

SURVEY ON MANURE MANAGEMENT IN SOUTHERN PIEDMONT REGION OF ITALY, NEW RULES AND FOLLOWING POTENTIAL FUTURE STRATEGIES

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ABSTRACT

The Council Directive 91/676/CEE concerning the protection of water against pollution caused by nitrates from agricultural sources has generated in Italy a new national and regional legislation relevant for the manure management in agriculture. In accordance to the Directive, and following national and regional laws and decree, “vulnerable zones” have been identified on the Piedmont regional territory. In these zones it is not possible to spread on fields more nitrogen than that required by the crop on the basis of a nutrient balance, and 170 Kg/ha is the maximum quantity of nitrogen from manure that is possible to supply to the crops. Minimum limits are set for manure storage as well as other restrictions related to nitrogen distribution.

These new rules have a great impact on livestock farms. In 2003 the agricultural administration of Piedmont region has started on an environmental monitoring action on livestock farms in vulnerable zones to evaluate the effect of the new rules and propose to the farmers manure’s management practices permitting to get through these new strict environmental rules without increase the production costs.

Results of the monitoring pointed out that livestock farms have to build storage spaces to assure essential storage capacity, and handle the excess of the nitrogen from manure compared with the land spreading capacity.

INTRODUCTION

Council Directive 91/676/CEE has the objective of reducing water pollution caused by nitrates from agricultural source and preventing further such pollution. The pollution, in the specific case of the Directive, is the discharge, directly or indirectly, of nitrogen compounds from agricultural sources in aquatic environment. The Directive defines “vulnerable zone” as area of land which drains into the water affected, or that could be affected, by pollution, and “action programme”, as action with the purpose of reduce pollution caused or induced by nitrates. Action programmes are specific for vulnerable zones. They have to consider environmental condition, and available scientific and technical data with references to nitrogen contribution originated from agriculture and other source.

The Directive has generated in Italy a new national and regional legislation relevant for the livestock manure management in agriculture. In Italy, regions’ administrations are responsible for the definition of the vulnerable zone, and for the implementation of the action programs describing the agronomical utilization of nitrogen from agriculture. Technical references have to be issued by the Italian Agricultural Ministry in accordance with article n. 38 of the Italian Legislative Decree n. 152 on 11th May 1999 that regulates the agronomical use of nitrogen from livestock farms.

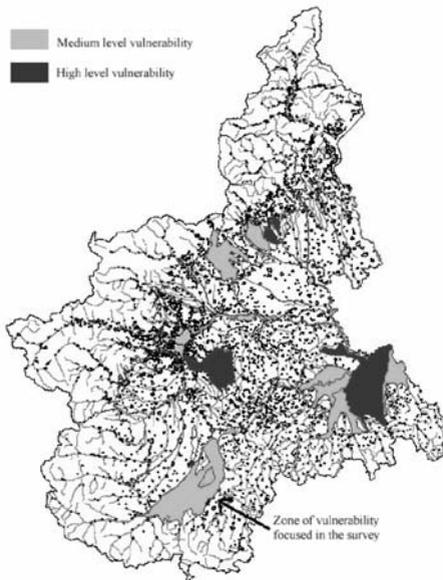
In vulnerable zones it is not possible to spread on fields more nitrogen than that required by the crop on the basis of a nutrient balance. Minimum limits are set for solid and liquid manure storage capacity. Other restrictions on land spreading of manure are imposed in relation with

weather conditions, distance from rivers, percentage of slope of fields, and for certain periods of the year.

These new rules have a great impact on animal production farms management. For this reason in 2003 the agricultural administration of Piedmont region has started on an environmental monitoring action on livestock farms in vulnerable zones to evaluate the effect of the new rules and propose to the farmers manure's management strategies permitting to get through these new strict environmental rules with minimum costs. The survey to monitor the situation has been carried out by farmers' associations with a methodology settled by the regional administration and with its supervision.

This paper report the results of the monitoring program carried out in Cuneo province, in the southern part of the Piedmont region, by "Coldiretti", a farmers' association, on their associates. In this part of the region there is high concentration of livestock farms and there is also one wide vulnerable zone to nitrogen pollution. The results of the survey in this specific area are analyzed in the larger context of the results from regional environmental monitor outcomes.

MATERIALS AND METHODS



Piedmont region Decree No. 9/R on 18th October 2002 identifies on the regional territory the "vulnerable zone to nitrogen pollution". Levels of vulnerability are defined in accordance with EU Directive depending on the content of nitrogen in the surface water. For this paper high level vulnerability (nitrogen content higher than 50 mg/l) and medium level vulnerability (nitrogen content between 40 mg/l and 50 mg/l) are relevant. See figure on the side.

On the soil in the two vulnerable zones, as defined above, the new regulation does not allow to supply more than 170 Kg/ha of nitrogen from organic manure. A minimum storage capacity of 120 days for solid manure and 180 days for liquid manure must be assured. These are the 3 parameters the environmental monitoring focused on, because affecting the livestock farms management and their immovable properties.

