SEVENTH FRAMEWORK PROGRAMME
THE PEOPLE PROGRAMME

*Annex I - "Description of Work"**

PART A:

Grant agreement for: **Initial Training Networks**
Call identifier: **FP7-PEOPLE-2013-ITN**

Implementation mode: **Multi-ITN**

Project acronym: NASSTEC
Grant agreement no.: 607785

Project full title: The **NA**tive **S**eed **S**cience, **TE**chnology and **C**onservation **I**nitial **T**raining **N**etwork

Date of approval of Annex I by REA: 23/05/2013
Project start date: 01/04/2014

**** This Annex I refers to the 2013 PEOPLE Work Programme*** *(European Commission C(2012)4561 of 9 July 2012)*

A.1 Project abstract

Keywords: Biodiversity, Conservation biology, Botany, Habitat and species restoration and rehabilitation, Seed ecology, Germination protocols, Seed production and trade, Ecosystem management.

Abstract:
NASSTEC will train 11 Early Stage Researchers and 1 Experienced Researcher in native seed science, conservation and use, so that environmental mitigation and adaptation projects can have increased impact. Without immediate enhancement of capacity and capability in this specific area of biodiversity science, the native seed industry in Europe will fail to develop towards the multi-million dollar markets of the US and Australia. NASSTEC plans to interconnect the public and private sector through the establishment of a multidisciplinary European doctoral 'school' with the aim of integrating knowledge in plant ecology, genetics, molecular biology, taxonomy, ecology, conservation, seed biology, environmental science, agricultural botany, crop science, breeding and horticulture. This knowledge will be transferred to industry, thereby contributing to the EU bio-economy. NASSTEC includes 7 full (FP) and 8 associated partners (AP) from 4 EU Member States. It interconnects 4 different sectors: private companies (3 FP and 2 AP), NGOs (2 AP), public land governance bodies and academic institutions (4 FP and 4 AP). The scientific and training programmes embrace 12 research topics, clustered under three sub programmes: A) *In situ* seed sampling; B) Seed biology characterisation; and C) Production and deployment of seed. Critically, the findings from the three sub-programmes will be interconnected, integrated and communicated rapidly and effectively to the ESRs/ER and all external stakeholders through a global e-Learning Environment (ELE). This ELE will be pivotal in delivering a balanced scheme of exchange visits and secondments, a rich programme of network events, news of network achievements and research information; including the findings of the final NASSTEC conference. NASSTEC will increase the competitiveness of ESRs/ER substantially and ensure that human capital is directed towards the development of a sustainable and dynamic European native seed industry.

PLEASE NOTE: According to the recommendations given in the Negotiation Guidance N, this text has been typeset in Times New Roman 12pt., in the tables in 9pt., page margins have been set at 2 cm.

PART B:

B.1 List of participants

B.1.1. List of Participants (full beneficiaries)

Beneficiary Number	Beneficiary short name	Beneficiary full name	Private Sector *(Y/N)*	SME *(Y/N)*	Country	Month enter project	Month exit project
1 (Coord.)	MUSE	Museo delle Scienze	N	N	Italy	1	48
2	RBGK	Royal Botanic Gardens Kew	N	N	UK	1	48
3	UNIPV	Università degli studi di Pavia	N	N	Italy	1	48
4	SSE	Scotia Seeds Limited	Y	Y	UK	1	48
5	JHI	The James Hutton Institute	N	N	UK	1	48
6	SESIL	Semillas Silvestres SL	Y	Y	Spain	1	48
7	SYN	Syngenta Seeds BV	Y	N	The Netherlands	1	48

B.1.2. List of Associated Partners (including role and status)

N.	Associated Partner name	Short name	Country	Organisation type	SME (Y/N)	Role in the project
1	Recrea - Gestión de Instraestructuras culturales, Turística y deportivas del principado de Asturias, S.A.U.	RCRA	Spain	Private	N	TR, SEC
2	Mylnefield Research Services (MRS) Ltd	MRS	UK	Private	Y	RES, TR, SEC
3	Agenzia per la Promozione della Ricerca Europea	APRE	Italy	Private	N	TR, SEC
4	The National Trust for Scotland	NTS	UK	Private	N	RES, TR, SEC
5	Botanic Gardens and Parks Authority	BGPA	Australia	Public	N	RES, TR, SEC
6	Jardín Botánico Atlántico, S.A	JBA	Spain	Private	N	RES, TR, SEC
7	Provincia Autonoma di Trento	PAT	Italy	Public	N	TR, SEC
8	Università degli studi di Bologna	UNIBO	Italy	Public	N	TR

B.2 S&T Quality

B.2.1. Objectives of the research programme

B.2.1.1 NASSTEC specific objectives

The overall objective of NASSTEC is a functioning network of academic and industry specialists able to produce and use European native seed effectively and efficiently. NASSTEC will:

1. Deliver key practical state-of-the-art training to ESRs and partners to ensure high quality seed sourcing and production. This will help identify, consolidate and improve existing technology platforms across the training network.
2. Connect key disciplines in native seed use, from innovative seed science research to technological development and inter-sector links.
3. Develop joint network products, including assessment and evaluation tools, such as protocols, and research outputs collated in an *ad hoc* 'NASSTEC Manual' (D39) for relevant internal and external stakeholders.
4. Create a dedicated internet-based NASSTEC Information Facility (IF, M3).
5. Provide draft guidelines on the production and use of native species' seed for submission to EU regulatory services as a complement to available seed certification schemes.
6. Connect NASSTEC with the USA and Australia native seed science and technology infra-structures that are already recognised internationally as examples of best practice.

Project-specific outputs seek to maximise use by a range of stakeholders (industry, non-profit organisations and public sector researchers).

Table 1. List of Work Packages

Work package No	WP Type	Work package title	Deleverables (D) Milestones (M)	Lead beneficiary	Start month	End month
WP1	MGT	Management	M: 1, 3, 4, 17; D: 1, 3, 6, 12, 17, 20, 24, 29, 36, 40	MUSE	1	48
WP2	MGT	Recruitment	M: 2, 5, 18, 23 D: 2, 4	UNIPV	1	23
WP3	RTD	Research	M: 6, 8, 14, 15, 19, 25, 26,29 D: 7, 16, 18, 21, 28, 30, 31, 32, 34	RBGK	5	48
WP4	TR	Training	M: 9, 11, 27 D: 8, 9, 11, 13, 19, 22, 25	JHI	6	42
WP5	MGT	Quality of research and training	M: 10, 21 D: 5, 37	UNIPV	4	46
WP6	DISS	Dissemination	M: 7, 16, 28 D: 10, 35, 39, 41	RBGK	7	48
WP7	DISS	Industry-academia integration	M: 20, 22, 24 D: 38	SSE	20	48
WP8	OUT	Outreach	M: 12, 13 D: 14, 15, 23, 26, 27, 33	MUSE	9	40

B.2.2. Research methodology and approach

B.2.2.1 Overview of NASSTEC role and planned activities

NASSTEC's scientific programme interconnects 4 leading academic institutions, with experience in seed science and plant biodiversity, with 3 private companies as full partners. This core group will **facilitate mobility within the network and learn from market leaders in US and Australia** so that specific expertise, technology and the native seed trade in Europe can grow

quickly. The inter-disciplinary nature of NASSTEC will enable the establishment of a high profile European doctorate in the area of seed research for native species able to deliver teaching and learning to all relevant stakeholders. NASSTEC comprises 3 sub-programmes:
A - *In situ* seed sampling - to provide essential training in plant taxonomy, ecology and reproductive plant biology, enabling the selection of species for mitigation projects aimed at Alpine, Atlantic, Continental and Mediterranean grassland habitats, involving ESR 1-3;
B - Seed biology characterisation - to develop skills in native seed physiology (germination and storage) and stress tolerance, so that functional and genetic data can be generated and used to match seed lots to specific environments for improvement, involving ESR 4-7;
C - Production and deployment of seed - to transfer knowledge on the means of improving seed quality (performance) to the nascent industrial sector (SMEs) for native seed production, enhancing the conversion rate from seed to plant (increased efficiency). Collectively, the work programmes will link source environments of the seed (physiology, biochemistry) with whole plant characteristics (intra-specific functional diversity), such that 'best-fit-for-purpose' types can be sourced, selected and used, involving ESR 8-11 and ER 12.

NASSTEC S&T will be coordinated by Prof. H. W. Pritchard[1] whose research group at RBGK regularly publish in high quality journals (e.g. PNAS, Trends in Plant Science) on all aspects of wild species seed biology. He will be supported by Prof. G. Squire[1] at JHI, and Prof. G. Rossi[1] providing an ecological and taxonomical perspective and leading the PhD school at UNIPV.

B.2.2.2 Detailed description of the 3 sub programmes

NASSTEC S&T will focus on research topics identified by private and public stakeholders for urgent attention at the European level and with particular emphasis on the grassland habitats in the different biogeographical areas in the partnership (Atlantic, Alpine, Mediterranean and Continental). Known generic differences in grassland performance between grasses and forbs mean that this system is ideal for fundamental science and practical application through multi-species, trait-based approaches to species selection and seed production. Through ESR-led case and pilot studies in different area, advice will be forthcoming on grassland restoration options of significance to many European countries and across the pedo-climatic range of the EU. Projects will tackle the issues of protection from soil erosion, and knowledge transferrable to many grassland restoration needs (e.g. railway and roadside banks, cave sites and building sites). For each system key species will be selected as models for detailed intra-specific studies.

B.2.2.3 Research sub programme A: **In situ** *seed sampling (mentor: Pietro Iannetta[1], JHI)*

Key industrial question to answer: "What species should I use and of what provenance?"

Companies wishing to produce seeds for restoration need species and ecotypes that are fit-for-purpose, both for the ensuing environmental conditions (including future-proofing) and edaphic features. NASSTEC intend to establish and test a simplified habitat classification system, that is more likely to be widely adopted, and to validate its appropriateness by assessing the variation in species performance based on plant and seed traits (phenotyping). The resulting reference guide will contain criteria that match species to habitats for restoration in Europe. The main objectives here are to produce a species reference guide and design the prototype on-line decision-tree for species selection for restoration for the targeted regions, based on a simplified habitat classification that matches pedo-climatic features with plant distribution patterns and functional traits, including reproductive and germination characteristics. Specifically, the aim is to be able to select key herbaceous taxa from various sources with high resilience to eroded, impoverished soils following the definition of seedling-sapling and seed quality parameters, including seed

[1] If any of the persons mentioned in Annex I is unable to participate in the project, s/he will be replaced by someone with the same level of experience and/or expertise

mass that is a good predictor of light sensitivity and the ability of the seedling to emerge from depth and thus establishment and resource capture. The final aim is to develop and apply user-friendly propagation protocols to enable the description of seed functional phenotypes. This sub-programme will involve ESR 1-3.

B.2.2.4 Research sub programme B: Seed biology characterisation (mentor P. Toorop, RBGK)
Key industrial question to answer: "How can I get maximum seed germination and establishment?"

This sub-programme applies seed molecular physiology, biophysics and other disciplines to gain an understanding of heterogeneity in seed qualities (dormancy, germination, survival). Whilst these vary with developmental / maturation time, they can be affected by post-harvest seed treatments. Comprehension of seed dormancy will aid successful reintroduction and restoration projects by improving the availability of cost-effective, fit-for-purpose seed, benefiting practitioners and growers in and beyond Europe. Outputs will include seed dormancy classifications, germination protocols, seed storage predictions and stress tolerance classes for seeds and seedling. In order to transfer knowledge to industry, research must be conducted on a wide range of species from different provenances. NASSTEC aims to investigate the germination behavior and assign species to the known >10 dormancy classes / types based on seed internal morphology and temperature application. Optimum germination conditions will be investigated and used to develop cultivation protocols for a selection of target species for grassland restoration in Europe, including a comparison of substrates for maximal seedling growth and reduction in seedling loss on transfer to the natural environment. Reliable supply of high quality seed lots in the trade demands the maintenance of viability over time. Seed longevity for alpine region species will be compared with those from other habitat types so that advice can be given to industry on adequate storage conditions and viability monitoring intervals. The inter-relatedness of seed vigour and viability will be explored and assessed as markers for substrate-dependent variation in seed/seedling growth. This sub-programme will involve ESRs 4-7.

B.2.2.5 Research sub programme C: Production and deployment of seed for environmental mitigation (mentor Giles Laverack, SSE)
Key industrial question to answer: "How do I mass produce native seed to a quality assurance standard?"

This sub-programme focuses on delivering seeds and knowledge for environmental restoration activities, particularly the grassland restoration pilot projects, and analysing case studies of mitigation practice. Profitable interconnections between the seed production industry, the environmental management authorities and the academic institutions will be facilitated to ensure that research delivers the required products. This sub-programme will deliver outputs on: case studies of best practice in the use of native seeds for mitigation projects; standard procedures for native seed quality assessment and certification; pre-treatments to improve seed establishment. Seed producers seek to simplify germination test conditions, to limit the range of sites, techniques and equipment needed to make the business more efficient and to improve the quality of the seeds on offer to customers. Sub-programme C will combine the products of the diverse research projects and deliver agronomic, processing, seed treatment and other production advice to the native seed industry. It aims to determine the quality (germination and purity) of seed currently being produced for the 'market' from diverse sources and reveal any causes of low quality. It will modify field production, harvest methods and timing, post-harvest treatments, processing and storage procedures so that high quality seed lots can be consistently produced. This information will be combined with data from field experiments, and from sub-programmes A and B, to create growing protocols for initial multiplication and commercial production of seed. A key objective is to improve seed (and seedling) stress tolerance and performance through seed treatments. It will

define seed provenance zones based on sub-programme A, specify simple standards and tests for quality control based on sub-programme B and interpret good management practice from sub-programme C. Finally, it will complete the development of the qualitative decision tool for species selection for restoration based on the business lifecycle, leading to the development of a certification scheme for discussion with appropriate users and agencies. This sub-programme will involve ESRs 8-11 and ER 12.

