



PROGETTO LIFE09 NAT/IT/000093 ECORICE



ACTION E.5 - INTERNATIONAL RICE FIELD ECOLOGICAL NETWORK



Biodiversity and rice production in rice agro-ecosystem The Action Plan

Giuseppe Bogliani and Francesca Della Rocca (Eds.)

Department of Earth and Environmental Sciences

University of Pavia (Italy)

Contributions of

David Rodriguez, Departamento de Recursos Florestais Escola Superior Agrária de Coimbra, Portugal;

Juan Carlos Cirera, Riet Vell S.A., Spain;

Georgiou Pantazis and Stelios Tamvakidis, Department of Hydraulics, Soil Science and Agricultural Engineering, Faculty of Agriculture, Aristotle University of Thessaloniki, Greece;

Claire Pernollet, Office National de la Chasse et de la Faune Sauvage - CNERA Avifaune Migratrice, Anatid team, France ;

Raffaella Pagano, Franco Tesio, Alessandra Melucci, Francesco Pellicciari , Alice Cerutti, Gabriele Varalda, Provincia di Vercelli (Italy);

Giovanni Borgarello, Pracatinat s.c.p.a (Italy)

Francesca Follis, Maurizio Tabacchi, Valoryza (Private Agronomy Consultancy for rice crop) (Italy)

Dario Zocco, Parco fluviale del Po e dell'Orba (Italy)

Please, cite this document as follows:

Bogliani, G. and Della Rocca, F. (eds.) 2014. Biodiversity and rice production in rice agro-ecosystem. The Action Plan. Action E.5 - International Rice Field Ecological Network. LIFE Project LIFE09 NAT/IT/000093 ECORICE.

The ECORICE European biodiversity action plan

Table of content

1 Introduction	4
1.1 Managing biodiversity	4
1.2 IRFEN – the ECO-RICE project action	5
2 Methods	7
2.1 1st International Workshop	7
2.2 Workgroup setup	8
2.3 Preparing a questionnaire	8
2.4 Elaboration of the Action plan	9
3 A shared action plan	10
3.1 The Action plan	13
4 Conclusions	18
5 References	19
6 Annexes	20

The ECORICE European biodiversity action plan

1. Introduction

The Birds and the Habitat Directive are the two cornerstones of the EU's biodiversity policy. Mainly, both of them work by establishing, protecting and managing a coherent network of sites designated for selected species and habitats listed in the two Directives. The aim is to grant a favourable status of conservation or an improvement in this.

The EU Biodiversity Strategy also promotes the full implementation of the Birds and Habitats Directives. In relation to agriculture, the strategy proposes to maximize areas across grasslands, arable land and permanent crops that are covered by biodiversity related measures under CAP, so as to ensure the conservation of biodiversity and to bring about a measurable improvement in the conservation status of species and habitats that depend on or are affected by agriculture.

All across Europe, rice farming is playing a main role with regards to several habitats and species protected by the Birds and Habitats Directives, mainly referring to water related habitats and species. At a local level we started this LIFE Project ECORICE, with the aim of taking action for the conservation of NATURA 2000 local sites involved with rice farming along two main strategy lines: 1) improve by direct conservation actions the quantity and the quality of high natural value areas (i.e. Marshes, bog, woods, natural springs...) and 2) confronting the rice farmers about the conservation objectives and the viable arrangements in agricultural practice that could enhance the ecosystem service provision of rice farming industry.

