LIFE ASAP

Alien Species Awareness Program

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HANDBOOK FOR REPLICABILITY

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Summary

Introduction

"Invasive alien species" (also called IAS) are human-carried organisms, accidentally or voluntarily, outside their area of origin, which settle in the wild and cause negative impacts on the environment (biodiversity, ecosystems, ecosystem services), but also on the economy and human health.

They are the second leading cause of biodiversity loss after habitat loss and/or fragmentation and the third most serious threat to endangered species in Europe (Genovesi et al. 2015); They are also responsible for significant socio-economicimpacts: the European Commission has estimated costs in the EU at over EUR 12 billion per year (Kettunen et al. 2009). The trend of the phenomenon of biological invasions continues to grow strongly due to the increase in trade, tourism, the displacement of means, people, goods: in a word, globalization. In the last thirty years alone, the number of alien species is estimated to have grown by 76% in Europe and 96% in Italy.

In response to this serious and growing threat, the national and European institutions have adopted different regulations, regulations and resolutions. In particular, in 2014, consistent with the european biodiversity strategy, the European Parliament and the Council of the European Union approved Regulation 1143/2014 "with provisions to prevent and manage the introduction and spread of invasive alien species", which came into force in Italy on 1 January 2015.

The Regulation requires Member States to implement a number of management measures for alien species on the list of EU-relevant species attached to the Regulation, such as blocking trade, possession and transport, early detection and rapid removal, identifying key avenues on which to focus prevention efforts. These measures currently apply to 49 eu-important alien species of which 33 are present in Italy.

In order for this regulation to be truly effective, the whole of society needs to be made aware of the problems caused by invasive alien species, support the actions necessary to mitigate their impacts, and adopt more responsible behaviours to prevent new introductions or the further spread of species already present in the territory.

The 2013 European "Attitudes towards Biodiversity" campaign shows that IAS is not yet recognised as one of the greatest threats to biodiversity. Also in 2013, an EPPO International Workshop in Portugal focused on how to communicate the IAS issue, confirming that, despite the efforts of governments, universities and NGOs, interest groups and public opinion rarely know what an IAS is and/or what the damage it causes, and highlighting the need to implement and improve communication in this area with well-planned and long-term programmes (http://archives.eppo.int/MEETINGS/2013_conferences/communication_pt.htm).

In particular, it was highlighted how messages should be adapted to a non-specialist audience, avoiding complex technical language and prioritizing stories and other elements (visual and otherwise) that make the message easy to understand.

Effective management of invasive alien species necessarily also passes through the adoption of virtuous behaviors by individuals that are the result of an acquired sensitivity and attention to the subject. It is therefore a priority to stimulate such behaviour, increasing public awareness of IAS and awareness of the need and urgency of the management of IAS through well-planned and targeted communication programmes.

The life ASAP project is part of the framework outlined, whose overall objective is to reduce the rate of introduction of invasive alien species and the consequent impacts on the environment, economy and health across the country.

This will be achieved through 3 main specific objectives:

1) the increase in public awareness and the different target groups identified in the project regarding the presence and impacts caused by invasive alien species on the environment, but also on economic activities and human health, and how to prevent the arrival of new species and to limit the spread of existing species;

2) the active participation of citizens in the collection of useful data on the presence and spread of invasive alien species (particularly of EU importance), but also the prevention of further arrivals, through the adoption of virtuous behaviours;

3) the effective implementation of the EU Regulation by public bodies responsible for the management of invasive alien species and the scientific community through the proposal of a list of invasive alien species of national importance.

Managing Invasive Alien Species

The hierarchical approach

The problem of invasive alien species has now become national and international: it is clear that it must be addressed as a priority for the preservation of biodiversity and for the protection of productive activities and human health. umana.

Very good tools for the management of invasive alien species are the **risk assessment** protocols, which can have dual function: 1) **to predict the invasiveness** of an alien species not yet introduced into a given territory, thus identifying potentially invasive species among those not yet arrived in order to prevent its introduction, diffusion and consequent impact; 2) **order** in a **priority scale** the invasive alien species already present on a given territory **in** order to identify the most harmful ones to be managed with priority over the others (process that in English is called *prioritizing* and that in Italian is translated with prioritization). For a proper risk assessment it is necessary to take into account all the components of the invasion process (introduction history, invasiveness, invasiveness, impacts, management measures); recently, in some protocols is also considered climate change. Risk assessment protocols consist of a series of questions that allow you to assess how invasive an alien species can be or is, but they can also be more complex and include the use of models and simulations on the current and potential distribution of the invasive alien species. Thanks to the results of the risk assessment, it is possible to draw up white (or green) lists, composed of species whose introduction is allowed, or blacklists (such as that provided for by the European Regulation), composed of species whose introduction or detention is prohibited.

As early as 2002, the Conference of the Parties of the Convention on Biodiversity outlined the strategy to be followed to combat invasive alien species: the **hierarchical approach;** This approach is based on three successive phases, ordered on a priority scale: prevention; rapid identification and eradication of species introduced in the early stages of settlement; mitigation of the impacts of invasive alien species already spread with eradication actions where possible, or permanent control when eradication is no longer feasible. Finally, restoration of local biodiversity.

Prevention involves the implementation of a number of measures to prevent the introduction of invasive alien species:

1) Strict and effective regulations;

2) a good system of surveillance and interception at possible entry points of species (e.g. ports and airports);

3) **codes of conduct,** that is, good practices to be adopted voluntarily by the individual citizen, operator or structure. The available European codes of conduct are listed in Tabella 1.

4) proper education and information of citizens aimed at raising awareness of the problem. It is important to make it clear to citizens on the one hand that prevention is the best step to work on and to invest in to avoid new introductions resulting in new problems; on the other hand, prevention, however effective it may be, does not completely prevent the arrival of new species, especially for those that arrive as contaminants or "hitchhikers": it is not possible, in fact, to control everything and something can escape. However, good prevention allows us to reverse the trend of increasing the number of invasive alien species that we are seeing in Italy and Europe; There will be no complete blockade of new introductions, but the number of species arriving will be drastically reduced with positive environmental, economic and health reasons. In Australia and New Zealand, where prevention is very effective and has been going on for some time now, there has been a dramatic decline in the number of introductions, particularly for certain groups (such as mammals), testifying to how this can be achieved.

Table 1 List of European Codes of Conduct and Guidelines on Invasive Alien *Species.*

European Code of Conduct for Botanical Gardens on Invasive Alien Species
European Code of Conduct on Hunting and Invasive Alien Species
European Code of Conduct on Pets and Invasive Alien Species
European Code of Conduct on Sport Fishing and Invasive Alien Species
European Code of Conduct on Zoos and Aquariums and Invasive Alien Species
European Code of Conduct on Floro-Vivaism and Invasive Alien Plants
European guidelines on protected areas and invasive alien species
European Code of Conduct on Invasive Alien Trees
European Code of Conduct on Pleasure Boating and Invasive Alien Species
European Code of Conduct on International Travellers and Invasive Alien Species

When prevention fails, we move on to the next stage, to the **rapid** identification **and eradication**

of nuclei of new invasive alien species. This phase involves a constant monitoring system on the territory, the rapid reporting to the relevant authorities in the case of interception of new species and the rapid response, that is, the immediate eradication to prevent individuals from spreading on the territory. **Eradication**implies the complete removal of all individuals of a species from a given territory.

However, for many invasive alien species at the moment we are in the third phase, **mitigation,** when species are already widespread on the territory. Eradication remains the most effective form of mitigation, because it eliminates all impacts caused by invasive alien species. Eradication is generally feasible in the early stages of introduction or in particular contexts, such as geographically bounded areas or islands, which, being confined environments, allow to remove all individuals of a species. In cases where eradication is not possible or technically very difficult and expensive, we speak of a "permanent" **control** over time, that is, the removal of a part of the individuals of a species from a territory in order to decrease or at least contain its impacts. In general, however, it is not possible to control all invasive alien species everywhere; through, therefore, risk assessment allows a priority species scale specie to focus management efforts on. su With a territorial analysis it is possible to identify the sites where it is feasible to carry out a control action that can have positive effects: sites delimited by natural barriers, sites that still host a certain biodiversity to be protected, sites that suffer a strong socio-economic impact on the part of the species. It is important to emphasise in communication to the general public that management efforts and financial resources are focused on situations where intervention is successful and takes on greater value (e.g. for the presence of relevant species/habitats): often, in fact, the public perception is that interventions are undertaken without rational planning and indiscriminately towards all invasive alien species.

For management purposes (whether eradication or control) for each invasive alien species are potentially more technical; not all techniques, however, are applicable in all over-the-top environments or are economically or environmentally sustainable. The best technique for that situation must therefore be chosen or, as is often the case, a combined approach of more techniques (integrated **approach)** must be adopted toenable the management operation to succeed. Among the management techniques to be adopted, many suggest promotingthe food use of an invasive alien species as a method of control and source of income (http:/eattheinvaders.org/). / However, this practice can actually prove counterproductive: the invasive alien species can enter popular culture to such an extent that citizens no longer want to eliminate it, indeed can encourage its presence. It is good, therefore, to be careful of indiscriminate use in this regard to avoid creating greater problems.

The European Rules

Regulation (EU) 1143/2014 of the Council's European Parliament of 22 October 2014 with "provisions to prevent and manage the introduction and spread of invasive alien species", is most briefly referred to as Reg. (EU) n. 1143/2014, which came into force on 1 January 2015, is based on the hierarchical approach described above and can help prevent and mitigate the negative effects caused by biological invasions.

The heart of Reg. (EU) No 1143/2014 is the list of invasive alien species of EU importance, for which the text imposes a number of restrictions (Article 7), including a ban on imports and trade, a ban on possession, breeding, breeding, transport, use and release in the wild.

The current regulatory definition of **exotic species (alien)** is given by art. 3, paragraph 1, of the Post (EU) No. 1143/2014. It is defined as "exotic species": *any* living *specimens of such species, subspecies or* lower *taxon of animals, plants, fungi or microorganisms moved out of its natural range; include the parts, gametes, seeds,* eggs *or prophesies* of that *species, as well as hybrids, varieties or breeds that could survive and subsequently reproduce.* It is obviously a purely biogeographical definition, without any negative connotact, which simply indicates the fact that a certain species has been transported by people from one part of the world to the other.