B.2.2.6 Integration, consistency and originality of the three sub programmes

In order to build the required capacity in the public and private sectors and expertise in native seed biology across Europe, it is essential to cover research capability and experience that spans the entire plant life cycle: seed production in the natural environment; characterisation of seed biology *ex planta*; and commercial production and deployment of seedlots. The three sub-programmes therefore present a logical means of delivering research expertise from 'field to laboratory to production'. Improved understanding and application is needed in all steps of this cycle to ensure successful habitat restoration in the chosen system (grassland) for environmental mitigation activities. Development of competencies in the 12 individual topics will support both the academic ambitions of early career scientists (through high quality training and skills development) and the applied needs of end-users. Importantly, NASSTEC will serve as a multi-disciplinary technology platform and an innovation hub for sustainable development, supporting plant / crop science, the agro-biodiversity community and the industrial sector. NASSTEC's key research programme outputs will be: highly competent ESRs/ER knowledgeable of the science and practice of restoration with native seed; published papers; guidelines on species and seed traits in relation to provenance; industry standards for native seed production and marketing; a DEXI-based decision tool for species choice that combines biology, agronomic and business information. Knowledge transfer between science-push (on the selection, sourcing, storage and germination of seeds) and user-pull (for functional production systems for native seed) will be ensured, so that European native seed heritage is not jeopardised by lack of knowledge and use of ineffective procedures that waste precious genetic resources during environmental mitigation actions. This combination of cutting-edge research (high quality output) on native seed and opportunity for commercial take-up (impact) is highly original. The information flows referred to above will be led by RBGK and supported by the three mentors of the S&T sub-programmes. Integration and communication will be underpinned by innovative management-systems support and facilitated through the internet-based NASSTEC Information Facility (IF) that will enable the delivery of the training programme.

B.2.2.7 Role of private companies

The three private companies that are full partners will add an essential industrial perspective to the science and expertise in the NASSTEC training network. They will help ESRs (and their supervisors) to recognise and deal with key aspects of applied seed science, e.g. improved production processes, seed treatment and multiplication (SSE & SESIL), seed pre-treatments (SYN) and sowing. Mechanisation of all native seed production processes seeks to ensure industrial scale production that will increase market value and capacity for native seed production. In so doing, numerous barriers to the availability of sufficiently large quantities of native seed for habitat restoration will be removed. The only ER in the network will play a pivotal role in transferring knowledge to the European seed industry within and beyond NASSTEC. Already, crop seed priming underpins enhanced seedling performance in the field and similar work on native seed will have undoubted impact on seed quality. This and other innovations, driven by industrial needs, will result in the development of standard operating protocols and guidelines for industrial-scale restoration applications (SESIL, SSE and SYN in particular). Because of the potential commercial benefits of the findings in NASSTEC, appropriate IP rights and patenting will be developed and agreed.

B.3 Training

B.3.1. Quality of the training programme

B.3.1.1 Overview of the training elements

NASSTEC training comprise a host-based element and a network wide element. The 2 components have been designed to integrate and build one on the other. The host based training provides the essential learning environment for each ESR. The network wide elements are broken down into 2 exchange types: which are the e-learning environment (ELE) and face-to-face learning environment (FtFLE).

B.3.1.2 Host based training

All ESRs will enjoy the benefits of the individual training usually provided by the host institution through participation in additional lectures and seminars relevant for the specific research topic undertaken. Specific direct individual tutoring will cover topic-related training and general complementary skills development. Elements include, introduction to facilities and equipment provided by supervisors and research fellows, health and safety induction, associated joint fieldwork and laboratory activities, oral and written presentation skills, scientific paper preparation workshops and career guidance. All relevant lectures and short courses offered by the academic partners will be listed in an ITN taught-element handbook (deliverable D8 so that each ESR/ER can use this document to help in deciding where to spend their exchange visits and secondments to their maximal benefit and career development.

B.3.1.3 NASSTEC PhD Programme

All ESRs will be formally enrolled in the PhD programme in 'Earth and Environmental Sciences' offered by the University of Pavia (UNIPV) running from 1.10.2014 to 30.09.2017 (tentative dates) (M5). Apart from the initial induction course (D9), on site attendance will not be expected, but all ESRs will be required to complete the distance learning modules that will include the unifying subjects specified below and will integrate lectures from all the network partners. Teaching material and lectures will be available through the network information facility (IF) via podcast, streaming and Q&A live session. All ESRs will prepare, submit for evaluation and discuss a peer-reviewed thesis in fulfilment of the requirements for the award of the degree of Doctor of Philosophy (M29). This special PhD cycle will be coordinated by Prof. G. Rossi (UNIPV) and advised by Prof. H. Pritchard as S&T coordinator.

The 11 Unifying subjects of the PhD programme will be: Statistics (36h), GIS (36h), Taxonomy of the most widespread European grassland genera Poaceae and Fabaceae, (24h, lecturer: B. Jiménez-Alfaro, SESIL), Seed Ecology and Sampling (24h, A. Mondoni, MUSE); Conservation genetics (24h, P. Iannetta et al., JHI); Agronomy and seed field production of herbaceous plants (24h, C. Galvez, SESIL); Grasslands of Europe: species composition, plant communities and ecology (36h, G. Rossi, UNIPV); Physiology of germination and seed quality (36h, A. Balestrazzi, UNIPV, H. Prtichard RBGK); Restoration ecology and transfer of technological knowledge (36h, K. Dixon, BGPA); Legislation on production and marketing of native seeds for habitat restoration (24h, S. Pedrini, UNIPV) Economical potential of the plant conservation market in Europe (24h, lG. Laverack, SSE). These add up to a total of 324h, at least 70% of which are mandatory according to the specific career development plant agreed.

B.3.1.4 Supervision arrangements

NASSTEC training plan / handbook (D8) will be a general reference guide to the ITN supervision arrangements including the programme and timetable of events, secondments, exchange visits, roles, reporting periodicity, code of conduct (including research integrity) also providing an introduction to the ELE and IF, aiming at establishing an open, discursive and supportive community of practice to underpin the high quality science to be carried out.
The first months after ESR enrolment (M5) will be a critical period leading to the development of an individual career plan and research extended abstract (D7). For this initial stage D8 will include 'induction objectives' to be delivered though an induction course (D9) and circulated among supervisors to ensure that the students are fully integrated within their host institution and aware of their hosts facilities and other training provisions. The supervisors will provide each ESR with an initial list of key published peer-reviewed articles relating to their project and will constantly coach their progress. D8 will provide details on the expected periodicity of tutoring meetings (more frequent in the initial period), event debriefing sessions, progress reports, oral and written presentations and personal web pages that each ESR is expected to deliver, also providing a scheme for regularly circulating selected information throughout the ITN and regularly reporting to the E-COM and the supervisory board.

B.3.1.5 Network based training

Training elements will also be provided by the network-wide collective training activities. These are delivered *via* 2 key vehicles which are the e-Learning and Face-to-Face Environments for training.

NASSTEC E-Learning Environment (ELE) offers the opportunity of an unlimited, inexpensive and continuous on-line electronic based communication and knowledge exchange system. This contact is structured into the following 3 components.

1 - **A network-wide information facility (IF)**, using free web2.0 tools the IF will deliver mailing lists, e-forums, an e-notice-board, on-line project management tool, social tools (wiki, facebook, tweets) and others tailored for the science community (**citeulike**; **mendeley**) and Open Access Publishing in European Networks **(OAPEN**). The IF will support 3 Annual general network e-Meetings (one *per* year), to discuss cross-cutting issues (as well as ESR training and findings). In addition, network wide e-workshops will also be delivered on the topics of: ***EW1*** *- statistical analysis of seed germination data, paper writing skills;* ***EW2*** *- native seed production and trade regulations;* ***EW3*** *- Key equipment appraisal in relation to seed bank design and storage techniques/seed-status monitoring.* An electronic newsletter will also be published quarterly and a wiki space will be populated by user generated content to showcase the knowledge gained. These resources shall be organised and accessible *via* a single NASSTEC website based Resource Centre (hosted by MUSE).

2 - **E-tutoring service**. ESRs will discuss their individual research topic and needs jointly with the 2 project supervisors (the local and the associated one) on a quarterly basis as a minimum periodicity and each half year with the sub-programme Mentor using video conference facilities. Additional meetings are anticipated, arising as necessary and according to the specific needs of the ESR and topic area. Every meeting will be documented taking concise minutes that will be filed and copied to the coordinator. A skills and capability data base will be compiled for all partners. This will be used to encourage and support meaningful dialogue, with a view to increasing capability and impact of native seed science across all sectors.

3 - **A video streaming service** will also be used to progress further knowledge exchange by broadcasting relevant seminars across the network at regular intervals. This service will be structured to span the range of technologies, socio-economic and ethical factors involved in

native seed biology. Over the course of the programme every partner will be expected to deliver at least one training seminar annually.

NASSTECs Face-to Face Learning Environment (FtFLE). This element delivers individual bilateral exchange visits, secondments and regular network-wide meetings that include: 1 PhD Induction course, 3 Annual General Meetings (D6-17-24) where all network trainees will be expected to present the progress of their individual project;. 3 annual workshops (D11-19-25) to address and debate cross-cutting issues and develop specific complementary skills; 2 summer schools (D13-22) being all round short courses to fully address a specific themes relevant for all ESRs; 1 end-of-programme conference (D35). The final conference shall be attended by open invitation to key stakeholders. The FtFLE provides unique networking opportunities for all network members, ESRs, supervisors and stakeholders, to integrate professionally and socially as part of global community of practice. Collectively these will comprise a valuable resource to build advanced final network products (such as the NASSTEC Manual - D39).

B.3.1.6 Secondments scheme

Each ESR will benefit from 3 secondments to partners to obtain key training in a discipline that is relevant to their own research activity. Over the maximum 3 secondments the time spent away from their main host institution will not exceed 3 months; for an average duration of 1 month per secondment. The first 2 secondments are pre-selected as described in the individual project description; assigning one to an academic partner and one to an industrial partner; this will ensure effective knowledge exchange between the academic and private sector. The 3rd secondment will be freely selected by each ESR to any other partner in the network that they deem suitable and is consistent with their research topic.

B.3.1.7 Exchange visit scheme

The exchange visit scheme will integrate and complement the other existing mobility opportunities and will be used to ensure connection among network partners for whom contact has not been facilitated *via* the secondment or training events. This might facilitate the opportunity to contact fellow ESRs with whom specific training activities or network event preparation is planned. The typical duration of an exchange visit is expected to be 1 week. The typical number of exchange visits is expected to range between 2 to 3 *per* ESR. Exchange visits must be planned and justified in relation to the delivery of their NASSTEC training milestones and approved by the relevant supervisor. Where possible, such visits should be profitably attached to existing scheduled training events, to minimise travelling.

B.3.1.8 Role of industry and associated partners

Each Associate Partner will host ESR mandatory secondments *and* will deliver an added value for the network *via* practical work experience and supporting individual ESR research projects. Within NASSTEC the expertise of private enterprises will be utilised to ensure that findings address issues that maximise the success and impact of native seed companies. Each commercial partner will disseminate the outcome of workshops among their colleagues.

B.3.2. Network-wide training events, schools, conferences, workshops

Table 2. Training activities

	Training events, workshops & conferences *(2 events per year)*	Lead Organising Institution	Planned date	Duration	Participants	Project month	Planned venue
1	PhD Induction Course (IC) (incl. Annual General Meeting) (D9)	UNIPV	Oct 2014	8 days	all ESRs	7	UNIPV
2	Cross Cutting Workshop 1 (CCW1) Quantitative functional molecular Diversity (D11)	JHI	Feb 2015	5 days	all ESRs	11	JHI
3	Summer School 1 (SS1) Seed collecting strategies to face climate change (D13)	JBA	Jun 2015	5 days	all ESRs	15	JBA
4	Complementary Skills Workshop 1 (CSW1) (incl. Annual General Meeting) Mock grant appl., IPR and patenting (D19)	APRE	Feb 2016	8 days	all ESRs/ER	23	SYN
5	Summer School 2 (SS2) Lab practice of germination & industrial seed processing (D22)	UNIPV	Jun 2016	5 days	ESRs/ER	27	UNIPV
6	Complementary Skills Workshop 2 (CSW2) (incl. AGM) - Plant conservation, ethics-outreach (D25)	MUSE	Sep 2016	8 days	ESRs/ER	30	MUSE
7	Conference (C) - Native seed S&T at the service of environmental mitigation (D35)	RBGK	Sep 2017	3 days	public	42	RBGK
8	PhD awarding ceremony (M29)	UNIPV	Mar 2018	1 day	public	48	UNIPV

PhD Induction Course (IC) (D9)
Host: UNIPV (RBGK)[1] - a 5 full days (36h) course (+ 3 days Annual General Meeting = 8 days) delivered by G. Rossi, H. Pritchard, A. Mondoni, R. Probert, P. Toroop., P. Iannetta, G. Laverack, C. Domeneghetti, A. Picco, T. Abeli, K. Dixon, D. Merritt.

Content: This course will illustrate the PhD course in Earth and Environmental Sciences, and the special provisions made for the NASSTEC sub-programme. It will introduce the key staff, supervisors and mentors, the training programme and its delivery composed of a balanced integration of teaching modules (also available as distance learning modules in the NASSTEC sub-programme) and individual research carefully supervised in conjunction with the NASSTEC mentoring scheme. It will specify the requirement for the award of the PhD title being a credit system fulfilled by attending teaching modules, passing examinations, taking part to workshops, seminars, summer schools and finally submitting a thesis. The course will provide basic complementary skills for analysing and discussing scientific literature; collecting, analysing and interpreting ecological dataStudents will be exposed to ecological research methods; guiding them to ask the relevant ecological questions, designing and implementing studies to answer those questions applied to seed ecology, eventually planning and carrying out their own experimental, ecological investigations. It aims to enable research students to successfully pursue a career in Applied Ecology and in the Seed Industry. The PhD School publishes twice a year the extended abstracts (D7) of the theses in its own journal *Scientifica Acta* available on-line at http://riviste.paviauniversitypress.it/index.php/sa

Cross Cutting Workshop 1 (CCW1) Quantifying functional and molecular diversity (D11)
Host: JHI (MRS) - a 5 full day (36h) workshop delivered by P. Iannetta, P. Hedley, J. Russell, M. Young.

