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**QUANTIFICATION OF COSTS AND BENEFITS
OF AMENDMENTS TO THE EU PLANT HEALTH REGIME**

*Framework Contract for evaluation
and evaluation related services - Lot 3: Food Chain*

FINAL REPORT

Food Chain Evaluation Consortium (FCEC)
Agra CEAS Consulting - Civic Consulting
Van Dijk Management Consultants
Arcadia International

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Prepared by the Food Chain Evaluation Consortium (FCEC)
(Civic Consulting – Van Dijk Management Consultants
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Key messages

The aim of this study was to provide supplementary economic data on impacts of amendments to the current EU plant health regime and to support the development of the impact assessment accompanying the legislative proposal of the Commission on the future EU plant health law. The key conclusions of the study are as follows:

- The total annual costs for the EU and MS of introducing **mandatory general intra-EU surveillance (Task 1)** for ten potential priority Harmful Organisms (HOs) were estimated at € **€23.4 million** per year if surveillance is carried out at fixed ‘best practice’ levels ("*EU surveillance requirements*" option), of which **€9.4 million** are **additional** to the current estimated EU 27 surveillance expenditure. Under the "*EU surveillance facilitation*" option (i.e. without fixed levels) the estimated costs range from **€14 million** (current levels of expenditure) to **€16.8 - €21 million**, of which **€2.8 – €7 million** are **additional** to the current estimated EU 27 surveillance expenditure.
- The costs of introducing compulsory **post-entry quarantine (PEQ)** in the import regime for a limited number of high risk ornamental plants for planting (*Task 2*) would largely fall on private operators (POs) and this measure may result in some rationalisation in the sector. The highest component are costs of building new facilities at the required biosecurity level (implementing the newly adopted ISPM34), which are estimated at ca. **€1,000/m²** or **up to €1 million** in total for a standard facility (up to 1,000 m²). Administrative costs for MS Competent Authorities (CAs) are to be fully recovered through fees charged to POs (inspection costs estimated at ca. €5,000 per facility in total over a PEQ period of 2 years), while the expected impact for the COM is likely to be minimal.
- The rationale and structure of the animal health financing could be applicable as a model for plant health to compensate for direct PO costs and losses, but the model will need to be adjusted to the specificities of plant health and the wide diversity of sectors affected, with a view to prioritisation and seeking a balance between public and private (commercial) interests. The financial impact of expanding the EU solidarity regime to **co-finance direct costs and losses of POs** (at 50% co-financing rate) (*Task 3*) was estimated at an additional expenditure for the EU of ca. **€5 million per year** at the current level and number of measures imposed by MS CAs on POs. This is very likely to increase the implementation of officially imposed measures by POs, and to trigger the implementation of national compensation schemes, but it is most unlikely to increase the intensity of measures taken by MS CAs.
- The financial impact of expanding the EU solidarity regime to also include **natural spread** of plant pests (*Task 4*) was estimated at additional EU expenditures of **min. €3.7 million per year** (50% co-financing), with a substantial increase in the case of inclusion of natural spread for HOs affecting the environment.
- In case of no action, the introduction, spread and establishment in the EU of regulated HOs impacting on agriculture, horticulture, forests and the environment (*Task 5*) has the potential to cause multiple **billions of Euros of economic damage** per year across the EU to sectors directly affected and upstream/downstream industries, as well as also potentially adversely affecting tourism, retail, and ecosystem values and services. The impact of an outbreak of any of the selected HOs reviewed by the study in terms of damage costs may extend to the entire value chain of the sector/s affected, with potentially very significant knock on effects on employment and the wider economy.
- Whatever approach is considered for solving the current lack of coherence in listing HOs between the seed or plant propagating material (S&PM) *acquis* and the EU plant health regime (*Task 6*), **impacts of aligning the two regimes** are likely to be **negligible**. Merging the visual inspection based plant passports (PPs) of the plant health regime with the sampling and laboratory testing based health certificates of the S&PM regime would lead to a cost reduction of about €1.5 million but, as several MS have already implemented this approach, the total benefit would be less. Delegation of tasks would help alignment to the approach of Regulation 882/2004/EC which is based on results to be obtained and not on how it should be done (current logic of the plant health regime).

- The **modifications to the plant passport (PP) system** (that would be issued in a larger number of cases than at present and/or in a more harmonised format; Task 7) have a **negligible financial impact** on POs. The required information is already present in their ICT system (used e.g. for stock keeping and invoicing), and the cost of possible modifications to formats of reports, labels, tags and the like (hence also PP), can be split over many users of the specific software packages in use.
- If mandatory surveillance targets for **protected zones (PZs)** (Task 8) are introduced, the cost of surveillance is increased (in the order of several thousand to millions of Euros, depending on PZ); where economic benefits of maintaining a PZ could be estimated, such **benefits clearly outweigh the costs of surveillance** even if this is carried out at an increased ‘best practice’ level. The costs of mandatory surveillance do not currently appear to be always shared between MS CAs and POs, and there is a need to reinforce the implementation of EU plant health regime provisions to collect mandatory fees for cost recovery of the inspections and sampling/testing in PZs. Immediate delisting of an infested PZ would no longer allow protection, thus possibly reducing the potential to eradicate while increasing the cost; on the other hand, immediate benefits may result for non-PZ MS in terms of saving high inspection and eradication costs to export to the PZ. Delisting an infested PZ after 2 years allows the time that is technically considered necessary for the eradication programme to run its course while enhancing the transition towards reinforced measures to maintain the integrity of the PZ, more in line with the Pest Free Area concept under the IPPC.
- The introduction of mandatory requirements for the prevention and control of IAS plants within the EU plant health regime may result in an increase in management costs across the EU as a whole. Although the total cost for absent or largely absent IAS plants is currently expected to be relatively moderate on the basis of the known level of presence and distribution and provided that EPPO guidelines on prohibitions of import/trade/planting are effectively introduced, **if in future these IAS plants become more widespread**, as is currently the case of *Ambrosia artemisiifolia* and *Hydrocotyle ranunculoides*, then the surveillance and control/eradication costs likely to require funding under Directive 2000/29/EC could become **very significant**. Given the widespread presence of some of these IAS plants and the fact that natural spread is by definition an important factor in their distribution, future eligibility for EU co-financing of measures against natural spread related outbreaks could have very significant impacts on the EU budget (per IAS plant, potentially €1.5-€3.0 million annually for surveillance and €10-€30 million for eradication and containment).

Executive summary

The aim of this study, which was carried out by the Food Chain Evaluation Consortium (FCEC) in 2011, is to support the development of the impact assessment accompanying the legislative proposal of the European Commission (COM) on the future EU plant health regime (EU PH regime). The purpose is to provide supplementary economic data on impacts which form part of the analytical and descriptive inputs necessary for COM to complete its impact assessment and to fill existing knowledge gaps. The study investigates the potential impacts of various options to amend the EU PH regime, based on the conclusions and recommendations of the CPHR evaluation (FCEC, 2010).