The normative definition of invasive **(alien) exotic species** is given by Article 3, paragraph 2, of Reg. (EU) n. 1143/2014. It is called "invasive exotic species": *an exotic species for which it has* been *found that the introduction or spread threatens biodiversity and* related ecosystem *services, or* has negative effects *on them.* This definition echoes the definition in the Biodiversity Convection (Rio 1992). The definition underlines the negative impacts only on biodiversity and ecosystem services, but The Post (EU) n. 1143/2014 also introduces impacts on human health and economic activities among the aspects to be considered to propose an invasive alien species on the union relevance list.

An **invasive alien species of union relevance** is defined (art. 3, paragraph 3) as that invasive alien species whose negative effects are considered to require concerted action at EU level in accordance with art. 4, paragraph 3.

The "alien species" and "exotic species" are to be considered synonyms.

The inclusion of invasive alien species in the EU relevance list (Art. 4) occurs if, based on the available scientific evidence, the following criteria are met:

1) are alien to the entire territory of the Union;

2) they are capable of establishing a vital population and spreading to the environment in a biogeographical region shared by more than two Member States or a marine subregion;

3) likely to have a significant negative effect on biodiversity and could have negative consequences on human health or the economy, as evidenced by the risk assessment (required under Article 5),

4) based on the risk assessment, concerted action at EU level is needed;

5) listing can lead to effectively preventing, reducing or mitigating their negative impact.

The first list, comprising 37 species, was issued with the Execution Regulation (EU) 13 July 2016, 2016/1141 of the Commission, which "adopts a list of invasive alien species of EU relevance under Regulation (EU) 1143/2014 of the European Parliament and Council." The first update of the list came into force on 2 August 2017 with the addition of 12 more species. There are currently 49 invasive alien species of EU relevance, 33 of which are already present in Italy (the list is shown at the bottom of the volume). The list is updated periodically and other species will be added (you can consult the European Commission's website to follow these updates: http://ec.europa.eu/environment/nature/invasivealien/list/index_en.htm).

Essential to be able to "candidate" a species to enter the list of UNION relevance is the preparation of a risk assessment under Article 5 that includes the following elements:

- the description of the species (taxonomy, history, natural and potential range);
- description of the dynamics of reproduction and diffusion;
- description of potential vectors for the introduction and spread of both accidental and deliberate species;
- risks of introduction, settlement and spread in the regions also in relation to possible climate change;
- current and potential distribution of the species;
- description of the negative effects on biodiversity and ecosystem services, human health, safety, economy;
- potential costs of damage done;
- known uses, social and economic benefits from using the species.

Under particular conditions, exemptions may be granted to the restrictions in Article 4 for research (particularly for scientific production and medical use) or ex-situ conservation ('conservation of species outside their natural habitat'), provided that species are kept in confinement, with no possibility of escape (Article 8).

In exceptional cases, for reasons of general imperative interest, Member States may issue

authorisations allowing institutions to carry out activities other than research (Article 9).

The possibility of taking emergency measures (Article 10) in the form of the restrictions under Article 7 is included, where the Member State is compromising the presence or imminent risk of the introduction into its territory of an invasive exotic species which is not on the Union's list but which the competent authorities consider, on the basis of preliminary scientific evidence, to be alien to the territory of the Union, capable of becoming so-viable populations, of spreading into the environment and which the competent authorities consider to be negative.

Each Member State, under Article 13, must draw up and implement one or more action plans for the accidental entry methods identified as priorities in its territory. These plans must include measures to be taken to minimise contamination of goods, ensure the implementation of appropriate controls, raise public awareness through an appropriate timetable of interventions.

Member States establish a system of surveillance of invasive alien species of euthic importance (Article 14), which collects and records data of presence, distribution and consistency in the environment of invasive alien species. The surveillance system covers the entire territory, including the territorial sea comparsa nuove waters, of the Member States and must be able to quickly detect the emergence of new invasive exotic species. esotiche invasive. The system will have to integrate with monitoring systems that may already be in place (see for example the system provided under Directive 92/43/CEE "Habitat"). The surveillance system will also be useful in assessing theeffectiveness of managementmeasures (eradication or control) adopted by Member States.

It is planned that fully operational structures will be in place in each Member State to carry out the official checks necessary to prevent the deliberate introduction into the Union of invasive alien species of euthic importance (Article 15).

Following the detection of a new species of EU relevance on their territory, the Member States give timely notice to the European Commission (Article 16) and apply the eradication measures, communicating them to the Commission itself and informing the other Member States, in order to complete and permanent elimination of the population of the invasive exotic species in question (Article 17).

in In the case where eradication is not possible, Member States prepare effective management measures (Article 19) to minimize their effects on biodiversity, related ecosystem services, human health and the economy. These measures consist of physical, chemical or biological, lethal or non-lethal interventions aimed at numerical control or population containment of an invasive exotic species. Member States then take rispetto costi appropriate recovery measures (Article 20) to facilitate the recovery of a degraded ecosystem, damaged or destroyed by invasive alien

species of EU importance, again on the basis of a cost-benefit analysis that demonstrates the cost effectiveness of these measures.

From 2019 and every six years, Member States will have to provide a report (Article 24) to the Commission on the official surveillance systems and controls, permits and authorisations granted under articles. 8 and 9, the distribution of eu-important invasive alien species and management measures (eradication or control) adopted, as well as on priority pathway *action* plans and costs incurred.

Each Member State may have lists of alien species of national importance (Article 12) to which the measures provided by art can be applied. 7 (restrictions), art. 8 (derogation permits), Art. 13 (Action Plans on Accidental *Pathways),* Art. 14 (Surveillance System), Art. 15 (controls), Art. 16 (early detection notifications), art. 17 (rapid eradication), Article 19 (management measures) and Article 20 (restoration of ecosystems).

Member States are working to ensure close coordination with other Member States, in particular with those who share the same underwater regions, the same biogeographical region, the same borders, the same watershed and any other common problem.

In Italy, the problem of alien species has been addressed in some national norms - in which there is an explicit prohibition on introduction - and regional.) These include, for example, the law of the Lombardy Region No. 10/2008 and the subsequent and consequent DGR No. 7736/2008 bearing the black *list* of regional alien species; DGR No. 46-5100 of 18 December 2012 of Piedmont "Identification of lists (Black*List*) of invasive exotic plant species of Piedmont and promotion of information and awareness initiatives".

On 14 February 2018, The Legislative Decree No. 230/2017 came into force, adapting Italian law to the provisions of Regulation (EU) No 1143/2014. The Decree takes up the provisions of the Regulation and identifies the administrative authorities responsible for the prevention, control, eradication, monitoring and surveillance measures provided for by the Regulation. For species of EU relevance (and in the future for those of national importance) the introduction, detention, breeding and cultivation, transport, trade, release into thenaturalenvironment, free transfer are prohibited. These prohibitions may be waived under a strict licensing regime for which the Ministry of Environment and Protection of the Territory and The Sea (MATTM) is responsible; le exemptions are granted for scientific research, *ex-situ* preservation, medical use, or, in exceptional cases and with authorisation from the European Commission, for reasons of imperative general interest.

MATTM is recognized as a national authority with the European Commission and coordination between public administrations; the Higher Institute for Environmental Protection and Research (ISPRA) is in charge of technical and scientific support for the implementation of the decree.

Autonomous Regions and Provinces are required to monitor their territory to detect the presence and distribution of invasive alien species and to implement rapid or management eradication interventions. For such interventions, local territorial authorities must ensure, where necessary, access to private land. Regions, autonomous provinces and national protected areas, following eradication or management of invasive alien species, must take recovery measures for damaged ecosystems. The Forest, Environmental and Agricultural Protection Unit Command of the Forest Carabinieri investigates and sprays the administrative sanctions provided and provides support, if necessary, to MATTM in carrying out the tasks assigned to it. Cross-border inspection points (for animal species) and entry points (for plant species) carry out official checks.

The Decree provides for the definition of an action plan on the entry vectors of invasive alien species, regulates the possession of these species by botanical gardens, zoos, scientific research institutes, importers, retailers and even private entities and defines and quantifies criminal and administrative penalties. I Owners of animals kept for non-commercial purposes and included in the union relevance list are allowed to hold them until the end of their natural life as long as they report them to MATTM.

Communication strategy

Effective management of invasive alien species necessarily also passes through the adoption of virtuous behaviors by individuals that are the result of an acquired sensitivity and attention to the subject. It is therefore a priority to stimulate such behaviour, increasing public awareness of IAS and awareness of the need and urgency of the management of IAS through well-planned and targeted communication programmes.

The life ASAP project is part of the framework outlined, whose overall objective is to reduce the rate of introduction of invasive alien species and the consequent impacts on the environment, economy and health across the country.

This will be achieved through 3 main specific objectives:

1) increasing public awareness and the different target groups identified in the project regarding the presence and impacts of invasive alien species on the environment, but also on economic activities and human health, and how to prevent the arrival of new species and to limit the spread of existing species;

2) the active participation of citizens aimed at collecting useful data on the presence and spread of invasive alien species (particularly of EU importance), but also in the prevention of further

arrivals, through the adoption of virtuous behaviors;

3) the effective implementation of the EU Regulation by public bodies responsible for the management of invasive alien species and the scientific community through the proposal of a list of invasive alien species of national importance.

Objectives of the Communication Plan

Based on the framework just outlined and the general and specific priorities reported, the strategies, modalities and communication tools identified for achieving the objectives, declined for the different interest groups involved, are defined.

In more detail, the objectives of the document are:

- Identify inherent communication problems with invasive alien species;
- Define guidelines for making communication on invasive alien species effective;
- Identify key messages on which to focus communication;
- Define the project logo, creative concept and la key visual of communication;
- Identify the most suitable communication tools also in relation to the different interest groups involved;
- Identify the most appropriate methodology for measuring the effectiveness of the communication strategy outlined.

Defining Target Groups and Specific Actions

Recipients of communication actions

The main recipients of information and campaigns can be as follows:

- general public;
- primary and secondary school students and teachers;
- public administrations: staff of institutions and public entities involved in the management of IAS;
- technical-scientific staff and teaching operators of protected areas, museums, botanical gardens, zoos and aquariums that come into daily contact with visitors of different contexts;

- hobbyists (sportsmen and hunters);
- business owners attività commerciali (producers and dealers of animals of affection, floro-vivaists); buyers and owners of alien animal or plant species;
- professionals (foresters, agronomists, veterinarians, biologists, naturalists, green architects, landscape architects, etc.);
- scientific community;
- transiting travellers in airports;
- tourists;

Additional recipients of the communication activities can be::

- journalists;
- environmental groups and activists in general.