[1] The institution in brackets will co-organise the event

Content: Sustainable *ex-situ* conservation and use of native species requires genetically representative sampling of their populations. Information about population structure and genetic diversity of target species is necessary especially in the case of geographically limited or disjunct populations. The theoretical part comprises lectures and discussions about the state-of-the-art techniques of such as those which are based on metabolism (MALDI-TOF), protein (1-D and 2-D) and nucleic acid (dominant and co-dominant marker based methods such as AFLP, SSR, I-SSRs *etc*.). Activities will include the use of molecular based protocols with dominant I-SSR based markers, PCR methods, genotyping using modern automated (laser-based) hardware, data processing and analysis using various software. The intellectual basis of diversity monitoring within an individual and within and between populations will be explored in depth. Next and 3rd-Generation (NG) sequence acquisition and data-analysis will also be broached; illustrating their application, potential, experimental designs and cover options for data analysis.

Complementary Skills Workshop 1 (CSW1): Mock grant application - grant writing, IPR and patenting (D19).
Host: SYN (APRE) a 5 full days (36h) workshop (+ 3 days Annual General Meeting = 8 days) delivered by K. Insogna, F. Lanfermeijer, J. Slaven, K. Dixon, D. Merritt *et al*.

Content: ESRs select 1 global and 3 sub-programme-related open calls for funding within the existing European funding framework that span research (Horizon2020), conservation (Life+), international cooperation (INTERREG), regional and rural development fund (ERDF and RDF). Workshop facilitators will introduce well in advance *via* the network IF various project management tools such as the Work Breakdown System (WBS) and object oriented planning tools such as the Logical Framework Approach (LFA). These will assist in structuring the prospective projects, identifying and defining WPs, Aims, Objectives, Milestones, Deliverables, Outputs, Outcomes, Constraints, Assumptions and Risk Assessment. Also, budget and project management. Appointed coordinators will collate the contributions from the network and finalise the application of those bids suitable for funding. Their efforts will be compared to EU bids that were successful (available from full partners).

Complementary Skills Workshop 2 (CSW2): Plant conservation, its ethics, economics, communication and social outreach (D24).
Host: MUSE (PAT) a 5 full days (36h) workshop (+ 3 days Annual General Meeting = 8 days) delivered by M. Cattadori, S. Dorigotti, M. Mezzanotte.

Content: All ESRs will meet to discuss the ethical aspects of plant (re)introduction with experienced senior researchers in the field. The rationale that justify why only native species should be used in environmental mitigation projects will be tested. The workshop will deliver specific recommendations on this issue. In a second stage ESR will debate and develop effective social outreach tools. The media will be tailored to ensure to meet the relevant needs of the various stakeholders and general public. This workshop will be open to key experts within the partner institutions and within the important area of public education and communication, fully integrating the IBSE approach (Inquiry based Science Education) promoted by the INQUIRE project (FP7-SIS-2010-1 266616) and the new MUSE science museum.

Summer School 1 (SS1): Seed collecting strategies to face climate change (D13).
Host: JBA (RCRA) a 5 full day (36h) course in the Cantabrian range (Spain) delivered by A. Bueno, R. Álvarez, B. Jiménez-Alfaro *et al*.

Content: ESRs will devise a collecting plan taking into account all environmental and genetic information for their target species. Facilitators will illustrate all the required steps needed to safely obtain seed from different representative sites. The use of GPS and GIS technology will be

demonstrated during the fieldwork. Special attention will be paid to seed maturity and the optimal times for collection, taking into account the seed storage behaviour (orthodox, intermediate and recalcitrant). Seed protection will also be studied and the ESRs will gain insight into the risks associated with key seed insects and fungal pests. Attention will then move to post-harvest treatments that including 'dry after ripening' and with a view to safeguarding and maximising seed viability and longevity. The ERSs will be introduced to the necessary equipment and techniques for monitoring the key physiological indicators of seed quality during drying. Practical sessions will focus on data logging, seed cleaning and initial storage with a special attention given to testing and validating procedures. A special final session will be devoted to define the potential ecological niche of glacial relicts surviving on the Cantabrian Range, using advanced GIS software and distribution modelling together with genetic information, useful for guiding reintroduction activities, as mitigation against climate change.

Summer School 2 (SS2): Laboratory practice of germination, industrial management and seed processing (D22)
Host: UNIPV (SESIL, UNIBO) - a 5 full days (36h) course delivered by G. Rossi, S. Orsenigo, C. Gálvez, T. Abeli, C. Ferrari

Content: This school will include theoretical and practical laboratory sessions. Its novel aspect will be the careful and detailed joint analysis of the experimental design for studies that assess germination. Each ESR will present their proposed germination activities, and these will form the basis for the network-wide field/commercial based case studies. It will also offer a review of the existing native seed production practice across Europe, serving to illustrate the different solutions, their relative effectiveness and to highlight specific issues. This exercise is also aimed to highlight additional research and infrastructure requirements to develop native seed production. ESR will be exposed to seed industries with site visit to seed industries district in the Po plain thanks to associated partner UNIBO.

Conference (C): Native seed science and technology for environmental mitigation (D35)
Host: RBGK (BGPA), a 3 full days international conference, organised by H. Pritchard, P. Toorop, G. Laverack, P. Iannetta, R. Probert, K. Dixon, D. Merritt.

Content: The conference will illustrate procedures, protocols, and case studies of restoration operations. It will also discuss the applicability of these approaches within Europe; presenting the ESRs with an opportunity to exploit the most promising applications. Various delivery media will be used to maximise impact. While presentations are more useful to scientists other means such as fact sheets, interactive demonstrations and workshops will be more useful to different stakeholders and practitioners. Visiting scientists Prof. K. Dixon and Dr. D. Merritt will play a pivotal role to facilitate the conference aims. The conference will be attached to a meeting of the Society for Ecological Restoration International (SERI). The conference is open to the public for external attendance.

All network events will total up to a maximum of 6 months per ESR out of the 36 standard duration of their appointment, that equals to 17% time-commitment of the total allotted to each ESR.

B.4 Implementation

B.4.1. Workplan

B.4.1.1 Overview of the work plan, milestones and deliverables

NASSTEC implements a standard Work Breakdown Structure (WBS) to detail, organise and manage the ITN activities in a deliverable oriented hierarchical subdivision of the workload in manageable units (WP - work packages), listed in Table 1 in section B2.1 on page 4, as required by the annex format, but is also copied below for the reader's convenience.

Table 3. List of Work Packages

WP N.	**NASSTEC WBS** Work Package Title	Type of Activity	Lead Participant	Other Participants Involved	Start month	End month
1	Management	management	MUSE	all	1	48
2	Recruiting	management	UNIPV	all	1	19
3	Research	research	RBGK	all	5	48
4	Training	training	JHI	all	6	42
5	Quality of research and training	management	UNIPV	all	4	46
6	Dissemination	dissemination	RBGK	all	7	48
7	Industry Academia integration	dissemination	SSE	all	19	48
8	Outreach	outreach	MUSE	all	9	40

The detailed list of milestones and deliverables (ordered by date) is provided in the tables below and the relative Gantt Chart is in appendix 1 on page 32 as required by the annex format.
Here follows a brief description of the content and task distribution within each WP.

WP1 - Management, C. Bonomi (MUSE) as project coordinator. This work package ensures an effective and timely delivery of all project products, taking care of coordinating the work *via* regular electronic contacts and meetings, a kick off meeting, 3 annual general meetings attached to network training events to minimise travel, a conclusion meeting and regular annual project reports. A full time project officer will make sure milestones are reached on time and will facilitate e timely production of project deliverables. A small and agile Executive Committee will assist the supervisory board to make the appropriate and timely decisions required by the project management The project will employ an on-line project management platform

WP2 - Recruiting, G. Rossi (UNIPV). This WP is strategically led by the only university in the network that will give to all the ESRs in the network the opportunity to gain a PhD award. A specific MoU between all partners will validate the individual training as appropriate for a PhD. WP2 will coordinate the individual partners recruitment, specifically promoting agreed guidelines.

WP3 Research, H. Pritchard (RBGK). This WP includes the 3 research sub programmes that are entrusted to the mentors of each area as previously described. This WP includes standard M & D (career development plans, individual project research plan, reports and theses) and specific outputs such as manuals, peer-review publications and pilot projects on grassland restoration.

WP4 - Training, P. Iannetta (JHI). This WP oversees the network wide training, producing the network training plan/handbook (D8), composed by the final version of the secondment scheme, the event calendar, the programme of the training events (workshops, summer schools and conference).

WP5 - Quality of research and training, A. Carini (UNIPV). This WP is lead by UNIPV (providing the PhD scheme) and will implement quality control procedures, ensuring that the best standards are adopted and improved with *ad hoc* guidelines and quality plan, leading regular audits, reviews and controls on project performance.

WP6 - Dissemination, P. Toorop (RBGK). This WP is lead by RBGK that hosts the project conference and is leading research. It aims at building a community of practice as a privileged way to disseminate the project products, raising the status of native seed science among the

scientific community. The conference proceedings will be published in a high impact factor journal.

WP7 - Industry Academia integration, led by G. Laverack (SSE). This WP will be led by the key project SME with the contribution of the ER. A three-way communication network will be developed between academia, producers and users. Current and potential producers and users will be identified in all EU countries (M11,12), initially through contacts with academic and botanical organisations. The technical level of development and current market will be established by questionnaire (M22), interview and direct contact and this will be fed into the project research programme to create messages for industry to be disseminated and developed through social media, an online forum, technical meetings at relevant conferences (ISTA, SER etc) (M24) and particularly through production and promotion of the technology transfer and NASSTEC manual (D38,39). The Australian experience in developing an integrated system of academic work and industrial practice will be used with key inputs from AP BGPA and the resources of AP PAT will be utilized to promote the improvement and expansion of native seeds by public administrations.

WP8 - Outreach, led by M. Cattadori (MUSE). M. Cattadori i based at MUSE the new Trento Science Museum and that leads a successful example of teachers' community of practice focused on Inquiry Based Science Education (IBSE). Delivery is by means of exhibitions, events and special school projects as detailed in B5 and in deliverable D14, D15, D23, D27, D33, promoting Responsible Research and Innovation (RRI).

Table 4. List of milestones

WP N.	M. N.	List of milestones	Lead beneficiary	Expected date
1	M1	Nasstec Project officer recruited *Indicator: project officer appointed*	MUSE	2
2	M2	11 ESR & PhD positions advertised Indicator: job description published	UNIPV	3
1	M3	Information Facility up and running *Indicator: website & IT tools in place*	MUSE	4
1	M4	Log frame Analysis performed Indicator: log frame adopted throughout the ITN	MUSE	6
2	M5	11 ESR & PhD enrolled Indicator: ESR based at host institution	UNIPV	7
3	M6	3 subprogramme research plans. Indicator: plans produced and circulated	RBGK	7
6	M7	ITN dissemination strategy Indicator: agreed, and circulated to the ITN	RBGK	10
3	M8	Criteria for species selection for grassland restoration. Indicator: target species lists produced: 10 species per ESR - total 110 species	RBGK	11
4	M9	LOM selected for training and outreach material Indicator: format defined	JHI	12
5	M10	Define assessment criteria for quality training Indicator: quality plan circulated	UNIPV	12
4	M11	Set up community of practice Indicator: target audience contacted	JHI	14
8	M12	Target audience and outreach plan and social media started. *Indicator: target identified and plan circulated*	MUSE	14
8	M13	Set up community of practice in education Indicator: on line forum active	MUSE	16
3	M14	Grassland restoration pilot projects: at least 3 project started. *Indicator: at least 3 exact locations selected*	RBGK	17
3	M15	Guide to dormancy and germination Indicator format and information collated	RBGK	18
6	M16	Agreement with a IF journal to publish conference proceedings. Ind. agreement rchd	RBGK	18
1	M17	Mid term review	MUSE	19
2	M18	1 ER position advertised Indicator: job description published	UNIPV	20
3	M19	Grassland restoration pilot projects: at least 3 sites sown. *Indicator at least 10 species sown for in at least 3 locations - total at least 30 species*	RBGK	20
7	M20	Identifying stakeholders in the EU native seed users Indicator: list prepared	SSE	20
5	M21	Audit and feedback on quality training Indicator: data collected throughout the ITN	UNIPV	22
7	M22	Survey EU native seed users needs Indicator: questionnaire circulated	SSE	22
2	M23	1 ER enrolled Indicator: ER based at host institution	UNIPV	23
7	M24	Set up Industry-Academia community of practice Indicator: on line forum active	SSE	26
3	M25	Grassland restoration pilot projects: at least 3 sites monitored after 1 year. *Indicator at least 10 monitored for at least 3 locations - total at least 30 species monitored*	RBGK	29
3	M26	Grassland restoration pilot projects: at least 3 sites monitored after 2 years. Indicator at least 10 monitored for at least 3 locations - total at least 30 species monitored	RBGK	40
4	M27	Training and outreach material loaded onto Scientix Indicator: material uploaded	JHI	42
6	M28	Collation of conference presentations and papers published by each ESRs/ER	RBGK	42
3	M29	PhD awarded. Indicator: ESRs take part to award ceremony in Pavia	RBGK	48

