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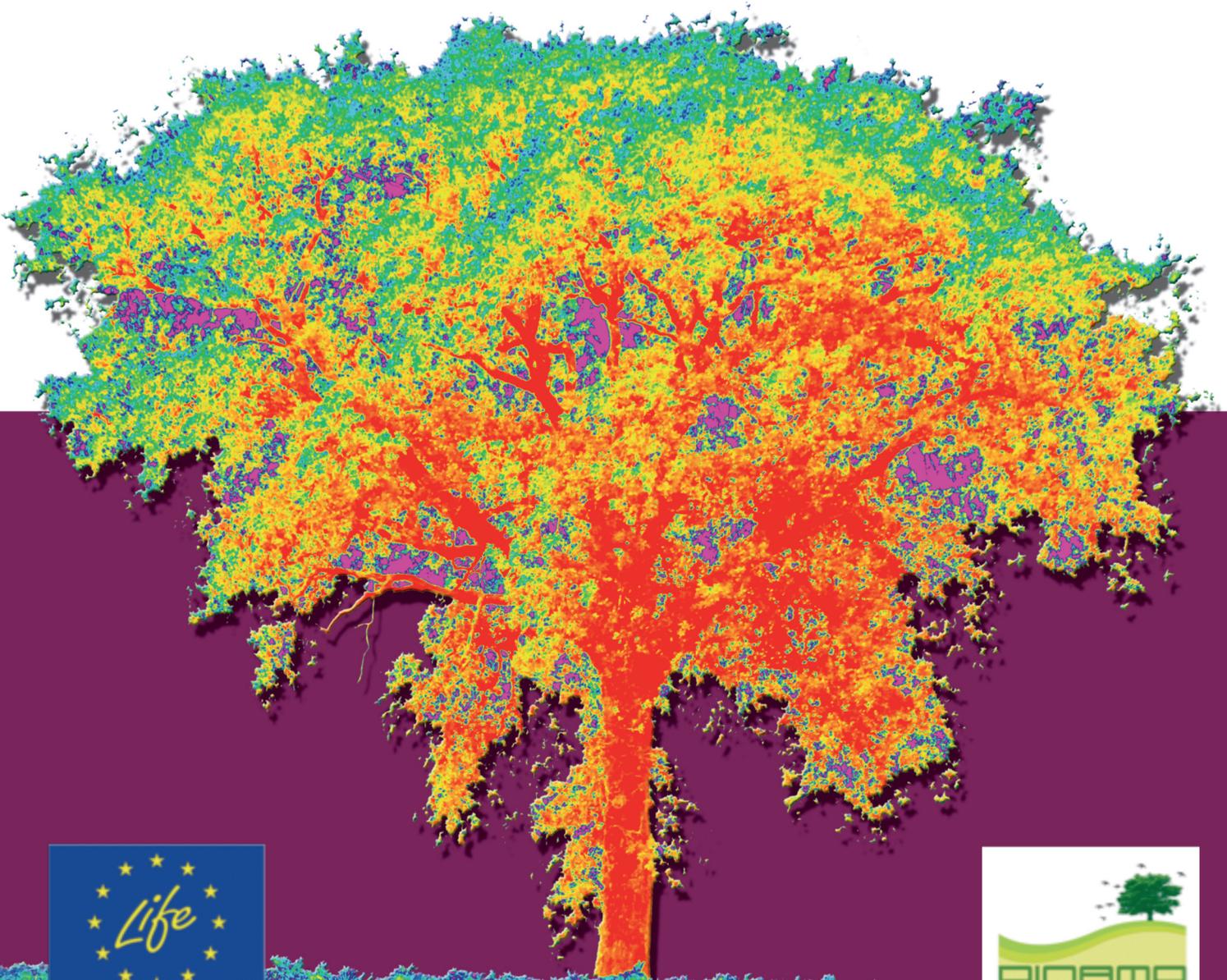
Italian National Agency for New Technologies,  
Energy and Sustainable Economic Development



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# GUIDELINES FOR THE REPLICATION OF THE DINAMO MODEL

LIFE08 NAT/IT/000324



Guidelines for the replication of the DINAMO Model

*Edited by Barbara Di Giovanni, Silvia Arena, Loretta Bacchetta, Angelo Cappuccio,  
Paola Carrabba, Massimiliano De Mei, Davide Marino, Laura Maria Padovani*

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## Member Editors

*Paola Carrabba, Loretta Bacchetta, Massimiliano De Mei,  
Barbara Di Giovanni, Laura Maria Padovani: ENEA*

*Davide Marino: University of Molise*

*Angelo Cappuccio: Confederazione Italiana Agricoltori (Italian Confederation of Farmers)*

*Silvia Arena: IGEAM DD*

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## LIFE8 NAT/IT/00324 PROJECT

<b>Total costs</b>	Euro <b>1.692.494</b>		
<b>% funding EU</b>	49,42%		
<b>Duration</b>	3 years	Beginning: <b>01/01/10</b>	End: <b>31/12/12</b>
<b>Partners</b>	 <p style="text-align: center;">University of Molise (coordinatore)</p>		
<b>Farms</b>	 <p style="text-align: center;">Italian National agency for new technologies, energy and sustainable economic development</p>		
<b>Farms</b>	 <p style="text-align: center;">Confederazione Italiana Agricoltori Molise</p>		
<b>Farms</b>	<p>IGEAM DD</p> <p>Bevilacqua Carlo Blascetta Marco D'angelo Sonia L'Opera Società Agricola Biodinamica Di Vaira s.r.l. Di Biase Lino Di Lorenzo Gabriele Di Martino Nicolina Terra e sapori di Giovanditti Anna Pina Iurescia Bruna Maria Maddaloni Paolo Marcucci Livio Pallotta Elena Patuto Alessandro Petrarca Antonio Pinti Luigi Roberto Turco Sandra Zappitelli Marco</p>		
<b>Municipalities involved</b>	<p>Acquaviva Collecroce Campomarino Guglionesi Larino Montenero di Bisaccia Palata Petacciato San Martino in Pensilis</p>		
<b>Local stakeholders</b>	 <p style="text-align: center;">Ambiente Basso Molise</p>		
<b>Local stakeholders</b>	 <p style="text-align: center;">Regione Molise Assessorato Agricoltura e Foreste Servizio Tutela e Valorizzazione del Patrimonio Forestale</p>		



## Introduction

*So delightful and plentiful is nature in its variety  
that no plant is found to look alike any another,  
nor any one branch, or leaf or fruit  
will be found to be precisely the same as any other*

*(Leonardo Da Vinci)*

*The first farmer was the first man,  
and all historic nobility rests  
on possession and use of land*

*(Ralph Waldo Emerson)*

*The farmers lives on bread, the insane leaves on dreams*

*(Book of Proverbs - the Old Testament)*

It is increasingly evident that biodiversity represents a fundamental resource for the socio-economic development, but it is equally clear that only sustainable development policies can ensure the conservation of biodiversity. In this respect, very promising are the latest contributions to the development of the *adaptive management*, a sustainable science promoted by the ecosystem approach. The adaptive management promotes methods inspired by the vision of a conservation biology and ecology, capable of integrating with the economy and the social sciences, as well as to give the right value to the natural capital represented by services related to ecosystem functions and, ultimately, to biodiversity<sup>1</sup>.

The National Report presented to the Convention on Biological Diversity (CBD) in 1998 already stated that: “Italy is one of the richest Countries in biodiversity of the Mediterranean basin. The Italian fauna consists of 57,344 species, of which 56,168 invertebrates and 1,176 vertebrates”. Overall, it represents more than a third of the European fauna. In some important groups, such as the *Orthoptera*, the *Coleoptera Carabidae* and the *Curculionidae*, the endemic component reaches the significant level of 25-30%.

Italy has a very rich biological plant heritage and several landscape units, with types sometimes widely differing from one another and deeply influenced by the kind of land use, quite often related to farming. The Italian flora is the richest in Europe: vascular plants are 5,463, 712 of which are endemic. Therefore, a complex landscape in terms of land use was created over centuries and millennia, based on a continuous interaction with biodiversity (from plant breeds to ecosystems), and used thanks to the development of a complex of traditional cultural technologies that allowed for the establishment of a delicate, continuously evolving/adapting balance between man and nature.

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<sup>1</sup> The EU 2020 Biodiversity Strategy European Parliament resolution of 20<sup>th</sup> April, 2012 on our life insurance, our natural capital: an EU biodiversity strategy to 2020 (2011/2307(INI)).

Let's think of traditional farming systems, transhumance, traditional management of water resources, maintenance of the territory, traditional culture: all these aspects highlight the importance of agriculture and traditional knowledge as related to the land conservation and management<sup>2</sup>.

The overall objective of the DINAMO project is inspired by these very considerations. Biodiversity, the territory (in its social, economic and environmental aspects) and agriculture are interconnected in an ever-evolving equilibrium.

It is therefore important to find a new synthesis among the farmers' need for income, the conservation and the biodiversity enhancement in agricultural areas and semi-natural habitats, which might preserve that balance. This intent is also strictly linked to the recent concept of sustainable diet, namely fair and economically affordable diets with low environmental impact, which contribute to safe food and nutrition as well as to the protection of and respect for biodiversity and ecosystems<sup>3</sup>.

In the new forms of local development, the level and quality of economic growth are dependent on the quality of the socio-institutional contest and on local resources. The territory, which incorporates all of these factors, can become a real resource for development, or otherwise turn into an obstacle.

DINAMO's strengths lie on its idea to apply an innovative model of collective actions, according to the principles of negotiation and partnership of various local actors (economic, social, institutional) whose participation is necessary to start up and implement integrated development projects. Integration is intended as networking and creating synergies among the specific and distinctive resources of the territory – environmental, productive, social, historical, cultural, etc. – the exploitation of which is crucial to the local development processes.<sup>4</sup>

The DINAMO Model has been proposed in the belief that the interaction between farms and a context including other production areas might enable to achieve concrete objectives of greater economic efficiency and conservation of biodiversity. The integration processes develop horizontal and vertical forms of collaboration among local actors.

If, on the one hand, they result in decrease of diseconomies of scale, optimization of the organization of production processes, strengthening of producers' contractual and professional positions, easier access to markets, provision of economic, social and infrastructural services, on the other hand they can support the quality of the environment where companies do operate<sup>5</sup>.

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<sup>2</sup> Padovani L.M., Carrabba P., Di Giovanni B., Mauro F., 2009. *Biodiversità – Risorse per lo Sviluppo*. ENEA (Book Series Focus – Sviluppo Sostenibile), Roma.

<sup>3</sup> FAO, 2012. *Sustainable diets and biodiversity: directions and solutions for policy, research and action*.

<sup>4</sup> Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Mainstreaming sustainable development into EU policies: 2009. Review of the European Union Strategy for Sustainable Development (COM/2009/0400 final).

<sup>5</sup> Alfano F., Tarangioli S. e Zumpano C., 2008. *Forme innovative di integrazione in agricoltura: un'opportunità per la permanenza dei giovani nel settore primario*. INEA, Roma.

## The DINAMO objectives

The *Basso Molise* is a region characterized by a high incidence of rural areas and, at the same time, by the presence of areas with a high biodiversity value.

The overall objective of the DINAMO project is to increase the local biodiversity through conservation actions implemented thanks to the joint cooperation of public and private bodies.

Conservation actions in public and private areas *enhance the naturalness of the areas near the Sites of Community Importance (SCI) and the Special Protection Areas (SPAs)*, preserve some species of birds and amphibians, and propagate indigenous trees and shrub species.

The farms, which are encouraged to cooperate also through specific participation tools, are involved combining the increase in biodiversity on the territory with a potential growth of the agricultural income, in accordance with a model that balances the economic growth with the conservation of natural resources. The DINAMO project also contributes to maintaining the flow of the ecosystem services that society is provided with by biodiversity, through both conservation efforts and the population involvement, and the evaluation of the benefits provided by services<sup>6</sup>.

The main objective of DINAMO is to demonstrate the effectiveness of a *replicable model* for the integrated management of land resources in order to counteract the loss of biodiversity, involving both public and private actors. The project, in fact, fosters the conservation and enhancement of local populations of threatened fauna and their habitats in agricultural and semi-natural areas through the implementation of demonstration practices and favouring the integration and complementarity between the European agricultural and environmental policies.

The objectives of the project are pursued through a twofold network: a material one, made of actual conservation actions, and an immaterial network, consisting of public and private bodies, which cooperate with a view to create a shared and widespread participatory model for biodiversity conservation and monitoring.

Therefore, the DINAMO Model aims at meeting the requirements of local growth, according to the sustainable development principles, through three different objectives:

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<sup>6</sup> Communication from the Commission to the Council and the European Parliament of 4 February 1998 on a European Community biodiversity strategy (COM(1998) 42 final).