Specific objectives, communication actions and recipients

Given the specific objectives of an alien species campaign, a number of communication actions targeting the various recipients of the following schematized can be identified:

Goals	Actions	Recipients
Raising awareness	Communication campaign for the general public in traditional media (daily and periodicals)	General Public Journalists
	Web and social communication campaign	General public
	Campaign in Tourist Information Points (PIT)	Tourists
	Information campaign in the airport arrivals area	Traveller
	Training campaign for teaching workers	Staff of protected areas, botanical gardens, zoos, museums, aquariums

Goals	Actions	Recipients
	Training and information campaign in schools	Students and teachers
	Information/trainingcampaign	Professional hobbyists
	Participation in trade fairs and industry conferences	Professional hobbyists
	Translation, drafting and dissemination of codes of conduct and best practices	Hobbyists Professional Traders Operators in botanical gardens and zoos General public
	Realization of specific educational paths	Visitors to protected areas, botanical gardens
	Realization of informative paper material*(brochures* on lists of species relevant	Hobbyists Professional Traders
	codes of conduct...)	Students Teachers Public General Travellers Tourists
Active Participation	Citizen Science campaign with bioblitz-themed	General Public Visitors to Protected Areas, Botanical Gardens, Zoo Students and Teachers
	Building an app	General public
Effective implementation Eu Regulation 1143/14	Training campaign via web and in presence on EU Regulation 1143/2014.	Regional staff Airport, Staff Customs, Staff Forestry ,Veterinary Staff, Staff of the Ministers, Staff of Protected Areas
	Production of a specific technical guide	Public administrations
	Information workshops and *Horizon scanning* exercise with experts	Scientific community

Communication guidelines

Communicating IAS

If the biology of conservation is a crisis discipline, the vast field of invasion biology is a kind of "squared crisis discipline", because all the criticalities inherent in scientific research on biodiversity and its conservation are amplified in the case of IAS by limits of knowledge and difficulties in interaction with society. Such issues can hinder communication on IAS in various ways; it is therefore necessary to focus them before outlining the communication guidelines.

1 Biological invasions are, by definition, **processes** and not static, fixed situations. Such processes (as well as all ecological processes) are **extremely complex,**they almost never follow linear dynamics and suffer greatly from numerous natural and anthropogenic variables. As such, they are therefore difficult to study and require long and considerable human and economic resources.

2 The negative effects of an invasive alien species on the ecosystem in which it is introduced may not be immediate, in fact many alien species become invasive only after a certain time – even decades – compared to their introduction and the establishment of certain environmental conditions.

3 It is extremely difficult to accurately and incontrovertiblely measure the impacts of IAS, especially on a large geographical scale; it is also difficult to make predictions with a high degree of reliability on the trajectories of invasion processes. The strong uncertainty of future scenarios prevents it from easily capturing the public's interest and raising awareness of the problem in it.

4 There is no unanimity in the scientific community in the basic definitions and terminology to be used in both strictly scientific language and popular language.

5 There is no unanimity in the scientific community on the weight of biological invasions in the big *picture* of environmental conservation: some scholars believe that the problems posed by the IAS are similar to those detected even before (fossil period) and are generally much less relevant, for example, of the degradation and direct destruction of ecosystems, land use or overfishing of natural resources; others even see them as an enrichment of biodiversity or a solution to the problems caused by climate change

6 Increasingly, parallels or juxtapositions are made with the question of human migration, confusing social and scientific aspects and posing the biology of invasions as a xenophobic

science.

7 The management of IAS is at the interface between scientific research and concrete actions, but incisive or unresolved actions (or whose effects take time) severely undermine the credibility of scientific research.

8 Society's awareness of IAS is very low, as is little awareness of the role of the individual in the invasion processes. In particular, probably also as a result of paragraph 4, **society** does **not perceive IAS as a** serious environmental **problem** and is set to worsen in the coming decades; much more immediate is, for example, the perception of global warming or the extinction of the snow leopard or white rhino by poaching.

9 Alongside the society's lack of perception of the problem of IAS, the role of the media is being played. In the media, IAS are "crushed" by more sensationalistic and more empathetic environmental problems, such as ocean plasticization, air, water and soil pollution, global warming or deforestation, and so on. A waterway overrun by *Eichhornia crassipes* is hardly documented in the media compared to a waterway contaminated by the discharges of an industry.

10 Also in the media it is very common to spread ambiguous or false messages about IAS by environmental or animal rights associations, interest groups or individual citizens, especially in relation to control and eradication actions.

11 The management of IAS may require physical elimination of animals or plants, which raise ethical problems and are accompanied by a major communication problem: it is difficult to communicate the need to "kill to save", an action in itself bloody against the "victim IAS". It is much easier to communicate the need di to take positive action to save a species, such as stopping deforestation in Madagascar to save lemurs, stop whaling in the Antarctic Ocean, and so on.

Strengths and Opportunities for IAS Communication

Despite the above issues, this theme also offers strengths for communication, which have been carefully analysed for the definition of the overall communication strategy. In particular, it should be pointed out that IAS-related issues have been the subject of numerous studies and that there is therefore an unassaibly scientific database confirming the very serious effects of these species on biodiversity. In addition, the impacts do not only affect the environment, but also extend to human health and economic activities (think of the case of tiger mosquitoes, toxic marine fish, or allergenic plants), thus touching the sensitivity but also the daily life of the whole society in different aspects. Finally, the adoption of the EU Regulation 1143/2014 imposes a series of

actions, which are mandatory, demonstrating the importance of this issue also at the political level and the need to activate actions even not fully shared by society.

Guidance for effective communication

di Given the objective complexity of the topic and its inherent communication difficulties, it is crucial that partners follow some of the general communication principles listed below.

1 Use shared terminology: All partners must refer to the same definitions with the goal of not generating confusion in the interlocutors and speaking to a single voice on all the chosen media, from oral presentations to the website, from social media to technical reports. A glossary, was then developed and agreed between all partners as a unique reference for definitions. The glossary will also be useful in social communication, and indeed could become an active part of it by periodically sharing in the project profiles the graphically reworked "cards" that illustrate the most significant terms.

2 Use language that is always clear, simple and "positive". You will have to choose keywords immediately understandable and easy to memorize, avoiding typical slogans of the war language (such as "war on invasive aliens"). Such language, in fact, could generate extreme feelings for or against the object to be fought, favoring purely emotional and non-rational reactions. It is also important not to use catastrophic language, but at the same time to try to be as incisive as possible in making it clear the true extent of the damage caused by IAS today and potentially in the coming decades. It is necessary to convey a realistic message (technicians cannot – nor do they want – to act against all IAS everywhere), but positive (there are situations where you can and must intervene, obtaining positive results), especially through the telling of stories (see below point 4.3). The language will also have to be adapted to the targets on the basis of their background (for example, children in a primary school have different backgrounds than employees of a nature museum), their interests (owners of animals of affection have interests other than the perception of the IAS problem (perception will be different – and therefore language will have to be different – in a place where an emergency caused by an IAS is taking place compared to a place where there are no tangible emergencies).

3 Always subject all the material to a thorough scientific review by the biology specialists of the invasions present between the various partners and present, where possible, scientific data to support the claims made (in particular on the damage and risks related to invasive alien species), avoiding to "blame" the species and interest groups responsible for voluntary introductions.

4 Seek the collaboration of environmental associations and activists in raising awareness of

the general public and interest groups towards prevention. Such cooperation could cushion any opposition by these groups and create a common point of interest in preventing further arrivals or spreads. In the event of controversy and extremist positions, avoid clashing or giving rise to sterile discussions, listening and countering calmly.

5 Shifting focus to species/ecosystems that are impacted by IAS, reiterating the importance of IAS management actions to safeguard them.

Key messages

The communication should focus on a limited number of key messages that will have to clarify some confusing issues (e.g. alien species are not all invasive) and highlight everyone's responsibility for the problem (alien species are by definition only man-made species) and the possibility of everyone doing something concrete to prevent or mitigate the problem.

More in detail the key messages to be communicated will be:

- Alien species are defined as species transported by **humans outside** their place **of origin,** consciously or not. They are not, therefore, considered alien those who, for example, "conquer" new territories favored by climate change.
- The introduction of alien species, as evidenced in the definition itself, is **intrinsically linked to human behaviours** and therefore it is essential to act on these behaviours to effectively address the problem.
- The alien species that are brought into a given territory are many but only a small part, about 10%, causes significant damage becoming invasive. **Not all alien species are, therefore, also** invasive. Scientists and managers are particularly focused on these.
- Alien species become invasive due to their biological and ecological characteristics and the environmental conditions in which they find themselves, not because of their "innate wickedness". An alien species can be invasive in area X but not in the Y.
- Invasive alien species cause negative impacts on biodiversity and ecosystem services, but also on our economy and health. They are therefore a serious threat and have direct **and** indirect **costs that weigh** on **both** the individual and the **whole community.**.
- Each person can contribute, with their own behavior and actions, to prevent the arrival of new species that could prove invasive and limit the spread of invasive alien species already present in our territory. **We** all therefore **share responsibility** for this problem, and simple gestures are enough to help limit the phenomenon (e.g. not releasing animals/plants into the wild; cleaning the keel of boats or fishing gear).

- Preventing the arrival and expansion of invasive alien species will avoid taking the necessary and unpopular management actions.
- In a limited number of cases, however, on **species recognised as particularly harmful** (the species of Union Relevance of Reg. Eu 1143/14), **management actions** (including suppression) **are obligatory** and should not be countered. Those who decide not to take such action, however, take the decision not to safeguard biodiversity and ecosystems

Training strategy

The figure of the multiplier

The multiplier formed within the Life ASAP is a figure that stands as a means between the technical-scientific world and the general public to convey proper training/information on invasive alien species. He is an operator who can have a different cultural background and who is variously involved in educational-disclosure services at scientific museums, botanical gardens, zoos, aquariums and protected areas. Interact with the public in their daily work tasks (e.g. gardeners) or plan and carry out specific training interventions and educational projects in these places. He is a key figure, because it allows the messages and materials processed to arrive in a widespread way on the territory. The multiplier plays a key role in raising awareness of the issue at the citizenry,triggering the desired positive feedback.

