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FINAL REPORT

Completion of the activities planned under Action B9

***Identification of economic - legal - administrative compensation
methods for farmland to be used for hydraulic - environmental purposes***

(in compliance with DGR n. 2110 of 10/14/2015 - Objective H - Activity no. 3)

September 2016

STRUCTURE OF THE REPORT

The object of the assignment referred to the "Support for the identification of economic - legal - administrative compensation methods for farmland adjacent to the identified streams (Rio Enzola, Rio Lavezza) for hydraulic - environmental purposes".

More precisely, the articulation of the work included a valuation of the compensation to be paid in case of floodplain easements for some areas concerned by the research project, resulting from the analysis and identification by the Emilia-Romagna Region. The valuation was based on the application of the methodology identified within the study on the "theoretical and methodological model for the calculation of compensation for floodplain easements". Some site inspections were carried out along the streams and in the municipalities included in the study in order to check whether floodplain easement was the best solution, or whether other compensation formulas could be found to cover the damages suffered by these areas deriving from periodic flooding.

The model and the formula used for calculating allowances for floodplain easements as well as the parameters introduced in the calculation were illustrated during a series of meetings held in the sites concerned by the project. This project phase should be further analyzed to get a deeper insight of the floodplain easement contents. In addition, each evaluation is affected by the particular circumstances of the case study. Hence, it has been emphasized that the compensation evaluation should be then supplemented by further appropriate addition/deduction values and any arising damages.

The report is structured as follows: the first part provides a brief general overview of the key property valuation standards used in the study, i.e. the expropriations and easements of land by a competent authority for a public purpose. In particular, it outlines the criteria for calculating the compensation payable to the land owner who suffers the loss of one of two property rights related to these instruments as well as changes in the legislation on the matter. It is indeed essential to clarify the value to be used in the formula for the calculation of the compensation and this was possible only thanks to a thorough study of the legislation in force.

The second part deals with floodplain easements and, more specifically, it describes the formula designed for the calculation of the allowance. With regard to it, reference is made to a few legislative provisions drafted by the Veneto and Tuscany Regions. Further detailed information is provided on the formula operation and on the implementation framework.

The third central part of the report provides an overview of the estimated compensation for floodplain easements due to the landlords of two plots of land concerned by the project.

In addition, it examines the possibility to participate in implementation calls for proposals launched by the department for Regional Development Plans (RDP), by identifying specific measures likely to enhance the desirability of negotiating partnerships between public and private partners to implement floodplain easements by farmers or other suggestions taking into account the guidelines.

The contents of this report are the sole property of the Emilia-Romagna Region.

INTRODUCTION

This study has been carried out in the framework of the LIFE RII Project, approved by the European Commission and co-financed by it within the LIFE+ Environment fund, i.e. a financial instrument funded by the EC to support environmental and natural redevelopment projects (LIFE11 ENV / IT / 000243 - LIFE RII Project). The project is geographically developed in the foothills of the Reggio Apennines, an area characterized by a high infrastructure and urbanization density (including both residential and industrial facilities), which might result in a high flood risk. The Municipalities concerned are: Albinea, Bibbiano, Quattro Castella, San Polo d'Enza (all of them located in the province of Reggio Emilia). The Consorzio di Bonifica dell'Emilia Centrale (Central Emilia Reclamation Consortium) is one of the project partners.

For the purpose of efficiency targets three groups of activities have been defined, of which one, i.e. the third one, deals with the identification of economic - legal - administrative compensation methods for farmland to be used for hydraulic - environmental purposes", as part of the *B9 project action*. This task was assigned to the Department of Agricultural Sciences of the University of Bologna.

The study started from a preliminary consideration related to the need for the Emilia-Romagna region, just like the entire Italian territory, to be secured, in order to prevent damage caused by extreme events such as heavy rainfall concentrated over short periods of time. To prevent hydraulic risks, several excess water containment measures can be implemented, such as overflow basins, flood expansion fields, or alternatively flood lamination reservoirs.

The building of embankments and artifacts allowing for the temporary retention of water in excess, with not always perfectly foreseeable frequent floods, requires available space for the development of permanent artefacts (embankments). In areas corresponding to sediments, embankments, balancing tanks and riverbeds, works stability and maintenance may require permanent land acquisition, through expropriation procedures for the public interest. In the reservoir section, however, flooding causes a number of constraints to property rights to and pursuit of business, as well as damage to present and future farming activities. The identified land can still maintain its function, although with use limitations due to possible flood hazards and agricultural production damage. In this case, compensation must be calculated in relation to possible limitations or other damage caused to assets, by applying a specifically designed valuation formula, in the framework of this project on floodplain easements.

A FEW KEY VALUATION CONCEPTS: EASEMENTS AND EXPROPRIATIONS FOR PUBLIC USE

The appropriate definition of easement is provided by the Italian Civil Code (art. 1027 to 1099) and by a few special laws.

Article 1027 of the Civil Code states that "predial servitude or easement is the charge imposed upon an estate for the benefit of another estate belonging to a different proprietor". Legally, easements are therefore identified as rights of use of another person's real estate", in which the use and utility of the object is for the benefit of the estate" (Polelli, 1997).

The piece of land burdened with the servitude is called *servient estate* ("praedium serviens") whereas the estate enjoying the benefit of the easement is called the *dominant estate* ("praedium dominium").

Servitudes can be classified in different ways, depending on the aspect that is taken into consideration (cf. Civil Code). If servitudes are regulated by law, the parameters to be used for the definition of the compensation are laid down by law.

Servitudes regulated by the Civil Code are:

- Rights pertaining to artificial waterways
- Storm drain or storm water easement
- Water supply utility easement
- Right of way.

An important distinction is that relating to the duration of servitude or easement: it is called "temporary" when its duration is less than nine years, or "permanent" if it is longer. This aspect is crucial for the final calculation of the compensation payable to the owner of the estate burdened with the servitude.

It is important that at the basis of the establishment of a right of servitude there is the actual need of the dominant estate, which justifies the establishment of servitude. The place of servitude can be moved in relation to the demands by both the dominant and servient estate owners, provided that these changes do not result into any damage or injury for the other estate.

By law, the piece of land or the building burdened with servitude must remain the property of the servient estate owner. No cadastral registration operations are required. The owner is therefore obliged to continue to pay all property taxes and this aspect is duly taken into consideration for the calculation of the easement compensation.

Property valuation standards allow to define the value of the real estate encumbered with servitude, namely the compensation due by the dominant estate owner to the servient estate

owner for the enjoyment of the good. In cases of voluntary servitude, the compensation is agreed upon between the parties through the establishment of a deed. Whereas, in the event of legal curtailment of ownership, when not regulated by law, it may be necessary to apply the basic property valuation standards, always keeping in mind that the legislation stipulates that statutory enforced servitude "must take into account the extant conditions, so as to cause as little damage as possible to the servient estate" (Michieli, 2002).

Expenses related to the easement allowance to be granted to the servient estate are always charged to the dominant estate owner. In the event of the easement termination, the latter shall be obliged to restore the area and return it to the servient estate owner in the conditions prior to the enforced servitude.