The study has followed a highly targeted analytical approach, with a specific methodology developed for each of the 9 Tasks. To allow a more in-depth analysis, each Task has focused on a representative selection of HOs of high impact for the range of sectors potentially affected. The analysis is based on a range of scenarios and assumptions that serve as the working hypothesis for deriving the required quantitative and qualitative estimates. The development of these working hypotheses, as well as data collection, is based on extensive consultation with the relevant organisations (including inputs received from the various COM services; Member States (MS) Competent Authorities (CAs) and stakeholders) and four Task Forces (TFs) set up to support the COM in the review of the EU PH regime.

Task 1: costs of introducing mandatory general intra-EU surveillance

The objective of Task 1 has been to estimate the costs of introducing mandatory general intra-EU surveillance for 10 potential priority harmful organisms (HOs)¹ and the impact on the costs of EU co-financing of such surveillance. The selection of HOs includes those currently considered to represent the greatest threat for the EU, on the basis of data on interceptions, provisional emergency measures, control Directives, and the requirements of Council Directive 2000/29/EC. For some of these HOs² mandatory surveillance is currently foreseen by EU legislation. The analysis undertaken was required to:

1.1 Determine an appropriate level of surveillance from best practices among MS and by comparison with known surveillance levels for other important HOs, including potato pests.

The appropriate level of surveillance was established on the basis of existing information on current surveillance methodologies in use in the MS and best practices were identified in part by means of a comprehensive survey of the EU27 MS CAs (to which 25 MS responded). The ‘best practices’ identified in this way were used as the basis for the cost calculations and reflect expert views as to what constitutes the most realistic combination of science and

¹*Anoplophora chinensis, Bursaphelenchus xylophilus, Erwinia amylovora, Guignardia citricarpa, Phytophthora ramorum, Potato Spindle Tuber Viroid, Rhynchosporium ferrugineus, Synchytrium endobioticum, Thrips palmi, Xanthomonas axonopodis pv. citri.*

² For 5 HOs mandatory surveillance is already currently foreseen under emergency measures for *Anoplophora chinensis, Bursaphelenchus xylophilus, Phytophthora ramorum, Rhynchosporium ferrugineus*, Potato Spindle Tuber Viroid (PSTVd), and in one case (*Erwinia amylovora*) under Protected Zones and buffer zones in place; although the remaining HOs are not currently subject to mandatory surveillance rules (*Guignardia citricarpa, Synchytrium endobioticum, Thrips palmi, Xanthomonas axonopodis pv. citri.*), voluntary plans are in place in some MS.

economic considerations rather than a technical gold standard³. Indeed, current National Plant Protection Organisation (NPPO) decision-making when planning and prioritising surveillance is a combination of what is practical and possible - given resource constraints - and achieving a balance between the need to address a number of potentially extensive HO threats and the economic interest in those sectors the NPPO is called on to protect. For example, on the basis of the information provided by the MS, inspections in nurseries generally tend to be combined for HOs affecting ornamental plants. Also in many cases, where data availability allows this, the level of sampling and testing is undertaken on the basis of suspected cases only.

1.2 Estimate total annual costs for the MS and the EU of introducing mandatory surveillance at fixed surveillance levels (at 50% co-financing)

On the basis of the identified ‘best practices’ in terms of surveillance methodology, the total costs of introducing mandatory surveillance across the EU-27 at these levels, were estimated at **€23.4 million** per year for the 10 potential priority HOs. This includes visual inspections in production places and the environment (40% and 34% respectively of total costs), sampling and testing (24%), and awareness-raising campaigns (2%). On the basis of the results of the CPHR evaluation (FCEC, 2010), the current EU 27 expenditure on surveillance for the 10 HOs is estimated at €14 million (see also Task 1.3). Therefore, the **additional costs** of introducing compulsory surveillance at fixed levels would be **€9.4 million**. The additional costs **for the EU**, given that currently there is no co-financing of these surveillance costs, are estimated at 50% of the global figure of €23.4 million, i.e. at **€11.7 million**.

HO	Visual inspections/production places	Visual inspections/environment	Sampling	Information campaigns	Total
Production places - nurseries	€ 9.3 million		€ 2.5 million	€ 81,000	€ 11.8 million
Forestry/open environment		€ 8.0 million	€ 1.9 million	€ 242,000	€ 10.2 million
Other production places			€ 1.2 million	€ 162,000	€ 1.4 million
Total (10 potential priority HOs)	€ 9.3 million	€ 8.0 million	€ 5.6 million	€ 485,000	€ 23.4 million
% of total	40%	34%	24%	2%	100%

(a) Estimates based on average EU fee rate. Figures rounded.

Source: FCEC calculations

1.3 Estimate total annual costs for the MS and the EU of introducing mandatory surveillance for the selected HOs without fixed surveillance levels (at 50% co-financing).

The underlying assumption under this option is that the EU would facilitate surveillance, but MS apply those levels of surveillance they consider appropriate. Under this assumption, the availability of EU funding could result in:

- a. *‘Status quo’*: MS continue at current levels of surveillance on the basis of their current priorities and budget availability. They therefore use EU funding to match the total funding they currently provide for surveillance. In this case the annual cost for the EU is estimated at ca. **€7 million** (at 50% co-financing); this is new expenditure since surveillance costs are not currently co-funded;

³ Defining ‘best practices’ on a scientific basis is an exercise beyond the scope of Task 1.

- b. *‘Dynamic scenario’*: this assumes that a higher budget would be available if there was EU co-financing at 50% as MS may decide to increase surveillance levels, to reach what they currently consider to be their needs (i.e. an increase of 20-50%), as indicated by MS by means of the MS survey. In this case, the total annual cost for the EU and the MS is estimated at ca. **€8.4-€10.5 million** each (at 50% co-financing). For the EU, this is new expenditure since surveillance costs are not currently co-funded.

In summary, therefore, the costs and additional costs of the various options are as follows:

Scenario	Total (100 %)	EU (50%)
Current expenditure (FCEC, 2010)	<i>€14.0 million</i>	-
At fixed surveillance levels (Task 1.2)		
	€23.4 million	€11.7 million
Additional to current expenditure	€9.4 million	€11.7 million
Without fixed surveillance levels (Task 1.3)		
a. ‘Status quo’	€14.0 million	€7.0 million
Additional to current expenditure	-	€7.0 million
b. ‘Dynamic scenario’	€16.8– €21.0 million	€8.4 – €10.5 million
Additional to current expenditure	€2.8– €7.0 million	€8.4 – €10.5 million

Task 2: costs of introducing compulsory post-entry quarantine (PEQ) for a limited number of plants for planting

The objective of Task 2 has been to estimate the costs of introducing compulsory post-entry quarantine (PEQ)⁴ for non European latent HOs which cannot be immediately detected by visual inspection or via appropriate laboratory testing within the timeframe of normal import procedures, but which pose a latent risk of infection. This option concerns a limited number of high risk ornamental plants for planting, in particular palm trees (risk of *Rhynchophorus ferrugineus*); and, trees of the *Acer* species and bonsai (all species), imported from East Asia (risk of a number of HOs including *Anoplophora chinensis*).