- *promoting the conservation of biodiversity in agricultural areas* by integrating it into the companies' decision-making processes thus favouring, at the same time, the integration of environmental and agricultural policies at the local and national levels;
- *stressing the advantages of conservation* by disseminating, through a participatory approach, an adaptive management of biodiversity resources;
- *emphasizing the benefits from conservation in terms of ecosystem services.*



## The sustainable approach in the DINAMO project

The overall objective of the DINAMO Project in Basso Molise is the development and dissemination of a land management model that combines protection, preservation, restoration and monitoring of natural habitats, wild flora and fauna with support to rural economy, involving farmers and the local government in the effort to strengthen the regional ecological network.

The core idea of the DINAMO Model is to find a way to meet the need for conservation of biodiversity and the ecosystem services relating to it even out of protected areas, to meet the dictates of the European Community Biodiversity Strategy (COM (1998) 42 final).<sup>7</sup>

Agricultural areas in Europe are a widespread environmental matrix and their appropriate management, as well as the implementation of a series of agricultural practices more environmentally sustainable, may have a key spin-off effect in terms of biodiversity conservation and enhancement of ecosystem services.

Non-protected areas can act as ecological corridors only if managed in a sustainable perspective, adopting a series of measures and good practices targeted at the conservation of ecosystem services. Although agricultural policies are chosen at the central level (national and regional), their application is primarily at the local level; this necessarily implies the involvement of local actors in order to increase the awareness on the need of adopting a sustainable approach to management.

This can also be achieved by favoring other environmentally-friendly farming practices, such as the promotion of traditional methods in the extensive agriculture, as well as the limited use of chemicals or the use of special tools (fledging bars) for heavy machinery. The increasing awareness of farmers on personal profits from sustainable land use practices has to be taken into account also.

The effort to bring the need for biodiversity conservation directly on the territory can only be implemented by combining environmental conservation with a potential increase in income, which the farmers joining the project may benefit from.

At the same time, the DINAMO project aims at implementing the ecosystem approach, as defined under the UN Convention on Biological Diversity<sup>8</sup>, namely a strategy for the integrated management of land resources that promotes the conservation and sustainable use of biodiversity in a fair and equitable way<sup>9</sup>.

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<sup>7</sup> Communication from the Commission to the Council and the European Parliament of 4 February 1998 on a European Community biodiversity strategy (COM(1998) 42 Final).

<sup>8</sup> UN, 1992. Convention on Biological Diversity.

<sup>9</sup> Padovani L., Carrabba P. & Mauro F., L'approccio ecosistemico: una proposta innovativa per la gestione della biodiversità e del territorio. *Energia, Ambiente e Innovazione*. Year 49, 1/2003:23-32.

Therefore, one of the main features of the ecosystem approach is the direct and substantial involvement of local stakeholders in land management as an integrated process, at both the environmental (soil, water, atmosphere, resources living) and social levels. Hence, the ecosystem approach is a way of thinking and acting in an environmentally-friendly way, on a scientific basis, integrating biological, social and economic information so as to achieve a balance which is socially and scientifically desirable among the priorities of achieving nature conservation, using resources and sharing benefits.

In particular, such an approach seeks to remove barriers among the human economy, social aspirations and the natural environment, firmly placing man within the ecosystem models.

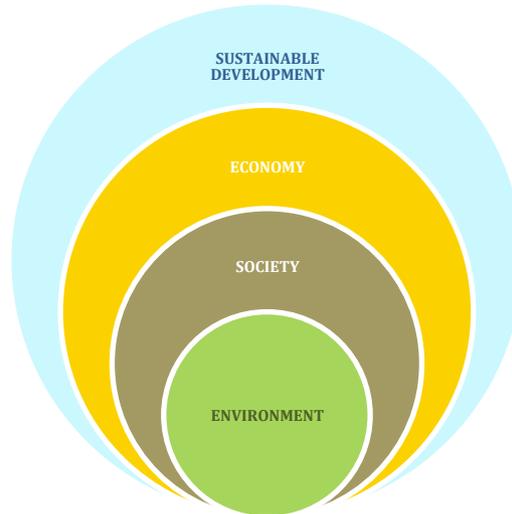
The added value of the DINAMO project is, therefore, to recognize and support the farmers' role in the creation and maintenance of semi-natural habitats, encouraging good management practices for farmlands out of protected areas, thus improving the conservation and sustainable use of biodiversity resources as well as the interconnection among natural areas. In this context, the fair recognition of the farmers' role, is also the economic and social drive that allows them to get more acquainted with the area surrounding their lands.

Furthermore, the DINAMO project has pulled together a network of people sharing the goal of finding new ways to strengthen the environmental, social and economic development of their territory, in full compliance with the dictates of sustainable development (*think globally - act locally*).



## Description of the DINAMO Model

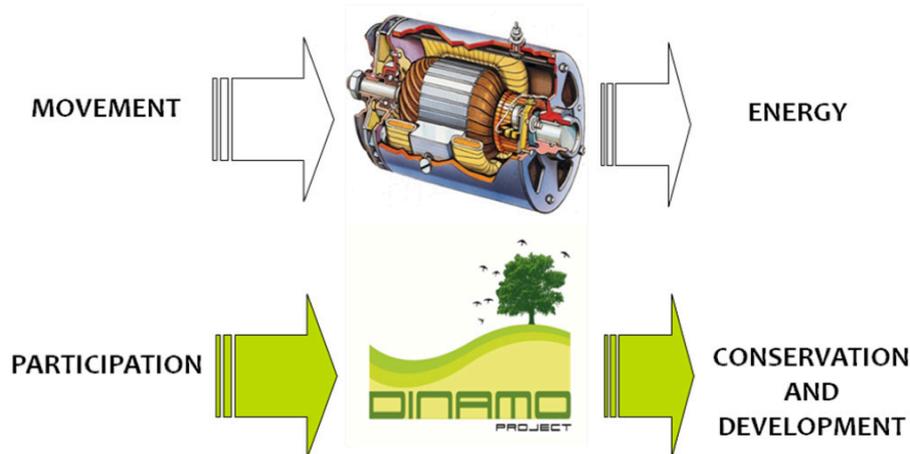
The basic philosophy of the DINAMO Model, starting from the assumptions of sustainable development, tries to achieve closing the cycle between environment, economy and society.



The main objective is indeed to create a replicable model for the integrated management of land resources, which combines biodiversity conservation with mechanisms of public-private social participation and income growth for farmers.

Starting from the social, environmental and economic analysis of the selected area (Basso Molise, Southern Italy), the project promotes the conservation and enhancement of local populations of threatened fauna and their habitats in agricultural and semi-natural areas, through the implementation of demonstration practices and favouring the integration and complementarity between environmental and agricultural policies, as defined by the European Union.

The key idea is just the one suggested by the project's acronym:



Just as movement generates energy through the dynamo, so participation produces conservation and development in the area through the hereby suggested model. Thus, the participation of private parties in the project, through the identification of appropriate conservation and development activities to be implemented in the area, provides **the basis of the model, which aims to reconcile conservation with economic growth**. At the same time, the involvement in the project activities contributes to disseminating a shared environmental vision and to understanding the social and economic value of the services humans are provided with by ecosystems. Therefore, the DINAMO Model combines the demonstration value of the action with an important content of understanding and raising awareness at the local level.

The DINAMO Model makes use of two participation tools, one for discussion and decision-making processes, and the other for implementation: the Agriforum and the Action Network, respectively.

The **Agriforum** is the discussion forum where action strategies for the conservation and enhancement of biodiversity in the territory are identified together with the economic initiatives in support of the local income. The Agriforum is a moment of participation, sharing and dissemination of information, whose members are project partners, farmers, public administrations, municipalities, local associations, private bodies and all the people who, for various reasons, are interested in land management. The subjects of discussion during the Agriforum are the work already done, the arisen difficulties and the achieved results; the continuation of the activities is planned and various strategies in support of the Agriforum activities and the farmers' income are evaluated, even after the end of the project .

Public administrations and farmers participate in the Agriforum to find new shared strategies for the local development. This participation is particularly important for farmers, being a privileged consultation environment where they can bring their own problems and actively share decisions. What is more, their participation allow them to obtain greater consideration when submitting requests for funding linked, for example, to the Rural Development Plan (RDP).

For public administration, participating in the Agriforum represents an opportunity to expand the level of agreement and consensus on decisions concerning land management and to increase the relation with the local agricultural productive realities, with potential positive effects also during the elections.

The **Action Network** is the operational arm of the DINAMO Model. It is made of farmers who participate in the model and that made themselves available to implement the practical actions scheduled in the project in their companies and in the public areas provided by the municipalities. The project activities, in fact, have been designed so as not to come into conflict with the regular agricultural activity carried out in the area, in order not to impair the basic income of farmers in any way.

On the contrary, the additional activities carried out by the farmers in the Action Network, favour an increase in income, based on the hourly pay provided for the work done within the project and for related activities which have been designed and achieved following the Agriforum initiatives, started up each time with the support of the Italian Confederation of Farmers (CIA). Farmers, in fact, receive the incentives and measures to compensate their participation in the network of action, with the aim of increasing their income and being encouraged to continue on the path of conservation and participation. The measures of compensation received by farmers are connected to the man / hours worked in the project activities.

The Agriforum activities are supported by the presence of a “control room”, made up of several stakeholder representatives involved in the model, which is in charge of coordinating and following the implementation of participation and conservation actions.

The Action Network is also a way to give a “mutual” sense to the activities designed under the Agriforum and implemented by all farmers for their land. No longer just companies but production companies united under the umbrella of the DINAMO project and the European Programme LIFE + logo, therefore more recognizable at the local, national and international levels. This last statement is supported by the fact that the Common Agricultural Policy, which is currently being developed, is having a greater recognition in terms of financial support to project initiatives proposed by companies that concretely demonstrate to pay special attention to the environment. Therefore, the participation in the DINAMO Model is actually an advantage for the farms involved.





## The choice of practical conservation actions in the area

The analysis of the territory and the identification of target species and habitats, namely the choice of conservation actions, is a key aspect in the implementation of the DINAMO Model.

Since at the national and international levels the potential areas on which to replicate the model are all different, with different species and habitats, actions should be chosen starting from a thorough analysis of the target area. To this end, besides analyzing the socio-economic and agronomic characteristics of the selected area, it is particularly useful to refer to the Natura 2000 Network data forms, which represent a valid description of the values and natural emergencies at the local level.

The choice of target species and habitats, apart from having a great importance from the point of view of conservation, it will also have an impact in terms of project visibility and will help to increase the income of farmers. It is, therefore, important that there are some species and / or habitats easily recognizable by the general public, so as to give greater visibility to the accomplished activity of preservation. Furthermore, the model will be strengthened if among actions there are some easily recognizable / traceable on the territory, such as, for example, in the case of the DINAMO Model, the positioning of artificial nests or the restoration of drinking droughts. The choice is properly made from the people who best know the territory from the scientific point of view or by the research institutes involved in the model.

The analysis of the territory, the choice of target species / habitat and of proper conservation actions consist of several phases:

- 1) Drawing up a check list of threatened habitats and species in the project area, starting from the analysis of the Natura 2000 Network sites of community interest in the project (for Italy, see [www.minambiente.it](http://www.minambiente.it)), as well as from the completed or under way fauna census (for the project area, see MITO 2000, project Atlas Amphibians and Reptiles Molise Region, 2010), from the proceedings of conferences, articles and publications related to the model application;
- 2) analysis of conservation issues associated with local farming practices;
- 3) surveys in the target areas of the project, to identify local potentialities for the conservation of biodiversity at risk;
- 4) selection of habitats and species to be protected;
- 5) to identify, in collaboration with the farmers' association, businesses to be actively involved in the project;
- 6) analysis of the cultivation practices implemented by the selected companies in order to identify the most appropriate practical actions to be proposed in each of them;

- 7) selection of practical actions to be implemented, required for each identified species or habitat. Particular attention is to be paid to the selection of practical actions that do not adversely affect the farmers' income in any way, so as not to counter one of the fundamental assumptions of the project.

In particular, the selection must take into account the following parameters:

- the degree of conservation interest, namely the presence of habitats and species, respectively, in Annex II of the "Habitats Directive" (92/43/EC) and Annex I of the "Birds Directive" (79/409/EEC);
- the proximity of farmlands to Natura 2000 sites, or their congruence with the creation of a regional ecological network in support of Natura 2000 sites;
- ecological relationships with the agro-ecosystem and the risk factors arising from agricultural practices carried out by the selected companies;
- an assessment of the farmers potential interest to carry out the project activities on the basis of their personal feeling, age, involvement in similar initiatives, ability to relate to and grasp the development opportunities provided by the project.



## The importance of participation actions

The participation actions related to the Agriforum and to the Action Network, as well as all those activities that have spread the DINAMO idea at the local, national and international levels, attest the work and the results achieved with the common commitment.