The dominant estate obligations are subject to some specific items of expenditure concerning:

- The establishment of servitude (in addition to the registration obligation as well as the payment of the resulting tax);
- Compensation for direct and indirect damages caused by the easement enforcement;
- Restoration of the servient estate.

As for the duration, it should be noted that if the easement is temporary, that is with a duration less than nine years, the compensation is defined as half of the permanent easement, excluding the direct damages that must always be fully compensated separately. The transition from temporary to permanent servitude before the expiry of the nine years' deadline implies that the dominant estate owner should pay an allowance covering the other half to the servient estate, plus the statutory interest accrued since the beginning of servitude. If, however, the easement extends beyond the set deadline without a new agreement, the dominant estate must pay the entire compensation as if the temporary servitude had never been in place.

The extinction of a permanent easement requires the servient estate owner to return the allowance, taking into account the reduction due to temporary easement. In this circumstance, accrued interest on compensation is not included.

According to the bibliographical sources that have been consulted, the easement compensation calculation formula can be expressed in this way:

Compensation = value of the burdened piece of land + related capitalized annual taxes + damages if any

The expropriation value turns out to be the reference value for determining the compensation of flood easements (cf. subsequent regional laws referred to). This is the reason why this issue is discussed here (albeit concisely). In fact, it is precisely the legislation on expropriation for public use which defines the agricultural value attributable to the estate to be expropriated, or to use as the basis for compensation calculation.

According to the basic concepts, introduced by the Ministry of Finance, the *agricultural value* is defined as "the market value considered apart from any capital gain not attributable to the use of the area for agricultural purposes. The agricultural value is identified as a result as *the most probable market price in a free purchase negotiation area* only in cases where the market is not affected, directly or indirectly, by the influence of the above gains ".

The Average Agricultural Value System, introduced by Law 865/1971, is no longer in force. For many years it was the sole reference for the assignment of value to an estate to be expropriated or burdened with servitude. Several initiatives by a whole set of entities were undertaken (European Convention for the Protection of Human Rights and Fundamental Freedoms (ECHR), the Italian Constitutional Court, FAO and so on) which fostered the transition from the Average Agricultural Value System to market value. Market value is defined as "the estimated amount for which a property should exchange on the date of valuation between a willing buyer and a willing seller in an arm's-length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently, and without compulsion" (*International Valuation Standards Council, IVSC*).

The Average Agricultural Value System remains however in force for the calculation of fringe benefits as provided for by Article 37, paragraph 9 for building areas, art. 40, paragraph 4, and art. 42 of Presidential Decree (DPR), for non-building areas. In fact, for all the individuals actively working within the holding, such as the farmer, the agricultural entrepreneur, the sharecropper and the tenant farmer, the additional benefit is a "compensation" for loss of profit, resulting from the sale of the property. For this reason, some Average Agricultural Values envisaged by the Consolidated Law still apply, because they are not used to quantify the value of the property, but simply as a compensation. Non-farming landowners are not entitled to this compensation. They are not entitled to any additional compensation in the event of voluntary transfer. The compensation must be proportional to the actual agricultural value, plus any topsoil (artifacts, crops, etc.), excluding all surcharges provided for by art. 45 (Confagricoltura, 2014).

The basic legislative act at national level in this area was the Consolidated Law regulating issues of expropriation for public use (T.U.E.), issued by Presidential Decree n. 327, date 8 June 2001 (entered into force on June 30, 2003) and subsequent amendments and corrective and supplementary provisions.

According to T.U.E., various compensation valuation criteria can be envisaged depending on the type of the reference area. In particular, areas can be classified as:

1. Building areas
2. Built areas
3. Non-building farmland,
4. Non-building non-farmed areas

Further differentiations in the calculation of the compensation derive from the expropriation types:

- a) provisional compensation,
- b) compensation for voluntary asset disposal
- c) final compensation amount.

Without dwelling further on this matter, suffices it to stress that the final compensation amount due to the owner of unbuilt but farmed land is "determined based on the agricultural value criteria, taking into account the crops actually grown in the farmland and the value of legitimately manufactured buildings, also in relation to exercising an agricultural activity, without assessing the possible or actual use different from an agricultural activity."(paragraph 1, art.40).

It is also specified that (paragraph 4) the property owner and farmer or agricultural entrepreneur is entitled to an additional allowance equal to the Average Agricultural Value of the actually grown crop. Tenant farmers, sharecroppers and stakeholders are also entitled to a legal compensation as a result of the expropriation procedure, whereby they are forced to drop their activities (art. 42).

Matters related to the compensation due for the imposition of the easement are regulated by T.U.E., Article 44, without a specific reference to the criterion to be used to quantify the compensation provided for. In this regard, the compensation shall be calculated by a valuator, unless servitudes are directly regulated by the Civil Code or by special laws.

Article 44, paragraph 1 provides that: "the owner of the agricultural holding is entitled to a compensation if the estate is burdened by an easement or affected by a permanent value reduction for the loss or restrained ownership right deriving from the execution of a public work or public utility work". Paragraph 1 identifies two situations: the first one relating to the easement allowance, which is due in the expropriation procedure established by a decree of disclaimer or divestment

(deed of easement) which constitutes an indispensable condition; and the second one, however, states that by the execution of a public work, the owner can suffer impairment, decrease, or loss of one or more rights inherent to his/her dominical rights, thus receiving a permanent injury (Barila, 2013).

Given the fact that the expropriation compensation is commensurate to the market value, even in the payment of the amounts provided for by art. 44 of T.U.E., reference should be made to that criterion, resulting into the evaluation of the difference between the market value of the property affected by the execution of the public work before, and after, the execution of the public work or imposition of the easement.

This concept is linked to the well-known valuation criterion known as **complementary value** of the property that is determined "only by calculating the difference between the market value of the property as a whole and that of the remaining separate portion, which is separately saleable" (Michieli, 2002).

The value loss of the asset burdened with easement is therefore determined by calculating the difference between the previous and subsequent market value of the property.

Especially in case of partial expropriation, even though this concept may apply to the subject of interest, such considerations are supported by bibliographic sources and by case law¹.

It should be emphasized that these statements are to be considered in the selection phase of the area to be burdened with easement, in order to avoid problems related to excessive compensation calculation due to value loss.

The effects caused by easement or by a partial expropriation could adversely impact the production costs of the remainder of the estate, through, for example, longer working time, higher costs for the movement of machinery and personnel, disruption of plots preventing the continuity of crops (such as orchards), or the need, on the part of the farmer, to change agricultural work system because of the occurrence of problems due to several causes.

It is therefore advisable to apply the easement deed on the whole farmland, preventing the area from being cut through or intersected by the easement, because this would lead to higher costs for the dominant estate.

¹ "...the settlement of the compensation is commensurate to the difference between the fair value of the property before the expropriation and the fair price of the remaining portion after the expropriation itself. It has a general scope and nature, and thus applies also to the expropriation of (both agricultural and building) areas, for which different laws set forth compensation criteria that are completely or partially independent from the market value of the property. " Civil Court of Cassation, Section I, 09.12.1998, No. 12386; see also judgments of the Civil Court of Cassation No. 15288/2000, No. 7663/1997, No. 12082/1995, No. 9686/1995, No. 7566/1993, No. 2133/1992 (E. Marone, 2008)".