From our analysis and expert consultation (MS CAs, stakeholders, COM, TF3, and European and Mediterranean Plant Protection Organization (EPPO)) the following conclusions on the impact of this option can be drawn:

- The largest impact will be felt by Private Operators (POs) importers of the selected categories of plants;
- As PEQ facilities would be based on PO premises, there would be a need to build/upgrade current PO facilities, as these are currently considered largely inadequate, in terms of biosecurity. In other words there is a need to adjust to the requirements arising from the recently adopted ISPM34 – i.e. at least biosecurity level 2, and possibly also in terms of capacity (to allow all imports of the selected plant categories to be placed into PEQ);

⁴ PEQ is different from post-entry inspections which are already possible today, after the consignment has been released for the internal market. Post-entry quarantine (PEQ) implies that the consignment is released for free movement only after an official quarantine period within which the consignment is held or planted under quarantine conditions and subject to official inspections and testing.

- In terms of costs for MS CAs, the administrative costs of setting up and implementing PEQ are to be fully recovered, through fees charged to POs for registration, regular inspections and sampling;
- The expected impact (in terms of administrative costs) for the European Commission is likely to be minimal, although there will be a need to: hold further consultations with MS and to steer the process of setting up and reviewing the system, e.g. in terms of the appropriate requirements for bio-security (implementation of ISPM34); and, to ensure that MS implement the PEQ requirements correctly.

The costs involved in building/upgrading and maintaining facilities to the appropriate biosecurity level (i.e. at least level 2) are estimated at ca. €1,000/m² or €300,000 - €1,000,000 in total for a standard 300 m²-1,000 m² facility. In addition administrative costs (registration, regular inspections and sampling fees to be paid to MS CAs on the basis of full cost-recovery) are estimated at ca. €4,480 – €5,040 per facility during a PEQ period of 2 years (on the basis of an estimated 32-36 inspections).

The above costs are considered to be relatively high, particularly for businesses with a high turnover trading small plants and therefore a relatively high number of low unit value commodities. It is therefore expected that this measure would result in some rationalisation in this sector. Although, in terms of business disruption, the impact is expected to be zero to minimal after the first 2 years (i.e. when products are released from quarantine), it is nevertheless considered that PEQ may not be a viable economic option in those cases where the costs exceed plant value (e.g. small *Acer* species), as this would effectively mean that the costs would outweigh the value of the plants put into quarantine.

It is noted that third country (TC) trading partners, e.g. Australia and New Zealand also have PEQ obligations on imports of certain plants into their territory. The Australian model, for example foresees specifically dedicated and high bio-security level facilities run exclusively in PEQ stations appointed by the Australian Quarantine and Inspection Service (AQIS), and importers bear the full cost of the measures for the officially imposed minimum quarantine periods and at officially set fees.

Tasks 3 and 4: financial impact of applying the EU solidarity regime to co-finance direct costs and losses of POs; and to include natural spread

The objective of Task 3 was to analyse the financial impact of applying the EU solidarity regime to co-finance not only costs of MS CAs but also direct costs and losses of POs pursuant to official measures imposed.

3.1 To clarify the extent to which the rationale and structure of animal health financing is applicable, as a model, for establishing a similar structure for plant health to compensate for such costs

The study has found that the rationale and structure of the animal health (AH) financing could be applicable as a model for establishing a similar structure for plant health (PH) to compensate for direct PO costs and losses, but the model will need to be adjusted to the specificities of PH and the diversity of sectors affected, for which a more in-depth feasibility study would be recommended. The diversity of HOs and affected sectors covered by the PH regime makes it unlikely that it will be possible to find a model capable of addressing all scenarios and all sectors. To achieve this there is need for prioritisation, based on the

significance and impact of plant pests at EU level and for the different sectors. It is further noted that the balance between public and private (commercial) interests needs to be fully taken into account in any model to be developed and in assessing the relative importance of individual HOs for different groups of beneficiaries, the purpose of compensation, and the relative weight of the public versus private good component of such compensation.

Regarding the potential for cost-sharing, a key principle of the ongoing cost and responsibility sharing schemes (CRSS) being developed in AH, is that direct costs should be partly covered by public resources (up to maximum ceilings), while for the compensation of non-covered direct losses and consequential losses, POs should assume primary responsibility through the development of private insurance schemes/mutual funds. PO liability - a key component in relation to Food Law - for helping mitigate risks through appropriate action is seen as an important element for future CRSS, as long as this does not result in a disproportionate administrative burden. The availability of support could be linked to compliance with statutory action, analogous to the “three tier approach”⁵ which is being developed by the COM/MS for contingency planning/minimum mandatory action. In practice, for a very limited number of EU priority pests, pest-specific contingency plans should be developed, with strong involvement of stakeholders. Contingency plans could thus include both preventative measures taken by POs and PO response/cooperation in the event of an outbreak. In such cases the co-financing of the eradication measures by the EU should be very substantial given the high importance of the pests and the fact that the actions are mandatory.

Stakeholders’ views were found to be quite divergent and generally the need for public intervention with solidarity funding appears to correlate with the interests of the more fragmented sectors. In broad terms, the arable sector appeared to favour reliance on Common Agricultural Policy (CAP) support in relation to funding, arguing that the funding for plant health solidarity should not affect the overall funding for CAP, while the horticultural and forestry sectors were more interested in compensation.

3.2 *To estimate in global terms (order of magnitude) the direct costs of POs associated with the officially imposed measures that would be eligible for compensation.*

This analysis was carried out for a representative selection of HOs affecting the different sectors⁶. The FCEC estimates are summarised according to eligibility under three headings:

- (i) Already eligible direct costs and losses: these are currently covered by solidarity i.e. costs of removal, destruction, disinfection, sampling and testing. These were estimated at the range of €19.3 - €44.8 million per year, reflecting the various scenarios used in the calculations. As an average between all scenarios, **the costs of heading (i) are estimated at €32 million per year;**
- (ii) Currently non eligible direct costs and losses: these are the costs not covered currently by solidarity i.e. loss of plant/production value for POs. These were estimated at

⁵ 1. Detection of a new listed/non-listed pest in new areas (minimum mandatory action – no contingency plan);

2. Detection of a listed pest of EU importance (generic EU contingency plan);

3. Detection of a listed pest of priority EU importance (EU pest-specific contingency template with minimum mandatory actions and national contingency plans).

⁶ *Diabrotica* vv, *Ralstonia solanacearum*, *Clavibacter michiganensis* ssp. *Sepedonicus*, *Bemisia tabaci*, *Erwinia amylovora*, Potato Spindle Tuber Viroid, *Bursaphelenchus xylophilus*, *Anoplophora chinensis*, *Anoplophora glapripennis*, *Rhynchophorus ferrugineus*

€6.7 - €13.4 million per year, reflecting the various scenarios used in the calculations. As an average between all scenarios, **the costs of heading (ii) are estimated at €10 million per year;**

(iii) Currently non eligible indirect costs and losses: these are the costs that go beyond the scope of Task 3, i.e. consequential losses from movement bans for POs. These were estimated at €15.3 - €19.4 million per year, reflecting the various scenarios used in the calculations. As an average between all scenarios, **the costs of heading (iii) are estimated at € 17.4 million per year.**

3.3 *To estimate the costs for the EU and MS CAs of expanding the solidarity regime to co-finance direct costs of POs, under two different scenarios: at current level of checks (scenario 1: static scenario); at increased level of checks (scenario 2: dynamic scenario)*

A priori, it is noted that the current legal basis in principle already provides the framework for compensation of certain costs/losses of POs when these are directly related to the implementation of officially imposed phytosanitary measures; this has however not yet been fully implemented. The impact on EU solidarity funding should therefore in principle be considered as neutral on this basis, as an increase in the required funding would relate to the full implementation of the current provisions. Nonetheless, in practice, full implementation of these provisions will carry an additional cost for the solidarity funding when compared to the current implementation.