The Agriforum regular meetings (six in the three years of the project) have progressively increased the awareness and involvement of farmers in the objectives of the model, spurring them to become proactive for the common tasks to be accomplished in the Agriforum. Furthermore, the participation in the Agriforum was not limited only to the entrepreneurs directly involved in the practical conservation actions. The word-of-mouth advertising carried out by the Italian Confederation of Farmers (CIA), the project partners and the involved entrepreneurs has led to an ever conspicuous attendance of farmers and other stakeholders at the Agriforum.

The most important result achieved by the Agriforum was the actual “DINAMO effect”, generated by the interaction between the project partners and the farmers. The latter have been able to seize the opportunity offered by the project to combine biodiversity conservation with an increase in income, and they have been promoting an initiative that should start in early 2013. This initiative provides for the establishment of a Farmers Association Custodians of Biodiversity, based on the scientific advice of research institutes and the technical support by CIA, which will manage a corporate brand in support of products directly sold by farmers.

All the companies interested in the biodiversity conservation objectives carried out by the DINAMO project will access this association, provided that they commit themselves to fulfill actions of conservation of fauna and habitats of Community importance, in accordance with rules and regulations developed in concert with research institutes. Taking advantage of the various opportunities for interaction offered by the several Agriforum meetings, farms have also developed, in collaboration with UNIMOL and CIA, a Solidarity Purchasing Group (GAS) which will rely on the University Recreation Club of Molise (CRAM) at the University of Molise, in Campobasso, therefore achieving the project goal to enable an increase in farmers’ income, starting from biodiversity conservation actions.

More difficult was the participation of municipalities. During the three years of the project, due to the administrative elections, there was a partial change of the institutional representatives (the mayor and the board) in some of the involved municipalities. Project partners were forced to resume contacts and explain once again the project purposes. Some municipalities, however, have actively shown their support to the project, effectively participating in the Agriforum and providing premises to carry out the project activities. The feasibility of a stand, where the “DINAMO” products are for sale at weekly markets and fairs organized by the municipalities is currently being studied.

Also other territorial realities, citizens, local stakeholders such as, for instance, some conservationist associations and nurseries have alternated in attending the Agriforum and the Action Network meetings. In particular, the associations' participation has allowed a greater dissemination of information at the local level, through their communication channels (websites and newsletters).

These extended participation has shown how creating opportunities of public confrontation leads to the development of proactive alliances among public and institutional actors, local stakeholders, entrepreneurs, in a dynamic economic growth which, in this case, also favours biodiversity conservation.

Among the participation actions of the project, the organization of five workshops is worth mentioning. This was part of several broader initiatives (conferences, public meetings) that effectively contributed to disseminate the objectives and results of the DINA-MO project, at the local, national and international levels.



## Strengths of the DINAMO Model

The main strength of the DINAMO Model is the active participation of public and private bodies in identifying, sharing and achieving policies and practical activities to promote biodiversity and sustainable development in a given area.

Some other strengths, identified during the implementation of the DINAMO Model in the Basso Molise, are the following:

- **The partnership structure:**
  - the presence of **research institutes** ensures that the initial environmental and socio-economic analysis is accurate and the chosen target species / habitats suitable. This also guarantees that the endorsement of concrete conservation actions is reasonable, has real chances of success, and does not jeopardize, in the first instance, the income of farmers. Research organizations have also the important role to ensure the proper implementation and the effectiveness of conservation actions carried out on the territory, providing a proper financial reporting, also in support of the Agriforum activities of information communication and dissemination;
  - the presence of the **farmers' professional association** ensures an adequate selection of participants in the DINAMO Model, in terms of sensitivity to the issues of conservation, ability to interact with the others and to work together on goals. At the same time, to the farmers the association is a warranty of the seriousness of the initiative and a constant point of reference for the bureaucratic / administrative fulfillments that the model developments may represent. Professional associations are also the interface that farmers have with institutions to request and obtain government subsidies and access European funds. This allows the activities carried out for the model realization to be given the greatest possible prominence as an additional strong point of the project presentation to PSR;
  - the **Public Administration's** presence guarantees that the activities carried out by implementing the model gain the greatest possible importance at the social level and are properly publicized and promoted at the local level, from the political, tourism and production points of view. Furthermore, the public administration can also participate in the initiative in economic terms, financing part of the activities provided for by the model, especially those that take place on public land (e.g., in the recovery of structures, such as drinking troughs or old rural structures to be used for recreational-social purposes, or in the recovery of abandoned or marginal public areas to be assigned to public use, or in the environmental recovery);

- the presence of **farmers** is the real driving force of the model. In times of economic crisis and decline in employment, some young people go back to the agricultural entrepreneurship and rediscover the pleasure of a true contact with the land, at the same time bringing new ideas and a willingness to build new patterns of production. In this context, the multifunctionality in agriculture and the possibility of matching with production coexist, besides recognizable quality and rediscovery / valorization of local varieties. The DINAMO Model supports this view and allows, once started, the progressive involvement of entrepreneurs, included those less prepared to change, setting them out for a more “social” vision of the agricultural activity at the local level;
  - the presence of **other stakeholders** (consumer associations, environmental and cultural groups, volunteering and ordinary citizens) enriches the model with ideas and potentialities. The ability to experiment with new patterns of collaboration among social forces is one of the strongest key aspect of the model. The farmer is not by himself with his land anymore, but he is part of a network that, all together, stirs to a more sustainable local development, also as individual income;
  - the realization of a “**control room**”, which follows and supports the Agriforum work, focuses the initiatives of the DINAMO Model on the goals of biodiversity conservation and on the increase in farmers’ income.
- **Information sharing and dissemination.** A greater awareness of local environmental, social and economic situations opens to new ideas to be implemented under the DINAMO Model. In addition, conservation activities, well publicized in the area, help to raise the general awareness on the importance of biodiversity conservation in support of ecosystem services. Besides creating a local pride for the activities carried out, proper dissemination of information also reduces the risk of vandalism at the detriment of conservation actions.
  - **Increased participation and dialogue.** The implementation of the DINAMO Model attracts more and more participants, increasingly enriched with different points of view, possibilities, projects, shared objectives.
  - **Equal representativeness of the involved actors** (institutions, research centers, farmers, individuals in general). The institutional actors act as facilitators of a process that increasingly becomes endogenous to the agricultural and territorial systems.
  - **Integrated approach to problems.** The presence of many actors ensures that all points of view are thoroughly evaluated and taken into account.
  - **Shared solutions.** Participating in decisions means implementing the solutions chosen by mutual agreement with more conviction.

- **Dynamic and more complex co-responsibility for change.** From monothematic consultation to project commitments. No longer just an enterprise-centred project, but an overall vision for the enlarged territory (district, Municipality, Province).
- **Propensity for improvement.** Growing together for a healthier and stronger territory, which offers more opportunities to everybody.
- **Increase in the sense of belonging.** No more connection to the land (farm) of the parents, but to the land (territory) able to concretely express the possibility of a shared development.
- **Increased awareness** of the importance of biodiversity conservation associated with production.
- **Protection of agro-biodiversity as an added value.** Awareness of the importance of the on-farm maintenance of traditional and local crops and the knowledge related to them.

The points described above testify the feasibility of finally assigning an economic and social value to biodiversity (target species and habitat) and to the ecosystem services associated with it.





## Weaknesses of the DINAMO Model

The most delicate aspect of a project relates to its weaknesses, especially when the activities to be undertaken are complex and multi-sectoral. The need to involve so different realities and territorial, business and economic activities makes the DINAMO Model particularly articulated. The weaknesses identified during the implementation of the DINAMO Model in Basso Molise are described below. Although each place of implementation may present various difficulties, it is believed that the ones shown here are sufficiently general criticalities, which can be attributed to the realization of the Model, irrespective of the territory of accomplishment.

- **Financial resources for the model start-up.** The DINAMO project, financed with LIFE + funds, had the advantage of relying on an initial budget that allowed to start and test the model, apart from the need to raise funds for farmers' involvement. Replication of the model in other territories will have to go through the identification of the funds required to start the activities (regional or municipal funds for local development, Rural Development Programs, the Common Agricultural Policy, Chambers of Commerce, etc.).
- **Difficult coordination of conservation and participation efforts.** To properly manage the Agriforum table, where there are instances of many actors with different challenges and expectations, is a key factor in the DINAMO Model. To this aim, a "control room" should be set up in order to represent the interests of all the actors (farmers, professional associations, research institutes, public administrations, citizens), and which can serve as a clearing house and a place of mediation for the aspects that will be then addressed and resolved by mutual agreement at the Agriforum level.
- **Difficult involvement of farmers.** An initial difficulty in involving farmers was noticed while carrying out the activities of the DINAMO project, although a careful selection of the farms to be employed in practical conservation actions had been made. This is probably due to an "a priori" skepticism, apparently resulting from previous disappointment. The careful and painstaking preparation, belief and involvement that CIA carried out as professional association, and the willingness shown by all the partners in managing relations with farmers and the activities to be carried out in the farms, has, over time, weakened this skepticism, thus allowing a more peaceful performance of conservation and participation actions.
- **Difficult involvement of public administration.** The involvement of public administration has been limited and discontinuous. Only a few realities, starting from a personal belief, have managed to concretely contribute to the project. Furthermore, because of the elections, public interlocutors change during the process, making it necessary to re-submit support issues to the model and to deal with new points of view. This causes an undeniable embarrassment and slowdown

of the activities. However, this kind of problem should diminish over time, as the Agriforum becomes a well-established reality at the local level, acting as a possible advisory and implementation point of reference for the initiatives proposed by the public administration on the territory.

- **Response time of conservation actions.** It has been tried to stress how the implementation of conservation actions and the achieved results create a sense of ownership of the project and a greater sensitivity to the local environmental issues. The natural response times to the practical actions of conservation are, however, quite slow, and may take some time for clear results. It may therefore happen, for instance, that the nests prepared for nesting are not occupied by the target species, provoking an initial sense of frustration in those farmers who were so dedicated to that activity. It is therefore necessary to explain at the outset that the practical results may require medium-to-long time to get good results.
- **Unpredictable events.** Also exceptional and unforeseeable events can create demotivation or discouragement of the people involved in the project. It is referred to extreme weather events (floods, hailstorms) or fires that may affect the practical actions carried out. Vandalism is also possible. Special attention should, therefore, be placed to support not only the importance of the actions, but mainly of the change of mentality of the people involved in the project. They should begin to consider conservation actions as an essential complement to traditional agricultural activities, with the aim of improving the overall environmental quality and increasing the consolidated revenue arising from such quality. As for the acts of vandalism, the unanimity of initiatives related to the DINAMO Model and the sense of belonging that they generate at local level should, over time, more and more discourage the repetition of such situations, thanks also to the information dissemination activities. A comprehensive and consistent information and awareness of the area and of the people may, in fact, check such situations of awkwardness and misunderstanding.

## Recommendations for the model replication

With the aim of encouraging the replication of the model in other territories as much as possible, the problems encountered during the implementation of the Project LIFE + DINAMO have been carefully examined in order to identify gaps, barriers and errors that might provide a comprehensive perspective based on the lessons learned - “what is replicable and what pitfalls can be avoided”.

The following are a series of points which are important for the success of the activities related to the DINAMO Model and that can, probably, be considered crucial to its replication.

- **Choice of partners:** The scientific bodies, if present at the local level, could ensure the adequate naturalistic knowledge of the area, which is needed to identify target habitats and species; the farmers’ professional association is of key importance both for the identification of the agricultural entrepreneurs more sensitive to the issues of conservation and participation, and for the necessary activities to be carried out at the local level (organization of the Agriforum and of the Action Network).
- **A broad initial consultation with local stakeholders** is vitally important to ensure that a wide collaboration, from the earliest stages of the model application, supports the implementation of the participation actions provided for.
- **Involvement of “non-profit” organizations and associations.** A systemic logic, namely the integration among different local stakeholders in the same area, increases the development of the model and provides additional important opportunities for its enhancement, although complex mechanisms of governance make it difficult managing the Agriforum with such a broad participation. The formalization of a “control room” to guide the Agriforum activities, propose economic and social development actions, monitor the correctness of the progress of the undertaken actions, by suggesting, where necessary, also the proper corrective actions, is highly recommended.
- **Involvement of municipalities.** In general, the scarce participation of local institutional realities (in this case, municipalities) can depend on local conflicts or difficulty in understanding the new social demands that emerge from the territory. Right from the design stage of DINAMO, there was a clear need to build a sense of belonging to the project. Promotional and involvement activities have then been planned and implemented for stakeholders, starting from the municipalities in the territory of Molise, to begin to share information, perceptions, needs, visions, and, more generally, implicit and explicit knowledge, to make them democratically become a common heritage of the project. The consensus-building has involved a strong listening and organizational skills to make the path, first achieving an alignment of visions and then, in a most advanced stage, a participatory de-

sign of the strategies of intervention. The start of such an iterative process has generated a habit to assess together the future development prospects, taking into account the existing experiences concerning the successes already achieved, thus aiming at making full use of the current capability. One of the aspects that has characterized the involvement of the institutional territorial players was the high rate of relational activities: most of the work was carried out in a collective dimension, in which project managers, promoters, technicians, scientists, farmers and other players in the area have interacted on the same level. It goes without saying that the quality of the project has been strongly influenced by the good quality of these relationships and interactions.