FLOODPLAIN EASEMENT

SOURCES FOR THE CALCULATION OF THE LAND EASEMENT COMPENSATION FORMULA

At present, floodplain easement is not ruled by any national law. Yet, reference is made to two key regional laws on the matter.

Regional Law 67/2003 of the **Tuscany Region** (Civil protection regional system and regulation of its related activities) has regulated the compensation regime for the construction of retention basins. Details are reported in other documents. Here, the formula adopted for calculation of the compensation is examined.

Article 31, paragraph 3:

"3. Owners of areas referred to under paragraph 1 shall be entitled to a compensation amounting to not less than one-third and not more than two-thirds of the indemnity payable for the same area in accordance with current legislation on property expropriation rights and in compliance with the criteria specified therein. (...)".

Hence, by this particular arrangement, the land easement compensation value is commensurate with the expropriation value and shall range between 1/3 and 2/3 of the same.

By way of example, an application case is reported here below concerning the findings derived from the legislation in the document "Works designed to reduce the flood risk in the territory of the municipality of Arezzo - Castro Stream detention basin - Cognaia Area" dated 2012.

The formula applied to the land easement compensation calculation is defined as follows:

$$V_{ci} = \frac{1}{3} V_{ei} + A * \frac{1}{3} V_{ei}$$

Where:

V_{ci} = Compensation Value to be paid

V_{ei} = Expropriation Value

The term V_{ei} refers to a comprehensive value that takes into account not only the value of the land, but also the type of agreement between the parties, whether amicable or not, the presence of any leases, the role of the owner and the crop grown in the farmland at the time of the calculation.

It is therefore a complete reference value, designed according to statutory criteria (T.U.E).

The "A" parameter identifies a coefficient obtained from the result of three environmental parameters, which identify:

a₁: the flood return time function

a₂: the flood water head

a₃: the flood duration

"A" can take into account values between 0 and 1, according to the scales assigned within the different technical documents consulted. In this way, it contributes to determine a part of the total compensation amount. In case one of the three environmental parameters were to be considered null, the second part of the compensation formula ($A \cdot 1/3$ expropriation value) would be equal to zero, bringing back, in this way, the final amount of compensation for the establishment of the easement to $1/3$ of that payable in the event of expropriation.

The Tuscany regional law thus recognizes a minimum compensation amount due for floodplain easement equal to $1/3$ of the expropriation value.

The document issued by the Civil Engineering Technical Office, Wide Metropolitan Area of Florence, Prato, Pistoia and Arezzo, of the Tuscany region, related to the final draft of the "Renai detention basin in the Municipality of Signa", in August of 2013, provides a deeper insight of further relevant aspects related to this project.

In the case of areas involved in an occasional water storage and draw-off processes (areas prone to flooding easement) land can maintain its current intended use; owners are in full possession of the land, even though some "curtailment of the right of ownership and operation, as well as damage to future crops" may arise and must be taken into account. Therefore, the compensation amounts due to land owners must be quantified according to the curtailment of their property right, related to "the damage arising from the restriction imposed on the real estate and the lack of production".

Article 3 of **Law 20/2007 of the Veneto Region** (Provisions for reorganization and simplification of rules and regulations - related to the Finance Act 2006 with regard to soil protection, public works and environment), paragraph 3, states that pursuant to this paragraph "the owners of the areas subject to the establishment of an easement, shall be entitled to receive a certain compensation whose amount shall not exceed two-thirds of the compensation calculated for the same area pursuant to the legislation on expropriation (...)", thus identifying, as in the case of the Tuscany

Region, a maximum compensation threshold equal to 2/3 of the expropriation value, but without mentioning any minimum easement compensation threshold.

In this regard, Annex A1 of **Regional Council Decree DGR n. 2373 of December 29, 2011** (Evaluation criteria for flooding easement), provides a detailed description of the floodplain easement compensation calculation methodology.

The compensation payable in case of floodplain easement must take into account:

- The curtailment imposed on the use of the property, and therefore the possible and consequent loss of value
- Damage caused to crops.

The total compensation value can be summarized in the formula:

$$I = I_v + I_d$$

Where:

I_v = compensation related to the diminution in value of the property;

I_d = compensation resulting from the loss of production of the property.

Different forms of compensation are also envisaged according to the reference subject. As a matter of fact, any damage caused to the property, such as the loss of value of the property, shall be paid to the owner, while the damage linked to production shall be paid to the estate manager (be it the agricultural entrepreneur, the farmer, or the tenant, etc.); in this case the two subjects do not coincide.

As for the loss of value of the asset, a base value accounting for 40% of the land value of the property is set forth in the Annex, provided that no are other curtailment impairs the use of the estate (eg. hydraulic constraints and the impossibility of spreading liquid manure onto the soil, even though the main constraint is the "loss of the building potential of the estate").

No change is envisaged in the compensation related to these factors in relation to the circumstances characterizing land use, such as land flood frequency, or duration, or the water level height.

The compensation calculation formula related to the economic loss in the property's value is therefore as follows:

$$IV = \sum \frac{VM}{(AVERAGE VALUE) * 100} * Ci * CI$$

Where:

VM (AVERAGE VALUE) = market value of the property

Ci = correction coefficient taking into account hydraulic constraints (with values ranging between 0.1 and 1)

CI = corrective coefficient taking into account manure spreading constraints (with values ranging between 1 and 1.05)

In addition to the diminished market value of the property, the formula takes into account the damage caused by flooding events to the production and business of the estate.

With regard to damage to crops, the formula takes also into account all factors that combine to determine the loss of production, such as frequency of flooding events and the persistence of water stagnation.

The formula used for calculating the damage to production proposed by the Veneto Region is as follows:

$$MP = \sum RLS * \frac{PP}{100} * IES * Cp$$

Where:

MP /PL = Production loss due to damage to crops;

RLS/SGM = Standard Gross Margin² of the crop category, calculated as a "weighted average of the typical income deriving from the different crops belonging to that category".

² The Total Standard Gross Margin (SGM /RLS) shall mean the balance between the standard value of production and the standard value of certain specific costs; this balance shall be determined for the various crop and livestock characteristics within each region (Decision of the Commission of the European Communities (85/377)).

PP = loss of production due to flooding, calculated according to the damage suffered by crops due to a prolonged water stagnation. The value is measured in percentage terms.

IES = annual impact of the flooding event, calculated on an annual basis using the ratio 1 / a return time of the event.

Cp = Hydraulic Hazard Coefficient, which takes account of any constraints present (values between 0.1 and 1).

To complete the calculation of compensation, the Veneto Region has added an additional calculation parameter: preventing access to the holding, due to limited farming activities thus resulting into a loss in the farmer's income.

For the calculation of this parameter reference is made to the Standard Gross Margins (SGM) of crops present in relation to the annual working days (280 days). Its result is then multiplied by the annual impact of flooding events and an unavailability coefficient based on the type of soil (with a light, medium, heavy texture), as reported in the formula:

$$lif = \frac{RLS}{280} * NS * Ci$$

Where:

lif = Compensation for the unavailability of the holding;

RLS = Standard gross margin per average cultivated hectare;

280 = Annual working days;

Ns = Annual number of flooding events;

The total value to be paid for the flooding easement, pursuant to Annex A1 of the Decision of the Regional Council DGR n. 2373 of December 29, 2011, therefore results from the sum of the two above-mentioned factors: compensation for loss of value of the property and compensation for the damage to the soil and crops determined on an annual basis.