Table 5. List of Deliverables

WP N.	Del. N.	List of Deliverables	Lead beneficiary	Nature	Dissemin.	Month
1	D1	Kick off meeting	MUSE	E	CO	2
2	D2	Recruitment guidelines and training course for selection panels	UNIPV	O	CO	2
1	D3	Consortium agreement signed	MUSE	O	CO	5
2	D4	MoU for PhD & training recognition signed	UNIPV	O	RE	6
5	D5	Guidelines for quality management and implementation incl. IPR	UNIPV	R	RE	6
1	D6	1st Annual General Meeting	MUSE	E	CO	7
3	D7	11 ESRs career development plans incl. extended abstracts or research plans	RBGK	R	RE	7
4	D8	Training plan/handbook (event programme, calendar, addresses, etc..)	JHI	R	RE	7
4	D9	Induction course	UNIPV	E	CO	7
6	D10	Project newsletter - quarterly from month 7 to month 40	RBGK	R	PU	7-40
4	D11	CCW1 and related teaching materials	JHI	E	RE	11
1	D12	1st year Annual project report incl. financial report	MUSE	R	CO	13
4	D13	Summer School 1 and related teaching materials	JHI	E	RE	15
8	D14	6 IBSE activities designed for schools (minimum)	MUSE	P	PU	15
8	D15	6 participants to the local Researcher's night (minimum)	MUSE	E	PU	18
3	D16	base stock of seeds collected and stored in partners seed banks. *Indicator: 20 accessions per ESR - total 220*	RBGK	O	PU	20
1	D17	2nd Annual General Meeting	MUSE	E	CO	23
3	D18	1 ER career development plan incl. extended abstract of research	RBGK	R	RE	23
4	D19	CSW1 and related teaching materials. *Indicator at least 3 draft application prepared*	JHI	E	RE	23
1	D20	2nd year Annual project report incl. financial report	MUSE	R	CO	25
3	D21	12 interim research project reports	RBGK	R	RE	27
4	D22	Summer School 2 and related teaching materials	JHI	E	RE	27
8	D23	6 Marie Curie Ambassadors in schools (minimum)	MUSE	E	PU	27
1	D24	3rd Annual General Meeting	MUSE	E	CO	30
4	D25	CSW2 and related teaching materials	JHI	E	RE	30
8	D26	6 participants to the Famelab contest in selected countries (minimum)	MUSE	P	PU	30
8	D27	2 weeks school teachers placements in each partner lab	MUSE	E	PU	32
3	D28	protocols for germination/cultivation/characterisation of target material prepared. Indicator: at least 10 protocols delivered for representative keystone families	RBGK	R	PU	33
1	D29	3rd year Annual project report incl. financial report	MUSE	R	CO	37
3	D30	Publications for species selection in grassland restoration. *Indicator: at least 1 manual and 3 papers published in peer-reviewd journals*	RBGK	P	PU	38
3	D31	Publications for quality certification procedures for native seeds. *Indicator: at least 10 case studies of certification analysed, 1 manual and 2 paper published in peer-reviewd journals.*	RBGK	P	PU	39
3	D32	Publications for adaptation, dormancy and germination. *Indicator at least 7 papers published in peer-reviewd journals.*	RBGK	P	PU	40
8	D33	Native flower beds display in 5 key cities of partner countries (minimum)	MUSE	P	PU	40
1	D34	Conclusion meeting	MUSE	E	CO	42
3	D35	12 final project reports (theses)	RBGK	R	PU	42
6	D36	NASSTEC Conference	RBGK	E	PU	42
5	D37	Report on quality management	UNIPV	R	RE	45
7	D38	Manual for Technology Transfer to the EU seed industry	SSE	P	PU	46
6	D39	NASSTEC Manual*	RBGK	P	PU	47
1	D40	End of project report incl. final financial report	MUSE	R	CO	48
6	D41	Conference proceedings published	RBGK	P	PU	48

§ the NASSTEC Manual (D39) will collate and present in an integrated way all key deliverables produced during the project: and in particular D30, D31, D32, D38 including

- criteria for species selection and identification of provenance areas for mitigation projects,
- detailed lists of species and provenance areas to be targeted for mitigation projects in 4 bio-geographical regions (Atlantic, Alpine and Mediterranean) in selected countries,
- Prediction tools for species ecotypes selection for mitigation projects.
- Recommendations for improved seed storage methodologies and guide to the implementation of advanced non routine methods.
- Seed germination protocols for a selection of taxonomic groups mostly used for mitigation.
- Seed production protocols for a selection of taxonomic groups mostly used for mitigation.
- Standard procedures for native seed certification
- Case studies of best practice in the use of native seeds for mitigation projects
- A grant application for the future advancement beyond the end of the project.

Table 6. List of Fellows' individual projects

Fellow number	**Project title**	Host institution	Relevant WP	Duration	Indicative start date
Research sub programme A:* In situ *seed sampling					
ESR 1A	A bio-geographical approach to species selection for mitigation / adaptation projects, with a specific focus in the Alpine and Atlantic region	MUSE (JHI)[1]	WP3	36	month 7
ESR 2A	Selection of high-quality grasses for the Mediterranean and Continental bio-region	SESIL (UNIPV)	WP3	36	month 7
ESR 3A	Methods for seed and seedling phenomics	JHI (MRS)	WP3	36	month 7
Research sub programme B: Seed biology characterisation					
ESR 4B	Bio-geographical aspects of seed dormancy	UNIPV (RBGK)	WP3	36	month 7
ESR 5B	Propagation protocols for the restoration of grassland habitat in Europe	SESIL (UNIPV)	WP3	36	month 7
ESR 6B	Seed longevity in storage	UNIPV (RBGK)	WP3	36	month 7
ESR 7B	Life history traits in contrasting environments - intra-species variation in stress tolerance	RBGK (JHI)	WP3	36	month 7
Research sub programme C: Production and deployment of seed for environmental mitigation					
ESR 8C	Improving seed quality in large-scale production	SSE (SESIL)	WP3	36	month 7
ESR 9C	Developing propagation and seed multiplication protocols for herbaceous flora	RBGK (SSE)	WP3	36	month 7
ESR 10C	Seed pre-treatments of native species for optimal establishment, for use in *in situ* restoration	SYN (RBGK)	WP3	36	month 7
ESR 11C	Certification of seed quality and provenance	MUSE (SSE)	WP3	36	month 7
ER 12C	Transfer of NASSTEC knowledge to European seed producers	SSE (SESIL)	WP7	20	month 23

The network as a whole undertakes to provide a minimum of 416 person-months of Early Stage and Experienced Researchers whose appointment will be financed by the contract. Quantitative progress on this, with reference to the table contained in Part C and in conformance with relevant contractual provisions, will be regularly monitored at the consortium level.

[1] The institution in brackets will co-supervise the ESR project

B.4.2. Fellows individual research projects

Fellow ESR 1A Research sub programme A: *in situ* seed sampling	***Host institution*** MUSE (co-supervised by JHI)	***Duration*** 36 months	***Start date*** month 7

Project title: A bio-geographical approach to species selection for mitigation / adaptation projects, with a specific focus in the Alpine and Atlantic region (WP3).
Supervisor name: C. Bonomi MUSE / P. Iannetta JHI
PhD enrolment: Yes, awarded by UNIPV

Objectives:
- Develop a model that identifies and structures the criteria for species and ecotype selection in restoration projects.
- Characterisation of the distribution patterns of selected keystone species from both the Alpine and Atlantic regions.
- Match seed provenance, habitat characteristics and location for keystone species in the Alpine and Atlantic regions.

Tasks and methodology: - Survey, critical review and adaptation of existing habitat and pedo-climagtic classifications systems.
- Define provenance areas for seed sourcing and use, based on the ecological and taxonomical data derived from this survey
- Sample and characterise the morphology, germination and dormancy of the populations of about 20 keystone species, clarifying the reproductive biology (e.g. phenology and seed output per plant at peak season).
- Frame a functional *ex situ* seed production system, taking into account, seedling productivity judged as shoot and root dry mass, comparing best performing seed lots of known provenance, with a qualitative multi-attribute decision-model

Results: - A simplified classification system for restoration projects in Alpine and Atlantic bio-geographical regions
- A guide to best performing seed lots of known provenance for key habitats and species in the Alpine and Atlantic region
- A decision-tree for species selection for restoration for the Alpine and Atlantic biogeographical regions.
*Contributing to milestone(M): **8**, 14, 19, 25, 26 & deliverable(D): **7, 10, 14/15, 16, 19, 21, 23/26, 27,** 30, 33, **34**, **35***

Dissemination:
- Presentations at conferences of the Society for Ecological Restoration and Conservation Biology
- Two papers in peer reviewed journals

Planned secondments:
1. SSE, Atlantic acidic grasslands seed selection; in Year 1; duration: 1 month
2. JBA, restoration in the Cantabrian range; in Year 2; duration: 1 month
3. freely chosen by the ESR; in Year 3; duration: 1 month

Risk assessment: Seasonality, deep seed dormancy and poor yield might severely affect the outcome of germination trials and seedling productivity measures; to prevent these events from badly affecting this project result the target species and population sampled will be increased by 50% to maintain a safe margin well above the minimum number of target data.

Fellow ESR 2A Research sub programme A: *in situ* seed sampling	***Host institution*** SESIL (co-supervised by UNIPV)	***Duration*** 36 months	***Start date*** month 7

Project title: Selection of high-quality grasses for the Mediterranean and Continental bio-Region (WP3).
Supervisor name: B. Jiménez-Alfaro SESIL / G. Rossi UNIPV.
PhD enrolment: Yes, awarded by UNIPV

Objectives:
- Develop skills in assessing, selecting and growing key herbaceous taxa from xeric grasslands for the restoration of degraded soils, with a special interest in landscapes of southern Spain and the Po Plain, Italy.

Tasks and methodology:
- Select best-fit-for-purpose species for the target soils and habitat using existing information on vegetation.
- Characterisation of *in situ* populations of about 20 target species, recording of reproductive biology and seed traits (mass, germination, morphometry) using methods described for project 1A.
- Seed collection of keystone species for the target ecological regions belonging to *Poaceae*, *Fabaceae* and *Asteraceae* (e.g. *Festuca, Sesleria, Bromus, Poa, Stipa, Erianthus, Ampelodesma*; *Medicago, Lotus, Astragalus, Trifolium*; *Aster, Inula, Helichrysum, Centaurea*. - Assess purity with ISTA methods for viability (X-ray, tetrazolium staining) and germination (vigour)
- Field sowing and / or transplanting in different degraded zones, slopes and soils in high xericity zones, based on autoecology.
- Monitoring and evaluation of this material through to reproductive maturity and the seed yield determination.
- Evaluation of reproductive maturity for a selection of key species in dry meadows

Results: - A prioritization system for the selection of appropriate taxa for a selection of the most representative habitats
- Datasheets containing information about species traits and their capability for habitat restoration.
- Toolkit for habitat restoration using native species, focusing on industrial applications for the investigated habitats.
*Contributing to milestone(M): **8**, 14, 19, 25, 26 & deliverable(D): **7, 10, 14/15, 16, 19, 21,23/26, 27,** 30, 33, **34**, **35***

Dissemination:
- Presentations at thematic conferences on restoration ecology, applied ecology and biodiversity conservation
- Two publications in peer-reviewed journals

Planned secondments:
1. JHI, Phenomics and species prioritisation and selection; in Year 1; duration: 1 month
2. SYN, Quality control in industrial seed processing; in Year 2; duration: 1 month
3. freely chosen by the ESR; in Year 3; duration: 1 month

Risk assessment: This task is entirely dependent on the selection of target species, and a crucial risk derives from possible low success of germinating seeds in the study habitats. To prevent this, it will be necessary to develop an adaptive methodology according to the available information of the target species and the preliminary results that will be generated along the time.

Fellow ESR 3A Research sub programme A: *in situ* seed sampling	***Host institution*** JHI (co-supervised by MRS)	***Duration*** 36 months	***Start date*** month 7

Project title: Methods for seed and seedlings phenomics (WP3).
Supervisor name: P. Iannetta JHI / J. Snape MRS
PhD enrolment: Yes, awarded by UNIPV

Objectives:
- Functional characterisation of intraspecific variation among individual accessions of wild legumes.
- To identify trait combinations that facilitates their establishment and co-existence with plants in different environments.
- Specific focus on seedling and resultant whole plant phenology, nitrogen fixation/rhizodeposition and seed functional traits

Tasks and methodology:
- Survey and sampling of seeds (and root nodule bacteria) of species at key sites: followed by seed multiplication ex situ.
- Phenotypic and molecular characterisation of seedling types from multiplied seeds, and the F2 seed characteristics.
- Trials to assess the potential of diverse types from a model legume species to facilitate coexistence with non-legumes.

Results: - Ecological survey of key wild legumes types from sites of special scientific interest.
- Functional characterisation of model legume types with high co-existence potential.
- Quantitative assessment of seed suitability plant facilitation/co-existence in situ.
Contributing to milestone(M): ***8****, 14, 19, 25, 26 & deliverable(D):* ***7, 10, 14/15, 16, 19, 21, 23/26, 27,*** *28, 30, 32,* ***34****,* ***35***

Dissemination:
- Join the British Ecological Society Agroecology Group, and International Society for Seed Science.
- Report perspectives and findings in years 2 and 3, to stakeholder fora identified via the NASSTEC network.
- To publish two publications in peer-reviewed journals, and report these at the ISSS Annual Meeting.

Planned secondments:
1. RCRA, Habitat restoration in ski slopes; in Year 1; duration: 1 month
2. MUSE, Species selection criteria; in Year 2; duration: 1 month
3. freely chosen by the ESR; in Year 3; duration: 1 month

Risk assessment: It is critical that the range of functionally distinct types identified for the co-existence/facilitation trials yield seeds that have a level of seed dormancy which is low: that is, their seeds must germinate readily. Failure in this respect will demand that additional trails are carried out to establish standard seed treatments which optimise germination and seedling establishment, such as: acid pre-treatment; scarification, seed coat removal; cold chilling, or/and; seed priming.

Fellow ESR 4B Research sub programme B: Seed biology characterisation	***Host institution*** UNIPV (co-supervised by RBGK)	***Duration*** 36 months	***Start date*** month 7

Project title: Biogeographical aspects of seed dormancy (WP3).
Supervisor name: S. Orsenigo UNIPV / R. Probert RBGK
PhD enrolment: Yes, awarded by UNIPV

Objectives:
- To identify optimum germination conditions in c. 40 alpine species.
- To assign specific seed dormancy classes.
- To characterise appropriate conditions for dormancy alleviation for seed lots from different provenances.

Tasks and methodology:
- Field data logger information linked to provenance will be used to set appropriate constant and alternating temperature regimes for germination testing in the laboratory involving up to six temperature treatments, and including 'move-along' studies that potentially last > 6 months each.
- Seed internal structure (sectioning and light microscopy) will also be used to inform test conditions (e.g. small embryos may be morpho-physiological dormant), and chemical treatments will be applied to the seeds when appropriate (e.g. gibberellic acid).
- Optimum conditions will then be used for the germination of soil seed bank samples from an altitudinal range (linked to 3A).
- Non-germinating seeds will be vital-stained with 1% tetrazolium chloride solution following ISTA-based methods, so that seed lot viability is known and can be compared between seed lots of difference provenances and between species.