- ***Special care in choosing and implementing practical actions.*** Among practical actions there should be some easily recognizable and traceable at the local level (e.g., the placement of artificial nests, restoration of drinking troughs). The attention placed in their realization starts from the consideration that the failure of the practical actions of conservation can affect the results of the model.
- ***Involvement and organization activities of farmers*** in order to support and enhance the sense of belonging to the project and the pride for the realization of practical actions. To this purpose, for instance, in the LIFE+ DINAMO project, information panels have been arranged and delivered to be posted up in the participating farms. These panels, besides describing the companies and their productive characteristics, also provide general information about the project and the practical conservation activities individually achieved by the farms. The entrepreneurs have shown to appreciate this kind of tool that is the practical and immediate evidence of its involvement in the DINAMO Model to any member of the farm.
- ***Identification and selection of the activities supporting the farmers' income,*** which are compatible with the practical activities for biodiversity conservation. This activity is particularly delicate and critical, because on its success depends the follow up of the model activities over time. For example, during the LIFE + DINAMO project a DINAMO producers' association has been constituted, aimed at carrying out biodiversity conservation actions in their farms for a brand managed by the association (farmer guardian of biodiversity), to support the sale of farm products. Furthermore, during the project, a Solidarity Purchasing Group was also set up and it was decided to offer the municipalities the purchase of farm products for school canteens.



*Logo proposed by the Agriforum of the DINAMO project as the identification trademark of the DINAMO Association in Molise*

The above mentioned advices directly arise from the experience of the DINAMO Model in Basso Molise and try to figure out a realistic balance between the strengths and weaknesses previously described, supporting the former and trying to reduce the latter. It is worth stressing as different geographical, environmental and socio-economic frameworks of application of the DINAMO Model can highlight situations and difficulties that have not been encountered in Basso Molise. The experiences built up in the three-year project come, in fact, essentially from a local context, although it is believed that they have a certain importance when compared both to a national and a European context.





## Tools for the realization of the DINAMO Model

The tools useful for the realization of the DINAMO Model are designed to foster both conservation practices and participation activities. The following is a list of the tools deemed to be the most useful for this purpose, or that proved to be such, during the LIFE + DINAMO project in Basso Molise.

**Control Room.** It is of fundamental importance to establish, from the earliest stages of the activities, the Control Room. This is the cohesive, proactive and implementing tool to support the Agriforum and the Network of Action activities. It is preferable that the social components involved in the model are all well represented in the Control Room, in order to better support the reasons for all.



*Meeting of the Control Room*

**Web-GIS.** In order to conserve biodiversity, it is appropriate to use a Web-GIS to manage, analyze and make use of spatial data and the accurate information gathered in the territory by research centers during phase 2, concerning the analysis of the local context. This tool allows visualizing, seeking and analyzing information through the internet, making it visible and sharing it in real time among all stakeholders. Knowing and picturing the distribution of conservation actions in space and time allow to perform more detailed analyses, to take faster decisions on possible corrective actions and, simultaneously, to have an overview. Furthermore, the ability to follow the activities in progress through the website is also essential to both the dissemination of information on the undertaken conservation initiatives and to strengthen the sense of belonging of those who practically carry out activities in their territories.



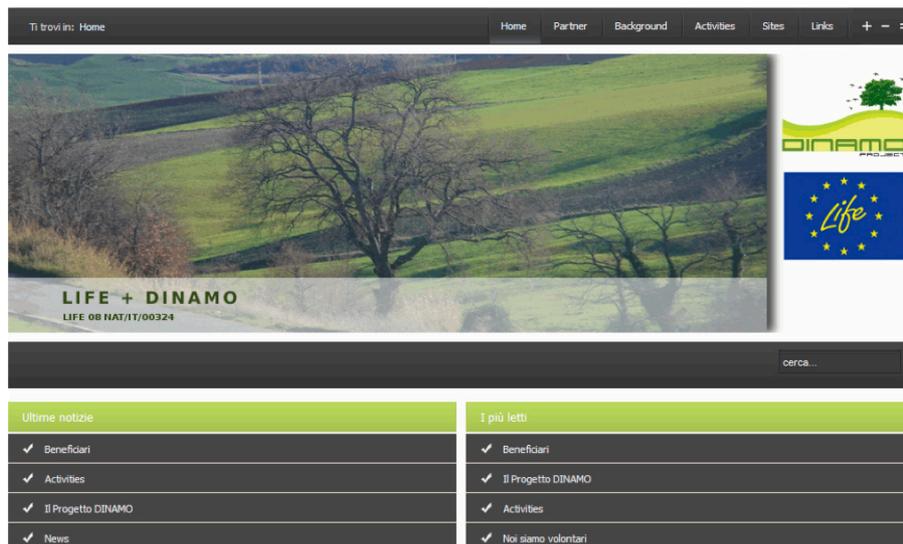
*DINAMO project handbook*

- **Handbook for the Implementation of Practical Actions.** The handbook is a tool designed to provide practical support to the work of those farmers involved in practical conservation actions provided for in the DINAMO Model. The handbook provides the user with detailed and easy understanding information on the ways and times each action requires (what to do, how to do it, when to do it). The handbook may also include pictures and a description of the species and habitats target of the conservation efforts, so that entrepreneurs can recognize the species when they see them.
- **Journal of Activities of the Network of Action.** The journal of activities is a helpful tool for tracing the activities carried out under the project. The news reported in the journal is in fact useful to follow and quantify the work carried out overtime, as well as to remind entrepreneurs the timetable to achieve the required maintenance actions. The journal also contains special sections where to report any sightings of wildlife and that can, therefore, also be used for the scientific activity, or as an “alert” to go and check special or unusual warnings on the field. The journal has to be properly made, easy-reading and understanding, so that farmers can take the shortest possible time to fill it out and dedicate themselves to their habitual work. It is particularly recommended that it be created with materials, which would allow an easy and prolonged use outdoor.



*Journal of Activities of the DINAMO project*

- Website.** Visibility of the model through a website is essential to the Agriforum activities. The website can be used to disseminate information and exchange documents, materials and also, in the case of the intranet, points of view and discussions by setting up a blog. Through the site, following the progress made by the model is also possible. The farmers involved in the realization of the model get visibility through the site, with great benefits for the sale of their products. Any public/private entity co-funding the model can also be authorized to add a banner to its website home page in order to publicize its membership of the DINAMO Model and, indirectly, its activities/products. This feedback mechanism can further support the model in seeking private funds to foster the Agriforum activities.



*DINAMO project website*



*Information material of the DINAMO project*

- **Information Material.** The information material is an important means of disseminating information. The newsletters, to be periodically sent to the website subscribers and to be made available on line, are important to advertise the activities of the model and their state of progress. Information panels can be displayed in the areas where actual conservation actions are carried out on public land, while leaflets, written in plain and intelligible language, can be distributed in schools, provincial tourist offices, at fairs, etc.. In order to foster a sense of belonging to the model by farmers and municipalities, also the business plates and panels are particularly important. The former can be displayed at the involved municipalities; the latter, exhibited at farms, illustrate the objectives and the benefits of the LIFE DINAMO project for the environment. In addition, the business panels include information related to farms, the list of marketed products and the maps showing the concrete actions therein made for the conservation of biodiversity.

- **Relations with the Media and the Press.** The relations with the media are essential to give all the necessary visibility to the DINAMO Model. Contacts with the press, as well as the overall communication activities, must be carefully designed, taking as a reference the various stakeholders whom they are addressed to. It is, therefore, appropriate to differentiate the contributions, depending on whether they are directed to the local press or publishing specialists, steering messages, language and content style according to the public that should receive them.
- **Technical and Scientific Reports.** Technical and scientific reports are needed to assess and be evidence of the results achieved by the DINAMO Model in conserving local biodiversity, with regard to the practical conservation activities implemented in the territory. These reports will form the basis for scientific publications that, also including a brief description of the model, can assist in spreading its objectives, at the national and international levels, also in the scientific field.





## Implementation stages of the DINAMO Model

This chapter is aimed at analyzing the different stages of implementation and the possible timing to comply with in order to replicate the DINAMO Model in other territories.

The DINAMO Model consists of 4 stages:

### Stage I: Organization

- **Identifying project partners.** The following are required:
  - research institutes for the territorial analysis, the identification of target species /habitats and actual conservation activities;
  - farmers professional associations that take care of the relations with companies involved in the project and organize/manage the Network Action;
  - farms;
  - territorial Public Administration, from the local (municipalities) to supra-municipal levels (provinces, regions);
  - any private companies interested in co-financing the DINAMO activities;
  - any other bodies showing considerable interest in participating.
- **Setting up a “control room”** that follows the implementation stages of the model, takes care of the organization and the Agriforum relations, is concerned with the implementation of decisions and the Agriforum initiatives. Each Agriforum’s member category is to be represented in the “control room”, so that any specific interests of theirs are guaranteed (conservation, local development, public interest, etc.). The control room shall:
  - a. monitor the implementation of the model;
  - b. identify the strengths and weaknesses of the model at the local level;
  - c. find solutions to problems;
  - d. propose corrective actions to the Agriforum.
- **Fundraising** (local, regional, national, international) to start up the model. This stage shall be performed at the control room’s level.
- **Selecting farms to be involved** in the initial phase of the model’s implementation by the farmers’ professional association, based on their sensitivity to environmental issues and on their ability to work in team.

## Stage 2: Context Analysis (by the involved research bodies)

- **Analysis and description of the geographical area.**
- **Characterization of land use**, especially as related to the protected areas established in the territory and to the agronomic characteristics of local farms.
- **Identification of local resources** (environmental, social and economic), functional to the realization of DINAMO.
- **Description of the political, legal, administrative and socio-economic context.**
- **Integration of the different levels of collected data** (environmental, territorial, rural, forestry, energy, etc.), and implementation of a Web-GIS supporting the choice and the implementation of practical conservation actions.
- **Selection of practical conservation actions** to be implemented in the territory.
- **Choice of the most appropriate sites for the implementation of the practical actions**, on the basis of: territorial features, characteristics of target species/habitat and characteristics of the involved farms.

## Stage 3: Beginning and Implementation: Practical Conservation Actions

- **Start-up of the Action Network activities.** This phase is managed by the professional association, in collaboration with farmers, under the supervision by the research institute which monitors the correct implementation of the practical conservation actions.



#### **Stage 4: Beginning and Implementation: Participatory Actions of the Model**

- **Participation activities at the local level**, to describe the objectives of the model and collect membership applications. These activities can be organized as seminars or public meetings, for instance on the occasion of local events (festivals, fairs, etc.), which help disseminate the objectives of the model.
- **Organization and implementation of the Agriforum meetings** (by the control room). It is recommended to perform at least two Agriforum annual meetings, in order to keep the participation always alive. The Agriforum organization should always keep in mind the agricultural production commitments and avoid to forward meeting proposals during very intense periods of work not to discomfort farmers, who are absorbed by their core business activities.
- **Iterative involvement of other local stakeholders** through the dissemination of information (advertising activities and the Agriforum decisions) and the production of material, such as newsletters and leaflets.
- **Identification and selection of the activities supporting the income of farmers**, compatible with the biodiversity conservation practices.
- **Organization of events and dissemination of information** at the local and supra-local levels. If the activities of the model are successful, it is important to spread the relevant information, even at a level higher than the local one. Besides further strengthening the model, such dissemination effort can offer new income opportunities to farmers and create new synergies with companies that operate at different levels such as, for example, companies operating in the field of logistics or associations (e.g., Slow Food in Italy) dealing with the dissemination of niche products and food patterns.





