

## A1 Izbira devetih demonstracijskih kmetij

Ukrepi za zmanjševanje vnosa nitratov v podzemne vode (izvedbene akcije) se bodo izvajali na devetih demonstracijskih kmetijah, ki jih bo izbrala posebna komisija, sestavljena iz strokovnih sodelavcev partnerskih organizacij (Kmetijska svetovalna služba, Kmetijski inštitut, Regijske kmetijske organizacije). Kmetijska svetovalna služba bo pripravila seznam 100 primernih kmetij, izmed katerih bo komisija izbrala 20 kmetij, na katerih bo izvedena analiza pretoka dušika (nakupi krmil in gnojil, poraba, prodaja produktov, produktivnost kmetij, vnosa dušikovih hranil na kmetijske površine, ki vključuje analizo krme, gnoja in tal. Na podlagi rezultatov analize bo izbranih devet demonstracijskih kmetij primerljivih velikosti in sicer:

- tri prašičerejske kmetije
- tri govedorejske kmetije za prirejo mleka
- dve govedorejski kmetiji za prirejo mesa
- ena poljedelska kmetija

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## A2 Pridobitev ustreznih aktov

V prvem letu projekta bo v vsaki regiji vzpostavljena zadruga (4), ki bo članom omogočala lažji prenos dobrih praks, izvedbo kolobarjenja, porabo prekomernih količin gnoja (poljedelske kmetije) ter skupno uporabo strojev. Za vzpostavitev zadruga morajo ustanovitelji zadruga pripraviti ustanovitveni akt, ki ga je potrebno overiti pri notarju. Po overitvi ustanovitvenih dokumentov bodo zadruga vpisane v sodni register. Za izvedbo akcije bo skrbela Kmetijska svetovalna služba v sodelovanju z regionalnimi oblastmi, ki bo koordinirala sestanke med ustanovitvenimi člani zadrug.

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## C1 Vnos ustreznih aminokislin v dieto

Na količino dušika v gnoju vpliva tudi količina dušika v prehrani živine. S preteklimi analizami prehrane in iztrebkov je bilo dokazano, da so krme pogosto beljakovinsko bogate in dejansko vsebujejo večjo količino dušika kot ga žival potrebuje. Presežek dušika se zato izloči preko iztrebkov. Zato bo Kmetijski inštitut na demonstracijskih kmetijah uvedel nove krmne mešanice, v katerih se bo soja nadomestila z aminokislinskimi pripravki. Na podlagi predhodno izvedene analize (akcija A1) bo pripravljen nov prehranski načrt za vseh osem živinorejskih demonstracijskih kmetij, ki bo lastnikom predstavljen na kmetiji sami (praktičen prikaz priprave mešanice). Prehranski načrt bo pripravila Kmetijsko svetovalna služba v sodelovanju s Kmetijskim inštitutom. Ves čas poteka projekta se bo spremljal učinek spremenjene prehrane (akcija B), ki se bo po potrebi prilagodila.

## C2 Uporaba inovativnih tehnologij gnojenja

Za večjo učinkovitost gnojenja bo vpeljan nov način gnojenja površin, in sicer se bo izvajalo gnojenje površin preko novega gnojilnega stroja, ki bo omogočal natančnejše doziranje gnojila v tla in s tem preprečil gnojenje sosednjih površin, do česar pride ob škropljenju. Pri tem se bo lahko uporabljala le tekoča, primerno razredčena, frakcija gnojevke, zato bo v tej akciji uporabljena tekoča frakcija, ki bo pridobljena z uporabo stroja za ločevanje gnoja (akcija C3). Akcijo bo izvedel Kmetijski inštitut, ki bo pripravil štiri gnojilne stroje skupaj z navodili za uporabo. Gnojilne stroje bodo prevzele v uporabo zadruga, ki bodo odgovorne za vzdrževanje in primerno uporabo s strani članov.