Results: - Based on seed physiological responses to temperature, morphology and sensitivity to plant hormones, the species' seeds will be assigned to the known >10 dormancy classes / types.
- Across the whole range of species tested, phylogenetic independent contrast analysis will be used to assess germination patterns in relation to taxonomy and ecology.
- Seed lot viability compared between seed lots of difference provenances and between species.
Contributing to milestone(M): ***8****, 14, 15, 19, 25, 26 & deliverable(D):* ***7, 10, 14/15, 16, 19, 23/26****,* ***23, 27,*** *28, 32, 33,* ***34****,* ***35***

Dissemination:
- Presentation of the results at international conferences of Seed Ecology and Seed Biology.
- To publish two publications in peer-reviewed journals, and report these at the ISSS Annual Meeting.

Planned secondments:
1. NTS, Restoration in the Atlantic biogeographical region; in Year 1; duration: 1 month
2. SYN, Industrial germination treatments; in Year 2; duration: 1 month
3. freely chosen by the ESR; in Year 3; duration: 1 month

Risk assessment: abnormal climatic conditions may affect normal seed development and therefore seed availability for some species; a few species may not provide seeds enough to carry out the complete set of experiments; species and population sampled will be increased by 50% to maintain a safe margin well above the minimum number of target data

Fellow ESR 5B Research sub programme B: Seed biology characterisation	***Host institution*** SESIL (co-supervised by UNIPV)	***Duration*** 36 months	***Start date*** month 7

Project title: - Propagation protocols for the restoration of grassland habitat in Europe (WP3).
Supervisor name: C. Gálvez SESIL / L. Zubani UNIPV
PhD enrolment: Yes, awarded by UNIPV

Objectives:
- Select the most appropriate taxa for restoring fields in Mediterranean (olive grove crops) and Atlantic vegetation areas.
- Define cultivation protocols for selected taxa (particularly grasses, legumes and composites) used in restoration projects

Tasks and methodology:
- Assessing seed germination and growth for target species, comparing lab, greenhouse, field conditions, adjusting parameters affecting seedling growth (nutrient delivery N, P, K), soil composition / substrates, light levels, temperature and humidity.
- Experimenting pre-germination pre-treatments and other relevant agronomic aspects for production.
- Above-ground and radical biomass estimate through observation and use of phenologic scales for each selected taxa
- Description of produced seed batches (viability- TTZ test/germination and purity,...), of harvesting ease and production costs, in small test plots (maximum 3x3m).
- Development of seed mixtures for setting covers in woody crops (olive grove).
- Assessment of performance of settled covers (setting, phenologic monitoring, and coverage).
- Capacity for sexual reproduction in commercial seeds batch conditions.

Results: - A compendium of nursery protocols on seed priming, germination and establishment for commercial companies.
- Guidelines for Industrial multiplication of key species for herbaceous covers in grassland and on woody crops (olive groves)
- Guidelines to prepare seed mixtures for herbaceous covers with native species under different pedoclimatic conditions
Contributing to milestone(M): ***8****, 14, 15, 19, 22, 25, 26 & deliverable(D):* ***7, 10, 14/15, 16, 19, 21, 23/26****,* ***27,*** *28, 30, 33,* ***34****,* ***35****, 38*

Dissemination:
- presentations at conferences (e.g. IUCN, Landa restauration Congress, Expoliva, SER, AEIP (Asociacion Española de la Ingenieria del Paisaje)
- two publications in peer-reviewed journals

Planned secondments:
1. MRS, Advanced laboratory use; in Year 1; duration: 1 month
2. BGPA, native plant propagation in W Australia; in Year 2; duration: 1 month
3. freely chosen by the ESR; in Year 3; duration: 1 month

Risk assessment: The main risk will be to investigate species unsuitable for seed mixtures in industrial use. As a mitigation measure, a larger number of target species will be included belonging to the families of Asteraceae, Poaceae and Fabaceae, selected on the basis of their ecological behaviour.

Fellow ESR 6B Research sub programme B: Seed biology characterisation	***Host institution*** UNIPV (co-supervised by RBGK)	***Duration*** 36 months	***Start date*** month 7

Project title: Seed longevity in storage (WP3).
Supervisor name: A. Balestrazzi UNIPV / R. Probert RBGK.
PhD enrolment: Yes, awarded by UNIPV

Objectives:
- To characterise seed life-span of species of greatest likely interest for commercial production (sky trucks restoration)
- To make available guidelines on viability monitoring protocols for the seed trade.
- To investigate priming techniques for increase seed longevity in storage.

Tasks and methodology:
- Species from the alpine region and other habitat types (including some woodland and wetland species) will be assessed
- Seed lot half-life (P50) will be determined using an existing ageing method (ageing at 45°C and 60% RH).
- Survival curves will be produced and P50 estimated. These will be compared with benchmark species and used to estimate potential longevity under appropriate storage conditions for conservation.
- Longevity determinations will also enable recommendations on viability retest intervals for stored collections.
- Seed priming effects will be investigated on target species, considering biomolecular analysis (DNA repair and antioxidant mechanisms).

Results: - A predictive model for seed longevity based on seed structure, habitat and climate factors will be will be developed.
- The effects of reduced seed viability on lowered seed vigour will be assessed; as such knowledge will be of help in interpreting substrate-dependent variation in germination in some species.
- The effect of seed priming (see ESR 5B) on longevity will be assessed for some species.
Contributing to milestone(M): ***8****, 14, 19, 25, 26 & deliverable(D):* ***7, 10, 14/15, 16, 19, 21, 23/26****,* ***27,****28, 32, 33,* ***34****,* ***35***

Dissemination:
- Presentation of the results at international conferences of Seed Ecology and Seed Biology.
- To publish two publications in peer-reviewed journals, and report these at the ISSS Annual Meeting

Planned secondments:
1. SYN, Industrial seed storage and processing; in Year 1; duration: 1 month
2. RBGK, Seed storage improvement; in Year 2; duration: 1 month
3. freely chosen by the ESR; in Year 3; duration: 1 month

Risk assessment: unpredictable climatic conditions may affect normal seed development and therefore seed availability for some species; a few species may not provide seeds enough to carry out the complete set of experiments.

Fellow ESR 7B Research sub programme B: Seed biology characterisation	***Host institution*** RBGK (co-supervised by JHI)	***Duration*** 36 months	***Start date*** month 7
Project title: Life history traits in contrasting environments - intraspecies variation in stress tolerance (WP3). **Supervisor name:** H.W. Pritchard & P. Toorop RBGK / P. Iannetta JHI **PhD enrolment**: Yes, awarded by UNIPV			
Objectives: - To generate genetic and phenotypic information on provenances adapted to stressful environments in which water and temperature limitations / extremes impact on species selection and survival. - To develop species ranking for seed stress tolerance and a list of alleles and genes that concur with stress tolerance.			
Tasks and methodology: - Phenotypic stress responses will be assessed for seeds of c. 10 species from various families and habitats and geographical distribution, matching the species selection in project 10C. - Seeds of both the soil seed bank and 'fresh' will be exposed to stress pre- and during germination; and seedlings will be treated to the similar temperature changes (cold and warm excursions), water limitation (e.g. PEG controlled) and stress cycles. - Differential scanning calorimetry at slow cooling rates will be used to investigate seed and seedling freezing responses. A perspective will emerge on natural regeneration likelihood and survival of species in the natural environment. - Species with a well characterised phenotype will be subject to genetic studies using pyrosequencing to test that locally adapted provenances that grow outside the species' natural habitat contain genetic backgrounds for stress tolerance.			
Results: - Diversity baselines assessments and seed banking of intraspecific diversity at key sites. - Functional characterisation of ecotypes in relation to geo-physics of provenance. - Understanding seed functional attributes in relation to persistence and adaptation to climate change (osmotic stress avoidance). *Contributing to milestone(M): **8**, 15 & deliverable(D): **7, 10, 14/15, 16, 19, 21, 23/26**, **27,** 28, 32, **34**, **35***			
Dissemination: - presentation at congresses of the British Ecological Society -Agroecology Group, and International Society for Seed Science. - Report perspectives and findings in years 2 and 3, to stakeholder fora identified via the NASSTEC network. - Two publications in peer-reviewed journals.			
Planned secondments: **1.** PAT, Habitat restoration in the Alps; in Year 1; duration: 1 month **2.** RCRA, habitat restoration in ski slopes; in Year 2; duration: 1 month **3.** freely chosen by the ESR; in Year 3; duration: 1 month			
Risk assessment: seed availability and deep dormancy and might severely affect the outcome of germination trials and stress tolerance measures; an increased safe margin in the number of population and species sampled will mitigate this risk			

Fellow ESR 8C Research sub programme C: Production and deployment of seed..	***Host institution*** SSE (co-supervised by SESIL)	***Duration*** 36 months	***Start date*** month 7
Project title: Improving seed quality in large-scale production (WP3). **Supervisor name:** G. Laverack SSE / C. Gálvez SESIL. **PhD enrolment**: Yes, awarded by UNIPV			
Objectives: - Establish quality of seed currently in production. - Develop production protocols to improve seed quality to attain higher levels of purity and germination - Establish achievable quality standards			
Tasks and methodology: - Survey of seed quality from a wide range of producers across Europe from commercial suppliers, supplemented by material from non-commercial sources and from activities under NASSTEC sub-programmes A and B. - A range of quality factors will be evaluated; primarily, germination in temperature controlled incubators and purity employing the standard technique of X-ray analysis - Test field production protocols for target species with low quality, assessing dormancy applying testing protocols that incorporate species-specific dormancy-breaking treatments as revealed by ESR projects across NASSTEC (e.g. after-ripening) and application of enhancement treatments, such as priming. - Harvest and Post-harvest techniques assessment testing mechanical methods for sequential harvesting to collect the ripest seed as an alternative to harvesting the whole seed population at one time			
Results: - Base-line survey data of seed quality. - Improved field and post-harvest production protocols - Recommendations for minimum standards *Contributing to milestone(M): **8**, 14, 19, 20, 22, 24, 25, 26 & deliverable(D): **7, 10, 14/15, 16, 19, 21, 23/26**, **27,** 31, 33, **34**, **35**, 38*			
Dissemination: - Two peer-reviewed publications - Presentations at the International Seed Testing Association and ISSS congresses - Report to NASSTEC network, including final conference			
Planned secondments: **1.** SESIL, Quality in Mediterranean seeds; in Year 1; duration: 1 month **2.** MUSE, criteria for species selection; in Year 2; duration: 1 month **3.** freely chosen by the ESR; in Year 3; duration: 1 month			
Risk assessment: Obtaining large enough numbers of samples for comparison may be a problem; a well-organised approach to gathering test samples is essential. Field production success is heavily dependent on weather conditions, a careful selection of target species and a larger number or trials well above the minimum target level will mitigate the identified risks.			

Fellow ESR 9C Research sub programme C: Production and deployment of seed..	***Host institution*** RBGK (co-supervised by SSE)	***Duration*** 36 months	***Start date*** month 7

Project title: Developing propagation and seed multiplication protocols for herbaceous flora (WP3).
Supervisor name: R. Probert RBGK / G. Laverack SSE.
PhD enrolment: Yes, awarded by UNIPV

Objectives:
- Assess natural reproductive output and soil seed bank dynamics and quantify constraints to germination and seed storage in selected understory plants
- Develop germination and propagation protocols
- Determine field production methods that maximise plant establishment and genetic diversity of offspring

Tasks and methodology:
- Survey convenient populations of targeted species to facilitate field monitoring of natural reproductive phenology
- Investigate post-harvest handling methods to maximise seed quality, laboratory experiments to quantify seed longevity
- Laboratory experiments to assess seed dormancy and to develop practical treatments for dormancy removal
- Apply germination and dormancy breaking treatments that maximise nursery establishment and plug plant production
- Set up field plots to investigate production methods (eg open versus shaded sites) that maximise flowering and seed production
- Field experiments to quantify the natural soil seed bank and to define emergence phenology under natural conditions

Results: - Reproductive output including seed versus vegetative propagation quantified for targeted woodland understory species
- Post-harvest handling procedures that maximise seed quality developed
- Germination and propagation protocols available to inform nursery production of high quality plug plants
- Field production methods developed that maximise flowering and seed production

Contributing to milestone(M): ***8****, 15 &* *deliverable(D):* ***7, 10, 14/15, 16, 19, 21, 23/26****,* ***27,*** *28, 32,* ***34****,* ***35***

Dissemination:
- At least two peer-reviewed papers on seed biology of targeted species
- present oral and poster papers at international conferences such as Society for Ecological Restoration (SER)
- develop training materials and technical guidelines for commercial producers

Planned secondments:
1. UNIPV, Dormancy in endospermic seeds perennials; in Year 1; duration: 1 month
2. SESIL, Mediterranean native seed production; in Year 2; duration: 1 month
3. freely chosen by the ESR; in Year 3; duration: 1 month

Risk assessment:
- Extreme weather events could seriously impact on all field experiments
- Intractable seed storage and / or dormancy problems could prevent the on-going development of propagation methods. *A careful selection of study species should mitigate this*

Fellow ESR 10C Research sub programme C: Production and deployment of seed..	***Host institution*** SYN (co-supervised by RBGK)	***Duration*** 36 months	***Start date*** month 7

Project title: Seed pre-treatments of native species for optimal establishment, for use in *in situ* restoration (WP3).
Supervisor name: F. Lanfermeijer SYN / P.E. Toorop RBGK.
PhD enrolment: Yes, awarded by UNIPV

Objectives:
- Test and improve, through seed treatments, the stress tolerance of alpine species for use in the in situ restoration of alpine meadows.
- Test the hypothesis that seed lots with higher stress tolerance will establish better in an alpine meadow, either because of their inherent genetic makeup or because of an improved sensitivity to performance-enhancing treatments.

Tasks and methodology:
- Selected species chosen by industry and seed lots of various sites from different geographical origin will be characterised for different levels of stress tolerance to temperature and water stress (at the seed and early sprouting stage).
- The seed treatments with the potential to enhance seed vigour (performance) will include priming in polyethylene glycol (PEG). Subsequent stress tests will be applied under controlled laboratory environment conditions, including cold test.
- Gene expression markers (from ESR 7B) will be used to select seed lots of high stress tolerance for testing in the field.
- Different sowing methods will be applied: a) broadcast sowing of treated/untreated seeds b) field planting of plugs grown in a greenhouse after laboratory germination of treated/untreated seeds. Furthermore, testing of stress tolerance, e.g. germination at low temperature, will be conducted in the laboratory and in soil at Syngenta.