## Annex I – LIFE+ DINAMO project team

### UNIVERSITY OF MOLISE Department of Biosciences and Territory



Davide Marino



Angela Stanisci



Anna Loy



Maria Laura Carranza



Anna Di Carlo



Angela Tavone



Lorenzo De Lisio



Giovanni Ciccorelli



Francesco Iannotta



Marco Ottaviano



Giovanni Pelino



Davide De Rosa



Giovanni Capobianco



Ugo Chiavetta



Claudio De Falco

### **Confederazione Italiana Agricoltori of Molise**



Donato Campolieti



Angelo Cappuccio



Anna Graziano



Angiolino Sisti

**ENEA - Italian National agency for new technologies,  
energy and sustainable economic development**



Laura Maria Padovani



Paola Carrabba



Massimiliano De Mei



Loretta Bacchetta



Barbara Di Giovanni

**IGEAM DD**



Sophia Valenti



Silvia Arena



Rossella Gabriele



Federico Antimiani

## Farmers



Carlo Bevilacqua



Marco Blascetta



Sonia D'Angelo



L'Opera Società Agricola  
Biodinamica Di Vaira Srl



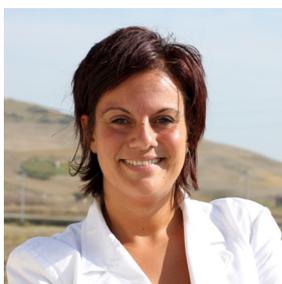
Lino Di Biase



Gabriele Di Lorenzo



Nicolina Di Martino



Anna Pina Giovanditti



Duilio Iurescia



Paolo Maddaloni



Livio Marcucci



Elena Pallotta



Alessandro Patuto



Antonio Petrarca



Luigi Roberto Pinti



Sandra Turco



Marco Zappitelli

## Municipalities



Acquaviva Collecroce



Campomarino



Guglionesi



Larino



Montenero di Bisaccia



Palata



Petacciato



San Martino in Pensilis

## Other local stakeholders

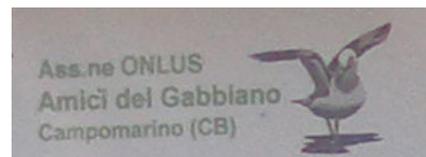
### VIVAIO MIGNOGNA

s.s. Ingotte km 11,500  
RIPALIMOSANI (CB)  
T 0874 451528  
F 0874 451528

vivaiomignogna@micso.net



Associazione  
Ambiente Basso Molise



Associazione  
Amici del Gabbiano



Giardino Flora  
Appenninica di  
Capracotta



Banca del Germoplasma  
del Molise





Vivaio Forestale Regionale  
Regionale  
“Le Marinelle” di  
Petacciato (CB)



Vivaio Forestale Regionale  
“Colle Astore” di Carpinone (IS)



Vivaio Forestale Regionale  
“Selva del Campo” di  
Campochiaro (CB)



Centro di Educazione Ambientale  
- Basso Molise





## **Annex 2 A description of the territory and the conservation actions carried out in the Basso Molise Area**

The implementation of the LIFE+ DINAMO model is focused on 10 municipalities of the “Basso Molise” area, in the Province of Campobasso. This area was chosen both for its plenty of zones with high biodiversity value, as evidenced by the presence of 12 sites in the Natura 2000 network, and for its strong connotation in terms of rurality, with over 95% of farming areas throughout the territory. Public and private sites were selected in this area in order to carry out a series of direct and indirect actions, aimed at conserving local biodiversity. These sites are adjacent to the Sites of Community Importance (SIC) and Special Protection Areas (SPAs) to ensure that all measures put in place by the DINAMO project increase biodiversity in a wider area than the one confined to the Natura 2000 sites, thus creating an ecological network where also rural areas are integrated.

- Campomarino
- Guglionesi
- Larino
- Montecilfone
- Montenero di Bisaccia
- Petacciato
- Portocannone
- San Giacomo degli Schiavoni
- San Martino in Pensilis
- Termoli

*Municipalities involved in the DINAMO project*

The Basso Molise area has a good hydrographic system, which includes the lower course of Trigno and Biferno rivers and Mergola, Tecchio and Sinarca streams, with a humid sub-Mediterranean climate and altitudes ranging between 0 and 400 m above the sea level.

The main land uses are related to agriculture in the inland areas (98% of the territory) and artificial areas (buildings and infrastructures), 0.2% of the land being in the coastal area, while natural areas cover approximately 1.5% of the territory. Tourism and industry characterize only specific sites along the coast and some areas of the Biferno River’s valley.

Farm production is mainly targeted at irrigated and tree crops. Most farms are medium-sized and directly managed by the owners, who use intensive-farming methods, with a strong specialization in monoculture and with a widespread crop irrigation and mechanization. This often implies an often excessive exploitation of the soil and extensive use of chemicals (fertilizers, pesticides, fungicides, etc.).

By analyzing the land cover according to the CORINE method, it is clear that only 2.3% of the project area is characterized by forests and semi-natural areas. The potential vegetation is represented by oak forests (*Quercus pubescens*), but the actual distribution of this type of forest is reduced to small relict patches in marginal areas, where intensive farming cannot be practiced.

Nearly 30% of semi-natural areas is represented by scrubs (3.2.2.) and areas with sclerophyll vegetation (3.2.3.). Small areas are also covered by relict forests of holm oak trees (3.1.1.1.) and woods with a prevalence of hygrophilous species (3.1.1.6). On the coastal dunes there are important areas covered by forests, mostly Mediterranean pines (3.1.2.1).

Many of the above mentioned residual forests belong to the EU priority types of habitat. Along the Molise coast, in fact, the European Commission identified 20 habitats of interest, 344 species of vascular plants – of which 40 are in the regional red lists, considered at risk of extinction due to anthropic stress – and 30 are exotic species, therefore alien to the local native flora (Izzi et al. 2007a<sup>1</sup>, 2007b<sup>2</sup>; Stanisci et al., 2007<sup>3</sup>).

To date, several environmental pressure factors have been noticed that threaten the survival of habitats and plant and animal species in the short and medium term, including: coastal erosion, intensive agriculture, uncontrolled access to the beaches, coast urbanization, drainage of wetlands and invasive alien species (Acosta et al., 2007<sup>4</sup>; Carranza et al., 2004<sup>5</sup>; Stanisci, Carranza, 2008<sup>6</sup>).

The coastal plains behind the dune housed, until a century ago, large areas of plain wood, divided into woods of Turkey oaks with Farnetto in the slightly hilly areas and forests with oak and Southern ash in the hollows, corresponding to habitats 91M0 and 91F0.

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<sup>1</sup> Izzi C. F., Acosta A., Carranza M. L., Carboni M., Ciaschetti G., Conti F., Del Vecchio S., Di Martino L., Frattaroli A., Pirone G. & Stanisci A., 2007a. Entità a rischio negli ambienti dunali costieri di alcune regioni dell'Italia centrale. *Fitosociologia*, 44 (2): 251-254.

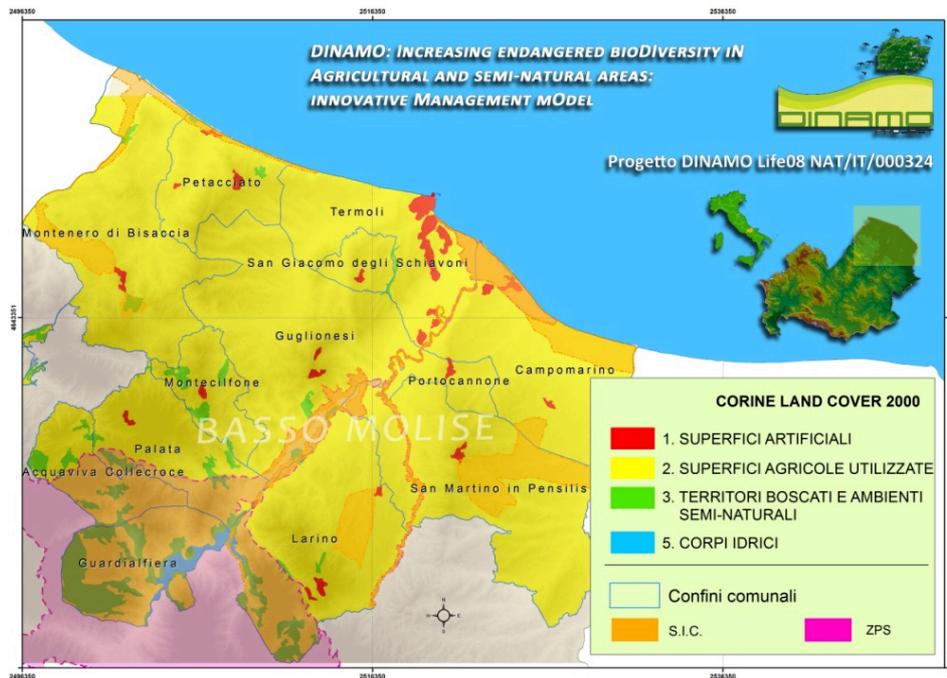
<sup>2</sup> Izzi C. F., Acosta A., Carranza M. L., Ciaschetti G., Di Martino L., D'Orazio G., Frattaroli A., Pirone G. & Stanisci A., 2007b. Il censimento della flora vascolare degli ambienti dunali costieri dell'Italia centrale. *Fitosociologia*, 44(1): 129-137.

<sup>3</sup> Stanisci A., Acosta A., Carranza M.L., Feola S., Giuliano M., 2007. Gli habitat di interesse comunitario sul litorale molisano e il loro valore naturalistico su base floristica. *Fitosociologia*, 44 (2): 171-175.

<sup>4</sup> Acosta A., Carranza M.L., Ciaschetti G., Conti F., Di Martino L., D'Orazio G., Frattaroli A., Izzi C.F., Pirone G., Stanisci A., 2007. Specie vegetali esotiche negli ambienti costieri sabbiosi di alcune regioni dell'Italia centrale. *Webbia* 62:77-84.

<sup>5</sup> Carranza M.L., Acosta A., Giancola D. 2004. Analisi del paesaggio della costa molisana. *Genio rurale, Estimo e Territorio* n. 12: 39-43.

<sup>6</sup> Stanisci A., Carranza M.L., 2008. Lo stato di conservazione del litorale molisano. In: Marchetti M., Marino D., Cannata G. (eds). *Relazione sullo stato dell'ambiente della regione Molise*. Università degli Studi del Molise. Campobasso. pp. 95-96. ISBN 978-88-901055-1-7.



Area in which the LIFE DINAMO project takes place. The mapping categories refer to the first level of detail of the CORINE Land Cover (scale 1: 10000) for the year 2000

<http://www.pcn.minambiente.it/PCN/>

Currently, these landscapes have disappeared along with the extraordinary variety of animal and plant species that characterized them. There is a small strip of mixed oak dominated by the Turkey oak (*Quercus cerris*) at Le Fantine (Habitat 91M0), the only evidence of the forests that once inhabited the sub-coastal territories. For these reasons, as part of the LIFE + DINAMO project, the 91M0 and 91F0 were taken among the target habitats.

Along some stretches of stream banks there are still some interesting riparian forests of white willow (*Salix alba*) and white poplar (*Populus alba*) (Habitat 92A0), which give rise to ecological corridors useful for the dispersion of local wildlife species. The DINAMO project conservation actions, therefore, are also aimed at the expansion of this type of habitat.

The coastal plains are surrounded by hills with a more widespread environment, consisting of thorn bushes (*Paliurus plug-christi*) and broom (*Spartium junceum*) and groves of oak (*Quercus pubescens*, *Q. dalechampii*). In these areas there are, among others, strips of habitat 91AA\* (woods with *Quercus pubescens*), which are also target of the LIFE + DINAMO project.



*Habitats of Community interest 92A0 - Forests in gallery Salix alba and Populus alba*



*Habitats of Community interest 91M0 - Balkan-Pannonian forests of oak*

From the wildlife point of view, the area is home to many vertebrate species, endemic or threatened in the Italian peninsula, which are characteristics of the plains, shrubs, forest and freshwater habitats.

Among these there are endemic amphibians such as the Apennine yellow-bellied toad (*Bombina pachypus*) and the Italian Crested Newt (*Triturus carnifex*); threatened reptiles such as the European pond turtle (*Emys orbicularis*) and the Hermann tortoise (*Testudo hermanni*); many breeding birds mentioned in Annex I of the Habitats Directive, including raptors such as Red Kite (*Milvus milvus*) and the Long-eared Owl (*Asio otus*), the Jay (*Coracias garrulus*) and several larks, including the Calandra (*Melanocorypha Calandra*), the Calandro (*Anthus campestris*) and Calandrella (*Calandrella brachydactyla*).

A more detailed description of the project area from a scientific and socio-economic point of view can be found in Carrabba et al. eds. (2011<sup>11</sup>).

The University of Molise has developed a Decision Support System (DSS) that, drawing on a database specifically designed for the project's needs, has allowed to better identify the areas where practical conservation actions can be carried out (Carranza, Ciccorelli, 2011<sup>17</sup>). A Web-based GIS is also available online (see web page [https://life-dinamo.sf.altran.it/pmapper/map\\_default.phtml](https://life-dinamo.sf.altran.it/pmapper/map_default.phtml)), which provides an easier access to the DSS information



*Habitats of Community interest 91AA - Woods of sessile oak*



*Adult red kite in flight (photo by L. De Lisio)*



*European roller resting and in flight (photo by L. De Lisio)*



*Toad Apennines. The left shows the typical yellow-black color of its belly, on the right is the cryptic coloration of dark-grey of the back (photo A. Loy)*



*Italian Crested Newt (photo by L. De Lisio)*



*The European pond turtle (photo by L. De Lisio)*



*The Hermann tortoise (photo by A. Loy)*

The identification of target species and habitats is an important aspect of the implementation of the DINAMO model. A successful replication of the DINAMO model at the national/international level is possible, but it must begin with a careful technical and scientific analysis of the referenced territory. To this end, in addition to analyzing the socio-economic and agronomic selected area, it is particularly useful to take as a reference the schemes in the Natura 2000 network, which provide a valid description of the values and natural emergencies at the local level.