To define the overall compensation due, it is necessary to capitalize the value by including the known mathematical financial ratios in the formula.

Ultimately, the total compensation can be calculated as follows:

$$\overbrace{\sum VM * \frac{40}{100} * Ci * Ci}^{I_v} + \overbrace{\left[\sum RLS * \frac{PP}{100} * IES * C_p + \frac{RLS}{280} * NS * Ci \right]}^{MP} \overbrace{\frac{q}{r}}^{I_{if}}$$

Where:

I_v = compensation for the loss of value of the property;

MP = Production loss due to damage to crops;

Iif = compensation for the unavailability of the holding.

r = Interest rate 1%;

q = Unit amount $(1 + r)$.

In order to clarify the application of the formula and the calculation of the compensation value, reference is made to Annex A1 of the Decision of the Regional Council DGR n. 2373 of December 29, 2011, (Evaluation criteria related to flooding easement): "In accordance with the Regional Law LR n. 20, of 16 August 2007, the total compensation amount (**Iv + Id**) must not exceed two-thirds of land expropriation compensation calculated for the same area pursuant to legislation on expropriation.

THEORETICAL METHODOLOGICAL MODEL FOR THE CALCULATION OF FLOODPLAIN EASEMENT COMPENSATION

The floodplain easement compensation calculation formula primarily refers to the aforementioned regional laws issued by the Veneto and Tuscany Regions, as well as to the basic economic valuation theories applying to easements and expropriations of land for a public purpose by competent authorities.

The first issue to be addressed is the relationship between compensation payable in the event of floodplain easement and that calculated under a compulsory expropriation order.

Specific laws provide a reference framework for the compensation payable in case of easement of land within a range of values between 1/3 of the allowance payable in the event of expropriation. In the case of the Tuscany region values range between 2/3 thereof. Whereas, the Veneto region establishes a minimum compensation amount accounting for 40% of the market value of the land, intended as a depreciation in the actual value with an encumbrance on the property.

These standards are the only reference values available and they seem to guarantee land owners and farmers a minimum compensation for the establishment of encumbrance on the property and protect public authorities from excessive charges. The easement compensation cost cannot be higher or close to the amount due in the event of expropriation, since it would impair its convenience.

Floodplain easements are linked to the frequency of events that may be characterized by very long return times and also deferred in time. Hence, the servient estate is not always flooded and can be regularly used to grow the usual crops. Furthermore, the flood frequency calculation may not be accurate since by its very nature it is characterized by the unpredictability of weather events. This unique feature gives way to a lot of discussion on how to actually quantify damages, costs to be incurred into and computed to calculate the compensation amount, the land to be burdened with floodplain easement and all financial benefits arising from easement, if any.

All these aspects, appropriately valued, must be taken into account when calculating the allowance due in the event of easement and to determine the compensation value range (1/3 - 2/3 of compensation for expropriation).

The compensation calculation formula takes into account the above-mentioned aspects, which are summarized and included in a single parameter called integral coefficient.

Figure 1: Schematic overview of the floodplain easement compensation calculation formula

$$\text{INDENNIZZO} = \frac{1}{3} V_{\text{esp}} \xleftrightarrow{\text{COEFFICIENTE INTEGRATIVO}} \frac{2}{3} V_{\text{esp}}$$

The integral coefficient (AGRO) is therefore a parameter of a variable nature, linked to the alleged damage caused to regular farming activities performed by the farmer in the servient estate. Reference is made to alleged damage since the easement value must be paid to the servient estate owner upon the establishment of the easement, considering the actual conditions of the holding at the time of valuation.

The reference expropriation value, for the setting of the minimum and maximum threshold of the easement allowance, can be calculated based on the provisions set forth by the Consolidated Law regulating issues of expropriation for public use (T.U.E.). A comprehensive value is obtained, taking into account the type of subject (owner, tenant, etc.) and type of compensation (provisional, final or voluntary transfer of rights), taking into account the characteristics of the estate (land value, topsoil, etc. ...) that influence its market value.

The AGRO integral coefficient includes taxes, damages arising from the construction of artifacts and works for the utility of the dominant estate, damage to agricultural production and any additions / deductions, depending on each individual case. In the case of floodplain easements, tenants or owners of servient estate are not prevented from farming their land and it is up to them to carry on their business activities. Therefore, despite the encumbrance on the property, no final subtraction of the leasehold estate occurs. Therefore, the owner will continue to pay contributions on the leasehold estate and will not be reimbursed for these expenses, because the land use is not undermined.

"Agricultural damages" are the real loss caused to production by the periodic flooding of the area.

In the proposed model, the Gross Operating Margin (ML)³ is the reference value chosen for measuring the income generated from agriculture, whose data pertaining to the main crops can be readily found in the Farm Accountancy Data Network (FADN). Damages to crops shall occur only in those years when the farmland is flooded, as set forth upon the establishment of the easement contract, based on the appropriate forward-looking assessments.

³ A company's earnings before interest, taxes, depreciation, and amortization (commonly abbreviated EBITDA) is calculated by subtracting the cost of labour from added value. The Gross operating surplus is the surplus generated by operating activities after the labour factor input has been recompensed (Source: FADN).

In the formula, this aspect is the introduction of the financial mathematical formula related to periodic income capitalization ($1/q^n-1$). This gives:

$$\text{Damage to crops} = \text{ML} * \frac{1}{q^n-1}$$

It has been estimated that damages to the normal management of the servient estate do not only derive from the lack of production, but a compensation must also be considered for the period during which the estate is unavailable. The latter is not strictly related to the production loss (damage to crops due to periodical flooding may occur but only in cases where the event is prolonged over a period of time and will be considered as a special case), but rather tied to the constraints arising from the presence of water flooding the land which limit owners' and farmers' activities. Taking as main reference the provision set forth by Annex A1 to Dgr n. 2373 of 29 December 2011 of the Veneto Region, the following formula is suggested for calculating the compensation due for the unavailability of the estate:

$$\text{Estate Unavailability Coefficient} = \frac{\text{ML}}{280} * \text{Days of non-use of the land} * \frac{\text{Estate Unavailability Coefficient}}{q^n-1}$$

In conclusion, the complete model provides that compensation for floodplain easements can be calculated by means of the following formula, with the necessary adjustments as appropriate:

$$\frac{1}{3} V_{\text{esp}} + \frac{Tr}{r} + \text{DANNI opere} + \text{DANNI agricoli} +/- \text{Aggiunte e Detrazioni} \leq \frac{2}{3} V_{\text{esp}}$$

APPLICATION OF THE FORMULA TO THE EMILIA-ROMAGNA AREAS

This calculation model highlights some of the main economic aspects to be taken into account when selecting land subject to easement. The identification of suitable land certainly requires technical considerations, but the economic feasibility must also be accounted for, in order to achieve the best cost-effective technical solution.

