CABI is a Not-For-Profit Inter-Governmental organisation with almost 500 staff working from 21 bases around the globe. For over 100 years, CABI has been actively involved in the management of invasive alien species and boasts over 700 years of collective INNS experience in house. Working on behalf of its 49 Member Countries (including the UK and its OTs), CABI delivers knowledge and sustainable solutions for some of the worst agricultural and environmental pest problems in the world often using Integrated Pest Management (IPM) approaches, and specialising in the biological control of invasive plants, insects and micro-organisms. We produce the freely available Invasive Species Compendium as well as the specialised Horizon Scanning Tool and countless other knowledge products. CABI welcomes the opportunity to contribute to this inquiry.

How well is the UK and its overseas territories managing the impact of invasive species and controlling the risks of further invasion?

The UK has been far ahead of its European counterparts for many years now thanks to the Non-Native Species Secretariat and its Strategy (updated once, in 2015). Their website has become a key source of information but is a little dated and could better link with other resources and actors in INNS. Until recently the Overseas Territories had been less well supported, but now significant attention is being paid to these key assets, both with respect to horizon scanning and pest risk assessments, as well as management of invasive non-native species present, which is a welcome development given their unique biodiversity and often vulnerable status.

The rapid response system demonstrated by the early detection and eradication of Asian hornet is certainly a feather in the cap of the GB team’s ISAPs whilst the Check-Clean-Dry campaign is widely quoted as a great example of education and engagement, Be Plant Wise is a little less well known. The lack of baseline data on awareness did hinder performance assessment of awareness campaigns at the beginning of the programme as did a lack of investment in marketing due to budget constraints.

The UK Government’s investment in classical weed biocontrol research has shown bold vision to not only focus on prevention but also deal with those invasive species that are causing the most damage, environmentally and economically, and importantly that the public and their representatives are most aware of. Ignoring these would have undermined faith in any programme especially when the equally pioneering economic impact assessment of invasive species in GB showed the cost of these species to the economy. This work is of great interest to many other European countries where this sort of sustainable management is desperately needed and now beginning to be adopted. It has also allowed international collaboration with many countries much further afield such as Japan, India, Australia, Argentina, Brazil, Pakistan. Though it is early days for most of those projects the long-term results should demonstrate the wisdom of investing in this research.

The UK’s PRA tool/process is one of the best in class, as evidenced by it being one of the only survivors in the EU assessment of suitable tools when developing its own Regulation. In the early days the commissioned PRAs focused on already established and well-known species which was probably not the best place to start but it did demonstrate the functionality of the tool and confirm what was to be expected.
In the end the performance of the management approach will be measured against whether the number and impact of INNS present on our shores is reducing. This is an almost impossible target, so assessing whether they are increasing at a slower rate than would be expected without intervention is perhaps more appropriate. However, the goal of the strategy is more modest – “biodiversity, quality of life and economic interests in GB will be better protected against the adverse impacts of INNS”. When one starts from a low baseline that is extremely easy to achieve, but now that the strategy has been running for a while it is getting a little harder. Targets always need to be achievable, measurable and timebound.

**Of those that are already in the UK, which invasive species are posing the greatest harm to:**

- **a. human health;** Giant hogweed, oak processionary moth, -
- **b. animal health;** Grey Squirrel/ squirrel pox, signal crayfish/crayfish plague, mink, , harlequin ladybird, New Zealand flatworm, 
- **c. plant health and biodiversity.** Crassula helmsii, Ash dieback, Rhododendron, sudden oak death, floating pennywort, Japanese knotweed and Himalayan balsam? Hottentot fig (*Carpobrotus edulis*), *Rhododendron ponticum*, *Ludwigia* spp. ruddy duck

The impact that invasive species can have on the environment and the economy have been documented, but impacts on human health as well as ecosystem services as a whole have been much less studied. Effects ranging from psychological impact, phobias, discomfort and nuisance, to allergies, poisoning, bites, disease and even death can be important however, as can the impacts on services provided by ecosystems which are vital for well-being (availability of water, products from agriculture and fisheries, access to/impoverished recreation).