The selection of species and habitats, besides having a considerable importance from the conservation's point of view, will also impact the visibility of the initiative at the local and national levels, by helping to increase the farmers' income. Therefore, it is important that there are some target species and/or habitats that are easily recognizable by the large public, in order to emphasize the accomplishment of the preservation activity, besides fostering the sense of belonging in the farmers. Also, the selection of practical actions to be carried out will contribute to this aim. The model will be strengthened by the fact that there will be some easily recognizable/traceable actions, such as, for example, the placement of artificial nests or the restoration of drinking troughs.

During the Agriforum, the comparison among the actions implemented in different farms, as well as the exchange of views, comments, and solutions to various problems, create a team spirit that strengthens the overall conservation action.

To meet the objectives of the DINAMO project, eight practical actions (C.1 - C.8) have been tailored to suit the natural features of the territory and the entrepreneurial characteristics of selected farms. Identifying the actions has been an extremely accurate process, structured into several stages of study and analysis of the area and compared with the existing literature. Furthermore the files of the Natura 2000 network, updated to 2009, were consulted with reference to sites of community interest in the project area (<http://www.minambiente.it>), the surveys of fauna completed or in progress (MITO 2000, <http://www.mito2000.it/> Atlas and Amphibians reptiles Project, Molise Region, 2010), conference proceedings, articles and publications.

Species and habitats at risk of extinction in “Basso Molise” have been chosen as target of the DINAMO project. The procedure took the following steps:

- 1) preparation of a “check list” of endangered species and habitats that are in the project area;
- 2) analysis of conservation issues that are associated with agricultural practices;
- 3) surveys in the “target” areas of the project, to establish the local potentialities in terms of threatened biodiversity;
- 4) identification, in collaboration with the CIA, of the companies to be actively involved in the project;
- 5) analysis of the cultural practices implemented by the selected companies, in order to identify the most appropriate practical actions to be proposed to each of them;
- 6) selection of habitats and species to be protected;
- 7) designation of practical actions to be implemented, which are required for each identified species/habitat.

In particular, the selection took the following parameters into account: the degree of conservation interest, namely the presence of habitats and species, in Annex II of the “Habitats Directive” (92/43/EC) and Annex I the “Birds Directive” (79/409/EEC), respectively; the closeness of agricultural land businesses to Natura 2000 sites, or their congruence with the creation of a regional ecological network in support of the sites of Natura 2000; the ecological relations with the agro-ecosystems and the threat factors arising from agricultural practices carried out by the selected companies; an assessment of the farmers’ potential interest in carrying out the project activities, on the basis of their personal feelings, their age, their participation in similar initiatives, their ability to get acquainted and grasp the development opportunities offered by the project.

The selected habitats and species, all included in the EU Directives referred to above, show a negative trend and a status which depend on the way of carrying out the agricultural practices. In particular, the habitats now included in the project area have only a relictual and fragmented distribution.

From the existing geo-referenced information of Basso Molise, 11 species of vertebrates and 4 habitats, included in Directive 92/43/EC, have been chosen as the direct and indirect targets of concrete conservation actions. In particular, 5 species of nesting birds, typical of Molise's open coastal and hilly areas (Red Kite, Jay, Calandra, Calandrella, Calandro), and 2 endemic species of amphibians (Toad Apennines, Italian Crested Newt) have been chosen as a "direct target". Target habitats, instead, besides representing a value in themselves, are also elected habitats for other species of Community interest, which therefore become secondary targets of the project: 2 species of nesting birds (the owl and the hobby), and 2 species of reptiles (the European pond turtle and the Hermann tortoise).

Overall, then, the concrete conservation actions of the project include the following species / habitats, both in a direct and indirect way:

#### **Birds**

- Red Kite (*Milvus milvus*) (direct action)
- Jay (*Coracias garrulus*) (direct action)
- Calandro (*Anthus campestris*) (direct action)
- Calandra (*Melanocorypha calandra*) (direct action)
- Calandrella (*Calandrella brachydactyla*) (direct action)
- Long-eared Owl (*Asio otus*) (indirect action)
- Hobby (*Falco subbuteo*) (indirect action)

#### **Amphibia**

- Apennine toad (*Bombina pachypus*) (direct action)
- Italian Crested Newt (*Triturus carnifex*) (direct action)

#### **Reptiles**

- European pond turtle (*Emys orbicularis*) (indirect action)
- Hermann tortoise (*Testudo hermanni*) (indirect action)

#### **Habitats**

- habitat 92A0 - Forests in gallery *Salix alba* and *Populus alba* (direct action)
- habitat 91F0 - Riparian mixed forests in *Quercus robur*, *Ulmus minor* and *Fraxinus angustifolia* (direct action)
- habitat 91AA - forests of *Quercus pubescens* (direct action)
- habitat 91M0 - Pannonian-Balkan Turkey oak – sessile oak forests (direct action).

## Defining Conservation Actions

The concrete actions for the conservation of target species and habitats have been subsequently described, to be implemented on farms and in public areas provided by municipalities. In particular, conservation actions have been chosen in order to:

- increase the reproductive capability of the Red Kite, the Roller, the Calandra, the Calandrella, and the Calandro;
- enhance the availability of habitats for the Apennines toad and the Italian Crested Newt;
- naturally recover marginal areas, the bushes and thickets along the shared and unproductive areas, in order to re-establish wooded areas corresponding to the habitats included in the European Habitat Directive 92/43/EC.

Below there is a brief description of the conservation actions implemented during the DINAMO project carried out in Basso Molise, with a mention of the achieved results.

### Action C.1 - Installation of Nesting Boxes for the Red Kite (*Milvus milvus*)

This action provides for the installation of 10 artificial nests for the Red Kite. The artificial nest consists in a wicker basket with a diameter of about 100 cm, covered with a crown of sprigs of local essences. The nests were placed in the upper 2/3 (about 10-15 m above the ground) of large trees isolated or grouped in small forest patches, located within the farms. The 10 artificial nests for the Red Kite were delivered to some farms involved in the project (Bevilacqua, Blascetta, D'Angelo, Di Martino Di Vaira, Maddaloni, Petrarca, Pinti, Turco).

Each farm received a nest except the “Turco” one, which was delivered two nests, since the characteristics of the farmstead allow it. The nests were installed with the help of an expert of tree climbing, because of the difficulty of positioning them, and due to the type of selected trees.



*The Red Kite's nest*

The nests were installed on oaks (8 nests) and poplars (2 nests), specifically on bifurcations of the branches, at 7-10 meters of height. Response times to the installation of artificial nests can be highly variable. Although it is not possible to detect the occupation of nests by red kites, a pair of Black Kites have been spotted in the vicinity of the nest placed in the Di Vaira farm, where the height of the nest and the very steep land, however, have not allowed to follow the nesting stages.

### **Action C.2 - Installation of Artificial Nests for the Roller (*Coracias garrulus*)**

This action provides for the installation of 120 artificial nests for the European roller. The artificial nest is in a locked box made of fir wood, measuring 47 cm (height) x 20 cm (length) x 24 cm (depth), equipped with a circular aperture of 5 cm on the vertical front. In each farm, 2 to 15 nests were installed, about 100 m far from one another (density: 1 nest/ha).

One hundred and twenty nest boxes were installed in a number ranging from 2 to 15, at a distance of about 100 m apart from one another (with a density of about 1 nest /ha), in the following farms: Bevilacqua, Blascetta, D'Angelo Di Biase, Di Lorenzo Di Martino, Giovanditti, Iurescia, the Biodynamic farm Opera, Maddaloni, Marcucci, Pallotta, Patuto, Petrarch, Pinti, Turkish and Zappitelli. Since there are no scientific studies on the prediction of the breeding environment by the Roller in Southern Italy, the boxes were placed in a wide variety of sites suitable to host it, so as to encourage the target species to use them. In particular, the boxes were positioned in olive groves, mixed forest edges and isolated oaks, in fields used for hay.

Out of a total of 121 nests, 50 (41%) were used by different species. Of these, 62% were occupied by birds, while 20% were used by mammals (Gliridi hibernating), and 12% by insects (especially beetles and ants). Although no nest has been used to date by Jay marina, this result is very encouraging, given that such high values values of occupation of artificial nests can be reached only after 3-4 years after installation (Avilés et al., 2000)<sup>7</sup>.



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<sup>7</sup> Avilés J.M., Sánchez J.M., Parejo D., 2000. Nest-site selection and breeding success in the Roller (*Coracias garrulus*) in the Southwest of the Iberian peninsula, *Journal für Ornithologie* 141 (3): 345-350.

### The Roller's nest

It is also known that the *Coracia garrulous* tends to occupy nest boxes already used in recent years by other species, e.g. owl and kestrel (Aviles et al., 2001<sup>8</sup>). This phenomenon has been related to the fact that the jay does not bring material to the nest and in nature it uses old green woodpecker nests, or cavities in man-made structures.

In total, the following species of birds, listed in order of frequency, were recorded: Scops Owl (*Otus scops*, 11 nests), Great Tit (*Parus major*, 4 nests), Sparrow (*Passer hispanoliensis*, 3 nests), Jay (*Garrulus glandarius*, 1 nest), the Italian Sparrow (*Passer italiae*, 1 nest), Owl (*Athena noctua*, 1 nest), Starling (*Sturnus vulgaris*, 1 nest).



*Long-eared Owl with eggs and chicks filmed on July 11, 2012 in an artificial nest of the D'Angelo farm*

### Action C.3 – Installing Fledging Bars for Protection of Calenders, Calender and Calandrelle

This action provides for the installation of 5 fledging bars, including 2 of which for harvester machines operating on cereal crops and 4 for tractors operating in the hay meadows. The use of bar fledging is specifically targeted to increase the reproduction of three species that nest on the ground in agricultural areas: the Alaudidi Calandra (*Melanocorypha calandra*) the Calandrella (*Calandrella brachydactyla*), and the Motacillide Calandro (*Anthus campestris*).

In view of the difficulties encountered with the bars installed on a combined harvester, in particular because of the conformity of land, it was decided to proceed with the use of bars only for tractors, which have increased from 4 to 5.

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<sup>8</sup> Avilés, J.M., Sánchez, J.M., Parejo, D., 2001. Nest-boxes used by Eurasian kestrels *Falco tinnunculus* are preferred by rollers *Coracias garrulous*, *Folia Zoologica* 50 (4):317-320.



Fledging bar installed on a tractor of the Di Vaira farm. Right: detail of the bar's hook

During the summer 2012 surveys aimed at checking the presence of the target species (the Calandra, the Calandro and the Calandrella) were carried out in those farms where the use of the bars was expected. The species' census was carried out during the breeding season through the methodology of listening points (Fornasari et al., 2002<sup>9</sup>).

The results are reported in Table I and indicate the presence of two species of Alaudidi (the Calandrella and the Calandra) on the Biodynamic Farm Di Vaira, whereas the Calandro has not been contacted in any of the examined areas.

FARM	2012, 5 May	2012, 25 May	2012, 21 June	2012, 22 June
BLASCETTA	Target species absent	Target species absent	Target species absent	Target species absent
D'ANGELO Sonia	Target species absent	Target species absent	Target species absent	Target species absent
GIOVANDITTI Anna Pina	Target species absent	Target species absent	Target species absent	Target species absent
L'OPERA SOCIETÀ AGRICOLA BIODI- NAMICA	7 <i>Calandrella brachydactyla</i>	1 <i>Calandrella brachydactyla</i>	Target species absent	Target species absent
PATUTO Alessandro	Target species absent	Target species absent	Target species absent	Target species absent

Table I - Results of birds monitoring in farms where bar fledging was used

<sup>9</sup> Fornasari L., De Carli E., Brambilla S., Nuvoli L., Maritan E. e Mingozi T., 2002. Distribuzione dell'avifauna nidificante in Italia: primo bollettino del progetto di monitoraggio MITO2000 – *Avocetta* 26 (2): 59-115.

## Action C.4 - Restoring Drinking Troughs to Improve the Habitat of the Italian Crested Newt and Toad Apennine

This action provides for the restoration of three abandoned drinking troughs, for the recovering of natural environments suitable for the Ululone of the Apennines and the Italian Crested Newt breeding.

The selection of the three drinking troughs is based on the following criteria:

- the well-known presence of at least one of the target species, in the same drinking trough or in neighboring areas;
- the availability of the municipality to act synergistically and ensure the preservation of work and species in the long run;
- the optimal ratio between costs and benefits of interventions, in terms of ecosystem functionality;
- the degree of naturalness of the environment which surrounds the drinking troughs.

The restoration of the three drinking troughs also involved the carrying out of useful interventions to promote the connection between the same drinking troughs and the surrounding environments, removing the architectural barriers that prevent access to the pools, in particular through the implementation of access ramps (Loy *et al.*, 2010<sup>10</sup>, 2011<sup>11</sup>). The restoration work was completed in January 2011. The three restored drinking troughs have been examined with periodic inspections from the beginning of the amphibians' season of activity (May 2011).