1.1 Managing biodiversity

The European agroecosystem covers the vast majority of non-urbanized areas (Stoate et al. 2001) and play a fundamental role in the conservation of biodiversity. In particular, rice cultivation covers about 460 000 ha (FAOSTAT 2009) and is concentrated in the largest alluvial plains, river deltas and estuaries (Fig.1). Even if modified for agricultural purposes, rice-dominated landscapes may be seen as wetland habitats maintained by human activities and have been worldwide recognized to be potential habitat for invertebrates, vertebrates and plants, including species of conservation concern (Fasola and Ruiz 1996, Czech and Parsons 2002, Bambaradeniya et al. 2004,

Kadoya et al. 2009). The maintenance and proper management of paddy systems are of fundamental importance for the conservation of wetland species that partly or completely depend on rice systems. This is the case of breeding herons in the Mediterranean region (Fasola and Ruitz 1996), migrant Common Cranes and Black-tailed Godwit in the East Atlantic Flyway and Portugal (Sanchez-Guzman et al. 2007, Lourenco and Piersma 2008), and some dragonfly species of lentic habitats in northern Italy (Bogliani 2008). Environmentally friendly cultivation practices, such as maintenance of water throughout the growing cycle (Ibanez et al. 2010), winter flooding (Elphick and Oring 2003) and organic farming (Mesleard et al. 2005), as well as restoration of seasonally-flooded marshes (Mesleard et al. 1995), have been demonstrated to favour rice fauna in several countries throughout the world. As sustainability is widely considered an aim to be achieved in agriculture, authorities are worldwide recommended to develop management strategies that involve farmers in the improvement of biodiversity and the maintenance of ecosystem functioning.

1.2 IRFEN – the ECO-RICE project action

An action of the ECORICE Project has been targeted at international networking.

We tried to set up a network of EU stakeholders involved with rice farming in Natura 2000 areas, aiming at drafting an action plan where rice farmers could play a leading role in ensuring the conservation of the protected habitats and species. We called this network IRFEN: *International Rice-Fields Ecological Network*.

The key issues of this action have been:

- to define clear conservation objectives at the wider scale possible;
- to work with the best scientific evidence available;
- to learn from best management practice involving experts, and farmers amongst them, in design;
- to define regionally adapted measures