**What are the risks of invasive non-native species migrating to the UK from future climate change?**

We are taking this to mean arriving rather than migrating which implies without human assistance and therefore not technically invasive as human intervention is in the definition. The risk and number will continue to increase, but climate change is likely to change the areas from which likely INNS could come from and their range within the UK as will the number of species and their composition. Propagule pressure and the three Ts (travel, tourism and trade) are probably more influential so if the new areas are those with which the number of pathways has increased too then the load will be higher. Climate change projections also mean that invasive species already present but relatively isolated in the UK are likely to extend their range further north. Equally, if present only as transient populations, invasive species could more firmly establish and spread, as could be in the case of *Ambrosia artemisiifolia* for example.

**What actions should the UK take to mitigate the risk, or adapt to, climate migrations of invasive species?**

Increased horizon scanning and ground-truthing movements of organisms as they spread due to climate change. Ignore those species that will come with their natural enemies under what has now become a natural and slow incremental expansion of their range and focus on those that can suddenly establish after breaking a geographical barrier where previous climatic conditions prevented their establishment. Focus on recidivists rather than those with some unproven potential as budgets are tight and the only real predictor of likely invasion is previous invasive behaviour in a similar eco-climatic range. Continue to raise awareness of the impact and extent of invasive species across the UK and Europe. Information exchange with other European states, good quarantine surveillance at ports of entry (i.e. airports, seaports), alerts and public awareness raising for potential known harmful organisms to arrive in the UK. Use of the precautionary principle to prevent
introduction and establishment of species that may become invasive given changes in climatic conditions e.g. pets and ornamental plant species currently at the edge of their range in the UK, but problematic elsewhere. Early detection and rapid eradication of introduced and currently marginal species in the UK (but invasive elsewhere) before they become well established, widespread and potentially invasive under climate change. Proactive management can be far more cost-effective than reactive and ongoing damage limitation. Horizon scanning and PRAs to include climate change scenarios to back this approach.

Where should the four nations prioritise resources to tackle invasive species?

Prevention – awareness raising, horizon scanning and increased border security with modern technology, also in-country campaigns comparable to “Check-Clean-Dry” preventing spread of invasive species already present more widely

EDRR – more thorough surveillance and monitoring with increased citizen science and easier logging perhaps through a single UK app (under GB NNSS Invasives module in collaboration with a popular reporting app) to record invasive species along with alert species. There are lots of apps for reporting various types of species, administered by various parties, in addition to the Alert Species email. A single overarching app could be useful for EDRR along with mapping spread, invasion hot spots, new introductions etc Action upon report is essential to maintain faith from the public so truly joined up Government delivering prioritised coordinated action

Mitigation – long term management plans for the areas most threatened by INNS and continued support of sustainable solutions like classical biological control.

The establishment of a contracted Invasive Species R&D/delivery unit to support the GB INNS Strategy and help advise policy, and deliver research and action in the field could be an effective way to ensure core skills and resources are retained, built upon, available and utilised for the long term.

How can the risk of trade and future trading relationships bringing non-native invasive species to the UK be mitigated?

Increased monitoring and surveillance at ports of entry, along the lines of the New Zealand/ Australia model where border biosecurity is taken very seriously indeed. Off-shoring the risk by insisting on and auditing SPS protocols at ports of export is much more effective at minimising arrivals as used by Australia who invest heavily in trading areas with similar ecoclimatic conditions.

How effective have the European Union’s Invasive Alien Species Regulations been at addressing and tackling invasive species?

In principle it is an excellent development but we see little evidence that a species being on the list has made any difference at all to its effective prevention and management in any EU Member State yet. For example, there are potential biocontrol solutions for Water Hyacinth, Himalayan Balsam and water primrose but those MSs with the worst problems do not seem interested despite being made aware, despite the requirement for action against these species under the EU Regulation.

In the event of EU exit, how should the UK establish its replacement for the European Commission’s scientific forum to update the species list of concern?
The UK has no shortage of invasive species experts in almost all taxonomic areas, so developing a genuine scientific forum would be relatively easy. The UK already coordinates the EC programme carrying out PRAs for the inclusion of species on the European list. CABI would be happy to provide expertise on that forum and already works closely with CEH (Helen Roy) on such matters and many of broader interest to the UK. We should also seek to maintain lose forum links, perhaps with observer status, with EU27 as our nearest neighbours and potential source of non-native species?

*How should the UK work with the European Commission and others internationally to reduce the risk of invasive species?*

Continue to offer expertise, support and coordination and perhaps even fund it if post-Brexit mechanisms do not allow direct funding. The benefits would be mutual. Good collaboration and information exchange with all European bodies responsible for plant, animal and human health as well as the natural environment, in terms of horizon scanning, risk alerts and management strategies for invasive species.

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