When selecting land subject to easement, the proper ratio between the crop in place and flooding frequency should be considered. In fact, in case of frequent events (with a frequency higher than 2 years), land cultivated with low income crops should be identified, whereas, in case of less frequent flooding events, the choice of land subject to easement could be broader.

Potential damage, with high flooding frequency and medium / high income crops would result into a non economically viable solution. Hence, the need to identify a different land subject to easement or, alternatively, to proceed with the compulsory purchase of land.

Three application cases have been identified for which a compensation has been calculated in the event of floodplain easement. They refer to agricultural land located in the province of Reggio Emilia, in particular within the municipalities of Quattro Castella, Bibbiano and San Polo d'Enza. For each case a detailed spreadsheet is reported and attached herewith (Annex 1).

In order to complete the following estimates, site inspections were carried out by the Emilia-Romagna Region officials and the calculation formula and its contents were made available to the parties concerned.

A spreadsheet was drafted containing all the data, variables and calculations, related to the different selected areas. An editable and scalable spreadsheet was processed, according to the client's needs. The calculation formula may be extended to all cases of floodplain easement applicable to all concerned areas.

The Provincial average agricultural land values that have been taken into account refer to the values calculated on an annual basis, by 31 January, by the Provincial Expropriations Commission within individual agricultural regions, with reference to the values of land free from any agricultural leases or constraints, by type of actual crop, and recorded in the previous year. INEA⁴ Values refer to the (minimum, average and maximum) land value database by crop type, region, province and altitude and annual RICA⁵ data of each individual crop, which are therefore subject to continuous updating.

All the three cases shall be examined in the following order: geolocation, spatial framework and parcel characteristics of the area under question; definition of the expropriation value for the

⁴ INEA (National Agricultural Economic Institute)

⁵ Farm Accountancy Data Network

calculation of the reference threshold values ($1/3 V_e$ and $2/3 V_e$); definition of the floodplain easement compensation value, thus leading to five alternative easement duration assumptions. In fact, as previously reported, the amount varies substantially in the event of a permanent floodplain easement or temporary one (lasting less than nine years, accounting for half the compensation value). Similarly, the possible flooding frequencies and floodplain easement duration assumptions have been used as reference:

1. annual flooding frequency in the event of a temporary floodplain easement lasting less than nine years;
2. annual flooding frequency in the event of a permanent floodplain easement;
3. 5-year flooding frequency in the event of a permanent floodplain easement;
4. 10-year flooding frequency in the event of a permanent floodplain easement.

Given the hydro-geological and climate characteristics of the areas in question, the twenty-year flooding frequency was excluded.

The floodplain easement value has been calculated based on the above assumptions and on the specially designed formula. The variables required for its operation have also been taken into account and the most cost-effective choice has been estimated depending on the situation.

For all crops, the gross margin values were drawn from the 2015 RICA database, while the INEA database was used to calculate land values for the same year.

Having no other details, the compensation amount was calculated based on the expropriation value referred to the case of a farmer and owner of the land in question.

Further details can be found in the case study sheets.

Case Study 1: QUATTRO CASTELLA

Spatial information

REGION	Emilia-Romagna
PROVINCE	REGGIO EMILIA
MUNICIPALITY	H122 (Quattro Castella)
AGRICULTURAL AREA	Agricultural Area 3A
ALTITUDE AREA	Plain
SHEET	10;21
LAND LOT	196-197;313-55
TOTAL ANALYZED SURFACE	1,2364 ha

Characteristics of the area

INTENDED USE	Area not suitable for building, to be used for farming
CROP CATEGORY	Arable-horticultural crops
CROP CLASS	Irrigated arable crop
MAIN CROP	common wheat
SOIL TYPE	medium texture

The expropriation value of 1 hectare of land in the area under question was calculated and it was then applied to the surface of the plots under consideration; this value amounted to € 87,650.59 (sheet 1.1 of Annex 1).

By Agro-wheat we mean the AGRO variable coefficient calculated in the case of an Irrigated arable crop as crop class, in particular taking wheat as economic reference (sheet 1.1 of Annex 1). The value of this coefficient, differentiated on the basis of the flooding cycle and then adjusted to the easement duration, supplements the minimum compensation value equal to 1/3 of V_m (average value) calculated in the event of an expropriation. The compensation value was calculated for 1 ha of land, and then applied to the actual size of the area concerned.

In conclusion, the floodplain easement compensation value ranged between €29,216.86 and €58,433.73.

In the event of annual flooding frequency, the permanent easement is unsuitable since the compensation value exceeds the threshold value equal to $2/3 V_e$. In this case, it would be necessary to take other solutions into account (eminent domain, temporary easements pending restoration work, identification of a different area, ...) (sheet 1.3 of Annex 1). In case of temporary easement it should be noted that the compensation that has been calculated is lower than the threshold set equal to $1/3$ of the calculated value for the expropriation and therefore the latter value should be paid to the remainder.

In cases of permanent easements with 5 to 10 years expected flooding frequency, the option that best reflects the flooding area characteristics should be analyzed, since they are all below the maximum convenience threshold equal to $2/3$ of the expropriation value (Sheet 1.4 of Annex 1).

Case Study 2: BIBBIANO

Spatial information

REGION	Emilia-Romagna
PROVINCE	REGGIO EMILIA
MUNICIPALITY	A850 (Bibbiano)
AGRICULTURAL AREA	Agricultural Area 5
ALTITUDE AREA	Plain
SHEET	26
LAND LOT	265
TOTAL ANALYZED SURFACE	1,6238 ha

Characteristics of the area

INTENDED USE	Area not suitable for building, to be used for farming
CROP CATEGORY	Arable-horticultural crops
CROP CLASS	Irrigated arable crop
MAIN CROP	Common wheat
SOIL TYPE	Medium texture

The expropriation value for the area under question amounted to € 97,493.75 (Sheet 2.2 of Annex 1). Compared to the previous case, in fact, the irrigated arable land in this region feature a decidedly higher average agricultural land value (VAM).

Since these particles are characterized by the same crop type as the previous ones, the AGRO variable coefficient was calculated for an irrigated arable crop as a crop class, in particular for common wheat (Sheet 2.1 of Annex 1).

The floodplain easement compensation value ranges between € 52,770.12 and € 105,540.23.

In the event of annual flooding frequency, permanent easement is not always cost-effective, since the compensation value is higher than the threshold of $\frac{2}{3} V_e$ and, in the case, it would be necessary to opt for other solutions (eminent domain, temporary easements pending recovery work, selection of a different area, ...) (Sheet 2.3 of Annex 1).

The temporary easement compensation should cover at least the minimum value of $\frac{1}{3}$ of the expropriation value since the one resulting from the formula is below this threshold.

In cases of permanent easements with expected flooding frequency of 5 to 10 years, it is necessary to evaluating the option that best reflects the characteristics of the flooding area, since all of them were below the maximum convenience threshold equal to the $\frac{2}{3}$ of the expropriation value (Sheet 2.4 of Annex 1).