Under the *static scenario*, on the assumption that all the MS where outbreaks occur introduce solidarity requests and all the dossiers submitted by MS are eligible⁷, all direct costs and losses would be covered by the EU at 50%⁸. The additional EU expenditure required for funding under solidarity if direct losses are made eligible (heading (ii)), at 50% co-financing rate, would therefore amount to ca. **€5 million per year**. This expenditure would be **additional** to the estimated expenditure to cover the already eligible direct costs (heading (i): €16 million per year of EU co-financing at 50%).

The inclusion of direct costs and losses under solidarity funding may have an impact of the level and intensity of measures imposed on the POs, and therefore impact on the overall solidarity funding (*dynamic scenario*). Over the last five years, a total amount of **€29 million** was paid in 10 MS to compensate costs and losses of POs following outbreaks of HOs, i.e. an average **€5.9 million per year**. By extrapolating to the whole EU, this would result in potential compensation at EU level of some €11 million per year⁹. In the absence of any further evidence, it is **not possible to quantify** the impact of the introduction of the coverage of costs and losses of POs on the level of measures imposed on the POs and co-financed by MS and therefore by the solidarity regime. On a qualitative basis, the availability of compensation for direct PO costs and losses incurred by the officially imposed measures is likely to trigger the implementation of national compensation schemes the legal basis for which currently exists in MS, but which have not been so far activated, very likely to increase the implementation of officially imposed measures by POs, and mostly unlikely to increase the intensity of measures taken by national authorities.

⁸ Compensation rate by MS is 100%.

⁹ It includes all costs and losses. It is noted that this calculation does not take into account specificities in MS in terms of current cost sharing arrangements, and focus on particular HOs and sectors of national relevance, but it is simply based on the current French compensation model.

Task 4: To estimate the impacts for the EU and the MS of expanding the Solidarity Regime so as to also cover prevention measures for natural spread.

Only 7 MS (out of the 25 MS that responded to the FCEC survey) indicated they would submit a dossier for outbreaks caused by natural spread. The **total cost** of these dossiers, as indicated by MS (only 5 MS provided figures), would reach **at least €7.3 million per year**.

On the basis of 50% co-financing, the **impact on the EU solidarity budget** would therefore be **at least €3.7 million per year**.

The figures provided by MS indicate that the increase in solidarity, although **not significant** in most cases, **would become substantial** in the case of inclusion of natural spread **for HOs affecting the environment**, as the case of *Rhynchophorus ferrugineus* indicates. This is due to the high eradication costs of these HOs, as shown in the analysis for Task 3, particularly if direct losses (heading ii) are also to be covered. It is also evident that the HOs with the highest potential for natural spread are also those with the most significant potential costs from the control measures taken in the case of outbreaks.

Task 5: economic impact of harmful organisms

The objective of Task 5 has been to estimate the potential economic impact arising from the spread of HOs, by focusing on specific HOs affecting a range of sectors (agriculture, horticulture, forestry, public/private green spaces).

The economic analysis undertaken primarily covers the actual or potential damage to the sector/s concerned (damage costs). The assessment of these is conducted drawing on the best available evidence from past outbreaks as existing studies and literature including pest risk assessments (MS, EU, EPPO Pest Risk Analyses) and cost benefit analysis (CBAs) of pest management. It is to be noted in this context that ultimately, the impact of an outbreak in terms of damage costs may extend to the entire value chain of the sector/s directly affected by the introduction, spread and establishment of the HO. This has potentially very significant indirect and knock on effects on employment, as well as on other dependent sectors and the wider economy.

The available evidence from past outbreaks and studies indicates that, if no action is taken, the introduction, spread and establishment in the EU of the HOs under review has the potential to cause multiple **billions of Euros worth of economic damage per year** across the EU to both those sectors directly affected and upstream/downstream sectors (including input suppliers, food processing and the wood working industries), as well as also potentially adversely affecting tourism, retail and other services, and ecosystem values and services.

The FCEC analysis and findings highlight the need to distinguish between the potential impacts of pests affecting the agricultural, horticultural and nursery sectors in terms of yield and quality losses, and the impacts of pests affecting forestry and private/public green spaces. For the latter, impacts are both more complex and long lasting in effect, while there are less possibilities and considerably higher costs involved in replacing destroyed or susceptible plants than is the case for agricultural crops. In addition to longer term commercial impacts arising from harvest losses, there are significant potential adverse impacts on biodiversity, amenity, landscape and other environmental values (including broader environmental

objectives such as the reduction of CO₂ emissions), which are generally very difficult to monetarise. We particularly note that as these functions of forestry and private/public green spaces have yet to be fully identified or quantified, the complete value of ecosystem services is always likely to be underestimated (European Commission, 2008a). Moreover, since the global impacts of pests and diseases are both complex and impossible to capture in their entirety, the estimates provided must also be considered to under-represent the entirety of the impacts.

In the forestry sector, several of the HOs reviewed have the potential to cause severe damage to EU forests, in terms of economic and landscape value, as indicated by the FCEC estimates below. The range of losses depends on the underlying scenarios and assumptions, including the extent of the infestation, anticipated timber harvest and the extent of yield losses in the affected area, and producer prices in the various markets. For example, the results indicate that in the worst case scenario for a single pest the cost could reach somewhere in the range of €42.6-€89.2 billion (*Anoplophora*) or €39-€49.2 billion (*Bursaphelenchus xylophilus*) in terms of the commercial value of the susceptible lost timber. Such losses could also have significant effects on employment: extrapolating on available evidence in the case of *Bursaphelenchus xylophilus*, some 11,040 jobs in the forestry and wood cutting sectors could be directly affected under the worst case scenario. Many more jobs would be at risk in the downstream sectors; the EU27 forestry and forest-based industries employ an estimated 2.4-3 million workers. Moreover, it would take at least 20-30 years for the lost forests to be replanted and mature to the point of generating new income from harvested timber.

Estimated potential impact of key HOs affecting EU-27 forestry, in case of 'no action' (a)	
<i>Bursaphelenchus xylophilus</i> (PWN)	Threatened area: 10-13 million ha of coniferous forests (assumed 50-90% mortality rate); Productive forestry value loss: €0.9-€1.7 billion (scenario 1: PWN widespread in current area: PT) to €39-€49.2 billion (scenario 4: PWN widespread in EU27); Export value loss: €174 million (worst case scenario: TC ban on EU imports).
<i>Anoplophora</i> (ALB/CLB) (b)	Threatened area: loss of 30% hardwood forest in the EU; Productive forestry value loss: €19.6-€39.2 billion (scenario 1: <i>Anoplophora</i> widespread in currently infested MS) to €42.6-€85.2 billion (scenario 2: <i>Anoplophora</i> widespread in EU27);
<i>Phytophthora ramorum</i>	Threatened area: loss of 20% hardwood forest in the EU high risk area (EU PRA); Productive forestry value loss: at least €4.2-€9.1 billion , plus threat to EU cork industry.
<i>Dendroctonus ponderosae</i> (MPB)	Threatened area: not yet present in EU; if introduced, 100% of susceptible area in medium/high risk regions (77% mortality rate), or 11.6 million ha coniferous (<i>Pinus sylvestris</i>) forest; Productive forestry value loss: €31.8-€45.5 billion

(a) Impacts on the sectors directly affected by the indicated pests.