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## C3 Uporaba stroja za ločevanje gnoja



Na kmetijah ne poteka ločeno zbiranje tekočih in trdih izločkov živali, zato bo ta akcija namenjena najprej pripravi mobilnega stroja za ločevanje gnoja (prvi šest mesecev), nato pa se vzpostavil sistem za uporabo stroja znotraj zadrug (ves čas trajanja projekta). Stroj za ločevanje trde in tekoče frakcije gnojevke bo omogočal ločeno uporabo posameznih frakcij, ki imajo različne lastnosti in so za to uporabljene na različnih površinah. Pripravo stroja in navodil za uporabo bo izvedel Kmetijski inštitut, vzdrževanje in nadzor nad uporabo bodo odgovorne posamezne zadruga. Vsaka zadruga bo prejela en stroj za ločevanje gnoja (skupno 4), ki bo na voljo članom zadruga za brezplačno uporabo.

## C4 Vzpostavitev mobilne aplikacije

Za zbiranje podatkov o izvajanju ukrepov na demonstracijskih kmetijah bo razvita mobilna aplikacija, preko katere bodo kmetje na preprost in hiter način dnevno vnašali podatke o tipu in količini uporabljene krme, količini pridelka (mleko, meso, zelenjava), količini iztrebkov. Aplikacijo bo v prvem letu projekta razvil Kmetijski inštitut, ki bo nato do konca projekta odgovoren tudi za tehnično pomoč in nadgrajevanje aplikacije. Kmetovalcem bo prikazana uporaba aplikacije ob rednih monitoring obiskih (akcija B).

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## E1 Organizacija izobraževanj

Vse ukrepe preizkušene v projektu bodo kmetovalcem in zainteresirani javnosti predstavili v okviru izobraževalnih aktivnosti. Kmetijsko svetovalna služba bo v sodelovanju z regijskimi oblastmi organizirala 1 dan odprtih vrat na demonstracijskih kmetiji na leto triletnega projekta v vsaki os štirih regiji (skupno 12). Za vsak dan odprtih vrat je predvidenih cca. 50 obiskovalcev.

V okviru rednih izobraževanj bo kmetijska svetovalna služba izvedla po 3 predavanja na leto v vsaki regiji, in sicer eno na temo prehrane, eno na temo gnojenja in eno na temo zadružništva. Skupno 36 predavanj, na vsakem je predvidenih 20 udeležencev.

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## E2 Vzpostavitev spletne strani

V prvih šestih mesecih projekta bo vzpostavljena projektna spletna stran v italijanskem jeziku. Osnovne informacije projekta bodo na voljo tudi v angleščini. Spletna stran bo vsebovala osnovne informacije o projektu, na njen bodo objavljene novice, projektne aktivnosti in dogodki ter rezultati projekta. V tej akciji bodo zajeti stroški priprave vsebine, prevajanja osnovnih informacij, oblikovanja in izdelave ter vzdrževanja spletne strani do konca triletnega projekta.

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## Summary

The Project's main objective was the optimising of the management of nutrients in livestock farms with a view to contributing to the reduction of both subterranean and surface water pollution. To achieve this objective the project envisaged initiatives at different levels in nine demonstrative livestock farms distributed over the five regions participating in the project (Piedmont, Emilia-Romagna, Lombardy, Veneto and Friuli Venezia-Giulia) as specified below:

1. The introduction of feeding techniques allowing the reduction of excreted nitrogen in dairy and beef farms and pig fattening farms;
2. The introduction of crops characterised by lengthy vegetative growing season and a high level of nitrogen take-up together with innovative slurry spreading techniques capable of maximising the fertilising use efficiency of the element;
3. The introduction of agro-environmental techniques (buffer strips, constructed wetlands) capable of reducing the flow of nutrients into the receiving water bodies in order to protect water resources;
4. The delocalisation of the solid fraction of effluent through enhancement as fertiliser, moving it to areas where soils are poor in organic matter and in danger of losing fertility, while also reducing the environmental pressure on areas with high livestock density within nitrate vulnerable zones;
5. Drawing evidence to cowshed and pigsty practices (provision of feed with reduced nitrogen content) and field practices (delocalisation of solid fraction of effluent) through the use of software tools specifically implemented and made available on the Project's website.

In the first year the work was concentrated on the identification and start-up of demonstrative farms and on the initiation of the work.

In the case of Action 1 in particular, farm surveys were conducted (consumption, purchases, sales and productive performance) together with the sampling of feed has allowed to obtain the nitrogen balance and use efficiency for the e ex-ante situation. Feed rations with modified protein content were introduced in 2012, the second year, while surveys were continued in order to calculate the first ex-post nitrogen balance. In the last year the surveys were continued along the same lines as those of the second year, in order to verify and confirm the results obtained. At the end of the project the consolidated nitrogen barn gate balances were drawn up.