Case Study 3: SAN POLO D'ENZA

Spatial information

REGION	Emilia-Romagna
PROVINCE	REGGIO EMILIA
MUNICIPALITY	I123 (San Polo d'Enza)
AGRICULTURAL AREA	Agricultural Area 3A
ALTITUDE AREA	Plain
SHEET	12
LAND LOT	281-282
TOTAL ANALYZED SURFACE	0,4810 ha

Characteristics of the area

INTENDED USE	Area not suitable for building, to be used for farming
CROP CATEGORY	Meadow/pasture
CROP CLASS	Meadow
MAIN CROP	Permanent meadow/pasture
SOIL TYPE	Medium texture

The expropriation value for 1 hectare of land in the area under question was calculated and it was then applied to the surface, smaller than previous cases, of the land lots registered in the cadastral maps in question; this value amounted to € 23,495.17 (Sheet 3.1 of Annex 1). The crop category of this area led to much lower average agricultural land value (VAM) set by the Provincial Commission than the previous case and this greatly affects the expropriation compensation value.

In this case, the so-called Agro-meadow coefficient is calculated in the case of a permanent meadow-pasture as crop class (Sheet 3.2 of Annex 1). The value of this coefficient, differentiated on the basis of the flood cycle and then adjusted to the easement duration, supplements the minimum compensation value equal to 1/3 of Vm (average market value) taken into account in case

of expropriation. The estimated compensation amount referred to 1 ha of land, and then applied to the actual size of the area under question.

In conclusion, the floodplain easement compensation value ranged between € 7,831.72 and € 15,663.45.

Similarly, in the event of temporary easement, compensation proves to be less than the expected minimum value envisaged to cover at least the diminished value of the estate result from the easement and therefore the remainder shall receive an amount equal to 1/3 of the average land value (Ve) and not the amount resulting from the calculation.

In the event of annual flooding frequency, permanent easement is unsuitable because the compensation value exceeds the threshold equal to 2/3 of Ve (market value) and it would therefore be necessary to opt for other solutions (eminent domain, temporary easements pending restoration work, selection of a different area, ...) (Sheet 3.3 of Annex 1).

In the event of permanent easements with expected flooding frequency every 5 to 10 years, it is necessary to analyze the option that best reflects the characteristics of the flooding area, since all of them were below the maximum convenience threshold equal to the 2/3 of the expropriation value. (Sheet 3.4 of Annex 1).

A FEW REMARKS ON POSSIBLE LINKS BETWEEN LAND HYDROGEOLOGICAL PROTECTION AND THE EMILIA-ROMAGNA REGION RDP (REGIONAL DEVELOPMENT PLAN)

Among the several hypotheses to be considered in case of flooding and hydrogeological damage, but especially also in view of prevention and recovery and solutions designed to make the regional territory safer and less vulnerable to such events, there is the possibility to resort, to some extent, to the new Emilia-Romagna Region RDP (Regional Development Plan). In particular, it should be pointed out that Measure **M05 - Restoring agricultural production potential damaged by natural disasters and catastrophic events and introduction of appropriate prevention measures**, subdivided into:

- ***5.1.01 - support investments in prevention actions aimed at reducing the consequences of possible natural disasters, weather adverse conditions and catastrophic events;***
- ***5.2.01 - investments aimed at restoring agricultural land and production potential damaged by natural disasters, weather adverse conditions and catastrophic events.***

Effective action plans covering the whole territory might be implemented thanks to public-private partnerships (both parties being the beneficiaries of these measures). The prevention approach offers several advantages compared to any action that should be implemented in the aftermath of an event (once the flooding has taken place): first of all it reduces the risk the population is exposed to and it allows to achieve interesting cost savings and to reduce the damage caused by the event.

A few eligible costs envisaged by the measure concern:

- Hydraulic and agricultural facilities as well as structural operations to reduce hydrogeological instability risk (eg., deep drainage, slopes reinforcing works, etc., including safety measures applied to minor water courses not pertaining to the public state property) in areas subject to high / very high hazard or to a high / very high risk;
- General technical costs, such as professionals or consultants' fees.

(See following diagram with sub-measure 5.1)

Sotto misura	Nome	Descrizione
5.1	Sostegno a investimenti in azioni di prevenzione volte a ridurre le conseguenze di probabili calamità naturali, avversità atmosferiche ed eventi catastrofici	Favorire l'attuazione di interventi di prevenzione rispetto ad alcune criticità rilevate sul territorio, quali, in primo luogo, la propensione al dissesto idro-geologico in alcuni contesti appenninici.
		L'aiuto consiste in un contributo in conto capitale calcolato in una quota % su una spesa massima ammissibile. Il beneficiario potrà richiedere un anticipo pari al 50% del contributo spettante.
		I soggetti interessati sono: imprese agricole; enti pubblici , ove sia dimostrato il nesso dell'intervento con la prevenzione di danni al potenziale produttivo agricolo.
		La sottomisura ammette al sostegno: - <u>interventi funzionali ad adeguare l'azienda agricola a normative più stringenti</u> emanate a seguito di eventi calamitosi/catastrofi naturali; - <u>sistemazioni idraulico-agrarie ed interventi a carattere strutturale</u> per la riduzione del rischio di dissesto idro-geologico in aree identificate a pericolosità o rischio elevato; - spese tecniche generali, onorari di professionisti o consulenti, in misura non superiore al 10% dell'importo ammissibile di cui alle precedenti voci.
		Le aliquote previste di sostegno sono così individuate: - 80% del costo dell'investimento ammissibile per interventi di prevenzione realizzati da singole imprese agricole; - 100% del costo dell'investimento ammissibile per interventi di prevenzione realizzati da Ente pubblico che opera a difesa del potenziale produttivo agricolo.

Measure 10 of the RDP is especially interesting for areas concerned by floodplain easement. It probably is the most significant agro-environmental guideline set forth by the regional document, since low-impact activities with distinct values are financed.

The measure, in general, and the individual operations, in particular, are aimed at fostering a **sustainable use and management of agricultural land, in particular by promoting the protection of water and soil resources, the preservation and enhancement of biodiversity, the agricultural landscape and the improvement of air quality.**

It is an undoubtedly relevant approach able to identify the agronomic activities that may be performed on these lands that can provide added value to protection activities. RDP operational choices are based on these specific assumptions, which will be further analyzed here below.

It is important to highlight the main objectives pursued by operations envisaged by measures 10 and more specifically "integrated production", which summarizes the general principles underlying the CAP reform for the protection of natural resources:

- reducing nitrate pollution;
- water savings;
- reducing pollution deriving from phytosanitary products.

Sub-measure 10.1 operations: agro-climatic-environmental commitments

Sottomisura	Nome	Operazioni
10.1	Pagamento per impegni agro-climatico-ambientali	10.1.1 – Produzione integrata
		10.1.2 – Gestione degli effluenti
		10.1.3 – Incremento sostanza organica
		10.1.4 – Agricoltura conservativa e incremento sostanza organica
		10.1.5 – Biodiversità animale di interesse zootecnico: tutela delle razze animali autoctone a rischio di erosione genetica
		10.1.6 – Biodiversità vegetale di interesse agrario: tutela delle varietà vegetali autoctone a rischio di erosione genetica
		10.1.7 – Collegamento ecologico dei Siti Natura 2000 e gestione sostenibile della praticoltura estensiva
		10.1.8 – Gestione di fasce tampone e bacini di fitodepurazione di contrasto ai nitrati e di anti-deriva per i prodotti fitosanitari
		10.1.9 – Conservazione di spazi naturali e semi-naturali del paesaggio agrario.
		10.1.10 – Ritiro dei seminativi dalla produzione per venti anni per scopi ambientali.