(b) *Anoplophora chinensis* (CLB) and *Anoplophora glabripennis* (ALB)

Source: FCEC estimates

The potential loss in value indicated above refers to harvested timber only, and excludes other forest landscape, recreational and environmental values which, as forestry data demonstrates, are much more significant. Based on estimates by UK Forest Research (2010) for specific UK tree species, the landscape/ recreational value and the biodiversity /carbon sequestration value of EU27 forests could roughly be valued at ca. **€56 billion (FCEC extrapolation)**. Other estimates (PRATIQUE) provide a landscape value of trees susceptible to *Anoplophora glabripennis* at €287.6/tree.

According to data reported by MS to Forest Europe, some **4.4 million ha of the EU27 forest area** (ca. 3% of the total forestry area) **is already damaged by insects and diseases**, which are the most significant damaging agents within EU forests and far more significant than the

damage caused by wildlife and forest fires. The total area damaged by insects and diseases in the EU27 may affect the production of an estimated annual felling volume of 12.3 million m³ of roundwood with an estimated value of €492 million. In addition, in the damaged area, such damage may affect the provision of non-wood goods (NWGs) (estimated value: €74 million) and of services (estimated value: €34 million). Taking these factors together therefore, the total loss of value from damage caused to date by insects and diseases may have already reached an estimated **annual loss of ca. €600 million in terms of income** generated from wood, NWGs and services provided by the affected forestry resource.

In the agricultural sector, the HOs under review can cause significant production and trade losses, as indicated by the FCEC estimates below (the range of losses depends on the underlying scenarios and assumptions, as noted for forestry pests):

Estimated potential impact of key HOs affecting EU-27 agriculture, in case of 'no action' (a)	
Maize	<i>Diabrotica virgifera virgifera</i> : <u>Crop value loss</u> : €472 million per year; up to € 6.1 billion over 25 years (FCEC, 2009); <u>Export value (under threat)</u> : extra-EU exports of €336 million per year (2008-2010 average)
Potatoes	High risk from a range of HOs (b), for 3 of which EU Control Directives are in place: <u>Crop value loss</u> : yield losses can vary from 20%-80% depending on the HO; on this basis, PCN could cause losses of up to €8 billion , ring rot up to €3 billion , and brown rot up to €4 billion ; <u>Export value (under threat)</u> : extra-EU exports of €413 million per year (2008-2010 average)
Tomatoes	High risk from several HOs (c): <u>Crop value loss</u> : €6.6 - €9 million (scenario 1: PSTVd spreading in previously infested MS) to €93-€127 million (scenario 2: PSTVd spreading throughout the EU27); <u>Export value loss</u> : from <i>Tuta absoluta</i> outbreak (US and Canada restrictions on EU imports) estimated at ca. €11.5 million per year

- (a) Impacts on the sectors directly affected by the indicated pests.
- (b) Including *Clavibacter michiganensis spp. sepedonicus* (potato ring rot); *Globodera* (potato cyst nematodes - PCN); *Ralstonia solanacearum* (potato brown rot); Potato Spindle Tuber Viroid (PSTVd).
- (c) Including Potato Spindle Tuber Viroid (PSTVd); Pepino Mosaic Virus (PepMV); *Tuta absoluta*

Source: FCEC estimates

Even at the level of direct impacts, it is difficult to put a monetary value on the production loss due to a plant pest, since a range of factors including pre-outbreak agricultural and forestry management practices and other preventive action will affect the extent of the damage likely to be caused by a specific pest, while the lost production value will depend on the prevailing market prices at the time the commodity concerned would have been produced and/or sold. Market prices are difficult to obtain in many cases (there is generally significant lack of data on prices, while in most sectors there is no 'EU price', making it complex to extrapolate at EU level). Furthermore, prices also fluctuate considerably depending on a range of factors, including in many cases the prevailing supply and demand in international markets. Such effects are compounded by the fact that outbreaks themselves may affect the level of market prices if they result in significant and drastic losses of production.

Other costs of 'no action', which have not been investigated here, include the impact that the spread and establishment of a HO could have on the functioning of the internal market if MS are forced to adopt measures which may affect the free circulation of goods within the EU.

By comparison, in the US, it is estimated that plants and plant pathogens cause annual damage of the order of \$64.1 billion, of which \$21 billion consist of crop losses caused by plant pathogens, \$13.9 billion of crop losses caused by insects and mite pests, \$4.2 billion

consist of loss of forest products and \$24 billion are estimated to be caused by crop weeds; of these figures, 40%-65% is due to introduced pests, pathogens and weeds (Pimentel et al., 2005). In the UK, a study carried out in 2010 estimated the total current annual cost of invasive non native pests to the British economy at approximately €1.9 billion.

The common conclusion that emerges from all available studies and the FCEC estimates is that, although the total annual costs (to both industry and government) of prevention and current (early response) measures may be significant, the potential benefits to be obtained by excluding the pest or containing/eradicating as early as possible are several times the order of magnitude of the cost of the measures taken.

Task 6: improving the coherence between the EU Plant Health Regime (CPHR) and the EU Seed and Plant Propagating Material Regime (S&PM)

The objective of Task 6 has been to address the coherence between the EU Plant Health Regime and the EU Seed and Plant Propagating Material (S&PM) *acquis*. The analysis undertaken was required to:

6.1 Determine the appropriate positioning of HOs in the CPHR and the S&PM regimes and estimate the economic impacts (costs and administrative burden for MS and EU authorities as well as for POs) of moving regulated HOs from one regime to the other according to the following three options:

- Status quo (with cleaning up of double listing). Costs for cleaning the different legislative texts are considered as marginal. It consists of a desk review of the texts, a contact with NPPOs to secure that all HOs are considered and then cleaning-up of the texts;
- All HOs to be moved from the S&PM regime to a separate Annex in the CPHR (but retaining their provisions and requirements). Impacts of moving all HOs listed in the S&PM Regime to the CPHR are limited to impacts linked to the mandatory import control measures. However as the large majority of host species for the HOs to be considered for transfer are plants for planting which are already inspected at import, and as all plants for planting entering the EU are already controlled by at least a visual control of each consignment, the costs for import control will not increase. Costs would however increase significantly if laboratory testing would be a mandatory part of the inspection. For illustrative purposes, applying one laboratory test to each consignment of ornamental plants would cost €6.8 - €23.4 million for EU 27 MS;
- All HOs pertinent to seed or plant propagating material to be moved from the CPHR to the S&PM regime. As the S&PM regime shall apply “*without any prejudice to the Plant Health regime*”, any S&PM certified material shall already comply with the provisions of Directive 2000/29/EC and therefore no cost impacts are anticipated. As certain species are not covered under the S&PM regime, some host crops (e.g. tobacco) and related HOs will be de-regulated under this option but with marginal impacts as these crops are not of high European economic value and pest diseases to be considered are not of high risks.