The multiplier needs specific training as communication and training on the subject of invasive alien species as a threat to biodiversity, activities and human health are particularly complicated and "risky". In fact, pesso in the dialectics, feelings or ethical positions of a diametrically opposite nature that can fire the debate are at stake.

The multiplier plays the key role of increasing the awareness and participation of society in the activities planned to counter invasive alien species. It must bear the message that everyone can do something, triggering a process of accountability: the individual citizen, the large multinational, the local or central public administration or even international can act, in different ways, against the spread of invasive alien species, thus helping to reduce the damage and risks arising from them. In particular, the multiplier will have to insist on prevention, which is within everyone's reach through choices, behaviors, actions that go in the direction of not contributing to the spread of invasive alien species.

Multiplier attitude

How should multipliers be placed with the audience during a training event? Nothing or almost, during a training event, should be left to chance. Of course, the multiplier must always be ready to "improvise" in the face of an unexpected demand, but a fundamental point for effective training and community is the care with which the training activity is planned and the message is processed. All this without neglecting the predisposition of the environment according to the target of one's training activity. The multiplier must therefore be fully aware that it must work on itself in order to plan and carry out a positive and profitable training event.

The multiplier is not only concerned with training, but also carries out a very important information activity in less structured contexts of a training event and more informal. For example, gardeners working in a botanical garden, gardeners and technicians who maintain zoos, volunteers and staff involved in information or maintenance activities in aquariums and protected areas regularly meet visitors with whom to interact. Questions from the public and brief informal interactions are important opportunities to make correct information. A multiplier must do all it can to give the right time and attention to this type of information activity, making itself available to answer questions competently and professionally.

Below we offer a short summary of the highlights that a multiplier should consider during a training event:

- **carefully plan the** training event both in time and in spaces: you must always be able to adapt and improvise, but excellent planning ensures educational success;

- use a strict language **register,** choosing the concepts and words to use to explain them by the audience;

- use **variations in tone of voice,, gestures** and **expressiveness** to emphasize concepts and keep interest alive during the training event;

- maintain a **position in the space** with respect to the participants so that they can make contact with everyone;

- **Encourage questions** from participants, possibly making it clear if necessary immediately that there is a set time frame for questions; on such a complex topic, an inclusive approach with a broad audience interaction must be maintained, which must rightly have the perception that different positions can be taken and that there are very well-prepared scientists or staff on invasion biology that can offer answers and personal reflections;

- **to focus on laboratory** and experiential activities to mere frontal lessons;

- **encourage the public to join** in the **prevention and monitoring** of invasive alien species.

Audience sensitivity

The different segments of society

Different audiences and stakeholders with whom multipliers, biologists and invasion technicians find themselves interacting, could have a very different and variable position depending on the context with respect to the invasive alien species, the problems associated with them and also the very science of invasion biology. The attention of some of these groupsti, has also changed in recent years (for example, public decision-makers and local government technical offices, which have begun to warn of the problem of invasive alien species and have to adapt to specific legislation); what is certain is that it is not to be considered a static attitude, but something dynamic, which can change if the collaboration between various subjects (professional and non-professional) increases and if the aspects of communication on this issue are improved.

In this case, for example, some possible positions on the problem of invasive alien species, relating to certain segments of society, are summarized as an example. The information reported is not to be considered absolute, but serves to make themultipliplic atore reflect on theimportance of formulating and adapting a message capable of reaching a specific target or carrier of interest characterized by a position very different from its own (and different from that of other targets). Within the same grouppo in visiting a museum, for example, it is appropriate to reflect on the possibility of finding a heterogeneity of opinions. In order for a fruitful training/information to be carried out, each of these positions must be taken into account and the language and examples brought by the multiplier must have the ultimate goal of making people think and not conflict with those who maintain positions far removed from what has been highlighted in terms of biological invasions in recent years from the scientific world.

For each of these categories, we recommend some aspects to take special care about when communicating issues related to invasive alien species and, more generally, invasion biology. These suggestions are also included in Table 2 in condensed form.

in Commercial operators who base an important share of their economic activity on the trade in alien species, such as some nurseries and aquaculture operators, "exotic" traders, pet shops and aquariophil shops, and who see the restrictions on sales, which could arise from the problems of invasion biology, as damage to their economic activities, will tend to be opposed or strongly skeptical. Animal welfare associations are also in principle opposed to the use of bloody methods used against invasive animal alien species and the limitation of animal law, even if it is

justified by environmental and conservationist purposes.

Table 2. Positioning in relation to the biology of invasions .

Position of interest in relation to the issues associated with invasive alien species and invasion biology	Examples of segments of society	Things to work on
Adverse	International trade operators; animal welfare associations	Provide correct information and examples of good practices (particularly regulations and codes of conduct for commercial operators; prevention, impacts and how beneficial it is to intervene promptly, during the early stages of invasion of an invasive alien species)
Skeptical	General audience; tour operators	Highlight the issue and show why it is necessary to combat the phenomenon; to make citizens informed and active
Neutral	Local administrations; other public administrations	Focus on the effectiveness of targeted and well-conducted interventions and their successes (with positive impacts on managers)
Interested/Concerned	Environmental associations; green industries; hunting and sport fishing associations; forestry activities	Promoting events involving citizenship to make them active in the management process
Favorable/Supporter	Natural area managers; academia; environmental organizations	Engage them in communication campaigns and educational events

For the categories listed so far, an important communication effort is needed to try to establish points of contact and to raise awareness of the real dimensions of the problem, although it is not

always possible to change the attitude of animal activists. In otherarticulate, we should focus on the importance of prevention, to stress that we are only working on a minimum number of species and that rapid removal is better than permanent control, because it means suppressing a number of smaller animals.

It is generally the public authorities that are called upon to act as a result of the new European Regulation and are asking for information and support from the expert technical and scientific bodies on the subject. di Developing clear and simple messages, combined with examples that reflect on the saving of public money from management measures against some invasive species, is a key point in the relationship with public administrations.

Environmental associations, green industries, hobbyists (hunters and fishermen) look with interest at the field of investigation of invasion biology and therefore are an important reservoir to draw on both for the further dissemination of proper communication of the issue on the territory, and for the involvement of large slices of society in the activities of monitoring and management of invasive alien species. Rather than working on the message, with these categories it is important to work on engagement and the need for every citizen to do their part. For this purpose, citizen ***science*** activities (bioblitz and species reporting apps) can be organised, as well as training events for these audiences.

Managers of protected areas, the scientific world and some environmental associations are to be considered to support the research and management activity provided by the biology of invasions, because they experiment daily in areas that study or manage the effects of invasive alien species. They can be valid subjects to be involved in communication campaigns and educational events, also because the places they manage can be real open-air gyms for the recognition of aliens.

The school

Classes of students of every order and grade are likely to be the main targets of di the multiplier training/information actions. For this target, it should not be underestimated the strong emotional reaction that children and young people usually have when talking, in general, about issues that affect animals. It will therefore be important to work with preparatory activities that make students aware of the ecological scenario in which the phenomenon of biological invasions manifests itself. In addition, given the peculiarity of the theme, it would be optimal to combine the interventions aimed at the children with training aimed at teachers. For this reason, we present some specific suggestionsti for the development of initiatives aimed at student classes.

- to incorporate the issue of invasive alien species into a wider context where biodiversity is

spoken and the importance of preserving and protecting it from a series of mines,ce, including biological invasions, and addressing with specific activities the key concepts of ecology such as diversity, system, relationship and complexity;

- Prior selection of what and how to communicate (concepts, language and methodology) taking into account theage of learners; you can't think of communicating everything: it's better to choose a few information and excellent examples to understand the main concepts and related issues; to focus a lot on the active role in prevention that empowers them as citizens;

- consult the national guidelines for the curriculum for kindergarten, the first and second cycles of education to develop the educational offer (available on the MIUR website) and bring this training action back into the framework of the UN 2030 Agenda for Sustainable Development objectives, towards which MIUR itself is giving guidance to schools;

- agree and co-design with teachers the training interventions (objectives and modalities) aimed at their students, in order to link the specific training on invasive alien species to the teaching programming actually carried out by students;

- Prioritise a laboratory approach with documentation production and avoid the fron lesson, tale, preferring, where possible, outdoor outings to show how close this issue is; for the little ones to think about educational games;

- English literature on the subject is very flourishing, so for the secondary school it is possible to think of offering routes and materials even in foreign language.

Communication issues and possible solutions

Understanding the problem of invasive alien species

1. ***Concepts generally little known, difficult to understand*** and sometimes used disproportionately. The concept of an **alien species** is little known and is definitely the first concept that needs to be clarified to the public. Full understanding of its meaning would imply basic knowledge (ecology, history, etc.) that the general public doesn't always have in general. So what kind of message is preferable to give? It depends on the context and the target of the message and it is essential to reflect before the training event. Sometimes one can even get content with making it clear that "*a species cannot* simply be introduced *into an* ecosystem *without* the *consequences.*"

Even less known is the **concept** of **invasiveness,**a concept that potentially creates a lot **of** confusionbecause it is sometimes applied even to native species (which therefore have in certain contexts an "invasive" behavior, think for example of certain weed species in agricultural contexts) or used indifferently, in a decidedly incorrect way, as a synonym for alien species. Further complicating matters is the dynamic nature of invasiveness, which can vary, for a given species, in space and time, and this fundamental characteristic must be communicated effectively with appropriate examples. In fact, a species can be introduced by humans to almost all the world, potentially being alien wherever it is outside its natural range, but it is not said that the species is invasive everywhere and should in any case be labeled as invasive forever. Emblematic is the case of many highly invasive alien species, which in their range of origin are of conservation interest. It is also worth pointing out that there is no problem for all alien species, but only for invasive species and for alien species for which there is insufficient scientific information about their potential danger to the environment in which they are introduced, and for which, therefore, a precautionary approach is desirable.

Therefore, the **terminology** adopted in common use when talking about alien species or invasive alien species can often be misleading. In addition to taking for granted too often in popular publications that an alien species is also invasive, in the available scientific and popular literature it is common to find the terms "alien", "alien", "domestic", "exotic", "foreign", "non-indigenous", "non-native" or "peasant" (see the glossary for definitions) used interchangeably, even if there are sometimes differences in the meaning. The situation (and terminology) is further complicated when parautoctone species, i.e. those species introduced before 1500 outside their natural range, are referred to. There are also additional terms that are used mainly in the botanical field, for plant species, in particular it deserves to be addressed the dichotomy archeophyte vs. neophyte, which basically takes up that between alien species (or alien) and parautocton.