Results: - Seed lots ranked from higher or lower stress tolerance (publication 1 - yr 2 work).
- The ability of seed lots to respond to treatments that can re-induce desiccation tolerance assessed (publication 2 - yr 2 work).
- Reintroduction of seed lot with high stress tolerance to alpine meadow (publication 3 - yr 2 work).

Contributing to milestone(M): ***8****, 15 &* *deliverable(D):* ***7, 10, 14/15, 16, 19, 21, 23/26****,* ***27,*** *28, 32, 33,* ***34****,* ***35***

Dissemination:
- Presentation of the results at international conferences of Seed Ecology and Seed Biology.
- To publish two publications in peer-reviewed journals, and report these at the ISSS Annual Meeting (years 1, 2 & 3).

Planned secondments:
1. SSE, Seed priming in acidic grassland restoration; in Year 1; duration: 1 month
2. UNIPV, Continental species germ & restoration; in Year 2; duration: 1 month
3. freely chosen by the ESR; in Year 3; duration: 1 month

Risk assessment: Seasonality may affect seedling survival: *a careful selection of study species will avoid this contingency*

Fellow ESR 11C Research sub programme C: Production and deployment of seed..	***Host institution*** MUSE (co-supervised by SSE)	***Duration*** 36 months	***Start date*** month 7

Project title: Certification of seed quality and provenance (WP3).
Supervisor name: A. Mondoni MUSE / G. Laverack SSE.
PhD enrolment: Yes, awarded by UNIPV

Objectives:
- Establish the current state of regulations and practice across Europe
- Identify quality requirements for genetic conservation and plant establishment
- Develop a certification scheme for European native species that is grounded in the findings of NASSTEC and meets the growers needs

Tasks and methodology:
- Review EU and country regulations and their operation
- Gather information from the commercial seed sector on the relevant needs (business drivers) with respect to current seed quality levels and challenges, encompassing the equipment development needs and costs to mechanise production, including the semi-automated production of seed mixtures.
- Survey of seed users and conservation scientists problems with seed quality and availability (ground- truthing)
- Assess the different factors affecting seed production and yield for native seeds and techniques developed by NASSTEC to enhance native seed production (e.g. provenance, gene expression, stress tolerance, shade tolerance, harvesting, etc)
- GIS modelling of ecological and administrative units for potential zoning employing DEXI models

Results: - Report on the current state of development of regulations, with suggestions for future developments
- Identification of threats to conservation below species level and the role of the market in native seeds
- Recommendations on regulation / certification

*Contributing to milestone(M): **8**, 14, 19, 20, 22, 24, 25, 26 & deliverable(D): **7, 10, 14/15, 16, 19, 21, 23/26**, **27,** 31, 33, **34**, **35**, 38*

Dissemination:
- Two peer-reviewed papers
- Congress presentations at the Society for Ecological Restoration and positive interaction with the Restoration Alliance
- Engagement EU policy makers bridging the commercial sector and the restoration practice

Planned secondments:
1. BGPA, Plant establishment; in Year 1; duration: 1 month
2. MRS, industrial quality control; in Year 2; duration: 1 month
3. freely chosen by the ESR; in Year 3; duration: 1 month

Risk assessment: An accurate and comprehensive picture for all EU countries may be difficult to obtain. Contact with local seed producers associations should mitigate this aspect

Fellow ER 12C Research sub programme C: Production and deployment of seed..	***Host institution*** SSE (co-supervised by SESIL)	***Duration*** 20 months	***Start date*** month 23

Project title: Transfer of NASSTEC knowledge to European seed producers (WP7).
Supervisor name: G. Laverack SSE / C. Gálvez SESIL.
PhD enrolment: No, not applicable

Objectives:
- To implement an efficient two-way communication between NASSTEC and the European seed producers
- Efficiently Transfer relevant technology from NASSTEC to the European native seed producers, effectively integrating Industry and Academia

Tasks and methodology:
- Identify native seed producers and potential producers in all sectors in the EU and establish their technical needs
- Gather information on the research and useful results delivered by all individual ESR projects by continuous contact with the whole NASSTEC community, facilitating the delivery of the NASSTEC manuals
- Carry out visits to selected project partners and seed producers, keeping in contact with the general public.
- Keep the Information Facility up to date with information exchange and using website and social media to communicated within and beyond the NASSTEC community.

Results: - Active contribution to website and social media and coordination of D33 - native plants displays in partner countries.
- Direct contacts and special meetings with EU native seed producers to implement technology transfer
- Supporting the delivery of the NASSETEC European Native Seed Production Manual (D39)

*Contributing to milestone(M): **8**, 14, 19, 20, 22, 24, 25, 26 & deliverable(D): **7, 10, 14/15, 16, 19, 21, 23/26**, **27,** 31, 33, **34**, **35**, 38*

Dissemination:
- The project website, social media and side events at Seed biology meetings (e.g. ISTA, SER, Seed Ecology, ISSS),
- Special meetings with Seed producer targeting selected producers and producers' association (Flora locale & VWW)
- Promoting the NASSETEC European Native Seed Production Manual (D39) with all relevant stakeholders identified
- One review paper on a peer reviewed journal

Planned secondments:
1. SESIL, seed production for restoration; in ER Year 1 (ESR year 2); duration: 1 month
2. freely chosen by the ESR; in ER Year 2 (ESR year 3); duration: 1 month

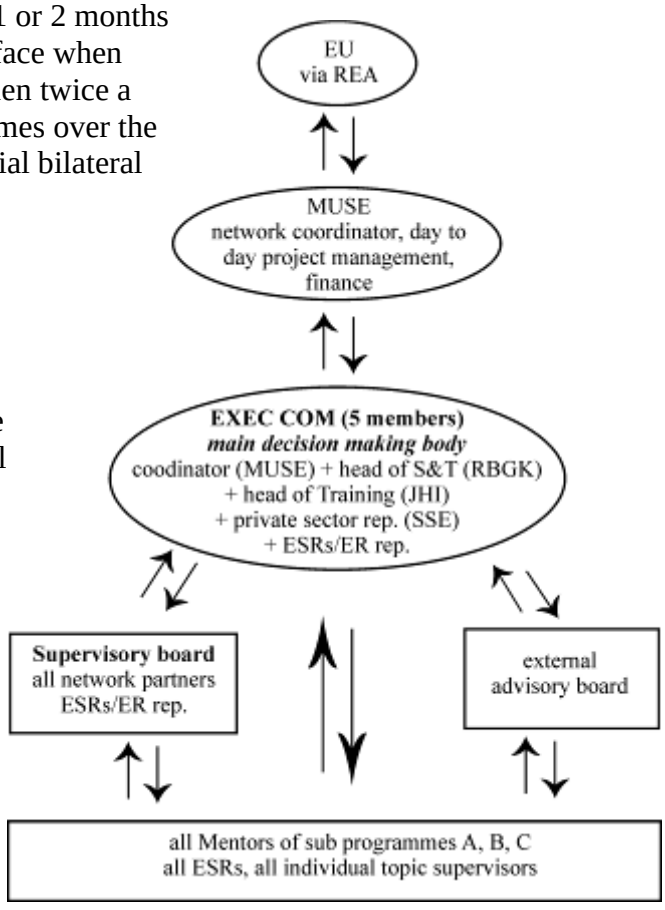
Risk assessment: Poor feedback from target audience should be addressed showcasing the business opportunities connected with native seed production.

B.4.3. Management structure, organisation and procedures

B.4.3.1. Network organization and management structure

For the ITN management, the coordinator will be supported by a full time **project officer** (to be recruited). S/he will be in charge of the day-to-day practical management of the network and will interconnect all ESRs/ER, their supervisors, other partners' staff, the REA and the committees described below. The project will employ an on-line project management platform (such as Glasscubes) providing different levels dashboards where project activities will be planned, modified and regularly updated electronically, implementing an automated e-mail reminder system and an on-line workspace including forums, discussion areas, conference calls, on-line file sharing and storage. The project officer will run the project helpdesk to answer all queries from inside and outside the network, will organise all technical meetings of the project committees and boards (see diagram below), the Annual General meetings and assist with the logistics of the training events. S/he will prepare minutes and collate reports, set internal deadlines, constantly remind the outstanding actions and contributions required from the relevant key person. S/he will regularly provide to partners the format and templates necessary for the required reports. In its leadership role, the coordinator will be supported by a deputy that will assist him, should any problem arise.

The deputy role will be taken over by SSE in particular by Dr. Giles Laverack, providing in this way an additional link with industry. The main decision making body of the network will be the NASSTEC executive committee (E-COM), composed by 5 representatives: the coordinator (MUSE) and/or his deputy (if necessary), the leader of S&T Hugh Pritchard (RBGK), the leader of Training Pietro Iannetta (JHI), the representative of private companies, Giles Laverack (SSE) and 1 representative of the ESRs. The latter will be democratically elected by all ESRs. The E-COM will enforce the project workplan dealing with all network scientific and training activities, ensuring the high quality of the science produced by the network, monitoring and auditing its implementation. The E-COM will meet every 1 or 2 months (as necessary) by electronic meansand face to face when occasion arises (for the kick off meeting and then twice a year for the 2 annual joint network events (7 times over the 4 years duration of the project). Additional initial bilateral visits between the coordinator and the partners may take place as needed (at least one per partner). The E- COM will appoint and seek regular advice from an external advisory board that will act as an audit panel. This advisory board will include 3 high profile independent scientists in the relevant field. The advisory board will be asked to join the Annual network meetings, where it will carry out an independent review of the project activities. The E-COM reports to the **supervisory board** that ratifies its decisions. The Supervisory board is chaired by the coordinator, is composed of delegates of all network partners, both FP and AP and the ESR representative. It will meet face to face once a year in conjunction with scheduled network events (3 times in total over the whole duration of the project). If necessary it might meet more frequently *via* electronic



means if at least 2 members call for a meeting. The day-to-day interface with the ESRs is entrusted to the individual research topic supervisors based locally. According to the recommendations of the European Charter for Researchers supervisors and an additional local tutor will be officially designated for each ESR by the local host and ratified by the supervisory board. They will be expected to meet at regular intervals with the ESRs and keep records of such meetings to be copied to the network coordination. They will be in close contact with the Mentor of each sub programme who is also expected to join in electronically to some of these regular meetings on a quarterly basis.

Table 7. Calendar of face to face management meetings:

N.	Management meetings *(2 events per year)*	Planned venue	Planned date	Participants	Month
1	Kick off meeting (D1)	MUSE	May 2014	all partners, full and associated	2
2	1st Annual General Meeting (D6)	UNIPV	Oct 2014	all partners, full and associated, all ESRs	7
3	Mid term review (M17)	MUSE	Oct 2015	the e-com	19
4	2nd Annual General Meeting (D17)	SYN	Feb 2016	all partners, full and associated, all ESRs	23
5	3rd Annual General Meeting (D24)	MUSE	Sep 2016	all partners, full and associated, all ESRs	30
6	Conclusion meeting (D36)	RBGK	Sep 2017	all partners, full and associated	42

According to the Special Clause 5 bis of Article 7 of the Grant Agreement, a mid-term review meeting must be organised, preferably during month 18-22 of the project. The venue and organisation of this meeting will be of the responsibility of the coordinator, and the timing and location of the meeting must be agreed with the REA project officer.

B.4.3.2. Financial management

The coordinator will entrust the financial management of the project to an experienced finance officer (Dr Denise Eccher) based at MUSE that actively led the financial management of 5 EU projects in the last 6 years, 2 of which in coordinator's role. A traffic light system will also be employed to link the payment of financial advances to the effective delivery of the agreed work plan; such a system was successfully employed in a previous project that involved 24 project partners (FP6-Ensconet) and can be considered an effective contingency planning and risk management system. A certain percentage (approx 30% of the training budget (category 3) will be withheld by the coordinator in a common basket to support participation to the training events of Associated Partners and to support the expenses of network-wide training activities.

B.4.3.2. Recruitment strategy

The E-COM will be in charge of the recruiting operations. It will produce specific guidelines for recruitment that will define the requirements needed for enrolment in the ITN and the subject area, open to first class degrees that qualify for enrolment on a PhD programme. They will enforce the EU Code of Conduct for the Recruitment of Researchers and provide practical recommendations to promote the effective implementation of the European Charter for Researchers, creating a supportive environment and working culture in each partner organisation. The E-COM will make sure that the job descriptions comply with the prerequisites and conditions for eligibility of candidates to ESR/ER positions as set out in the Marie Curie People work programme. The E-COM will ratify all the selection panels appointed by each partner for candidate selection recommending that they should be composed by at least 3 members and that at least 1 originate from a country other than the host and that at least 1 is female to grant gender balance. The E-COM will organise a specific training course on candidate selections procedures that is mandatory for each panel component, issuing specific evaluation criteria designed to judge impartially the achievements of each candidate taking into account a wide range of the candidate's abilities including group work ability, mobility experience, project management, public awareness activities, industrial involvement and knowledge transfer. All recruitment

procedures will be conducted in the same open, efficient and transparent way in all countries including assessment of CV, a set of interviews and written assignments.
A minimum period of 2 months between the publication of the position advert and the deadline for submission will apply. All details of the recruiting procedures will be publicly accessible. Positions will be widely advertised *via* websites with banners and links but also with printed flyers, targeting the relevant stakeholders. National information days will be organised in country where partners are based. Adverts will be posted on the global European and the national Euraxess portal. All appointed ESRs will be briefed on The European Charter for Researchers and the ethical principles they should abide to, illustrating in detail what they should expect from their appointments and the constraints they will be subject to, detailing safe working practices, research freedom, intellectual property rights, joint data ownership, co-authorship, relation with supervisors, career opportunities, continuous professional development (CPD), etc.