With reference to Action 2, a number of indicator plots for each farm were monitored from the agronomic and environmental point of view. In 2011 the situation ex-ante has been monitored. Starting from 2012 innovative agronomic techniques (such as the spreading of organic fertilizers and crop rotation) had been applied to the plots designed to render field nitrogen use more efficient and thus reducing the quantities of nitrates released into the water DOC-2014-1555/4.6.5 Final Report 6 LIFE ENV/IT/000208 – AQUA C.R.P.A S.p.A table. In addition, surveys were carried out at the farm level in order to produce the data necessary for the definition of the nitrogen balance for the entire farm (farm-gate balance) both before and after the introduction of the new techniques. Analogously to action 1, the surveys were continued during 2013 at the whole farm level: the work carried out in the third year allowed to draw up the nitrogen farm gate balances.

So far as the agro-food measures were concerned (A. 3), the site with a buffer zone and the site with a wetland area were activated during 2011, first year of the project, in order to identify the ability of such features to intercept the nutrients not absorbed by the crops and present in the run-off water, and the first data have been obtained. In the 2012-2013 period quanti-qualitative surveys of water resources and crops were carried out on the two experimental sites: the data confirm the ability of these devices to intercept the nutrients.

Under Action 4 in the first year has been formed the Consortium for the separation of slurry and the transfer of solid fraction. From the second year work was begun on the solid-liquid separation of slurry by the Consortium member farms and on the transfer of the solid fraction from the livestock areas to the lands requiring organic matter input in the Province of Mantua. The solid-liquid separation tests were conducted on the effluents in different conditions in the first two years (2011-2012), with agronomic tests on the effectiveness of the separated solids as a fertilizer carried out in three regions during the two last years (2012-2013).

Under Action 5 (traceability and certification) the tool designed to highlight nitrogen flows in the stable (feed, animals and products) and in the farm, in particular solid fraction of slurry in order to keep track of the same, has been created in the first year while the second year saw the further testing and refinement. Tests were conducted using the data identified in the demonstrative farms in the context of Actions 1 and 2. During the last year the final versions of the tools were implemented and published on the website of the project.

The activities planned for Action 6, that is the assessment of economic and environmental sustainability, were carried forward in parallel to actions 1 and 2, with the assessment of the ex-ante situation and, in the last two years, the ex-post situation, deriving from the introduction of the livestock and farming improvements.

Networking activities (A. 7) were carried out with the holding of the three meetings of the group of European experts with the presentation and discussion on both the activities carried out and the results obtained; the last meeting has been held in conjunction with the final conference.

The dissemination activities (A. 8), completed in the third year, took the form of demonstrative activities on the farms involved in the Project, training courses, meetings at schools and the publication of technical articles dealing with the project results. The extent to which expected results were achieved was measured by the application of the monitoring protocol set out during the planning stage (A. 10).

The Project's main outputs have been in the form of data, the related elaboration and the conclusions of the individual actions contained in the reports (deliverables) writing up such actions. The results of the Project have been conveyed to the end users (farmers, technicians and public administration officials from both local and central government) through the various dissemination and demonstrative actions implemented over the three-year period.

Finally, the two software tools usable through the web site also represent important outputs. They can be used for the calculation of the nitrogen balance sheet and the delocalisation of the solid fraction of livestock slurry subjected to solid/liquid separation.

This report provides evidence of the activities carried out under the different actions making up the Project and of the results obtained during the three year period. Finally, it also DOC-2014-1555/4.6.5 Final Report 7 LIFE ENV/IT/000208 – AQUA C.R.P.A S.p.A highlights the problems encountered both of a technical and a financial nature during the conduct of the various activities.

The administrative part describes the management activity for the conduct of the Project: the planning of activities over time, the Project's organisational diagram, the responsibilities of the beneficiaries, the activities carried out by the co-ordinating beneficiary in the project management and the project management assessment.

The technical part contains the description of the actions, the activities carried out and their results, a description of the dissemination and demonstrative activities, the assessment of the extent to which the objectives were achieved and, in conclusion, an analysis of long-term benefits.

All the above has been rounded off with information and comments relating to the financial report.