6.2 Assess the impacts of merging the plant passport and certification schemes and more particularly:

The analysis of the costs and benefits for MS CAs and for POs of merging the visual inspection based PPs of the CPHR with the sampling and laboratory testing based health certificates of the S&PM Regime. Currently none of the current CPHR and S&PM regimes are a barrier to the merger of field inspection services. For S&PM, field inspections can be done under official supervision and in the case of CPHR some operational tasks can be delegated to bodies other than the official NPPO. Costs can be reduced by asking the S&PM inspectors to control holdings in the context of the PP obligations. In case all inspections for PP were carried out by S&PM inspectors, total yearly savings can be estimated at less than €1 million per year. The total benefit of moving from a non-integrated approach to a coordinated joint inspection would lead to a cost reduction of about €1.5 Million but as several MS have already implemented this approach the total benefit would be less.

- The analysis of the economic impacts for POs and for CAs (CPHR and S&PM) of upgrading the PP requirements for propagating material to the level of the S&PM regime. We consider that upgrading PP requirements to the level of the S&PM regime requirements does not lead to any impact as there is no additional requirements to be implemented as they already exist. Inconsistency exists only in the legislative texts from which they have to be removed.
- The analysis of the economic impacts of merging the new PP document (logo) and the certificate document. Adding a logo on these labels will have a nearly zero cost as the only thing to be done would be to add this logo on the label format.

6.3 Determine the role of the private sector in the CPHR regime and delegation of tasks.

The different evaluations and other studies that have been performed during the last three years in the areas of S&PM and PH have all highlighted the demand by a majority of stakeholders and CAs of delegation of tasks that should be understood in two different ways:

- Delegation of tasks from the official NPPO to other official bodies (as already implemented in some MS for PP controls carried out by certification bodies);
- Delegation of tasks directly to POs (e.g. certification under official supervision in S&PM).

Conclusions of this analysis show a low level of consensus regarding this possibility of delegating tasks.

MS CAs in favour of delegation of tasks (i.e. FR) have highlighted that further delegation would help to align to the approach of the Regulation 882/2004/EC which is based on results to be obtained and not on how it should be done (current logic of the CPHR regime). In that context any tasks related to the monitoring of compliance of businesses with CPHR obligations may be delegated e.g. inspections, sampling and analysis etc. However, delegation of responsibility for taking action where infringements are found is prohibited. The COM retains the possibility to restrict further the types of tasks that may be delegated.

Apart from using private laboratories in the context of CPHR, stakeholders and CAs consider that any other controls, and especially visual controls, related to general surveillance and implementation of control and emergency measures should remain an official task that should not be delegated.

Task 7: impact of options on possible modifications to the existing plant passport system

The objective of Task 7 has been to evaluate the impact of six different options concerning possible modifications to the existing PP system:

7.1 Obligation to have PP accompanying the smallest unit in trade in the business to business (B2B) chain

In principle there is no impact, since such an obligation is already in place, through the issuance of replacement PPs, as foreseen under the present regulation, especially in the case that a large passported consignment is split in several smaller ones.

7.2 Obligation to have PP accompanying the smallest unit in trade in the business to consumer (B2C) chain, meaning that all plant material (for which at present a passport is needed), sold in nurseries and garden centres to a final consumer, would have to be passported

With the exception of individually sold bulbs, all other plant material (seeds, seedlings, ornamental plants, etc.) already carry some type of tag or label; adding information to these can be done either by the garden centres or by their furnishers, at a negligible extra cost. Note that final buyers who need large quantities of a given species will not buy from garden centres (B2C) but from nurseries (B2B), and thus already receive a PP if this is required for the species.

7.3 Dropping the existing distinction between sales (of passported plant material) inside or outside a protected zone (PZ)

Although such a distinction is foreseen under the present regulation (with sales outside a PZ not needing a PP), business practice today is already such that POs do not distinguish, and thus issue PP for all their consignments of species needing a PZ passport, even those not sold inside a PZ; this is also an indication that the cost of issuing plant PPs in cases where this is strictly spoken not compulsory, is not an issue.

7.4 All plant material (traded in the B2B chain) should carry a passport (this option does not extend to the B2C chain)

The implementation of this option would lead to an increase in the number of passports, the gross unit cost of which can be estimated at below 10 eurocent per consignment (the average value of a consignment in the B2B chain is not known, but is probably at least €100, so the increase is less than 1 ‰); the net unit cost can be still lower, if the “passport” information can be added to already existing documents such as invoices or transportation document (as is usual business practice, with the consent of the CAs).

Note that in that case, all operators will have to be authorised to issue PPs; such authorisations do not lead to an extra cost in the large majority of the MS, the necessary inspections being combined with normal phytosanitary inspections.

7.5 The existing formats, which cover a wide variety, should be harmonised, while keeping the existing data fields

This option would obviously have no impact for POs who fill in the PP by hand. For POs using a computer system, the impacts will be limited to minor modifications to the existing software packages (adapting the layout of documents to be printed); note that most operators use a package developed by specialised software companies, and that consequently the cost of its modification can be split over a large number of users (and will probably be considered to be part of the normal updating/upgrading that is included in the licence, and so will not be invoiced separately by these software companies to their users).

7.6 The existing formats should not only be harmonised but also simplified, so that they could take the form of a label

The impact would be the same as for 7.5: none for POs who still fill in the passports by hand; a limited impact (modification of software packages) for the ones who use a computer system, since the cost can be split over many users of such packages.

Task 8: costs and benefits of introducing mandatory surveillance targets and mandatory de-listing procedures for infested protected zones

The objective of Task 8 was to analyse the costs and benefits of introducing mandatory surveillance targets and mandatory de-listing procedures for infested PZs, by focusing on specific examples of PZs¹⁰. The selected PZs provided a balanced representation of the various types of HOs and the different situations in MS with regard to the implementation of measures for the maintenance of PZ status, and of the challenges, added value and the costs for MS to maintain PZs in place.

8.1 Identify best practices of surveillance targets for each HO for the selected PZs

The improvement of surveillance targets within the PZs was recommended by the CPHR evaluation (FCEC, 2010) as one of the options for improving the current system of PZs and reinforcing their credibility, as the concerns with the current system of PZs stem from implementation issues. The ongoing work of a dedicated DG SANCO/MS TF also highlighted the need to introduce at EU level minimum levels of surveillance within PZs in order to provide a degree of harmonisation in the approach followed across the EU. For this Task, appropriate surveillance levels were identified on a case by case basis, to the extent this was possible, and applied to the selected case studies (PZ/HO).