B.4.3.3. Gender aspects
The E-COM will urge all partners to do their best to remove all local administrative and legal obstacles to obtain full employment contracts, even if temporary, for all ESRs/ER, making sure all social security provisions are granted providing working conditions which allow both women and men researchers to combine family and work, children and career. Specific provisions will be put in place to grant maternity leave, and if necessary a specific extension of the project duration will be negotiated with the EU to grant female researchers the possibility of resume their research appointment within the network without any major disadvantage or drawback caused by the maternity interruption. In order to promote women participation, gender balance, equal opportunities and disadvantaged groups' access, the E-COM will urge each partner to allow maximum flexibility in working hours, also considering tele-working and remote access when appropriate; however under no circumstance will less advantaged groups have precedence over quality and competence criteria. Career breaks will in no circumstance be penalised.
A family audit procedure will be implemented throughout the network taking the move from MUSE family audit system aimed at monitoring women and family needs and designing adequate tools to accommodate them, aiming to be effectively user oriented. A Equal Opportunities officer will be officially appointed to facilitate promotion of gender aspect throughout the network.
Outreach activities gender oriented are included in the list of outreach activities in B.5.3
The E-COM will adopt a Gender Action Plan that will implement the points laid out above setting a target of 40% women in recruiting and a gender balance in the E-com and supervisory board.

B.4.3.4. Intellectual property
Because of the potential commercial benefits of the findings in NASSTEC, appropriate IP rights and patenting management will be crucial for the successful interaction of academia and industry. A specific IP strategy will be developed, agreed and included into D5, thanks to UNIPV IPR office that will actively monitor Nasstec R&D technological solutions to verify their originality, uniqueness and innovative potential constantly comparing them with the market leader in the respective industrial sector. In doing so, the IPR office will be supported by **J. Slaven,** Patent Attorney, expert on patenting and IPR Syngenta department of IP Crop Protection.
The IPR office will support and facilitate the interaction with the EU IPR helpdesk (www.iprhelpdesk.eu), being available for the whole duration of the project to support recognition and protection if IP developed in the course of the project and providing advice to promptly identify technology suitable for patenting and facilitating its registration process.

B.4.3.5. Subcontracting NOT applicable
B.4.3.6. Third parties (other than subcontractors) NOT applicable

B.4.3.7. Consortium Agreement
A Consortium Agreement will be signed within the first 2 months of the project.

B.4.4. Project monitoring and key performance indicators

Periodic and final reports are contractual deliverables, according to Article 4 and II.4 of the Grant Agreement. In addition, progress reports are due at the end of the first and third year in order for the REA to monitor the implementation of the project.

When preparing those documents, the coordinator should report according to the following key performance indicators and specify the means to monitor them.

B.4.4.1. Research Activities

- Research results obtained (including a short description of progress on the individual projects) and deviations, if any, to the original research work plan.
- Scientific highlights and achievements (scientific/technological breakthrough, patents, awards, prizes etc...).
- A full list of individual and joint publications, directly related to the work undertaken within the project (including citation index and impact factor), with appropriate acknowledgment of the funding source.
- Intersectoral and multidisciplinary collaboration.

B.4.4.2. Training Activities

- Implemented training events/activities and deviations, if any, to the original training plan (including Career Development Plans, coaching or mentoring activities in place at each host institution).
- Participation of the fellows in training events and meetings from the network (workshops, seminars, summer schools, etc), and at international conferences outside the network (names, places, dates).
- Transferable skills training (e.g. project management, presentation skills, language courses, ethics, intellectual property rights, communication, entrepreneurship, etc.).
- Implementation of visits/secondments undertaken within the network to both full participants and associated partners.

B.4.4.3. Management activities

- Status of ESR/ER recruitments at each participant, and relevant issues related to the recruitment strategy/process and gender balance, with justification for any deviation from the original plan.
- Effectiveness of networking, communication and decision-making between stakeholders.
- Effectiveness of the "training events and conferences": external participation and integration in the training programme.
- Effectiveness of the financial management and compliance with Marie Curie salary rates.
- IPR management and commercial exploitation of research results.

B.4.4.4. Dissemination and outreach activities

- Implementation and analysis of the proposed outreach activities and deviations, if any, to the original work plan.
- Analysis of the dissemination activities.

B.5 Impact

B.5.1. Impact towards the policy objectives of the programme

Most growers and producers of native seeds in Europe are individuals or very small companies with only a few employees. Current career paths are generally from conservation work with an environmental background or from horticultural seed production. In most cases crucial knowledge of the scientific and technical characteristics of native seeds are lacking and there is no established route for access to this knowledge for producers. Many producers are operating on a 'trial and error' approach and use of anecdotal evidence. Error is prevalent and in some cases an entire mythology has emerged relating to seed longevity and storage, dormancy, germination and quality testing and the significance of seed origin. Native seed producers often lack many of the resources available to established conventional seed producers: links with academia; research and development capability; trade associations with lobbying capacity; access to capital; marketing skills. Demand often exceeds supply, especially for species which are difficult to produce. The recent enactment of directive 2010/60/EU, affecting a range of fodder crops which are native species, also demonstrates the weakness of the producers in influencing their trading environment. The directive is widely seen as restrictive in ways which are problematic to producers and detrimental to conservation while protecting the interests of plant breeders. NASSTEC plans to make an impact on the European market by training the personnel needed for its development with a wide range of skills.

The project's main goal to create a network of academic and industry specialists able to produce and use European native seed effectively and efficiently will be achieved by connecting four leading academic institutions, with experience in seed science and plant biodiversity, with three private companies as full partners and seven associate partners.
This will allow the establishment of a high profile European doctorate at UNIPV in the area of seed research for native species as part of the Earth and Environmental Sciences PhD stream, outing NASSTEC researchers at the forefront of native seed science.
The project ESRs and ER career prospects will be enhanced by their participation in a range of varied but integrated research projects at PhD level, coordinated across a set of organisations. This arrangement will allow the opportunity to experience a comprehensive range of activities, which make up this developing area of native seed science and technology. The projects will attract well qualified and motivated individuals and to allow them to choose the subjects which interest them most and to tailor their training to their individual needs by access to the partners and to the wider contacts of the network. ESRs/ER will have access to excellent laboratory facilities and the most experienced scientific and technical professionals possible; and to real examples of practical applications of the use of native seeds. It will enable ESRs/ER to construct a broad view of the various areas of work in this subject which will help them in their future careers in research, research and development in seed production or advisory work in the use of native seeds by allowing them the flexibility to move between different sectors and to understand and incorporate the varying needs in their own work, offering recruitment and career opportunities. Each ESR/ER will feel part of a thriving international research community articulated in a complex and yet well targeted network. The scientific, technical and entrepreneurial skills which will be gained by ESRs/ER in NASSTEC are needed in the public and private sector by existing employers and new employers as more companies and countries begin native seed production. We see the researchers, on graduation, as valuable assets to the types of organisation participating in the project – universities, research centres, public land bodies, NGOs, seed producers – and to a wider range of employers including consultants, engineering companies and government departments. Experience in the project will give

researchers the skills and confidence to work in EU countries with developed native seed production and research and also countries with little or no current involvement in this area.
The UNIPV PhD structure set up for NASSTEC is seen as a key long-term collaboration which will persist beyond the period of the project with ongoing contributions from the project partners.
The links between industry, the public sector and NGOs will be strengthened during the project in ways which will extend beyond the life of NASSTEC funding as many more questions will be raised by these initial collaborations and the relationships will be established to pursue them jointly.
The expected results will include the graduation of highly employable researchers and ESR/ER career prospects will be monitored by recording and reporting feedback from contacts of individual researchers with potential employers (where this is not confidential) at year three and actual careers will be monitored at the end of the project. and beyond. Positive discussions and, above all, appointments in a relevant subject area will be seen as indicators of success.

B.5.2. Plans for exploitation of results and Dissemination strategy

Dissemination to the research community beyond the NASSTEC partners will be through:

- A project website, actively used, promoted and linked to relevant sites including forums, social networking tools and open-access publishing.
- Publications (as detailed below)
- Researchers joining scientific associations and congresses (as detailed below)
- Production of a NASSTEC Manual of results (as detailed below)
- Guidelines on seed production and use for EU regulatory services
- The programme of visiting scientists
- The workshop programme which will be open to invited guests
- The end of project conference and published proceedings

A dissemination and use plan will be prepared in the first phase of the project.

In total 23 papers (2 by each ESR and 1 by the ER) will be submitted to the journals listed below, aiming to effectively publish at least 12 of them within the project duration (being deliverable D30, 31, 32 (for individual details please refer to the dissemination tab in each individual project description in section B.4.2)
List of target journals addressed by ESR/ER for submitting publications: *PNAS, Trends in Plant Science, Annals of Botany, Journal of Applied Ecology, Journal of Ecology, Conservation Biology, Biological conservation, Biodiversity and Conservation, Seed Science and Research, Seed Testing International, Ecography, Oikos, Plant Biosystems, Nordic Journal of Botany, Plant Physiology, Crop Science, the Plant Journal, Ecological Management & Restoration, Ecological Restoration, Restoration Ecology, New Phytologist, Annals of Botany, Environmental and Experimental Botany, Flora, Journal of Vegetation Science, Integrative and Comparative Biology, Physiologia Plantarum, Plant Biology,*

As a whole the project will be presented to at least 32 international congresses and conferences as detailed in the dissemination tab of each individual project description in section B.4.2. Oral and Poster presentations will be submitted to the following target conferences: *the World Conference on Ecological Restoration and the European Conference on Ecological Restoration organised periodically by the Society for Ecological Restoration (SER); the International Congress for Conservation Biology (ICCB) and the European Congress for Conservation Biology (ECCB) organised periodically by the Society for Conservation Biology (SCB); the Annual meeting of the British Ecological Society; the Seed Ecology conference: an international meeting on seed and the environment and the workshops on the Molecular Aspects of Seed Dormancy and*

Germination organised periodically by the International Society for Seed Science (ISSS); the IUCN conference; the International Seed Testing Association Congress; the Landa Restauration Congress, the congress of the Asociacion Española de la Ingenieria del Paisaje; the European Botanic Garden Congress (Eurogard) and the Global Botanic Garden Congress organised every three years by Botanic Gardens Conservation International, The International Botanical Congress; the Annual Botany Conference of the International Association for Plant Taxonomy; the International Congress of Ecology organised by the International Association for Ecology (INTECOL) and other similar conferences local, national or regional interest.
Selected contributions will also be presented at the final project conference and will be published in the conference proceedings (D41).

As a whole the ESRs/ER in the project will contribute to publish 12 issues of the project newsletter and to the following 6 joint project publications including manuals, guidelines, protocols and case studies: Protocols for germination/cultivation/characterisation of target material (D28), Manual for species selection in grassland restoration (D30), Manual for quality certification procedures for native seeds (D31), Guide to dormancy and germination (M15), Manual for adaptation, dormancy and germination (D32), Manual for technology transfer to the EU native seed industry (D38). All of these will be collated in a general Nasstec Manual (D39). (for the individual involvement of each ESR/ER in these products please refer to the results tab in each individual project description in section B.4.2).

The visiting researchers (identified in Prof. Kingsley Dixon and Dr. Dave Merritt from Associated Partner BGPA) will join in person the project community for a few days/weeks in preparation of the following 3 key network events: during the Induction Course at the beginning of the ESR appointment (D9 in Oct 2014 in Pavia, Italy); half way through the ESR training for the Complementary skills workshop 1 - mock grant application, IPR and patenting (D17 in Feb 2016 in the Netherlands) and at the final conference (D31 in Sep 2017 in Kew, UK).

As required by Annex II of the grant agreement, the coordinator will ensure that all publications and presentations by members of the project consortium - including all funded fellows - acknowledge the EU financial support received. This acknowledgement should specifically refer to the Marie Curie Initial Training Networks (ITN) action, as well as the project number and acronym.

B.5.3. Outreach activities

Outreach activities to the general public will be prioritised as a specific programme within the project, led and coordinated by MUSE, and implemented by the research fellows. ESRs will be required to carry out dissemination and outreach activities as part of their contracts of employment, with carefully-planned activities for each ESR, as detailed in the outreach plan (M12). These will not be overly-prescriptive but rather appropriate activities related to their own projects and host institutions. In their planning for each outreach activity ESRs will formulate clearly the impact they wish to achieve with special attention to Responsible Research and Innovation (RRI). The impact of the ESR-led public-engagement activities will also be highlighted and publicised at the Annual Meeting, on the project website and in the regular Newsletter. A necessary indexing and selection criterion of the metadata pertaining to the outreach and dissemination activities will be the first step in the outreach programme and will be carried out at the beginning of the ESR appointment using LOM descriptors (Learning Object Metadata) that will be used to index all the material produced (M9). These descriptors will be included in the outreach plan (M12). The model of the teachers' community of practice lead by MUSE a on sustainability issues will taken up by NASSTEC, creating a similar community for native seeds (M13).

The actual outreach tasks and deliverable will be the following:

- D10 - **A quarterly newsletter** - A standard outreach tool, supplemented by press releases, leaflets, posters and the regular use of social media carried out both centrally by the project officer and individually by each fellow form the beginning of their appointment
- D14 - **IBSE activities** designed for schools. The existing connection with the EU project INQUIRE - Inquiry-based teacher training for a sustainable future (thanks to MUSE and RBGK) will be used to select, adapt and use established resources for environmental education in schools and botanic gardens relevant for the use of native seeds and plants, both in formal and informal settings. At least 6 ESRs will therefore select, adapt or develop a specific IBSE (Inquiry Based Science Education) to use with local schools
- D15 - Six participants to the local **Researcher's night** (minimum). Selected partners/ESRs (minimum six) will contribute to the local edition of the EU researcher night, offering to develop/host a local session if no local edition has been already planned in the vicinity of a partner site. This event is usually held in September.
- D23 - Six **Marie Curie Ambassadors** in schools. At least 6 ESRs will be required to make contacts with selected local schools, planning and running a day visit as Marie Curie Ambassadors to introduce the project and highlight its benefit to society, using one of the IBSE activities designed in D14. These might also include seed collecting days and seed sowing events that will be used to target also parents of pupils, to raise awareness of the importance of native seeds and of the research being carried out in NASSTEC.
- D26 - Six participants to the **Famelab contest** in selected countries - Selected partners/ESRs (minimum six) will contribute to the local edition of the FAMELAB contest (www.famelab.org), offering to develop/host a local session if no local edition has been already planned in the vicinity of a partner site. This contest aims at electing the brightest science communicator in each partner country, eventually reaching the European finals.
- D27 - Two weeks school **teachers placements** in each partner lab. Contacts will local schools will also be used to offer teachers the opportunity to spend a two weeks placement period in each partners lab, during the summer school break, to raise awareness of the use of native flora among teachers and educators
- D33 - **Native flower beds display** in 5 key cities of the partner countries. The project success will be celebrated with native seeds, plants and flower beds display in 5 cities of all partner countries, showcasing the real product that the project aims to deliver.
- M27 - All Training and **outreach material loaded onto Scientix** - the EU science education portal www.scientix.eu and LRE - the Learning Resource Exchange portal http://lreforschools.eun.org.