Sub-measure 10.1 operations and environmental protection objectives

Operazioni	Riduzione inquinamento da nitrati	Risparmio idrico	Riduzione inquinamento da prodotti fitosanitari
10.1.1 – Produzione integrata	X	X	X
10.1.2 – Gestione degli effluenti	X		
10.1.3 – Incremento sostanza organica	X		
10.1.4 – Agricoltura conservativa e incremento sostanza organica	X	X	
10.1.5 – Biodiversità animale di interesse zootecnico: tutela delle razze animali autoctone a rischio di erosione genetica			
10.1.6 – Biodiversità vegetale di interesse agrario: tutela delle varietà vegetali autoctone a rischio di erosione genetica			
10.1.7 – Collegamento ecologico dei Siti Natura 2000 e gestione sostenibile della praticoltura estensiva	X	X	X
10.1.8 – Gestione di fasce tampone e bacini di fitodepurazione di contrasto ai nitrati e di antideriva per i prodotti fitosanitari	X		
10.1.9 – Conservazione di spazi naturali e seminaturali del paesaggio agrario.	X		X
10.1.10 – Ritiro dei seminativi dalla produzione per venti anni per scopi ambientali.	X		X

For the purposes of research, sub-measures are undoubtedly very interesting:

10.1.09 - Conservation of natural and semi-natural spaces of the agricultural landscape;

10.1.10 - Withdrawal of arable crops for twenty years for environmental purposes

In both cases these measures are designed to use financial resources with a view to 'rehabilitating' rural areas through afforestation projects and complementary perimeter tree fences pursuing the specific purpose of using land for hydraulic protection.

In fact, implementing these measures allows an annual financial revenue, which can be regarded as a real economic capitalization of positive externalities generated by farmers. The rehabilitation of the area will enhance the rural landscape by increasing the value of the area.

A detailed description of measure 10.1.10 is reported here below. It seems to be probably the best complementary solution to be applied to the design of areas subject to floodplain easement.

Withdrawal of arable crops from production for environmental purposes for twenty years (Measure 10.1.10)

The operation promotes biodiversity in the plain, which is affected by the pressure exerted on agro-ecosystems, promoting actions aimed at protecting the environment, including its fauna and flora, in particular Sites of Community Interest, and combating the fragmentation of traditional structural elements by maintaining the habitat, capitalizing on results achieved by past programs in view of positive effects on biodiversity and the landscape, and finally contributing to the Focus area P4A objectives and fully meeting F13 requirements. It is a twenty-year-long operation and it envisages active sustainable management and maintenance commitments by means of three types of actions: **Action F1** - Wild fauna and flora environments; **Action F2** - variously structured environments with landscape and ecological connection functions; **Action F3** - Environments for the protection of hydrological systems.

Action F1 is subdivided into the following environmental categories:

Wet meadows. Keeping at least 50% of the *area concerned by the action* (hereinafter called *SII*) flooded for at least six months from October to March. In the months of April, May, June and July, the submerged surface is reduced up to 30% of the *SII* area. Those areas that remain flooded from March to July, at least as of the end of the second year of commitment, it is necessary to maintain a minimum number of semi-submerged islets/outcrops emerging from water, each one not less than 100 square meters wide, with an average density of at least one hectare of *SII*. The perimeter embankments, islets and/or outcrops are to be maintained with gently sloping banks, with a less than 25° slope. Except for cases of force majeure, in the months of April, May, June and July, sudden

rises in water level must be avoided not to cause any destruction of birds' nests and eggs. Vegetation control in the SII area must be performed in compliance with the allowed periods and, in areas with herbaceous vegetation not subject to flooding at least once a year. Trees and/or shrubs listed in Table b) may be preserved, granting each tree and/or shrub enough surface occupied by the orthogonal projection of the tree canopy. As for the areas concerned by the project for the first time and in particular those that are flooded even partially, a mandatory authorization by the competent Land reclamation Consortium to be annexed to the aid application is required. The parcels of land that have been set aside being labelled as environmental "wetlands", already subject to agri-environmental measures laid down by Regulation (EEC) No. 2078/92, EU Commission Regulation (EC) No. 1257/99 and Regulation (EC) No. 1698/05 (hereinafter "already subject to agri-environmental measures"), may be subject to this type of action and be included in the environmental classification as "Wet Meadows".

Clearings and thickets. A plant cover should be grown on the surface by: permanent grassland or permanent or end-of-cycle alfalfa crop; polyspecific vegetation, including at least 5 different species, of which at least 3 shrubs, as reported in the Table b). As for the grass cover of the meadow, if the turf is absent and/or deteriorated, seeding and/or overseeding should be performed using a mixture of grassland species mainly composed of Gramineae (grasses) and Leguminosae (legumes), even prior to surface tilling for soil preparation purposes, giving prior notice to the relevant offices. It is mandatory to monitor the herbaceous vegetation of permanent grassland and/or alfalfa fields at least once a year. In flat surfaces, if not contiguous to wetlands, at least a pond should be maintained over a total extension not exceeding 10% of the whole surface (S.I.I.). Action F2 consists of variously structured environments, with alternating permanent grassland, also in conjunction with: isolated or grouped shrubs or in a linear formation, isolated trees, or in groups or rows, ponds or lakes. Permanent grassland, which consist mainly of grasses, should be subject to at least one mowing/shredding to be performed annually, any time of year. Action F3 consists of permanent grassland, possibly with wooded areas planted with trees and shrubs. It is mandatory to monitor the permanent grassland vegetation at least once a year. For all the actions envisaged in the area under question (SII) it is forbidden to use any pesticides and herbicides; to spread any chemical or organic fertilizers, sewage or digested sludge and/or sludge in general; no livestock grazing or sheds are allowed; no aquaculture and sport fishing activities are allowed; no produce obtained from the grassland management should be traded; herbaceous vegetation is to be controlled by mowing and/or shredding, only in the period ranging from 10 August to 20 February (except for action F2 and service pathways, where mowing is always allowed); Coypu (*Myocastor coypus*) population should be continuously monitored using traps (according to the specifications issued by relevant offices); the immediate restoration of riversides and banks damaged by underground burrows; draining to be carried out in August/September for the removal of non-native aquatic and/or amphibious species, such as, in particular, herbivorous carp, catfish, red-eared turtles (according to

the specifications issued by relevant offices); ban to introduce and in any case remove common carp, semi-domestic ducks and geese, if any; keeping only trees and/or shrubs listed in Table b); ban to introduce and in any case remove any pollutants and waste of any kind; removal and disposal of non-biodegradable items/waste (plastic film mulches, shelter etc.) used for the rooting and development of seedlings, from the areas occupied by trees and/or shrubs and from areas "already subject to agri-environment measures" by the fourth year of commitment and anyway already starting from the first year of commitment. Applicants shall file an application, supplemented with a technical report, drafted by a qualified technician, a copy of the cadastral plan in which the SII areas are well identified and demarcated. This report must provide a detailed description of all the actions that are envisaged, their purpose, and the "twenty-year management and conservation plan" of the environment in question; keeping on record a copy of all the documents attached to the application and a registry to write down and underwrite all management and conservation operations implemented during the twenty-year-long period, within 48 hours of execution, to be filed at one's headquarters, as declared at the time of submission of the application; promptly reporting any occurrence of events caused by force majeure, any changes to the environment and any changes to the twenty-year management and conservation plan to the relevant authorities.