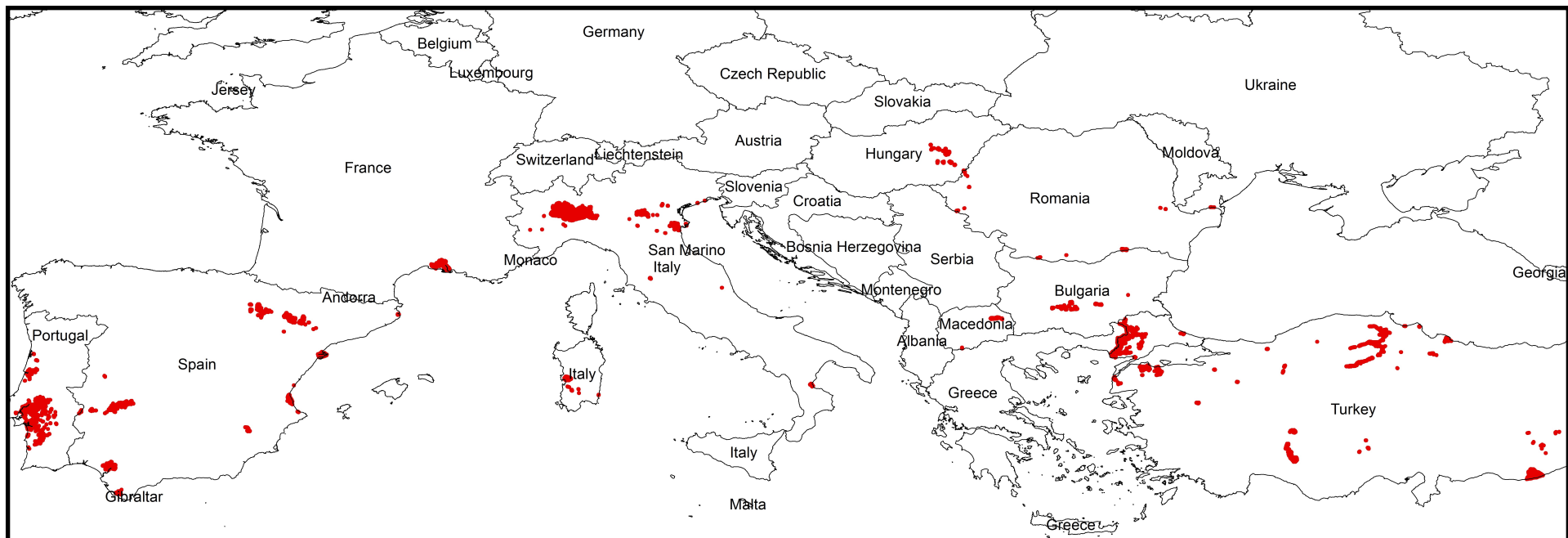


Figure 1. Distribution of Rice Fields in Europe

2. Methods

The specialized technical assistance needed for building up IRFEN Action was charged to the Department of Earth and Environmental Sciences (DSTA) of Pavia University. The Action started on November 2011 as a result of contacts and meetings held in Valencia during the last phase of EURICE project and developed thorough many steps which are chronologically described below:

2.1 - 1st International Workshop

Organization of an International Workshop on biodiversity conservation of rice-agroecosystem.

On February 23, 2012, Vercelli Province held a first workshop during which partners from Italy, Spain, Portugal, and Bulgaria shared their experience on rice-fields management of their own areas. Many local and regional stakeholders also participated.

The main topics proposed for discussion concerned water cycle management, treatment of rice antagonist, stubble management, agricultural landscape elements, canal and embankment management and exotic species management.

The methodology proposed for discussion was derived directly from the experience of a working team on local biodiversity in the Vercelli Plain area (Tavolo Tecnico Biodiversità della Pianura Vercellese nell'Ambito 24 del PPR Piemonte). This team gathers representatives from several local institutions devoted, to different degrees, to biodiversity conservation. The workshop aim consisted in identifying the main threats to local biodiversity and, then, ranking priorities with expected results and action to be taken in order to reach such results. All these subjects were presented in a matrix linking the issues and identifying clusters, with regard to priorities (Annex 1). As said, the focus was quite on the "local" level, so when we proposed the same matrix to the international audience, the result wasn't much what we would have expected. Given the significant difference existing between different geographical areas and socio-economic contexts, the debate showed that, at present, drafting of common international guidelines was hard to reach, because each country has its own criticalities, which differ among each other's (see Annex 2). Anyway, what we found is that every rice growing area in EU is hosting species of animals and or plants protected under the *Natura 2000* scheme.

Thus, there was room to work together to draw up a common action plan.

2.2 Workgroup setup

We asked a formal subscription to the working group by compiling an application form online.

Firstly, we tried to keep alive the contacts taken from EU-RICE project which led to the February 23 2012 meeting. Unfortunately, almost none of the EU-RICE partners answered our call (only Greece did), so we focused on gathering new partners who would be keen to join the network formally. The new partners involved were from Spain, France and Portugal, in addition to the Greek colleagues (Annex 3, 4).

2.3 Preparing a questionnaire

Revision of the information obtained in step 2.1 and preparation of a questionnaire in which partners involved in networking were asked to indicate management measures put in place in their rice-growing areas

Requested data regarded general information on SCI (data about Sites of Community Importance) and SPA (data about Special Protection Areas) and more specific data related to four topics, each one in a separate sheet: AGRI (data about rice farming); ENVI (data about environmental aspects management); RURAL (data about rural development); GOV (data about policies supporting biodiversity). Subjects subscribing to IRFEN were asked to fill data sheets (Annex 5) and attach all documents/references reckoned as valuable for the matter about their local situation with regard to:

- 1) Basic data regarding the relationship between rice farming and biodiversity (in particular Natura 2000 areas).
- 2) Main opportunities and synergies and best approach for the integration of rice farming and nature conservation within existing policy measures.
- 3) Challenges, difficulties and success factors: key issues to improve implementation of measures and their results.
- 4) Ways and means to improve cooperation between the farmers and the nature conservation community.