Table 8. List of Outreach Milestones and Deliverables:

N.	M & D N.	Milestone or Deliverable title	Lead organisation	ESR /ER involved	by month
1	D10	Project newsletter - quarterly from month 7 to month 40	RBGK	all	7-40
2	M9	LOM selected for training and outreach material	JHI	none§	12
3	M12	Target audience and outreach plan and social media started	MUSE	none§	14
4	D14	6 IBSE activities designed for schools (minimum)	All	½ of all ESRs*	15
5	M13	Set up community of practice in education	MUSE	none§	16
6	D15	6 participants to the local Researcher's night (minimum)	All	½ of all ESRs*	18
7	D23	6 Marie Curie Ambassadors in schools (minimum)	All	½ of all ESRs*	27
8	D26	6 participants to the Famelab contest in selected countries (minimum)	All	½ of all ESRs*	30
9	D27	2 weeks school teachers placements in each partner lab	All	all	32
10	D33	Native flower beds display in 5 key cities of partner countries (minimum)	All	all except 3,7,9	40
11	M27	Training and outreach material loaded onto Scientix	All	none§	42

§ will be done centrally by the project officer being an organisational/reporting task
** to be freely chosen by the ESR (alternative options D14/15; D23/26)*

B.6 Ethical issues

The Beneficiaries accept to uphold the highest standards of scientific integrity and ethical conduct during the implementation of the grant agreement.

No ethical issues are raised by NASSTEC, as confirmed by the Evaluation Summary Report.

PART C:

Overall indicative project deliverables

A3.1:
Overall Indicative Project Deliverables

Project Number [1]	607785	Project Acronym [2]	NASSTEC

One Form per Project

	Initial Training 0-5 years						Total
	Early-Stage researchers			Experienced researchers			
	Months	Researchers	% Fixed amount contract (B)	Months	Researchers	% Fixed amount contract (B)	Months
MUSE	72	2	0%	0	0	0%	72
RBGK	72	2	0%	0	0	0%	72
UNIPV	72	2	0%	0	0	0%	72
SSE	36	1	0%	20	1	0%	56
JHI	36	1	0%	0	0	0%	36
SESIL	72	2	0%	0	0	0%	72
SYN	36	1	0%	0	0	0%	36
Overall Total	396	11	0%	20	1	0%	416

PART D:

Overall maximum EU contribution

A3.2:
Overall Maximum European Union Contribution

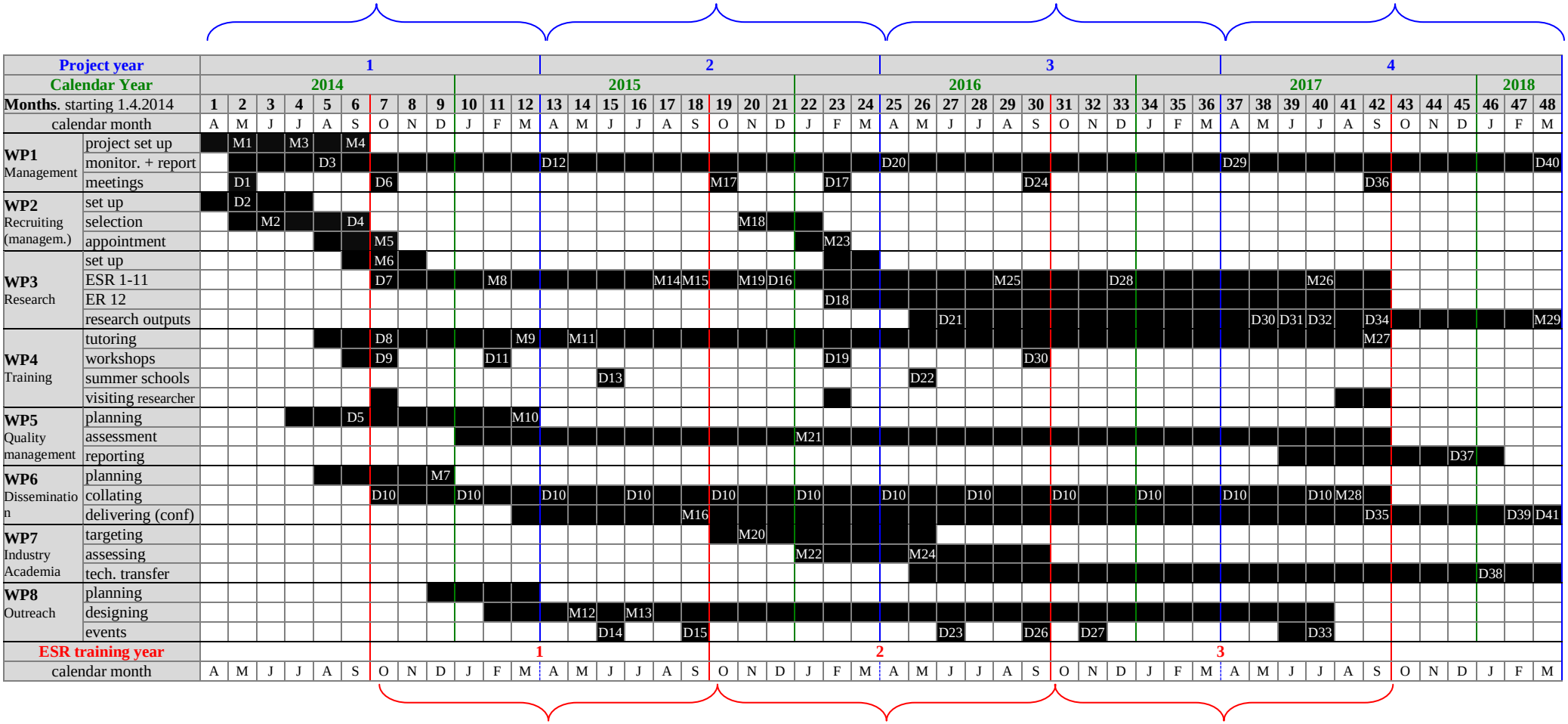
Project Number [1]	607785	Project Acronym [2]	NASSTEC

One Form per Project

	Living allowance (1)	Mobility allowance (2)	Contribution to training expenses of eligible researchers and research/transfer of knowledge programme expenses(3)	Management activities (including audit certification) (4)	Contribution to overheads (5)	Total
Year 1	240,065.00	64,438.50	118,800.00	85,518.50	50,882.20	559,704.20
Year 2	493,234.00	131,161.80	241,200.00	85,518.50	95,111.43	1,046,225.73
Year 3	558,754.00	142,585.80	259,200.00	85,518.00	104,605.78	1,150,663.58
Year 4	279,377.00	71,292.90	129,600.00	80,824.00	56,109.39	617,203.29
Total	1,571,430.00	409,479.00	748,800.00	337,379.00	306,708.80	3,373,796.80

Appendix 1: Gantt chart

The chart has been synchronised with the invariable date of the Pavia PhD programme starting every year on the 1st of November with a reasonable advance network preparation time of 6 months suggesting a possible start date for the project of 1st of April 2014.



Key: WP - work package, t task, D deliverable, M milestone, please refer to table B.4.1 and B.4.2 for the detailed list of milestones and deliverables ordered by date.

Appendix 2: Extract from the 2013 PEOPLE Work Programme

Structure of the cost categories applicable for ITN (adapted from Table 3.1 and 3.3 of the WP)

This information does not substitute the relevant information of the 2013 People Work Programme, which should be consulted for further details.

1 **Monthly living allowance**	2 **Monthly mobility allowance**	3 **Contribution to the training expenses of eligible researchers and research/transfer of knowledge programme expenses**	4 **Management activities (including audit certification if applicable)**	5 **Contribution to overheads**
Flat rate of : 38 000 Euro/year for ESRs and 58 500 Euro/year for ERs Rate for individual countries is obtained by applying the correction coefficients listed in Table 3.2 of the WP.	Flat rate allowance to cover expenses linked to the personal household, relocation and travel expenses of the researcher and her/his family in the host country: reference rate of EUR 700 for researchers without a family and EUR 1000 for researchers with a family. Rate for individual countries is obtained by applying the correction coefficients listed in Table 3.2 of the WP.	<u>For multi-partner ITNs and IAPP:</u> Flat rate of EUR 1800 per researcher-month managed by the host organisations to contribute for expenses related to the participation of researchers to training activities; expenses related to research costs; execution of the training/partnership project and contribution to the expenses related to the co-ordination between participants. <u>For EID and IPD:</u> Flat rate of EUR 1200 per researcher-month managed by the host organisation(s) to contribute for expenses related to the participation of eligible researchers to training activities and expenses related to research costs, as well as to contribute to the expenses related to the co-ordination between participants.	Maximum of 10% of the total EU contribution.	10% of direct costs except for subcontractors and the costs of the resources made available by third parties which are not used in the premises of the beneficiary.

EU27 and Associated Countries correction coefficients (adapted from Table 3.2 of the WP)

For other countries (such as ICPC and third countries), please consult the WP.

Austria	106.2
Belgium	100.0
Bulgaria	62.7
Cyprus	83.7
Czech Republic	84.2
Denmark	134.1
Estonia	75.6
Finland	119.4

France	116.1
Germany	94.8
Greece	94.8
Hungary	79.2
Ireland	109.1
Italy	106.6
Latvia	74.3
Lithuania	72.5

Luxembourg	100
Malta	82.2
Netherlands	104.1
Poland	77.1
Portugal	85.0
Romania	69.5
Slovak Rep.	80.0
Slovenia	89.6

Spain	97.7
Sweden	118.6
UK	134.4

Albania	63.1
Bosnia & Herz.	74.4
Croatia	83.0
FYROM	60.6
Iceland	95.0
Israel	96.4
Liechtenstein	109.9
Moldova	64.3

Montenegro	65.0
Norway	140.6
Serbia	74.0
Switzerland	119.6
The Faroes	134.1
Turkey	98.4

Appendix 3: Key to Acronyms and Abbreviations

3rdP - 3rd Party
AAB - Association of Applied Biologists
AFLP - Amplified Fragment Length Polymorphism
AGM - Annual General Meeting
AM - Assisted Migration
ANOVA - Analysis of variance
AP - Associated Partner
APRE - Agenzia per la Promozione della Ricerca Europea, AP3
BBSRC - British Biotechnology and Biological Sciences Research Council
BECOTEPS - Bio-Economy Technology Platforms
BES - British Ecological Society
BGPA - Botanic Gardens and Parks Authority, AP5
C - Conference
CBD - Convention on Biological Diversity
CCW - Cross Cutting Workshop
CEO - Chief Executive Officer
COP - Conference of Parties
CPD - Continuous Professional Development
CSIC - Consejo Superior de Investigaciones Científicas, Spain
CSW - Complementary Skills Workshop
D1-D35 - Project Deliverables 1-35
DELINAT - Institut für Ökologie und Klimafarming, Ayent, Switzerland
DEXI - a programme for multi-attribute decision making
E-COM - Executive Committee
ELE - E-Learning Environment
EM - Electron Microscope
ER - Experienced Researcher
ERA - European Research Area
ESR - Early Stage Researcher
ETP - European Technology Platform
EUNIS - European Nature Information System
FAO - Food and Agriculture Organization of the United Nations
FP - Full Partner
FtFLE - Face-to Face Learning Environment
FTIR - Fourier Transform Infrared Spectroscopy
GC-MS - Gas chromatography Mass Spectrometry
GIS - Geographic Information System
GSPC - Global Strategy for Plant Conservation
HPLC - High Performance Liquid Chromatography
IAS - Instituto de Agricultura Sostenible
IBSE - Inquiry based Science Education
IF - Nasstec Information Facility
ICP-ES - Inductively Coupled Plasma Atomic Emission Spectroscopy
IPR - Intellectual Propriety Rights
IPEN - International Plant Exchange Network
IPGRI - International Plant Genetic Resources Institute (now Bioversity International)
ISTA - International Seed Testing Association
ITN - Initial Training Network
JBA - Jardín Botánico Atlántico, S.A, Gijon, AP6
JHI - The James Hutton Institute, FP5
LFA - Logical Framework Approach
LOM - Learning Object Metadata
LRE - Learning Resource Exchange
M1-M25 - Project Milestones 1-25
MA - Master of Arts
MALDI-TOF - Matrix-Assisted Laser Desorption Ionization - Time of Flight
MoU - Memorandum of Understanding
MRes - Master of Research
MRS - Mylnefield Research Services, AP2
MSB - Millennium Seed Bank
MSc - Master of Science
MUSE - Museo delle Scienze, FP1
NCP - National Contact Point
NGO - Non Governmental Organisation
NTS - The National Trust for Scotland, AP4
PAT - Provincia Autonoma di Trento, Servizio Foreste e Fauna, AP7
PCR - Polymerase Chain Reaction
PDF - Portable Document Format
PEG - Polyethylene Glycol
PP - Project partner
R&D - Research and Development
RBGK - Royal Botanic Gardens Kew, FP2
RCRA - RECREA Gestión de Instraestructuras culturales, Turística y deportivas de Asturias, AP1
RRI - Responsible Research and Innovation
S&T -Science and Technology
SABRI - Scottish Agricultural and Biological Research Institutes
SCD - Seed Conservation Department
SEM - Scanning Electron Microscope
SERI - Society for Ecological Restoration International
SESIL - Semillas Silvestres, FP6
SIS - Science in Society
SME - Small and Medium Enterprise
SOP - Standard Operating Procedure
SPE - Global Seed Physiology and Enhancement Department
SS - Summer School
SSE - Scotia Seeds, FP4
SSR - Simple Sequence Repeats
SYN - Syngenta, FP7
TTZ - Tetrazolium Test
UNEP - United Nations Environmental Programme
UNIPV - University of Pavia, FP3
WBS - Work Breakdown System
WTO - World Trade Organization