8.2 (a) Estimate the costs of introducing mandatory surveillance at identified surveillance level versus benefits

Costs: The current costs of surveillance in PZs are generally lower than in the case of Buffer Zones (BZs) established within infested non-PZs. This is due to the fact that in PZs, in the absence of infestation, intensified surveillance levels are not generally applied. In the case of host plants and sectors with high economic value for the MS, the costs of surveillance in BZs could be from 2.5 to up to 10 times higher, as the number of controls needed to guarantee the same level of protection would need to be increased substantially. If current surveillance levels are considered insufficient to justify/ensure freedom from the HO, these would need to be raised and this would result in a higher cost. If mandatory surveillance targets are

¹⁰ *Erwinia amylovora* – IT, LV; *Bemisia tabaci* (European populations) – UK, FI; *Ips amitinus* – IE, EL; *Cryphonectria parasitica* – CZ, SE; *Globodera pallida* – SK.

introduced at the level of 'best practice' (as defined for the purposes of Task 8 and indicated Task 8.1 results), the cost of surveillance is increased, as these levels generally result in higher inspection and/or sampling intensity. This increase may concern the level of visual inspections, with an intensity increase of 100% (e.g. *Erwinia amylovora*) in certain cases, and/or the level of sampling, with 10% additional sampling applied (e.g. *Globodera pallida*) or even higher increases, in the range of 100% or more (e.g. from symptomatic cases only to established levels of sample/ha in the case of *Erwinia amylovora*).

Benefits: Evidence of the benefit of PZs is generally scarce; in most cases, there are currently no CBAs to support already established PZs (with the notable exception of *Bemisia tabaci*). In this regard, it needs to be considered whether carrying out a CBA should become a formal requirement in future for the establishment of PZs. In those cases where economic benefits could be estimated (i.e. *Bemisia tabaci*, *Erwinia amylovora*, and *Globodera pallida*, and in general for HOs affecting plants with a commercial value), it can be concluded that such benefits clearly outweigh the costs of surveillance even if this is carried out at an increased level. Thus, for example where the economic sector is highly important at national level, e.g. apple and pear production in IT, where the sector generates some €1.1 billion in terms of annual production value, the value of production in those regions where the bulk of production is concentrated will amount to several hundred million Euros. In other words potential production losses are very substantial indeed compared to surveillance costs at increased levels amounting to hundreds of thousands of Euros. The same holds true in the case of the potato sector in SK, where the costs of the order of thousands of Euros of increased surveillance are far outweighed by the benefits of the protection of a sector with a value of €34 million.

Results of costs and benefits for the PZs selected for the purpose of this exercise are presented in the table below:

HO for which PZ is in place	Surveillance costs at 'best practice' levels (a)		Benefits (value of protected sector)
<i>Globodera pallida</i>	SK: € 41,000		SK: €33.8 million
<i>Erwinia amylovora</i>	PZ: IT (two regions): €54,800 IT (est.): €4.2 million LV: €85,900	BZ: IT (two regions): € 264,960	IT (two regions): €180 million IT: €1.1 billion LV: €3.2 million
<i>Bemisia tabaci</i>	FI: €331,700		€48.9 million (tomatoes only) Cost - benefit ratio estimated at 0.93-1.99 over 30 years (at current levels of surveillance)
<i>Ips aminitus</i>	SE: €4,200 CZ: €19,000 - €33,400		Environmental value (non quantifiable)
<i>Cryphonectria parasitica</i>	EL: €55,010 IE :€ 5,800		Economic value: Export value of coniferous round and sawn wood EL: €1.5 million IE: €62.6 million
			Environmental value (non quantifiable)

(a) 'Best practices' defined in accordance with methodology followed in the study (Task 8.1).

(b) Recommendation on the appropriate sharing of the costs of mandatory surveillance between MS CAs and POs

The analysis highlighted several cases where the costs of mandatory surveillance do not currently appear to be appropriately shared between MS CAs and POs. In particular, although mandatory fees are foreseen by the EU plant health regime for the cost recovery of the inspections and sampling/testing carried out by the MS CAs in the PZs, in several cases this provision is not being implemented and fees are only partly collected or not collected at all. This issue was also identified in the evaluation of the CPHR (FCEC, 2010). There is therefore a need to reinforce the implementation of these provisions.

8.3 Estimate the economic impact of mandatory de-listing of the selected PZs (a) immediately, or (b) after two years

Eradication efforts are pursued in PZs for as long as it is economically, as well as technically, justified. During the eradication period (i.e. up to 2 years according to EU legislation) POs benefit from the continued status of a PZ, but also bear the higher costs of intensified inspections and eradication. The balance between these costs and benefits will determine the degree to which MS pursue their efforts to eradicate in order to maintain PZ status.

- (a) In case of immediate revoking of PZ status, it is no longer possible to protect the area while engaging in an intensive eradication effort. Free trade immediately occurs, thereby potentially placing the area at higher risk and possibly reducing the potential to eradicate while increasing the cost of eradication. It can also be expected that surveillance will have to be intensified in this case, as the requirements on imported material can no longer be imposed. Therefore the impact is in all cases the immediate loss of the benefits from the protection that a PZ offers (as described above). On the other hand, there could be immediate benefits for non-PZ MS which today may have to maintain costly (i.e. intensified) inspection and eradication systems to export to the PZ, if these requirements no longer need to exist;
- (b) Delisting after 2 years offers certain advantages to an infested PZ under eradication, compared to immediate delisting in that: a) it allows the time that is technically considered necessary for the eradication programme to achieve its objectives; and, b) where the PZ faces difficulty in achieving the objectives of the eradication programme, it allows the possibility of a smooth transition of that PZ towards alternative measures for maintaining some protection of non-infested territories within the PZ, via the establishment of BZs.

Task 9: costs of including in the EU plant health regime five Invasive Alien Species (IAS) plants

The objective of Task 9 has been to estimate in global terms, the costs for the EU of including in the EU plant health regime five IAS plants (weeds)¹¹. All of the selected IAS

¹¹ *Polygonum perfoliatum*, *Pueraria lobata*, *Hydrocotyle ranunculoides*, *Eichhornia crassipes* and *Ambrosia artemisiifolia*. The aim of this particular selection has been to cover the following key criteria: geographic impact and distribution of IAS plants across the EU27 (north/south; east/west); presence and distribution of the plants within EU, i.e. absent/locally present/established in some MS; range of plants' habitats (land/water); affected sectors (agriculture/environment).

plants have a high probability of entry, establishment and spread in the EU27 and very significant potential impacts, as documented in the main literature¹².

By definition, the inclusion of any new HOs in the EU plant health regime will entail some costs for the EU and MS associated to the obligation to adopt management measures for their prevention, and in the event of introduction, for their control and eradication. While the general assumption has been that the IAS plants under review would be dealt with in the same way as currently regulated HOs (i.e. under Council Directive 2000/29/EC), ultimately the costs would depend on the specific measures to be followed. Such measures include control at import, surveillance, eradication and containment, as well as, where relevant, movement within the EU (PP system). The identification of the measures that would be most suitable for each of the examined IAS is an exercise beyond the scope of the study. Thus, in order to estimate costs, the FCEC has developed hypotheses on the measures that might be appropriate in each case, based on the information currently available in the reviewed literature and by means of expert consultation. It is also noted that, *a priori*, it is not clear at present whether any of the reviewed IAS would fulfil the eligibility criteria for co-financing under the EU solidarity budget¹³.

From this analysis and extrapolations of each of the selected IAS plants, the following key conclusions can be drawn.