2.4 Elaboration of the Action plan

Data from questionnaire were analyzed (identifying common SWOTs) by the coordinator. In order to sketch the action plan we provided a proposal (scoping) to be discussed by all the participants during the 2nd international workshop organized by ECORICE team. Finally we elaborated and shared with all the partners a draft of the action plan.

On June 21, 2013, Vercelli Province hosted the second international workshop. During this meeting we showed to all the participants the results emerged from the questionnaire, highlighting shared contents and common actions. Then, each partners exposed a short presentation (some 15-20 min each) about a specific topic among the four identified topics (Annex 6): AGRI (data about rice farming); ENVI (data about environmental aspects management); RURAL (data about rural development); GOV (data about policies supporting biodiversity) following the below described “logic structure”:

- a) Criticalities (what are the major problems toward biodiversity as you and your institution perceive them?)
- b) Priorities (on the basis of your experience/study, could you rank the above criticalities according to a priority order, with regard to biodiversity enhancement/conservation?)
- c) Good Practice (By your knowledge are there any good practice that deals with the above problems?)

Each presentation was functional to keep the workshop within the framework adopted, so that the subsequent discussion could benefit from all the perspectives. The discussion followed the METAPLAN technique, a facilitation method initiated in Germany by Eberhard Schnelle (1978). This is a communication model in which opinions are developed, a common understanding is built and objectives recommendations and action plans are formulated to focus on a problem and its possible solution.

This method consisted in a collection of ideas regarding each of the four topic described above. All people in the group wrote down ideas, each idea on one card. Then all cards were collected, fixed on a pin board and grouped under categories. Under the guidance of Giuseppe Bogliani (Pavia University), we identified a possible path for future common action and everyone added their most specific competences (Annex 8).

3. A shared Action plan

The Annex 8 document contains information related to 4 main topics:

- 1) **Agriculture**: agricultural techniques biodiversity-friendly. Trends of rice cultivation areas and sustainable agricultural techniques.
- 2) **Scientific research**: the state of art of knowledge about biodiversity in rice paddies common habitat/species, percentage of rice paddies in N2000 areas, habitat/species depending on rice paddies management, biodiversity indicators, monitoring, habitat restoration techniques, threats and opportunities
- 3) **Rural Development**: the role of biodiversity in Rural Development Is biodiversity an added value for farms? Job opportunities. Conflicts & Synergies
- 4) **Governance**: Improve the design and management of agricultural policies related to biodiversity conservation in the rice agro-ecosystem good practices, financial support, well-tuned RDP

For each topic, the Action plan provides: 1) **Identification of shared Priorities**; 2) **Expected Results** with regard to Priorities and 3) **Actions** to achieve the expected results.

During the elaboration of the Action plan, a significant diversity existing among the countries emerged especially about the agricultural techniques adopted (Table 1) which should reflect, in some cases, different needs and priorities for maintaining high biodiversity values. However we found a strong agreement on what are the main threats and opportunity for rice field environment (table 2) and also the main conflicts and synergies for assuring a better rural development with respect to biodiversity (table 3). Given the importance that rice fields have as alternative habitats to natural wetlands, and owing to the role they play in the conservation of a large number of birds, the management of rice fields should incorporate a series of production methods and agricultural policies supported by scientific studies that works towards improving the environmental role of the rural rice landscape. For this reason an international Action Plan will incorporate the 4 main topics described above, that are shared by all the countries involved, and together move toward the aim of conserving rice-agroecosystem biodiversity in Europe.

Here we present a scheme of the Action Plan showing the main information extrapolated by the annex 8. The main information showed in the scheme are selected through hierarchical process in which each country assigned a score ranging from 1 to 3 for each priority, expected result and

action identified. We calculated the mean value for each topic and ordered them from the most important (3<score>2) to the medium (2=<score>1) and less important ones (1=<score>0), (from yellow to blue in the Annex 9 document). The action plan scheme shows only the main priorities.