Type of support

Areas implementing the above-mentioned measures may be subject to payment, namely:

- those areas implementing the above-mentioned measures for the first time: in this case only plain surfaces are eligible;
- those areas already subject to the same measures, at the end of the commitment period, pursuant to Regulation (EEC) No. 2078/92, EC Commission Regulation (EC) No. 1257/99 and Regulation (EC) No. 1698/05. In this case all surfaces of the region are eligible.

Surfaces are not eligible to payment if they are occupied: by non-native plants not belonging to the indigenous or historically present flora in the territories concerned laid down in Annex b); by Euro-American hybrid poplars; by orchards; by wetlands of any size where aquaculture and sport fishing is practiced.

Should these same surfaces adopt these measures for the first time, the extension of the surfaces occupied by trees and/or shrubs shall be measured in accordance with the structural specifications laid down in Table c). As for areas including other items, such as ponds or lakes, the actually occupied area shall anyway be calculated.

Beneficiaries

Beneficiaries are farmers in accordance with art. 2135 of the Civil Code, their associations, including farmers' cooperatives and collective properties.

Eligible costs

Subsidies are granted to areas concerned by the project to cover the following eligible costs:

- The annual cost related to any shortfall in the average gross operating margin
- Annual maintenance costs
- Annual operating costs
- Transaction costs

Eligibility Conditions

Areas located in the region are eligible for these aids. Only lowlands sown with arable crops are eligible for the application of these measures. F3 Action applies only to lowlands with buffer zones of springs and wells regarding water for civilian use and to protection areas of environmental resources such as lakes, reservoirs and streams, pursuant to art. 17 of PTPR (ER Regional Environmental Landscape Plan). Actions already benefiting from agri-environmental measures provided for in Regulation (EEC) No. 2078/92, EC Commission Regulation (EC) No. 1257/99 and Regulation (EC) No. 1698/05, the eligibility conditions, with reference to the eligibility of only plain surfaces, do not apply. To be eligible for this type of operation, the surface subject to this kind of action must meet the criteria laid down in the following table; this eligibility condition does not apply and it should be regarded as an exclusive eligibility condition for payment in case of surfaces that have never adopted these measures, being the subject of an initial application.

Table: 10.1.10 Operation - Operation characteristics

Type of action	Characteristics of the area		
Actions	Minimum size: 1 ha Smaller yet adjacent land parcels are allowed		
<p>F 1) Wet meadows</p>	<p><u>Flooded Surface:</u> presence of a layer of water on a part of the area concerned by the project</p>	<p><u>Islets / outcrops:</u> At least 100 square meter-wide semi-submerged outcrops, surrounded by water</p> <p><u>Banks:</u> Perimetral and gently sloping banks of islets with less than 25 degree steep slopes.</p>	<p><u>Trees / shrubs:</u> Presence allowed on a surface not exceeding 30% of the minimum surface</p>
<p>F 1) Clearings and thickets Complexes</p>	<p><u>Thickets:</u> Trees / shrubs growing on at least 30% of the area concerned by the project , distributed in a patchy way and/or merged into one or more multispecies and single-plant belts. The presence of isolated plants is allowed.</p>	<p><u>Clearings:</u></p> <ul style="list-style-type: none"> - Permanent meadow or fully grown or end-of-cycle alfalfa meadow covering at least 50% of the area concerned by the project - Among the annual species with an extension not exceeding 10% of the clearing, it is allowed to sow a mixture composed of at least two of the following species: sorghum, millet, foxtail millet, great millet, sunflower, corn 	<p><u>Ponds:</u> The presence of at least a more than 1 m deep, 20 square meter wide pond, with gently sloping banks is required on lowlands, provided that they are not contiguous with wetlands (distant more than 200 mt); one or more ponds covering up to 10% of the surface are however allowed.</p>
<p>F 2) Differently structured environments</p>	<p><u>Permanent grassland:</u> It should cover at least of 50% of the area concerned by the project</p>	<p>Presence of at least 2 of the following items over at least 30% of the area concerned by the project:</p> <ul style="list-style-type: none"> a) Isolated, grouped or linear shrubs b) Isolated or grouped trees and/or rows of trees c) Ponds and/or lakes (it is not an eligibility requirement) 	<p>The extension of surfaces occupied by tree and/or shrub species is calculated by assigning the following values:</p> <ul style="list-style-type: none"> -to each specimen of trees, both isolated or grouped together, by assigning a value of 3 m of radius starting from the trunk - to each specimen of shrubs, both isolated or grouped together, by assigning a value of 1.5 m radius at the point of planting - in the case of hedges, only if planted along the perimeter of the set aside area and of shrubs that are part of it, by assigning a value of 0.5 m radius -if high scientifically or monumentally valuable trees are present in areas adjacent to the set aside arable lands, including the orthogonal projection of their canopy on the surface

<p>F 2) Differently structured environments</p>	<p><u>Permanent grassland:</u> minimum size: 50% of the area concerned by the project</p>	<p>Trees / shrubs and/or ponds and/or lakes: Presence allowed up to a maximum of 50% of the area concerned by the project</p>	
<p>F 3) Areas occupied by permanent grassland possibly with the presence of trees and shrubs in the buffer zones of springs and wells regarding water for civilian use and in the protection areas of environmental resources, such as lakes, reservoirs and streams</p>			

Principles relating to the definition of the selection criteria

Spatial principles: priority was assigned to the Natura 2000 network. Any other areas approved by the Emilia-Romagna region programmes are subordinated to the Natura 2000 network areas, such as: areas pursuing a predominantly nature conservation objective; mainly landscape protection areas; prevailing hydrological protection areas.

Technical principles: the actions envisaged by this operation were already included in the agri-environmental measures provided for in Regulation (EEC) No. 2078/92, Commission Regulation (EC) No. 1257/99 and Regulation (EC) No. 1698/05; larger holding surface concerned.

The reasons for the choice of spatial selection principles are to be related to Focus area P4A. It is therefore a priority to apply this type of operation in the Natura 2000 network areas, identified in the implementation of the European Directive No. 92/42 / EEC (Habitat) and n. 2009/147 / EC (Birds Directive), where the adoption of the measures provided for here is identified as necessary. The areas subordinated to the Natura 2000 network are the other areas with predominantly nature conservation purposes, landscape areas and hydrological protection areas, given their prevailing ecological function (protection/enhancement of biodiversity and landscape and protection of water resources) pursued by this type of operation. The reasons underlying the choice of technical principles have to be related to the greater impact in terms of environmental effectiveness, should the surface of the areas concerned by the project be larger, in particular those which have already completed the previous twenty-year-long commitment period.

(Applicable) amounts and support rate

Subsidies shall be granted per hectare, differentiated as follows:

- **plain areas 700 EUR / ha**
- **hill and mountain areas 500 EUR / ha**

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