For four of the selected IAS plants¹⁴, the main pathway appears to be intentional introduction through imports of ornamental plants. Consequently, EPPO recommends the prohibition of imports, sale, movement and planting (of *Pueraria lobata*, *Hydrocotyle ranunculoides*; *Eichhornia crassipes*) or controlled imports only (*Polygonum perfoliatum*). The implementation of the **EPPO recommendations on imports** would appear the simplest and most cost-effective control option that would be available under Directive 2000/29/EC; nonetheless, taking account of WTO-SPS obligations, similar restrictions would also apply to intra-EU movements and the obligation to eradicate and contain outbreaks.

The absolute scale, as well as relative share, of the costs of prevention, control and management measures that could be pursued under Directive 2000/29/EC, will depend on the **current status and distribution** of each of the selected IAS plants. A distinction can be made between two groups:

1. For **IAS plants absent** (*Polygonum perfoliatum*) or **largely absent** (*Pueraria lobata*, *Eichhornia crassipes*) from the EU27, the potential costs will be mainly in terms of preventive action, including import controls and surveillance. These costs are generally expected to be significantly lower in order of magnitude than for the second group, as long as no new outbreaks of these IAS plants occur. On this basis, for these plants, the additional cost of **general (preventive) surveillance** is expected to be **relatively moderate**. This cost might become **more significant if specific intensive surveillance** in the context of control and eradication plans is to be required, indeed

¹² Including, EPPO PRAs (available for *Polygonum perfoliatum*, *Pueraria lobata*, *Hydrocotyle ranunculoides* and *Eichhornia crassipes*) and, in the case of *Ambrosia artemisiifolia*, EUPHRESKO.

¹³ This is particularly questionable for *Ambrosia artemisiifolia*, for which 'natural' (i.e. not man-assisted) spread is a significant risk factor; it could also be questioned for the other IAS as, by definition, all IAS plants owe their invasiveness to their intrinsic ability for natural spread.

¹⁴ In particular, those currently absent (*Polygonum perfoliatum*) or largely absent from the EU (*Pueraria lobata*, *Eichhornia crassipes*), as well as for the more widely present *Hydrocotyle ranunculoides*.

very significant the more infestations become widespread and the scale of the surveillance expands, but cannot be estimated with the information available. As an indication, the cost for more specific intensive surveillance of *Pueraria lobata* in forestry in the affected and high risk areas could be up to the estimated costs for the surveillance of *Bursaphelenchus xylophilus* in forestry (€656,000).

The potential **control and eradication costs** for these pests in the event of pest introduction could be **significant**, as has been seen in the case of the control and eradication costs for *Eichhornia crassipes*, i.e. ca. €3 million per year (according to documented cases in ES and the US; average annual expenditure over 3 years in ES and 10 years in the US). **At EU level**, therefore, the **total cost is expected to be lower for this first group** of pests (compared to the second group), as long as they are absent or largely absent from the EU¹⁵.

2. For IAS plants that are already widely present/distributed in the EU (*Ambrosia artemisiifolia*, *Hydrocotyle ranunculoides*), the total potential costs are likely to be **significantly higher** in order of magnitude than for the first group.

In this case, the available evidence suggests that the **cost of surveillance** could be **very significant**, as this would certainly be required within control and eradication programmes. The cost could therefore approach the order of magnitude of HOs affecting the open environment, estimated under Task 1 at ca. €1.5 - €3 million per pest per year¹⁶.

Furthermore, the potential **control and eradication costs** for these pests could be **very significant**. As an indication, the control and eradication costs in the case of *Hydrocotyle ranunculoides* have been ranging from ca. €1 - €2 million per MS per year (according to documented cases in BE, NL and the UK). Given the currently already widespread distribution of these IAS plants, this implies that **at EU level**, individual IAS plants may require €10 - €30 million per year for eradication and containment. **At EU level**, therefore, the **total cost is expected to be higher for this second group of pests** (compared to the first group)¹⁷.

In conclusion, the introduction of mandatory requirements for the prevention and control of IAS plants within the EU plant health legislation may result in an increase in management costs across the EU as a whole. **With the exception of *Ambrosia artemisiifolia* and *Hydrocotyle ranunculoides***, the **total cost** for the other selected IAS plants is expected to be **relatively moderate, under the following two conditions**:

- i. This global assessment is made on the basis of the **current known level of presence and distribution** within the EU27 of these IAS plants. If the presence and distribution proves to be different than what is currently known from the available literature or any of these IAS plants becomes established and spreads, this would

¹⁵ As indicated above, it is also noted that not all of this cost is expected to be eligible for solidarity compensation under current rules, for example the current restrictions for outbreaks due to natural spread.

¹⁶ This order of magnitude corresponds to earlier estimates provided under the CPHR evaluation on the basis of data submitted by MS CAs, which had estimated that for the 10 HOs covered by emergency measures annual surveillance costs amounted at ca. €18.6 million i.e. on average ca. €1.86 million per HO.

¹⁷ Again, it is also noted that not all of this cost is expected to be eligible for solidarity compensation under current rules, for example in the context of the current restrictions for outbreaks due to natural spread.

- immediately affect the level of surveillance and control and eradication costs that might be incurred;
- ii. **EU-wide prohibitions of import/trade/planting of ornamental plants and/or susceptible material** are introduced, in accordance with EPPO guidelines and recommendations, as this is assessed to be the main pathway for the introduction and/or further distribution of *Pueraria lobata*, *Hydrocotyle ranunculoides*, *Eichhornia crassipes* and *Polygonum perfoliatum* in the EU27.

In this sense, the estimates made here reflect the impact of known pest risk and action taken to avoid introduction or further spread, rather than hazard analysis which is effectively the worst case impact. However, if in future the above conditions change, and these **IAS plants become more widespread**, as for example *Ambrosia artemisiifolia* and *Hydrocotyle ranunculoides* below, then the surveillance and control/eradication costs likely to require funding under Directive 2000/29/EC could become **very significant**.

The case of *Ambrosia artemisiifolia*, and to a certain extent also that of *Hydrocotyle ranunculoides*, sets these apart from the other IAS plants examined here. Due to the wide distribution of these plants throughout the EU, the introduction of mandatory requirements for the control of these IAS plants under Directive 2000/29/EC could result in a **very significant impact** on the plant health budget. In any case, given their widespread distribution and the fact that natural spread is an important factor in their distribution, it is not clear at present which of the current measures available under the Directive would be applicable for the management of these IAS plants. It is therefore impossible with the information available to date to make a meaningful estimate of the global cost of including these IAS plants in the future EU PH regime¹⁸. For *Ambrosia artemisiifolia*, at present, prevention (through early detection and eradication) of new populations is considered the best measure for halting further spread, while full eradication is currently largely considered impossible¹⁹.

¹⁸ The likely impact of the various management options for the control of *Ambrosia artemisiifolia* is expected to become clearer after the completion of a study recently launched by DG ENV which aims to assess the epidemiology, effects and control costs of this pest in the EU27.

¹⁹ Guidelines for management of common ragweed, *Ambrosia artemisiifolia* - Results of the EUPHRESKO project Strategies for Ambrosia control 2008-2009. See also EPPO datasheet and PL PRA 2001.