Table 1. Agriculture: Rice agricultural techniques in five European countries

Country	Area of Interest	Prod. T/Ha	Sowing	Rotation	Kind of rotation
Portugal	Mondego Lowlands	6	Submersed	Small %	Rice-Corn
Spain	Delta del Ebro	6.5	Submersed	No	
Greece	Thessaloniki area	8	Submersed	Small %	Rice-Corn
France	Camargue	5.3	Submersed	Yes	Rice-Wheat
Italy	Pianura padana	6.5	Dry	Small %	Rice-Corn/Wheat

Table 2. Environment/Research. Common threats and opportunity

THREATS	OPPORTUNITIES
European agriculture policy	Enhance winter flooding
Globalization of rice market	Stop stubble burning
Herbicides and pesticides	Foraging and breeding sites
Exotic species	Added value of local production
Hunting pressure	
Water pollution and water management	

Table 3. Rural Development. Conflicts and Synergies

CONFLICT	SYNERGIES
Birds damages (flamingo, purple swamphen)	Improving commercialization of rice
Traditional stubble burning	Opportunity for organic rice farming
Old-farmer culture	
Water quality	
Hunting and unregulated tourism	

3.1 The Action Plan



Agriculture						
Priorities	Farming practices for biodiversity	Incentives for biodiversity		Marketing of environmental services		Farming inputs reduction/control
Expected Results	Biodiversity improvement	Farmer involvement, improving the awareness		Economic viability of farms		Efficiency improvement Impact reduction
Actions	International network	Awareness campaign	Training campaign	Policy coordination	Fund of AES	Best practices for biodiversity, application and training Quality controls
What we can do	Promotion of workshop activities	Awareness campaign	Training campaign	-	-	- -
What Other can do	Funds available for networking (i.e INTERREG)	-	-	Policy coordination	Funding of AES	Quality controls Best practices for biodiversity, application and training
What is necessary to know	Experiences from other situations. Pros and Cons.	How much farmers appreciate what has already been done	To know well the ecosystem services	-	-	- -

2

Rural development

	Sustainable tourism	Valorisation of local products & services	Farmers engagement	Public awareness		Efficient implementation
Priorities						
Expected Results	Tourism increase	Networking	Farmers' participation	Public awareness.	Policy participation	Policy efficacy.
Actions	Common marketing for sustainable tourism.	Network building.	Dissemination about funding	Information	knowledge sharing	Policy design
What we can do	Common marketing for sustainable tourism.	Network building.	Dissemination about funding	Information	knowledge sharing	-
What Other can do	Support of competent authority	-	-	-	-	-
What is necessary to know	-	-	-	-	-	-

3	Research			
Priorities	Identifying efficient & effective solutions (practices, environmental targets...) to adopt for farmers and environment	Improving monitoring protocols	Increasing the multi-sectorial, international cooperation	Understanding the relationship between biodiversity and ecosystem services
Expected Results	Evaluation of rice farming/ biodiversity relationship	Producing a draft protocol	Common projects	Goal oriented policies
Actions	Multi-sectorial applied research	Monitoring and information plans	Funding research networks International networking	Financing specific research and ecosystem services networks
What we can do	Multi-sectorial applied research	Monitoring and information plans	International networking	-
What Other can do	-	Feedback on policies	Funding research networks	Financing specific research and ecosystem services networks
What is necessary to know	The state of art	-	-	-

4

Governance

Priorities

Expected Results

Actions

What we can do

What Other can do

What is necessary to know

Improving coherence and effectiveness of measures, improving monitoring protocols

Availability of simple measures, effective and financially attractive.

Increased number of farmers involved

Local network

International network

Information, environmental education (INFEA)

Local network

International network (sharing)

Information, environmental education (INFEA)

All the stakeholders have to join the process

Feedback on policies

Map of strategic projects

Integration and Application Policies

Co-planning and sharing needs

Proposal of technical solution shared by farmers

Proposal of technical solution shared by farmers

Feedback on policies (funding)

-

4. Conclusions

After a long process that lasted three years, it has been possible to develop a European action plan for the management and the sustainable use of rice agro-ecosystems. The drafting of an action plan that was unique for all the European countries engaged in rice production has required a huge effort of participation by the Countries involved and a strong work of synthesis by the technical group responsible for drafting the action plan. The agronomic and cultural diversity between the countries was undoubtedly the biggest obstacle to overcome. Although these differences continue to persist, distinguishing between the individual countries, it was still possible to develop a plan containing important common goals. These goals will lead to a more conscious management of their own territory maintaining high biodiversity values.