It is unthinkable to clarify all these terms during a training event, but it is desirable to make a thoughtful choice of terminology to use and remain consistent throughout theurata course of the training event or educational path. The choice within Life ASAP is to try to standardize terminology for animal and plant species, suggesting the use of the term alien species (or exotic when talking about The Regulation(EU) No. 1143/2014) and invasive alien species, leaving out the other synonyms. Le Species introduced outside their natural range before 1500 are therefore referred to as parautocton, be they plants or animals. We believe that simplifying terminology is a key step in the simplification and clarity of the message and educational success.

To develop a good educational programme on this issue, you need concepts and terms with

clear and understandable definitions. For this reason, we suggest that you refer to the glossary at the end of this volume. In fact, in the clarity and consistency of the register dronanza used, much of the credibility of the message that a trainer intends to propose, therefore an excellent deal of terminology is necessary.

It is also suggested to follow an order in presenting the various concepts to the public: it is good to always start from the concept of **alien species,**discussing the possible synonyms that are used, highlighting cases where the use of an alternative term is relevant and those in which there is an incorrect use of a term. Critical analysis of non-scientific publications can offer interesting insights to prepare or to work, even in the classroom, on these aspects. Starting from the positive aspects related to alien species, we introduce the possible negatives until we reach the end of invasive alien species and the problems created by these species.

2. ***Climate change*)** is often related to biological invasions. It facilitates the natural spread of some native species, thus complicating the perception, or not, that an introduction is mediated by man. As mentioned at the beginning of the guide it is good to distinguish between native species and alien species (real!) that expand with climate change, bringing clear examples of this, such as the stabilization of tropical or subtropical alien species (see the lessexisian species that are coming to the northern Mediterranean). It should be clarified that species that arrive only as a result of an expansion of their range caused by climate change do not fall under the definition of alien species, because displacement is not caused by direct human action. However, climate change can facilitate the introduction and settlement of alien species, and in addition it can increase the invasability of certain areas by species of warm climates.

3. ***Spreading misleading messages*.**. There is a widespread perception in the general public that more harm is done than beneficial by removing invasive alien species, be they plants or animals, rather than "*letting nature take its course*". It is worth pointing out that the option of "letting nature do" is not neutral, but is a real management choice with specific consequences (loss of numerous species, increased socio-economic and health impacts). Moreover, the effects of management actions towards invasive alien species are not always immediate and it is often necessary to give time to the ecosystem and native species to recover. There are published (therefore verified) results of the success of these eradication/control actions and must be reported to the general public. To support the arguments to be used to understand the need for active intervention, it is good to identify charismatic native species as potential "victims" of invasive alien species. For example: red squirrel victim of the gray squirrel, native shrimp victim of American shrimp; shearer major and shearer minor rat victims on the islands; sea lily victim of the fig of the octets.

4. ***Complexity of processes and inability to draw up a simple*** global ***picture of invasions.*.** This could be a weakness for our arguments, because the complexity of the processes that are called into question in an invasion process by an alien species makes it very difficult for specialists to develop a simple and clear scenario of what will happen over the years and often makes it impossible to quantitatively analyze possible alternatives and associated uncertainty. In fact, since biological invasions depend on a combination of relationship dynamics between different species, abiotic effects and human influences, predicting the consequences in terms of the spread of the invasive alien species and the possible impacts exerted is difficult to process. It is important to be aware prevenzione of this, not being afraid to recognize these difficulties, avoiding generalizations and trivializations, thoroughly analyzing the situation of the context we are dealing with, and focusing a lot onthe 'prevention aspect through the adoption of good behavioral practices. comportamento.

5. ***Difficulty in the perception of the extent of the***problem. Al Unlike other phenomena that threaten biodiversity globally, such as climate change, global scenarios about the threats posed by invasive alien species are rarely proposed by experts, precisely because of the complexity of the study of invasion in ecological terms. This lack of large-scale scenarios has negative repercussions in terms of political credibility and acceptance of the phenomenon among the general public, not allowing the construction of a solid basis for public managers and decision-makers who are having to take steps to contain or mitigate the impacts of these invasive alien species. Recent studies, combined with the economic damage already reported, are filling this shortfall and can be brought to support to better understand the extent of the problem.

6. ***Lack of full consent in the community.*** There will always be deniers, as already happened for detractors of other theories (for example, natural selection and climate change). Some even suggest that invasive alien species will save The Earth! However, in the case of biological invasions these are minority positions. In favour of the problem there is a wide scientific and grey literature on the impacts of invasive alien species which, together with the effects we can observe every day for some species (such as the tiger mosquito), endorses its credibility.

7. ***Fake News*** . As with other areas, we live in a time when even on invasive alien and alien species fake news ("hoaxes") are generated that, unfortunately, easily make inroads into the public especially of Internet users. This "literature" of fakes is particularly flourishing with regard to insects and spiders, exploiting the possible aversion to these species. A classic example is the high danger of the Asian hornet *Vespa velutina* reported on the websites, because it often traded with the giant Asian hornet *Vespa mandarinia* (not present in Europe). Some species, even native, but little known to most, are associated with devastating effects on the economy or human health, making them pass as invasive aliens. Many frequent

hoaxes on the web and in the newspapers point out the success of non-bloody alternative management techniques, unfortunately often not supported by data that proves its effectiveness, or the noinvasiveness of species whose impacts are well documented. It is necessary, as always, to always look for the source of information and verify its veracity, before sharing or spreading a hoax. Le Invasive alien species are a serious problem for biodiversity conservation, economic activities and human health, and the spread of buffalo is a practice that mortifies the efforts of those who are fighting for proper scientific and technical information. A positive aspect of the spread of buffaloes is that they are a very good starting point for working also on the issue of biological invasions in a school setting.

Invasion biology support and citizen engagement

Work is needed to build consensus around the discipline of invasion biology and actions to prevent, monitor and manage invasive alien species. There are many criticisms of discipline and actions generally used; here are the main ones (Richardson and Ricciardi 2013; Courchamp et al. 2017; Ricciardi et al. 2017; Russell and Blackburn 2017):

1. Nothing new under the sun: **biological invasions have always** been **there,** in analogy to what happens in the modern era, because man has always moved animals and plants. This is a criticism that is often moved, even in the scientific environment. It is true that humans have introduced species outside their area of origin since historical times, but it is equally true that the rate of present-day introduction of invasive alien species by man as a result of globalisation and the impacts of the introduced species themselves have been exponentially increased and have significantly higher numbers than any situation in the past, putting unprecedented pressure on native ecosystems.
2. **The impacts of alien species on biodiversity are overestimated** and do not reflect reality. This criticism is also often made in the scientific field and rather underlines the difficulty of finding good data on the impacts of invasive alien species, especially at level or local level. But some species are well studied in their invasion areas and it is therefore easy to collect adequate material to tell with data at the hand of these invasions. Databases at international, European and national level are available for any type of user who is able to browse online. The picture that emerges from the analysis of this phenomenon on a global scale and from the many years of research of invasion biology is that invasive alien species are able to profoundly alter the ecosystem in which they are introduced, being one of the main causes of extinction of native species or, at the local level, of populations of native species. It is advisable to take as a reference the site of the Life ASAP, designed to be a resource even in these terms, as it collects easy-to-access scientific material on the most well-known

invasive alien species nationwide.

3. **Introducing alien species means increasing the** biodiversity **of** a **given area,,** generating hybrids that are perhaps more resistant and therefore, all in all, it means doing something positive for the environment. While this knowledge may seem intriguing atrata first glance, the richness of species should not really be regarded as the only aspect of measuring the value of biodiversity in a given area; it is misleading to assess the richness of species in a mere quantitative way, but the "quality" and the role played by species should also be considered. Moreover, since it is very difficult to have information on the impact of alien species (and therefore it is sometimes difficult to assess their invasiveness in advance) without conducting long-term studies, it is a reckless attitude to think of releasing alien species that could have even very severe loro invasività) senza condurre studi long-term impacts on native species and therefore effects in priori terms of decreasing species wealth.

   Hybridisation (which can have important and positive elementslicazioni importanti in agricultural or industrial activities) is now one of the most important forces that today lead to the extinction of wild species, the loss of genetic heritage and the trivialisation and homogenisation of natural environments. It is therefore not to be considered a benefit in terms of the conservation of biodiversity in natural ecosystems, but also a threat to the reproductive capacity of species in the wild.

   Finally, it is worth remembering that the biodiversity of a given area is the result of a process of evolution and natural selection that took place over tens of thousands of years or more, which produced a complex and co-evolved community, not of man-induced artificial process in a short time to increase the number of species, without considering the medium and long-term effects on pre-existing communities. The latter is, in fact, an overly simplistic view.

4. **The positive aspects of introductions** of alien species **are not adequately highlighted** and are at least as many as the negative ones. The introduction of many alien species for agricultural use or breeding, for example, has had indisputable positive effects on the quality of human life. There are many examples that can be used to explain that the problem is not ALL alien species (e.g. potato and tomato are alien species, but their benefit is enormous if you think about how rooted they are now in traditional peasant culture and everyday Sono life) and not even those alien species that are grown or bred in confined environments or at least without the risk of them being introduced into the wild. Sometimes alien species are deliberately introduced to control or combat the spread of other alien species with a view to biological control: the benefits are undoubted, although it is sometimes difficult to assess the possible long-term impact on other indigenous species not specifically subject to biological control. Therefore, we are not in the presence of a crusade against alien

species, but we try to make correct information about invasive alien species, which have already shown to cause important impacts on the environment, human health and economics.a. Finally, there is currently no case of an invasive alien species that has brought more benefits than harm. With regard to alien species in general, however, we need to have a precautionary approach, considering how conditions in in a given area can change over time.

5. **Accusation of xenophobia** (Coates 2011). The dichotomy invasive alien species (and more or less correct synonyms) and indigenous or native species has sometimes been confused and associated with a nationalistic feeling that pits native humans against a given place to foreigners, from a political perspective that has nothing to do with the issues of biodiversity conservation and nature conservation. In order to strengthen social cohesion around an ecological problem, such as the impact of an invasive alien species, the language used in certain communication campaigns has sometimes recalled some nationalist and racist messages. Nothing more wrong. And it should be borne in mind that the tendency to bring back to the human dimension what happens for plants and other animals is quite immediate and easy. Therefore, clarity on this aspect is necessary, especially with regard to the new generations. Biologists, naturalists, scientists and conservation technicians work to protect biodiversity, because they believe that diversity is a value to be preserved. Diversity, even of alien species, is based onmuch of the economy and subsistence of mankind (think of all the agro-food products that we normally trade around the world, both plants and animals). in Since, however, it is we humans who have animal species and plants for our nourishment and our pleasure as we want around the world, we must be aware that some of them can, once voluntarily or unintentionally introduced into the wild, cause impacts on biodiversity, human health and economic activities. Within the age of globalisation, we need to take into account what we can do to reduce these risks and use plants and animals more consciously. All this is beyond nationalist political visions or feelings of fear of the foreigner as different.

