability. Cost, and the ability to pay, is likely to be major factors as these resources diminish. These assessments must take into account relevant global economic and political factors.

Increased attention must be given to recycling more, or all, of these inputs that are essential for plant growth. In the longer term, that will become necessary to sustain food production. The costs of changing to a nutrient recycling system for established urban populations would be very great, but much less for new developments.

Improving the food system through research and innovation

Research, development and innovation offer the only prospects for improving the food system to make it more sustainable and more secure. The first requirement is for government and the other stakeholders to accept that the food system is facing these challenges. Then government and the other stakeholders must accept that a great deal of research and development will be essential if the problems are to be quantified and solutions are to be found.

Although there have been some very recent encouraging signs of such investment, it has to be recognised that a great deal more will have to be done to reverse the effects of the policies of successive UK governments which have withdrawn R&D funding over several decades. There also needs to be a greater focus on research that will deliver solutions to practical problems, as well as continuing to undertake more fundamental 'blue skies' studies.

It will be necessary to increase the UK R&D skills base in relevant disciplines as this has been allowed to run down. Increases will be needed in salaries for researchers, to take into account the level of training required before beginning a research career and to make agricultural research a more attractive career proposition for talented people.

The challenge of getting proven developments put into practice must not be underestimated because primary food production is a highly atomised industry, with a very large number of individual decision-makers. Experience shows that these decision-makers respond well to clear market signals and to some publicly funded incentives, but effective knowledge transfer will also be required. The market alone is unlikely to provide effective knowledge transfer on the scale required.

No technology that could contribute to sustainability should be excluded. The current 'risk averse' climate in the UK must be confronted with the realities of long-term sustainability and the implications for a sustainable and secure food system. The current obsession in the European Union with 'hazard' when we should be considering 'risk', must also be confronted. This does not mean *carte blanche* for the development and introduction of any and every technology, but it does mean making realistic risk assessments of any potential harm to human health and of any potential adverse environmental effects.

Sustainable Farming

The systems that currently produce most of our food, including systems designated “organic”, are not sustainable. The recognition and the acceptance of this fact have to be the starting point for the development of any plan for “sustainable farming”.

The sustainability issues about water and some major plant nutrients are dealt with above.

The most obvious non-sustainable input is extracted petroleum oil used in farming primarily for motive power. Alternative energy sources must be identified and developed for practical use. A great deal of work is being done on developing cars for personal transport that are powered by alternative energy sources. In contrast, very little work is being done on identifying suitable alternative energy sources to power the motive units currently required for crop production and farming more generally. This should be a research priority.

Nitrogen is the main driver of crop growth on which all farming ultimately depends. Nitrogen fertiliser, in a variety of forms, is a very large imported input to most of the crop production systems used to produce most of our food. A great deal more could be done to recycle a substantial proportion of the nitrogen carried off the food producing land with each crop, although the costs of re-engineering our sewage disposal systems to achieve that would be substantial and some social sensitivities would have to be set aside.

Much of the nitrogen fertiliser used in farming around the world is synthetic. It has been estimated that about one-third of the world’s population is sustained through the use of synthetic nitrogen fertiliser. That proportion is likely to rise as world population increases and more food must be produced from the same or a diminishing area of land suitable for crop production. The present methods of producing this synthetic fertiliser are not sustainable because they depend on extracted hydrocarbons both for feedstock and for energy. The renewable alternatives are not currently cost-effective in money economics. Diminishing supplies, and consequent increasing costs, as well as recognition of the need for sustainability, are likely to change that short-term perspective.

Plant breeding technology may offer an alternative sustainable approach to providing crop plants with the nitrogen needed for growth. This would involve the transfer of a nitrogen-fixing capability to crop species that do not naturally have it. The yield of such nitrogen-fixing plants is likely to be slightly lower that that of similar plants fed synthetic nitrogen fertiliser. Determining which approach is likely to be the more ‘cost-effective’ when assessed in terms of sustainability should be a research priority within the Plan.

Reducing and reusing waste

Waste should be reduced wherever possible throughout the food production system. Some material that is presently designated “waste” could almost certainly be recycled and so should be regarded as a potential source of inputs rather than as “waste”. For example, it has already been shown that some

"waste" can be used as a feedstock for energy production in anaerobic digestion systems and the residue used as plant nutrients and soil conditioners. A change of mindset is likely to be needed as much as a change in market forces or a change in public incentives.

Our Action Plan

The Plan rightly recognises that there are many stakeholders in the UK Food System and that they all have a contribution to make to any plan designed "to make the food system more economically, environmentally and socially sustainable". It must, however, be the responsibility of central government to bring all the stakeholders to a common understanding of the challenges the Food System really faces. Until that is done, there is little prospect of devising a worthwhile plan to cope with the changes that will occur by 2030 and lays the ground-work for a secure and sustainable food production system in the periods beyond.

BCPC will be pleased for this response to be made public without restriction.

Dr Colin Ruscoe
Chairman, BCPC
E-mail: expro@bcpc.org

Annex

BCPC - Promoting the Science and Practice of Sustainable Crop Production

BCPC (The British Crop Production Council) is an independent body which promotes the use of good science and technology in the understanding and application of effective and sustainable crop production. It represents the interests of Government departments, the agrochemical industry, farmers' organisations, advisory services and independent consultants, distributors, research councils, agricultural engineers, environment interests, consumer opinion, training and development.

BCPC derives its opinions from a network of experts in a wide range of organisations involved in crop production, and from its Expert Working Groups on Weeds, Pests & Diseases, Applications, and Seed Technology.

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British Crop Production Council 7 Omni Business Centre Omega Park ALTON GU34 2QD	Tel: +44 (0) 1420 593 200 Fax: +44 (0) 1420 593 209 Web: www.bcpc.org Email: md@bcpc.org