We believe that there is room for future cooperative actions between “rice areas”, involving different stakeholders in the pursuit of EU added value. The next financial framework 2014-2020 could offer the chance implement the identified actions, widening the public of involved subjects.

5. References

- Bambaradeniya CNB, Edirisinghe JP, De Silva DN, Guanatilleke CVS, Ranawana KB, Wijekoon S (2004) Biodiversity associated with an irrigated rice agroecosystem in Sri Lanka. *Biodiversity and Conservation* 13: 1715-1753.
- Bogliani G (2008) Habitat risicolo e fauna. In: Angelini R, Ferrero A, Ponti I (Eds.), *Il riso*. Bayer CropScience, Ed. Script, Bologna, pp. 254-269.
- Czech HE, Parsons KC (2002) Agricultural wetlands and waterbirds: a review. *Waterbirds* 25 (Special publication 2): 56-65.
- Elphick CS, Oring LW (2003) Conservation implications of flooding rice fields on winter waterbird communities. *Agriculture, Ecosystems and Environment* 94: 17-29.
- FAOSTAT (2009) Food and Agriculture Organisation (FAO). FAOSTAT 2009. <http://apps.fao.org>, accessed 6 December 2011.
- Fasola M, Ruíz X (1996) The value of rice fields as substitutes for natural wetlands for waterbirds in the Mediterranean Region. *Colonial Waterbirds* 19 (Special publication 1): 122-128.
- Kadoya T, Suda S, Washitani I (2009) Dragonfly crisis in Japan: a likely consequence of recent agricultural habitat degradation. *Biological Conservation* 142: 1899-1905.
- Lourenco P, Piersma T (2008) Stopover ecology of Black-tailed Godwits *Limosa limosa limosa* in Portuguese rice fields: a guide on where to feed in winter. *Bird Study* 55: 194-202.
- Mesleard F, Grillas P, Tan Ham L (1995) Restoration of seasonally-flooded marshes in abandoned ricefields in the Camargue (southern France) - preliminary results on vegetation and use by ducks. *Ecological Engineering* 5: 95-106.
- Mesleard F, Garnero S, Beck N, Rosecchi E (2005) Uselessness and indirect negative effects of an insecticide on rice field invertebrates. *Comptes Rendus Biologies* 328: 955-962.
- Sanchez-Guzman JM, Moran R, Masero JA, Corbacho C, Costillo E, Villegas A, Santiago-

Quesada F (2007) Identifying new buffer areas for conserving waterbirds in the Mediterranean basin: the importance of the rice fields in Extremadura, Spain. *Biodiversity and Conservation* 16: 3333-3344.

Schnelle E (1978) "Neue Wege der Kommunikation. Spielregeln, Arbeitstechniken und Anwendungsfälle der Metaplan-Methode". *Veröffentlichungen der Stiftung Gesellschaft und Unternehmen* (Königstein/Ts.: Peter Hanstein Verlag). Heft 10

Stoate, C, Boatman, N D, Borralho, R J, Carvalho, C R, G.R., d S and Eden, P (2001) Ecological impacts of arable intensification in Europe. *Journal of Environmental Management*, No 63, (4) pp337-365.

6. Annexes

Annex 1. Matrix of topics concerning rice agro-ecosystem management and biodiversity conservation

Annex 2. List of countries criticalities concerning rice agro-ecosystem management and biodiversity conservation

Annex 3. Application form

Annex 4. List of the international stakeholder involved

Annex 5. Questionnaire

Annex 6. List of Partner presentations

Annex 7. Partner presentations

Annex 8. Full Action plan matrix

Annex 9. Action Plan revision process