6. **Preventing the entry of invasive alien species, monitoring their invasion status, managing them and trying to limit negative impacts are a waste of resources and public money as a lost battle** (or, unfortunately often happens, the environment is never a priority). At a time of economic crisis it may seem pointless to allocate money for the management of a problem that apparently concerns plants and animals, but such a reasoning is completely superficial because it is now established that invasive alien species are able to profoundly alter the environment in which they live, going to undermine even our daily lives, the landscape that surrounds us , safety and human health, economic activities. The choice is to identify intervention priorities, according to a hierarchical approach that allows to achieve great results with a well-considered and concentrated effort. Preventing new introductions of potentially invasive alien species is

the least expensive and maximum-performing action, because it prevents harm and possible mitigation costs. Monitoring on the ground and rapid identification allow us to take timely initiatives towards a species that is not yet abundant, allowing to spend little and achieve the result, that is, eradication. Control, precisely of long-term management, is certainly the most expensive but sometimes inevitable choice on the part of a public administration in certain contexts. The money is used to prevent, monitor and control alien species, but the European Union gives guidelines and sets intervention priorities for species of EU relevance, because it makes sense to start from common species on which everyone can do something, spending little and spending well, without smearing the resources available on infinite lists of species. It is therefore perhaps a lost battle if you look at the large array of invasive alien species already present and constantly coming, but it is not a lost battle against the few species against which you can actually (we are told by scientists and technicians working in the field) actually do something.

7. **Use of bloody methods** in **the management of** some invasive alien **species.** Having to numerically check or try to eradicate plants but especially animals can be something decidedly unpleasant that attracts criticism from a part of the citizenry. Fortunately, especially in recent years, si many methods known as 'ecological' are being tested, more atanimal welfare. Sometimes, however, the results are not what was hoped for and the urgency of the conservation actions required, often combined with the scarcity of economic resources available to public administrations and the logistical and financial impracticality of certain techniques, does not allow to deal with the emergency without the use of bloody methods (also for this prevention is essential, because on this can actually achieve a good cross-party consensus in all civil society!). These methods have evolved a lot in recent years, reaching very advanced forms of capture and euthanasia. However, it is worth remembering that many non-bloody methods are currently only being proposed or being tested without having yet had any real feedback on their effectiveness. Researchers are working in this direction, but until alternative control techniques are proven to be applicable and effective, those currently available will be used. Finally, it is good to remember and propose again in this case the discourse of charismatic species victims of invasive alien species to make it clear that, containing the invasives, it promotes the life of the natives.

8. Lack of **citizen involvement** in planned decisions and activities towards alien species and invasive alien species. All too often there is a disconnect between management and science and the ordinary citizen, who finds himself having to witness initiatives for the management of invasive alien species or prevention of new introductions without being involved or even informed. In recent years, however, work has been being done on how citizens can participate in the management of the problem (adoption of good practices, reporting new species),

assuming a role as an active citizen.

9. **Why doesn't invasive alien species cause obvious impacts?** In many cases, the impacts are perceived when the invasive alien species is already widespread in the territory and as a result control and management interventions become very difficult or very expensive and, in the most serious cases, also not feasible as an irreversible process has been triggered (e.g. extinction of a species). Moreover, sensitivity to this issue has grown, but not yet enough.
10. **The introduction of invasive alien species will enable us to cope with climate change.** Nothing more wrong! Many invasive alien species are favored by climate change that will increase their impacts, creating ever-increasing problems to ecosystems, the economy and human health, and leading to increasingly irreversible damage.

General training tips

- Start from **positive stories,** with animal or plant , species close to the public, of local interest or flashy and well-known species, for which there is a good story to tell;
- starting from **daily experience or** local **experiences,** working with video or news material in the press related to radio interviews and/or newspapers as a lesson point;
- **avoid using "belligerent" terms** when it comes to biological invasions: we are not at war with anyone, here we talk about biodiversity conservation;
- take a **very technical-scientific approach and language,** without demonizing the phenomenon in its own right;
- **avoid clashing** and dwelling on sterile discussions if controversy arises; it must be remembered that the audience is heterogeneous and numerous and a sterile discussion does not benefit anyone in a training event that is aimed at a group of people. It is better to listen and counter serenely bringing to support the data in our possession. Moreover, while it is understandable that an ethical approach that a priori rejects the need to cause the death of a living organism, it is important to bring discussion back into the field of pragmatism.

Educational strategy

Contemporary cultural and educational scenarios are characterized by a complex dialectic

between global and local, learning difficulties in the new generations and open and controversial problems, such as that of the IAS, which require a new way of educating and training. This must be aimed at promoting research, recovering motivation to learn, achieving new cross-skills and active participation. It is for this reason that, as part of the preparatory actions of the Life ASAP project, Action A2 provides for the definition of a training plan, structured in specific subplans for each identified target group, which:

1) analyze and compare the modalities and tools used for training in the specific theme (best practices),

2) define common frameworks within which to decline training according to the specific needs of language, timing, delivery mode, operating context of the different target groups.

Methods and Tools for the effectiveness of teaching

In solving the IAS problem, the training activity of key targets is highly strategic. It is essential in the training design to integrate multiple ways of learning, also on the basis of the contexts in which the activity itself is proposed and the target of the subjects in training.

In order to make the subjects in training aware and protagonists of the training path that they are facing, and therefore to make the training process itself more effective, it is necessary to identify a way of sharing on the model of the training contract, which can serve to read the expectations and previous experiences of each participant and to present the training path both in content and methods, so that the path to be taken together is explained.

This preparatory step is also central to understanding the right direction of training course design both in terms of general and specific objectives, methodologies chosen, the level of content to be processed and evaluation tools to be used.

The prevailing approach that is used in training processes of this type, as we have also seen from the practices analysed, is of the frontal type in the classroom, articulated according to different methodologies and aimed at gaining above all knowledge and developing sensitivity on a specific problem.

The same objectives are also achieved on a type of formal distance training, which is widely used to reach a higher and more widespread number of subjects to be trained and informed.

This more traditional approach is integrated when there are circumstances, a more operational methodology in the field, which allows the direct observation of the phenomenon and the contexts where it manifests itself.

However, a direct or indirect experiential contact (case studies, training on the job) is always valued, especially if the training objective is to acquire operational skills for the resolution of the problem.

Also, do not underestimate the educational importance of sharing moments such as conferences and workshops, to broaden the social base aware of the terms of the phenomenon of alien species and to empower the different targets involved in training with respect to their specific role in coping with the contrast of the phenomenon.

The following pages summarize the main techniques that will be used in the context of the training activities provided by the project.

Classroom learning

In the training activities, the classroom maintains a very important role, even if it is necessary to innovate deeply the way in which traditional lessons are managed. The frontal lesson with a teacher who explains for hours must be considered outdated for its ineffectiveness since our brain already after 15 minutes of listening does not have the opportunity to remember clearly. Then the classroom must rethink itself, innovate, become more active and experiential, integrate with other methodologies. The advent of new learning technologies no longer makes it necessary to use the classroom to transfer information concerning, for example, rules or laws that can be conveyed through technological channels that allow its use in the ways and times decided by the user. In this way, the classroom can be used more effectively for experiential training based on comparison, simulations and work on concrete cases. Educational aids in the lesson can and must also evolve. Presentations need to be better curated, movies, multimedia tutorials, art stimuli, cognitive maps, metaphors and many other ways to make classroom intervention shorter, but also much more effective for learning. Among the different types of classroom training that can be used in this project are:

- The frontal lessons
- Case studies

SCHEDA 1 - Frontal Lessons

Learn from the lesson of an experienced lecturer In summary

Classroom training is the most classic method of training. The aim of this training methodology is to increase people's *know-how* on technical or behavioural issues. The role of an experienced lecturer on both content and effective teaching methodologies is central. In some experiences and best practices, such as those gained by the Pacific Invasive *Initiative,* you also choose the front classroom mode to work on acquiring technical-operational skills for the eradication of IAS. This training easily integrates with all other training methodologies, such as *coaching,*, *e-learning,* , *outdoor, project work,* etc.

What is it?

This is the lesson in the "traditional" sense, in which the teacher mainly uses verbal exposure. In the frontal lesson the student plays a predominantly passive role, it is the teacher who has a fundamental function: it is the task of facilitating the learning process, stimulating motivation and keeping the attention of the participants. Giving an effective and engaging lesson requires careful design and preparation of supporting teaching materials. A frontal lesson can, however, become participated in some contexts, then with an active participation of learners, through the

choice of techniques of involvement of the participants and the activation of experiential methodologies.

The role of the teacher

The trainer must in this case be a builder and facilitator of learning processes. In fact, it must build the *setting,* write the task of design or discussion, be able to synthesize what has emerged to realign it with the training path as a whole and evaluate its outcomes through the preparation of a tool of self-assessment of the subject in formation, with respect to the increase of one's awareness towards a specific problem.

What is it for?

The aim of this training methodology is to increase staff *know-how* on technical or behavioural issues. Good classroom training also helps to strengthen internal ties and collaboration between members of the organization. Il The comparison in the classroom allows for a greater circulation of information. The active participation required of the participants promotes the communication of the organizational processes, strategies and objectives of the organization, thus strengthening collaboration and team spirit. In order to facilitate the learning process and keep the attention of the participants, the frontal lessons must always be very short, to allow the best acceptance of concepts only heard.

SCHEDA 2 – Case studies

Solving cases to be effective in your work reality At a glance

The tool is to have participants analyze educational cases. Participants are asked to analyze in detail a practical problem, to propose a correct diagnosis and solutions. This methodology creates a close link between the training and the operational reality of the participants. If well managed, in addition to the educational result obtained, it can produce concrete results in improving the ability to solve problems.

What is it?