*Drinking trough of Nallo*

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<sup>10</sup> Loy A., M. L. Carranza, G. Ciccorelli, L. De Lisio, P. Gaglioppa, D. Marino, M. Ottaviano, G. Pelino, A. Stanisci (2010) DINAMO D.4.S. – 1° Rapporto sul Monitoraggio Scientifico - Scientific Monitoring Report I-(LIFE08 NAT/IT/000324).

<sup>11</sup> Loy A., L. De Lisio, 2011. Rete Natura 2000 e aree protette in Molise. In: Carrabba et al. (eds.) *Il Progetto DINAMO per la Biodiversità del Molise*. ENEA, Roma.



*Drinking trough of Nallo. Larva of newt found on August 2, 2012 (photo L. De Lisio)*

The Environmental Association Basso Molise, as a local stakeholder, cooperated to control the drinking troughs. The monitoring of the restored drinking troughs, carried out in the spring 2011, detected the colonization of Nallo and Fonticillo drinking troughs by green frogs and toads but not of the target species of the project (Italian crested newt and toad Apennine), whereas any sample of amphibians was detected in the Sant'Adamo drinking trough (Loy et al., 2011<sup>11</sup>).

On the contrary, the investigation carried out at Nallo drinking trough on August 2, 2012 led to the discovery of a larva of Italian Crested Newt (*Triturus cristatus*) in the fountain, confirming the intervention usefulness.

Simultaneously with the drinking troughs restoration, between 2010 and 2012, some Capture-Recapture-Marking (Williams et al., 2002<sup>12</sup>) sessions were carried out in five drinking troughs of the Matese Mountains, in order to study some populations of the Ululone, found there (Loy et al., 2011<sup>11</sup>; Magliolo, 2010<sup>13</sup>).

The study was carried out on the populations and the number of existing specimens to evaluate the possibility of a sustainable harvest of larvae and young fish to be released in the drinking trough of Fonticillo in Guglionesi.

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<sup>12</sup> Williams B.K., Nichols J.D., Conroy M.J., 2002. *Analysis and Management of Animal population*. Academic Press.

<sup>13</sup> Magliolo M., 2010. "Censimento delle popolazioni di Ululone appenninico *Bombina pachypus* in Molise". Graduation thesis, University of Molise.

The high density of adult and young specimens as well as larvae detected in three drinking troughs in the Matese area has allowed to take a sample of a total of 40 tadpoles and 6 young specimens, a choice that would ensure the sustainability of the removal and a good chance of forming a minimum viable population and good genetic variability, in agreement with the guidelines on reintroductions of IUCN (AAVV, 1998<sup>14</sup>).

On October 3, 2012 there was a capture session and the marking of the relocated population. The results allowed to recapture two specimens removed from “Guado della Lorda” and detect the presence of six new metamorphosed specimens. The population of surveyed metamorphosed specimens currently amounts to 8 pieces. Considering that sexual maturity is reached only in the third year of age (Lanza *et al.*, 2007<sup>15</sup>), the success of the translocation and stabilization of a viable population will be evaluated over the next years. A study is being carried out on the viability of populations (PVA - Population Viability Analysis, Beissinger *et al.*, 2002<sup>16</sup>) which will define the needs and modalities for possible future inclusions.

### **Action C.5 - Planting Native Tree**

This action provides for the planting of trees and shrubs belonging to the forest habitat 92A0 (*Salix alba* and *Populus alba* gallery forests) and 91F0 (Riparian mixed forests of great rivers of *Quercus robur*, *Ulmus laevis* and *Ulmus minor*, *Fraxinus excelsior*, or *Fraxinus angustifolia* (*Ulmion minoris*) in 3 hectares of public lands and municipal areas in connection with the Natura 2000 sites. The target habitats of this action have now become rare in the whole sub Adriatic coastal area, where the flood plains of rivers are remodeled and cleaned by human activities. The riparian forests and those of alluvial terraces are areas of great naturalistic importance, for the high biodiversity that distinguishes them and for their role as natural corridors for wildlife vertebrates.

Once the areas where implementing action C.5 had been identified, site sampling was carried out to process a “checklist” of the native wood species to be used for plantations (Table 2), according to which an investigation was carried out to assess which essences were available through the regional forest nurseries that certify the origin of the available plant material. The species not available have been the object of selection, collection and propagation through action C.8, which is described below.

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<sup>14</sup> IUCN, 1998. Guidelines for Re-introductions. Prepared by the IUCN-SSC Reintroduction Specialist Group. IUCN Gland, Switzerland. and Cambridge, UK.

<sup>15</sup> Lanza B, Andreone F., Bologna M. A., Corti C., Razzetti E., 2007. *Fauna d'Italia*, vol. XLII, Amphibia.

<sup>16</sup> Beissinger, Steven R. and McCullough, Dale R., 2002. “Population Viability Analysis”, Chicago: University of Chicago Press.

<b>SPECIES</b>	<b>N</b>
<i>Acer campestre</i>	120
<i>Alnus glutinosa</i>	150
<i>Arbutus unedo</i>	120
<i>Carpinus orientalis</i>	30
<i>Celtis australis</i>	300
<i>Cercis siliquastrum</i>	340
<i>Corylus avellana</i>	260
<i>Cornus mas</i>	260
<i>Cornus sanguinea</i>	260
<i>Coronilla emerus</i>	50
<i>Euonymus europaeus</i>	340
<i>Fraxinus ornus</i>	180
<i>Fraxinus oxycarpa</i>	30
<i>Ligustrum vulgare</i>	260
<i>Phyllirea latifolia</i>	290
<i>Pistacia lentiscus</i>	240
<i>Populus alba</i>	50
<i>Populus nigra</i>	160
<i>Populus tremula</i>	20
<i>Prunus avium</i>	250
<i>Prunus spinosa</i>	200
<i>Pyrus piraster</i>	50
<i>Rhamnus alaternus</i>	10
<i>Rosa canina</i>	190
<i>Rosmarinus officinalis</i>	100
<i>Salix alba</i>	230
<i>Salix purpurea</i>	220
<i>Salix triandra</i>	150
<i>Sambucus nigra</i>	220
<i>Sorbus domestica</i>	170
<i>Spartium junceum</i>	330
<i>Quercus cerris</i>	240
<i>Quercus frainetto</i>	220
<i>Quercus ilex</i>	330
<i>Quercus pubescens</i>	310
<i>Quercus robur</i>	50
<i>Ulmus minor</i>	290
<i>Viburnus tinus</i>	160
<i>Myrtus communis</i>	160
<i>Erica arborea</i>	160
<b>AMOUNT/TOTAL</b>	<b>7500</b>

Table 2 - List of species and number of specimens used for carrying out action C.5



Location of the areas of intervention of the C.5 action along the borders of the farm "Opera Biodynamic Di Vaira"

The areas of intervention for action C5 are along the streams Mergola and Tecchio, in the Petacciato municipality. There are 4 areas with a surface of about half an hectare each, and three rows of about 4 meters wide (Loy et al., 2011<sup>11</sup>). The permit of the Petacciato municipality was released on April 2011 (Municipal Resolution n. 62 of 04/11/11 62 of the Petacciato municipality).

The selection of species was based on geological, soil, climate and, actual and potential, vegetation characteristics in order to start the recovery of habitat 92A0 – gallery forests *Salix alba* and *Populus alba*, and the habitat 91F0 – mixed riparian forests of great rivers with *Quercus robur*, *Ulmus laevis* and *Ulmus minor*, *Fraxinus excelsior*, or *Fraxinus angustifolia* (*Ulmion minoris*) (Carranza e Ciccorelli, 2011<sup>17</sup>).

Following the directions provided by the CIA and the nursery-farm Mignogna, involved in the installation and maintenance of the interventions, the technical details for the collection of plants and cuttings of trees and shrubs have been defined, both from the greenhouse of the Bioscience and Territory Department of University of Molise, where 4200 small plants of native species were propagated (action C.8), and from the Regional Forest Nursery "Le Marinelle" (Loy et al., 2011<sup>11</sup>). This has ensured the control of the origin of the native plant material used in this action.

<sup>17</sup> Carranza M.L., Ciccorelli G. 2011. Il Basso Molise: geografia ed ambiente fisico. In: Carrabba et al. (eds.), 2011. *Il Progetto DINAMO per la biodiversità del Molise* (LIFE08 NAT/IT/000324) D.1.S – D.2.S – D.3.S. ENEA. Roma. ISBN 978-88-8286- 237-4. pp: 15-16.

The facilities were made according to a regular square mesh layout (Bernetti, 2003<sup>18</sup>) of 2 meters on each side, spreading in an irregular manner, “with patches”, shrubs and forests. The distribution of shrub species and forestry groups allows to obtain an already diversified horizontal structure (Mercurio, 2010<sup>19</sup>), whereas the vertical structure, as described, will be diversified at a later stage of wood maturation, also necessary for the current proximity of plants (2 meters).

At present, the specific composition of the areas with facilities discloses the presence of annual and pioneer species that represent the first ones colonizing the agricultural lands no longer cultivated. Starting from next year, grassland species are expected to settle, of the ecological succession leading to the forest of the Southern English Oak and Ash (habitat 91F0) in the areas of alluvial terrace and the forest of Cerro and Oak (habitat 91M0) in slopes with a mild morphology.

The facility will be managed according to an adaptive approach (Ciancio & Nocentini, 2002<sup>20</sup>), proceeding as an experiment: the reaction to each action will be monitored by using floristic-vegetational indicators, so as to harmonize the cultural interventions with the natural successional processes, in order to get the functionality of the forest ecosystem restored in the valley floodplain.

Specifically, the diagnostic species of habitat 91F0 and 91M0, of the Italian Handbook of Habitats (<http://vnr.unipg.it/habitat/>), will be used as biomarkers.

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<sup>18</sup> Bernetti G., 2003. *Selvicoltura speciale*, UTET, Torino.

<sup>19</sup> Mercurio R., 2010. *Il restauro della foresta mediterranea*. CLEUP, Padova.

<sup>20</sup> Ciancio O., Nocentini S., 2002. Conceptual issues of close-to-nature silviculture and biodiversity conservation and related monitoring requirements. Proceedings of the IUFRO Conference: “Collecting and Analyzing Information for Sustainable Forest Management and Biodiversity Monitoring with special reference to Mediterranean Ecosystems”. Corona P. et al. (eds). European Commission EUR 20392 EN (2002), pp. 27-39.

## Action C.6 - Planting Native Trees and Shrubs on Large Surfaces

This action has started up the restoration of forest habitats 91M0 (Forests Pannonian-Balkan of Turkey oak and sessile oak) in 5 acres of communal areas, through the planting of trees and shrubs belonging to the potential native vegetation. Until a century ago, the coastal plains harbored large areas of plain wood, articulated in cerrete with Farnetto in slightly hilly areas and forests of Southern English Oak and Ash in depressions, corresponding to habitats 91M0 and 91F0.



*Planting activities in Action C.6*

Currently, these landscapes have disappeared along with the extraordinary wealth of plant and animal species that characterized them. Action C6 intended to expand a residual forest of coastal plain in “the Fantine” area, to recover its functionality and enhance its conservation value. Sampling was then carried out on site and a check list of wooden native species was developed to be used for plantations. Consequently, a protocol was developed for the collection and propagation of seeds and cuttings of these species.

Unlike action C.5, in this case the intervention has been carried out only in one area, which is next to a residual forest of the habitat 91M0, using a technique similar to the one adopted in action C.5.

The facility was made according to a sixth of regular installation (Bernetti, 2003<sup>18</sup>), with a regular square mesh layout of 2 meters on each side, spreading in an irregular manner, “with patches”, shrubs and forests.

The area is located partly inside and partly close to the SIC “Foce Saccione – Bonifica Ramitelli”, where there are populations of Hermann Tortoises monitored during the project (Berardo, 2011<sup>21</sup>), in which the connection with the SIC is guaranteed by bands of vegetation along the access road.

Part of the intervention area that falls outside the SCI (about 0.5 hectares) will act as a connector between this and the near SIC “Foce Biferno-Litorale Campomarino”.

In Table 3, there is the list of species and number of specimens for each species used in the plant construction.

<b>SPECIES</b>	<b>N</b>
<i>Arbutus unedo</i>	300
<i>Cercis siliquastrum</i>	250
<i>Euonymus europaeus</i>	350
<i>Ligustrum vulgare</i>	300
<i>Phyllirea latifolia</i>	350
<i>Pistacia lentiscus</i>	350
<i>Prunus avium</i>	500
<i>Rosmarinus officinalis</i>	350
<i>Spartium junceum</i>	350
<i>Quercus ilex</i>	600
<i>Quercus cerris</i>	450
<i>Quercus frainetto</i>	550
<i>Carpinus orientalis</i>	350
<i>Fraxinus ornus</i>	500
<i>Ulmus minor</i>	600
<i>Viburnus tinus</i>	600
<i>Myrtus communis</i>	350
<i>Erica arborea</i>	500
<b>AMOUNT/TOTAL</b>	<b>7600</b>

Table 3 - List of species and number of specimens used for the restoration of the habitat 91M0 in the area “Le Fantine”, in the municipality of Campomarino

<sup>21</sup> Berardo F., 2011. Monitoraggio di flora e fauna di interesse conservazionistico nelle aree Natura 2000 costiere del Molise – Degree Thesis in environmental biology – University of Molise.