The analysis of educational cases is aimed at developing diagnosis skills and decision-making skills in the participants. Such cases, which are often real situations, are carefully prepared and selected according to the target *audience.*. This technique is not used at the beginning of the course, but after a series of lessons and exercises have been carried out, so that the teachers and students have got to know each other. Participants are asked to analyse a concrete problem in detail and propose solutions. Generally, the analysis of the case is done in subgroups and the conclusions of each of them are then compared in the plenary session. One variant is

represented by the "self-case", which is proposed by one of the participants, who exposes a problem he experienced firsthand in his working reality. The cases on which the method is based can be distinguished in different types in relation to the educational objective:

- **"diagnosis"**cases: the case used presents a complex situation, with heterogeneous variables and a lot of information; the aim is to make a diagnosis by selecting and interpreting the data provided;
- **cases of "decision"**: or cases of problem solving, in which you describe a starting situation and a purpose to which you want to get to. It is up to the group to identify the most appropriate means or solutions, training them to make decisions quickly;
- **cases of "events analysis"**: the case is real and is presented in full, even if it did not work. The group discusses possible other solutions based on that taken in reality.

The role of the trainer

In this methodology, the role of the moderator teacher (who can intervene in simulations by playing the role of a simple citizen, for example), which will emphasise the way individual decisions have been made. In the specific application to IAS training, however, the trainer, given the technical nature of the subject, will not be able to ignore the validity of the same, and therefore the feasibility and goodness of the decisions proposed by the learners. The moderator must therefore: establish the rules and timing of the discussion; ensure that all participants have the opportunity to express their ideas; prevent any of the participants from monopolising the discussion; prevent excessively confrontational situations from developing.

What is it for?

The method of cases tends to stimulate the investigative and analytical skills of the participants and also to expose them to different ideas and principles than a those previously followed.

Training On The Job

To understand and memorize it is always better to work concretely, manipulate, simulate, activate the whole body but provided that the experience is accompanied by reflection. In some contexts, experience can be an obstacle to learning new models or understanding new scenarios. Behaviors and strategies successfully used in previous contexts lead the individual to automatically crystallize and reproduce their models, with the risk of failure if such behaviors and strategies are applied in different contexts.

In changing environments, where continuous change is the only certainty, the culture of "continuous learning" must be a central value. The key to making *learning by doing* is then *learning by thinking!* Reflecting on experience, reworking, integrating, new experience, reflecting, stopping again to reason, re-examine and integrate again, in a continuous cycle of experience and reflection.

The formal activation of the training process may include:

- structured observation of other experiences. The person or group in learning acquire knowledge from experts, analyze cases of success or failure in direct form (with side,visits and comparisons), or in indirect form through the analysis of videos and documentation;
- reflection on the observed experience, the reconstruction of the fundamental steps, the comparison with one's own performance, the resources and constraints of one's operating environment.

Self-observation of one's own experience follows a similar process:

- Structured detection of the behaviors and operations carried out, whether they are limited to individual operations or continuous processes, to bring out first the strengths punti di forza and then the areas where to intervene to improve and achieve the expected performance;
- reflection on one's own behaviors, on the strategies activated in that situation, on successes and failures, for greater self-awareness;
- Defining learning goals, visually displaying the ideal performance required and activating an appropriate level of attention and concentration during the new experience.

The process can of course be enriched as a group, activating a cooperative learning process, or assisted by other experienced figures, initiating a *coaching* process. .

Among the different types of *training on the job* that can be used in this project are:

- action*action learning*
- *project work*
- *study tour*

SCHEDA 3 – *Action learning* Training in real-world contexts At a glance

Action*Learning* is an experience-based learning strategy through which participants learn to and from others. Starting from the analysis and interpretation of learning experiences, one

identifies the process that generated it. It normally takes place in real or simulation contexts. I Participants are called to work on defined and concrete projects, with a codified learning environment structured in meetings, individual, small group and collective activities. The conductor is an expert in learning processes.

What is it?

In*Action Learning,* people learn to act effectively by analysing and interpreting their past experiences, with the aim of identifying the process that generated learning. There must be at least three features for action *learning* to be talked about:

1. the action takes place in real or simulation contexts. Participants are called to work on defined and concrete projects;
2. all participants in the group (called Set) are expected to participate. Participants in each set can actually work on the same project or work on different projects and come from different organizations;
3. the focus is mainly on the learning process, not just the actions of the group.

Action*Learning* recognises vital importance to action, but it also states that action alone is not enough for there to be learning. Il *Learning by doing* may be enough if you're trying to learn a basic mechanical skill, but in the complex world of organizations, the only experience in solving problems is not enough. For learning, we need to reflect on that experience, to identify exactly what has been learned, to internalize teachings, and to devise action plans to deal with new and different situations.

The role of the trainer

For the Action Learning methodology*to* be effective, all participants need to be involved in the activities. The trainer must be able to manage the spaces and times so that everyone can contribute to the work that the group is called to carry out.

What is it for?

Action*learning* can be applied in two learning contexts: individual and organizational.

From the individual's point of*view, Action Learning* allows you to:

- improving learning capacity;
- develop analysis skills; ;

- develop the ability to work in a group;
- manage i change processes;
- working on projects;;
- improve communication and negotiation skills.

From the organization's point of*view, Action Learning* allows you to:

- increase the ability to cope with change;
- raising awareness of the whole context towards learning processes;
- valuing existing but still implicit knowledge;
- improve the climate and interpersonal communication.

SCHEDA 4 – *Project work*

Learning by realizing concrete projects

Project Work is an effective training tool that requires participants to carry out a concrete project. In some cases, the project must be designed on the basis of what has been learned previously in the courtroom. This methodology normally follows a classroom activity, a training gym, an *e-learning path.* Through the realization of operational projects the learning is reinforced and personalized, the training path is "anchored" to the real operational context of the participants and the organization has a "consuleential" return. The participants produce improvement projects, new ideas, concrete work plans of great use for the organization. This methodology has been found to be frequently used in training for students, who are invited to design information material (e. brochures, videos,...) to raise awareness of the problem of invasive alien species in their territory (CISM), *Species Management* as an example of good practice mentioned, especially with the aim of reorganizing what has been learned in multimedia and classroom learning contexts. The conductor is an expert in learning processes.

What is it?

Training is the world of the intangible. Hard to touch, to measure. In organisations where the dominant culture is that of "concreteness", training is often perceived as an obstacle to "doing". Touching the effects of good training creates a bridge with the prevailing cultures of organizations: *Project Work* is one of the privileged tools in this regard. Non However, this is not a retreat, a compromise towards operational work, but an effective training tool that requires participants, usually divided into working groups, to carry out a concrete project on the

basis of what has been learned previously, for example, in the classroom.

The role of the trainer

The task of the trainer in the case of a Project *Work* is first of all to identify the issues on which the participants, divided into groups, are called to reflect and draw up the project. The trainer will then have to read and evaluate how much the groups have produced.

What is it for?

Project Work has a number of advantages:

- learning is reinforced and customized through the implementation of operational projects;
- the training path is "anchored" to the real operating context of the participants, thus solving one of the classic problems of training: to be often perceived as too far from everyday life;
- the organization has a high "conseulential" return, when participants produce improvement projects, new ideas, concrete work plans.

Project Work can be individual or made in small groups.

Study tour and outdoor training

This training area brings together some activities whose common thread, which is to learn from experience. Learning in a study visit, also called the *Study Tour,* allows you to compare yourself with other collective experiences and concrete cases. Learning with the methodology of *Outdoor Training* is useful for confronting the group dynamics that are triggered in contexts with a strong experiential component.

Among the different types of *training on the job* that can be used as part of this project is the *Study Tour.*.

SCHEDA 5 - *Study Tour* Learn with a Study Trip At a Glance

The *Study Tour* is a real study trip, an activity of analysis and comparison of management/educational performance within one or more organizational realities (for example, in the case of the LIFE ASAP project, protected natural areas) or scientific and research institutes. This methodology is useful for those organisations that are called upon to address change and innovation and need to deal with real cases and successful experiences. Especially

for the training of technicians of the public administration is indicated the effectiveness of touching virtuous faunistic management realities, as in the examples of aquariophilia and fishing in Brazil, and then reproduce the processes that lead to a good prevention of the spread of IAS in the individual territorial realities. The people involved will have the opportunity to analyse, compare with colleagues, reflect, thus developing strategic skills for their work. A learning process expert will be able to assist the group involved in the Study *Tour.*.

What is it?

The *Study Tour* is a real journey of study inside or outside the working reality in which you operate. It is a lively, participatory learning mode and very rich in cognitive and emotional stimuli. By putting participants in direct contact with experiences and solutions adopted by other organizations, it allows you to combine the method of analysis and comparison with the possibility of knowing in person contexts and notable subjects.

The role of the trainer

The trainer involved in the *Study Tours* will:

- organize the programme;
- select organizations and cases of interest for learners;
- assist i participants during the Study *Tour.*.

What is it for?

The purpose of this training methodology is to understand the potential of the organisations visited with particular regard to the analysis of the approaches, methodologies, techniques and tools used. The methodology is also very useful to take inspiration on how to deal with and solve certain situations through the use of good practices that have allowed the resolution of some problems.

Conferences and workshops

Participation in conferences outside the workplace is a well-established practice in training the staff of organisations, whether public or private. I Conferences and events are usually moments of comparison with other experiences, allow you to learn specialized knowledge and skills, help to explore trends and novelties. These are normally intense, short moments that last from a few hours to a few days, often with a high number of participants. The workshops are short seminars normally aimed at those in senior positions within the organizations, and involve comparisons

with experts, witnesses, often of high professional level.

These moments of encounter and comparison are used in most of the good practices analysed within the Life ASAP project, both as a synthesis phase of a path, and as an initial dissemination of a territorial issue in relation to IAS.

SCHEDA 6 - Conferences

Participate in conferences to update and deepen At a glance

Specialist moments organised by university institutions, public and private research and training institutions can be included in this field.

What is it?

A classic formative moment, the conference is a meeting organized on well-defined and specific topics, usually characterized by a specialized cut. Participants can choose from a wide range of conferences and seminars organised by university institutions, research and training institutes, public and private. Conference participants usually have a rather passive role as "public" or "audience".

The role of the trainer

The trainer is responsible for helping the staff in the selection of conferences, referring to his learning needs and making sure of the validity of the training offer.

What is it for?

This methodology has objectives of deepening, updating and refinement. By participating in good conferences you have the opportunity to listen to the contributions of the top experts and perceive the main innovations and trends in the sector.