The operations were performed between January and February 2012. The plant was, therefore, made and delivered in March 2012. The program envisaged some routine maintenance activities, cleaning and emergency irrigation, that have not been realized due to an arson occurred on June 29, 2012. The fire has affected most of the surface, within which the plant is located. From an initial assessment, made a few days after the event, it was pointed out that about 90% of the area affected by action C.6 was covered by fire. The damage evaluable at that time seemed to be almost total, the plants being still small. All locks have been affected by the passage of flames, and different extents of the damage were attributable to each individual.

However, from a survey carried out on October 8, 2012, the topsoil showed clear signs of recovery; in particular, the ability of many species to survive events of this type is such that many of the plants continue to be viable. A positive role has been played by the mulching film that is wrapped around the collar of the plant (put in place during planting). A number of sprouts and individuals have suffered only partial damage. The average value of damage over the entire area is 0.79, which is equivalent to approximately 60% of the surface; therefore, approximately 40% of the plants showed signs of vitality. In particular, it was found that plants that adopt a regenerative strategy based on a vegetative reproduction present more signs of life, even if they have suffered significant damage. The passage of fire did not significantly alter the floristic-vegetation composition of the plots, as shown by the abundance of recovered perennial species.



*Planting activities in Action C.6*

### **Action C.7 – Naturalistic Recovery of Marginal and Unproductive Areas in the Farm Land**

This action prompted the start-up of processes of naturalization in unproductive areas of the involved farms, and the preservation of wooded edges within the farms (about 5 ha). This made it possible to exclude the territories from the effects of the passage of farm machineries, cutting and fires, starting them off in the reconstruction of habitats of Community interest. It is expected that these areas are transformed into bushy areas and scrubs within 8-10 years, with the possibility to evolve, depending on the morphology of the ground and the proximity to watercourses, habitats of Community interest, targets of the project.

For this purpose, in the farms involved in the project, suitable areas were chosen for a short term natural recovery, namely areas not cultivated for some time, with shrubs and / or trees of a certain size. For this purpose, it was necessary to carry out a full and detailed mapping work of ditches and marginal areas, through the integration of the hydrographical map, of the areas with trees and of the recent digital orthophotos. Subsequently, suitable areas were selected in the field and with the participation of farmers, who indicated the unproductive areas that they intended to engage in the conservation action.



*Control Area of Action C.7*

<b>FARM</b>	<b>AREA (HA)</b>	<b>METERS</b>
BEVILACQUA	1,54	74,39
D'ANGELO Sonia	0,67	-
DI BIASE Lino	0,41	-
DI LORENZO	0,02	-
DI VAIRA	3,30	612,16
MADDALONI	0,68	-
PINTI	0,77	-
ZAPPITELLI	-	283,96
IURESCIA	-	89,38
<b>TOTAL AMOUNT</b>	<b>7,39</b>	<b>1059,89</b>

*Surfaces dedicated to action C.7 for each farm involved*

Action C.7 has started up the processes of re-naturalization of 9 unproductive areas of some farms (Table 4). The monitoring was carried out by floristic vegetation sampling in permanent areas, located within the areas involved in the conservation action (Loy et al., 2011<sup>11</sup>). The interventions were carried out in the following farms: Bevilacqua, D'Angelo Di Biase, Di Lorenzo, Iurescia, L'Opera Biodynamic Agricultural Society Di Vaira, Maddaloni, Pinti and Zappitelli. The total concerned area is 7.39 acres and 1059 meters, distributed along streams and ditches, along the shores of lakes within farms and in areas already covered by woodlands or scrubs.

The sectors assigned to action C.7 are included in the DINAMO geo-database (web see page <http://www.distat.unimol.it/STAT/laboratori-I/environmetrica>) (Loy et al., 2011<sup>11</sup>).

In the summer 2012, vegetation and structural elements were detected, with the subsequent comparison of the data collected in the previous two years, thus proceeding to the evaluation of the re-naturalization status. The results of the monitoring showed that the re-naturalization of unproductive areas, especially those already occupied by thickets and bushes, is proceeding with the increase in coverage of different shrub species and the entry of other nemoral plant species. In particular, in the once bushy or arboreal areas extending along the shared limits, the recovery of vegetation proceeds with greater speed. In these cases, the recovery time of the native woody vegetation can be estimated in 10-15 years, in the absence of human disturbance (from the landscape multi-temporal analysis carried out in the area). To get these conditions, it is necessary to support the farms that have taken this virtuous path towards biodiversity of Community interest, assisting them in the funding request to the Rural Development Plan (RDP).

The advantages of re-establishing woodland areas adjacent to the sites of the Network Natura 2000 are related to the enlargement of the areas occupied by woody habitats of Community interest in Basso Molise, but also the increase in suitable habitats for fauna species with a conservation concern such as birds of prey – the Red Kite (*Milvus migrans*),

the Black Kite (*Milvus milvus*), the Hobby (*Falco subbuteo*) and tortoises (e.g., *Testudo hermannii*). Action C.7 also included the possible eradication of invasive alien species of wood (e.g., *Robinia pseudoacacia*, *Ailanthus altissima*). This intervention was necessary because the woody invasive exotic species are uncommon in the territories of the target farms. Only in the “ Di Vaira” farm there is a wooded nucleus of *Robinia pseudoacacia*, but it is used for the production of honey and, therefore, it has not been modified.

### **Action C.8 - Ex-Situ Conservation and Propagation of Local Ecotypes of Bushes and Trees Used in Actions C5-C7**

Action C.8 has allowed the collection of seeds and cuttings of native species of trees and shrubs that are not available in the regional forest nurseries, for their propagation and use in the reforestation activities C.5 and C.6 in public areas, and for their *ex-situ* conservation at the Germplasm Bank of Molise.

The *ex-situ* conservation has allowed not only to make local ecotypes of native woody species available even after the end of the current project, but also to trigger an effective collaboration with the Regional Forestry Centres and nurseries of Basso Molise. For example, this collaboration has determined that forest nurseries made available, free of charge and beyond the needs that are strictly related to the project, plant material to the farms involved in the DINAMO project, to be used in further reforestation activities of the farm areas.

A total of 4200 plants have been obtained, belonging to the target species identified at the beginning of the project (Carranza *et al.*, 2011<sup>17</sup>; Loy *et al.*, 2011<sup>11</sup>). The details of the protocol for the collection, conservation, planting and monitoring are reported in I Report Scientific (Loy *et al.*, 2011<sup>11</sup>) and in Deliverable D.7.T, D.8.T, D.9.T (Carranza *et al.*, 2011<sup>17</sup>). All plants have been taken by the farm Mignogna that also provided to the reforestation of actions C.5 and C.6. At present, the propagation of native shrubs – useful to compensate for the lack of facilities created within the LIFE + DINAMO project – is being carried out.



*Cleaning the collected seeds*

For more detailed information on the scientific aspects of the project development, it is possible to download the reports on the scientific monitoring of the project from the site: <http://www.lifedinamo.it/>

To further support the scientific activities of the project, a Web-GIS was developed and implemented, and it is available at the following web-address: [https://life-dinamo.sf.altran.it/pmapper/map\\_default.phtml](https://life-dinamo.sf.altran.it/pmapper/map_default.phtml)

<b>Species</b>	<b>Plants obtained from seed or cuttings</b>
<i>Acer campestre</i>	300
<i>Carpinus orientalis</i>	270
<i>Corylus avellana</i>	200
<i>Cornus sanguinea</i>	145
<i>Coronilla emerus</i>	166
<i>Euonymus europaeus</i>	132
<i>Fraxinus ornus</i>	209
<i>Ligustrum vulgare</i>	245
<i>Malus sylvestris</i>	224
<i>Phyllirea latifolia</i>	118
<i>Pistacia lentiscus</i>	130
<i>Pistacia terebintus</i>	55
<i>Populus alba</i>	110
<i>Populus nigra</i>	167
<i>Prunus spinosa</i>	105
<i>Pyrus communis</i>	55
<i>Quercus cerris</i>	225
<i>Quercus pubescens</i>	8
<i>Quercus robur</i>	110
<i>Rosa canina</i>	41
<i>Salix alba</i>	115
<i>Salix purpurea</i>	401
<i>Sorbus aucuparia</i>	250
<i>Sorbus domestica</i>	85
<i>Spartium junceum</i>	134
<i>Ulmus minor (U. laevis)</i>	200
<b>AMOUNT/TOTAL</b>	<b>4200</b>

Table 5 - List of plants raised from seed or cuttings for each species



*Propagation of cuttings in the greenhouse*



*Material gathered for action C.8*



*Conservation seeds for action C.8*

<b>SPECIES</b>	<b>COLLECTED SEEDS</b>
<i>Acer campestre</i>	503
<i>Acer monspessulanum</i>	307
<i>Arbutus unedo</i>	119
<i>Carpinus betulus</i>	51
<i>Carpinus orientalis</i>	59
<i>Celtis australis</i>	164
<i>Cercis siliquastrum</i>	255
<i>Cistus creticus</i>	508
<i>Cistus salvifolius</i>	507
<i>Cornus sanguinea/mas</i>	154
<i>Coronilla emerus</i>	204
<i>Crataegus monogyna</i>	340
<i>Cytisus villosus</i>	506
<i>Erica arborea</i>	30
<i>Erica multiflora</i>	423
<i>Euonymus europaeus</i>	345
<i>Fraxinus angustifolia subsp. oxyocarpa</i>	150
<i>Fraxinus ornus</i>	100
<i>Halimium haliminifolium</i>	3016
<i>Laurus nobilis</i>	58
<i>Ligustrum vulgare</i>	227
<i>Malus sylvestris</i>	45
<i>Myrtus communis</i>	285
<i>Paliurus spina-christi</i>	169
<i>Phyllirea latifolia</i>	155
<i>Pistacia lentiscus</i>	266
<i>Populus alba</i>	15
<i>Prunus avium</i>	30
<i>Prunus spinosa</i>	187
<i>Pyrus piraster</i>	45
<i>Quercus cerris</i>	35
<i>Quercus frainetto</i>	70
<i>Quercus ilex</i>	84
<i>Quercus petraea</i>	25
<i>Quercus pubescens</i>	144
<i>Quercus robur</i>	60
<i>Rhamnus alaternus</i>	115
<i>Rosa canina</i>	220
<i>Rosa sempervirens</i>	50
<i>Rosmarinus officinalis</i>	40
<i>Salix alba</i>	20
<i>Salix purpurea</i>	25
<i>Sorbus aucuparia</i>	198
<i>Sorbus domestica</i>	165
<i>Spartium junceum</i>	340
<i>Ulmus minor</i>	35
<i>Viburnus tinus</i>	179
<b>AMOUNT/TOTAL</b>	<b>11033</b>

Table 6 - List of collected seeds for each species

<b>FARM</b>	<b>MUNICIPALITY</b>	<b>ACTION C1: Number of installed artificial nests for the Red Kite</b>	<b>ACTION C2: Number of installed artificial nests for the <i>Coracias garrulus</i></b>	<b>ACTION C3: Number of delivered flushing bars</b>	<b>ACTION C7: Recovery of native vegetation in marginal areas (Ha)</b>
BEVILACQUA Livia	San Martino in Pensilis	1	12	-	1,54
BLASCETTA Marco	Acquaviva Collecroce	1	11	2	-
D'ANGELO Sonia	Acquaviva Collecroce	2	11	1	0,67
DI BIASE Lino		-	-	-	0,41
DI LORENZO Gabriele	Montenero di Bisaccia	-	5	-	0,3
DI MARTINO Nicolina	Montenero di Bisaccia	1	9	-	-
L'OPERA SOCIE- TÀ AGRICOLA BIODINAMICA	Petacciato	1	15	-	3,30
GIOVANDITTI Anna Pina	Guglionesi	-	2	1	-
IURESCIA Pasquale	Petacciato	-	9	-	-
MADDALONI Paolo	Acquaviva Collecroce	1	6	-	0,68
MARCUCCI Livio		-	2	-	-
PALLOTTA Elena	Montenero di Bisaccia	-	3	-	-
PATUTO Alessandro	Larino	-	7	1	-
PETRARCA Antonio	Larino	1	6	-	-
PINTI Luigi Roberto	Palata	1	4	-	0,77
TURCO Sandra	Palata	1	12	-	-
ZAPPITELLI Marco	Montenero di Bisaccia	-	7	-	-
		<b>10</b>	<b>121</b>	<b>5</b>	<b>7,67</b>

Table 7 - Overview of the conservation actions implemented on the farms involved in the project





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