SCHEDA 7 - *Workshop*

Team meetings to activate professional networks and share experiences

The *Workshop* is based on the maximum enhancement of the skills of the participants present, who are confronted with external experts. The meetings are characterized by the active participation of the participants. Normally, an expert or witness and an animator will attend. The role of the animator is to launch stimuli of discussion, to make synthesis, stimulate confrontation. The *Workshop* has the advantage of creating bonds and facilitating the comparison between the participants. It's a key time to activate professional networks. It is

useful to increase the flow of knowledge within organizational networks and foster their integration.

What is it?

The *Workshop* or *"team* meeting" is based on the maximum enhancement of the skills of the participants" present. The meetings are characterized by active participation to develop discussions and to share meaningful or problematic experiences. A workshop model proposed as of greater use for IAS training activities includes limited meetings between specialists on related issues, in which each participant can present their ideas and experiences. A subsequent choral discussion then draw conclusions that sum up the best ideas that emerged from the comparison.

The role of the animator

The role of the animator is to launch stimuli of discussion, provocations and start the activities; once the intervention begins, the real protagonists of the meeting become the participants and external experts.

What is it for?

The effectiveness of *team* meetings is linked to the potential of teamwork: the integration of individual ideas and the sharing of personal experiences facilitate the achievement of concrete goals. Training experience produces tangible results that take the form of projects that can be carried out in the field of professional activity. In addition, the comparison with external experiences and stimuli broadens the cultural horizons of the staff.

Distance training

Distance learning is considered one of the most effective methodologies within the best practices analysed, as it opens the door to a new paradigm of individual and collective learning, enabled by the network and technology, but not determined by them. It is the result of the convergence between training processes and the internet, thanks to which network technologies are used to create, develop and facilitate learning, distributing in real-time personalized and dynamic in-depth content. Each *e-learning* system aims to convey content through self-training or study materials in learning groups. Participants can communicate with trainers in real time, albeit remotely, through chats, forums, etc., with undeniable reductions in costs and problems related to the need for staff to move to reach the training sites. Networking creates a communication relationship at three levels of interaction: between the participant and, from time to time, the learning objects, teachers docenti and other

participants. Distance learning is increasingly taking place within learning communities and *social networks,*where people share professional interests, goals and experiences. All this is facilitated by technology and in particular by *online* training platforms that allow *to* articulate teaching in flexible, customizable and modular proposals on the need and experience of the context.

In this sense, one of the most innovative training experiences detected among the experiences of good practices is that put in place by *the National Ocean Service Education* recalled among the *best practices*, which has identified a liaison tool called Bridge, which allows trainers and educators and targets of users interested in receiving training on the specific theme, to access an always up-to-date and animated platform, which guarantees in a sense the permanence and evolution of the process and the educational relationship.

Among the different types of distance learning that can be used in this project are *e-learning* courses and *Webinars*..

SCHEDA 8 - *E-learning* courses

Continuous personal training in virtual environments

E-learning training is normally used for courses of a predominantly technical nature (new laws, standards, technical procedures), but also for other topics whose content can be strictly coded. The advantage of this methodology is that of flexibility, of customizing routes in terms of time, of the reusability of the materials produced. formazione *E-learning* training is normally used in conjunction with other training methodologies (classroom, outdoor, project work, etc.), thus composing *blended*trainingcourses. There is normally online *tutoring* and the possibility of interaction between participants with *forums,* chats and other modes.

What is it?

di The *online*trainingactivity, normally carried out on *e-learning* platforms, proprietary or *open source*,, was initially introduced on the grounds of significant cost savings. Over time it has also established itself for the improvement of the educational effectiveness of all training, especially in *blended* modes. *E-learning* training environments are typically accessible individually via network, but can also be used in classrooms and multimedia labs. The real advantage of the platforms is related to the provision of integrated environments, in which they coexist:

- features for production/content management;
- a applications to manage communication activities between participants and each individual participant with the *tutor* using forums and chats.

What is it for?

E-learning training allows:

- management of educational content. From *e-learning* platforms, participants can consult multimedia courses, i.e. comprehensive courses with images and the voice of the trainer, documents, teacher films or other multimedia learning objects;
- management and tracking of the interaction between participants and content, between participants, participants and teachers;
- the ability to create quizzes and assessments using various methodologies; the management of the relationship between teachers and participants with the possibility of creating *forums* and chats, in order to facilitate the exchange of experiences, ideas, opinions, problems on the issues covered;
- storage of resources. Educational materials, handouts used during lessons, photos of classroom meetings, bibliographies, even in a downloadable and printable version, can be made available to users.

a Distance learning is therefore a mode that has the potential to create continuous personal training environments.

The role of the trainer

The trainer called to run an *e-learning* training course is responsible for selecting and inserting the material useful to the participants for a personal study. If the platform is not only used as a resource repository, but involves ways of interacting with the participants, the trainer is responsible for animating the participation of learners. It will open forums, stimulate discussion, solve any problems that may arise during on online training.

SCHEDA 9 - *Webinar*

The *online* specialist seminar

It is a *live* and short-distance training mode normally used to supplement classroom training for in-depth study.

What is it?

The *webinar* - literally a web seminar - is a *live* event delivered through the network, which allows several people at the same time to connect live to participate in an interactive lesson,

workshop or conference, as happened within the training project of the Center for Invasive *Species Management* (CISM) mentioned among the best practices. Thanks to the internet, in fact, the *webinar* combines in a single experience the convenience of enjoyment from home with the effectiveness and interactivity typical of an event in presence. Just as in a real classroom you find yourself at the set time and all participants have the opportunity to actively intervene during the event to ask questions and share ideas. nel I *Webinars* can take place by downloading a program to each participant's computer, or by connecting to a *web* application via an e-mail link (meeting invitation or meeting *invitation).* To access the *webinar* you obviously need an Internet connection, a multimedia tool management program, and speaker/headphone.

What is it for?

To deepen thanks to the contribution of a more experienced a specific theme in a usually short time frame (2 hours) with a good level of interaction.

The role of the trainer

Since the event takes place synchronously, the trainer called to manage a *webinar* must be careful to keep the participants' interest alive, encouraging their participation through the animation of the discussion.

Methodologies and Tools for Target

The following diagram shows the type of activity, training objectives, methodologies and training tools considered best suited for each project target group

Type of Activity	Target	Training objectives	Methodologies	Tools
Training of knowledge "multipliers"	Technical staff of the Protected Areas and operators of the teaching ofun zoos, aquariums, botanical gardens, scientific museums and protected areas that have direct contact with citizens. They are involved in actions to ensure replicability and transferability	Providing knowledge about IAS and possible issues with the general public (conflicts with local populations, animal welfare associations, etc.) Making known the active role of the citizen in prevention	Mixed methodology of classroom and distance training. Workgroups.	- Training pact, *workshops*, expert interventions (also with *webinar* mode)) - Case studies - Action learning - Simulations - Learning tests (admission and final assessment) and approval questionnaires - Handouts, ppt presentations, manuals, individual species cards, specific texts
Governance	Staff of the Central and Local Public Administration, involved in processes and activities of surveillance, and management of IAS in the territory. Targets belonging to this type have a direct role in the implementation of Regulation 1143/14	Learn terms and content of the problem of invasive alien species and how they are monitored and managed on the ground, as well as the obligations arising from the new European Regulation	Classroom and distance training methodology.	- Training pact - Expert interventions (even with webinar mode) - Case studies - Video surveys - Action learning - Final Learning Verification - Dispense, ppt presentations, specific texts, videos - Letions, video tutorials, pc usage and collections of specialist websites of interest - di Entrance test and finaldi assessment, finale, approval questionnaires

Type of Activity	Target	Training objectives	Methodologies	Tools
Governance and technical-territorial operations	Personnel of protected areas, operational on the territory in processes and activities of surveillance, and management of IAS	Providing knowledge to detect, prevent and manage IAS	Methodology of f-ormation in the classroom and at a distance, study visits	- Expert interventions (even with webinar mode) - Workshop - Case studies - Dispense, specific texts - Study tour - Self-assessment tests, liking questionnaires
Technical-territorial operations	Hobbyists (such as hunters or fishermen), engaged in direct contact with the territory	Cognitive tools for IAS detection and prevention	Methodology of training in presence	- Expert interventions (even with webinar mode) - -Conferences and Workshops - Good practices - Brochure codes of conduct presentations ppt
Governance and technical intermediation operations	Business operators who have direct contact with possible IAS buyers	Learn the terms and contents of the IAS problem and learn about its role in implementing the Regulation on the prohibitions on the marketing of species on the list	Classroom ormulation methodology, working groups, visits and outdoor training	- Expert interventions - Action learning - Handouts, specific texts, manuals, individual species tabs, ppt presentations - Entrance test and final assessment, approval questionnaires

Type of Activity	Target	Training objectives	Methodologies	Tools
Governance and technical intermediation operations	Professionals such as forest biologists, architects and green designers, veterinarians	Learn the terms and content of the IAS problem and become aware of its role in adopting, and transferring, responsible behaviour	Classroom training methodology, working groups, visits and outdoor training	- Expert interventions, conferences and workshops - Handouts, specific texts, code of conduct, ornamental green, presentations - Action learning - di Entrance test and final assessment, finale, approval questionnaires
Governance	In the airport context, personnel responsible for the inspection and control of goods in transit (border inspection points, veterinary offices, forestry, regional plant protection services, etc.)	Cognitive framework on the roblema of invasive alien species, regulatory environment, role of airports, control protocols	Classroom training methodology and working groups	- Expert interventions - Action learning - Dispense, specific texts - Video surveys - Entrance test and final learning verification,di apprendimento, approval questionnaires
Education	Environmental Education workers, teachers, animators. Target audiences riferimento of this type have a cultural and educational task	Cognitive framework on the problem of invasive alien species. Knowledge of educational and communicative tools for education and dissemination of the problem of IAS	Classroom and distance training methodology	- Training pact - Expert interventions (also with webinar method) - Video surveys - Action learning - Project work - Self-assessment tests

Type of Activity	Target	Training objectives	Methodologies	Tools
Education	Volunteer citizens	Cognitive framework on the problem of invasive alien species. Using the Smart App for Data Collection, Geolocation, and Transfer	Classroom and distance training methodology	- Recruitment campaign - "Bioblitz" - Expert interventions (also with webinar method) Seminars - Videotutorial and video-games - Self-assessment tests