Livestock farms have been classified in 3 categories on the basis of the annual production of nitrogen from manure: lower than 2 tons (corresponding to less than 39 cows or 198 adult pigs), between 2 and 6 tons, and higher than 6 tons (corresponding to 116 cows or 565 adult pigs). In accordance with regulation the two last farms' categories have to implement, respectively, a "Simplified Agronomical Utilisation Plan" and an "Agronomical Utilisation Plan". These documents describe, and take memory in files, the agronomical and technical measures the farms follow to curb, or to use better, in accordance with limits of land spreading imposed by the regulation, the farm manure, and to comply with requirements concerning farms facilities, such as manure storage capacity. The local public administration check the accordance with the regulation of the measures proposed by livestock farmers in these documents, and inspect their actual application.

RESULTS AND DISCUSSION

Former analysis concerns data from environmental monitoring as summarized by Piedmont regional administration. Main results on vulnerable zones in this region (coloured areas in previous page picture) are shown in table 1.

Table 1. Results of the regional environmental monitoring on Piedmont vulnerable zones.

Area	Livestock farms (No.)	Nitrogen from manure (ton)	Farms' surface available for manure land spreading (ha)	Mean quantity of nitrogen for available surface for land spreading (Kg/ha)
Piedmont region	1,519	6,201	63,955	97
Cuneo province	563	3,038	21,349	142

On the basis of the data above we can state that on the total of regional vulnerable area the mean quantity of nitrogen from manure land spread on farms' surfaces is below the mandatory limit of 170 Kg/ha stated by the regulation. Looking at Cuneo province data the mean value increases, but remains below the limit. The environmental monitoring outlines that only about 14% of total regional livestock farms have nitrogen production that leads to exceed 170 Kg/ha in land spreading. This percentage is 26% for Cuneo province. The data of regional environmental monitoring on livestock farms on the vulnerable zone on the territory of Cuneo province points out more precisely the situation, as shown in table 2.

Table 2. Results of the regional environmental monitoring on Cuneo province vulnerable zone.

Annual production of nitrogen from manure	Livestock farms (No.)	Nitrogen from manure (ton)	Farm surface available for manure land spreading (ha)	Mean quantity of nitrogen for available surface for land spreading (Kg/ha)
>2 tons	76	76	869	87
2→6 tons	354	1,244	11,952	104
> 6 tons	133	1,717	8,529	201

As reported in the previous table bigger livestock farms on Cuneo province vulnerable zone do not have enough surface to spread manure to respect the limits of 170 Kg/ha of nitrogen from farm manure set by the regulation.

We can analyse better the Cuneo province situation taking into consideration the rough data as collected by "Coldiretti" farmers' association during the survey to carry out the environmental monitoring as requested by the regional administration. "Coldiretti" represents near 80% of the livestock farms affected by the vulnerable zone requirements in Cuneo province. 372 are cattle farms and 68 are pigs farms.

The cattle farms have animal live weight of more than 20,000 tons. The surface for land spreading of manure is about 10,000 ha. Very few cattle farms exceed the threshold of 170 Kg/ha of nitrogen from farm manure supplied to the crops. The cattle farms in this area are commonly medium dimension farms (around 100 cows) with, traditionally, a close link between cattle and land. In spite of that the big cattle farms do not have enough land to satisfy the recent requirement concerning limit of land spreading of nitrogen. In this area the production of nitrogen from manure exceed 150 tons the possibility of land spreading on farm crops. To comply with the regulation requirements for minimum storage capacity in farms cattle is necessary to build more

than 27,000 m³ of storage space for solid manure and about 20000 m³ of cisterns for liquid manure.

The 68 pigs farms have 6,879 tons of animal liveweight producing more than 770 tons of nitrogen from manure, mainly liquid. They have about 3,352 ha of surface available for manure land spreading. It means that they have to distribute more than 220 Kg/ha of nitrogen from manure on their crops, largely higher than 170 Kg/ha allowed by the new environmental regulation. The pigs farms have a surplus of 170 ton of nitrogen in comparison with the potential available for land spreading in accordance with environmental regulation on existing farms' surface. Pigs farms need more than 50,000 m³ of cisterns to store liquid manure to fulfil regulations' requirements.

CONCLUSIONS

The survey carried out by the farmers association and the regional environmental monitoring program pointed out the two main action programmes' measures the livestock farmers have to deal within the near future to comply with the new environmental regulation defining the vulnerable zones to nitrogen pollution: to built storage spaces to assure essential storage capacity, and handle the excess of the nitrogen from manure compared with the land spreading capacity.

Pigs and cattle farms share lack of storage capacity. In Cuneo province is necessary to built about 120,000 m³ of new storage spaces with an estimated cost of 4.5 millions €.

Two strategies could be supposed to solve the excess of nitrogen from livestock manure. The first is to increase the surface for land spreading. This is the most technically feasible, environmentally sustainable and economically profitable. New surfaces for land spreading are available inside the vulnerable zone both from livestock farms, since the mean quantity of nitrogen spread is 142 Kg/ha, and from crop farms.

The second one is to have recourse to plants for liquid manure treatments. This technique should be confined to farms that cannot adopt previous strategy. The manure treatment should be low-cost and easy to adopt, such as a solid-liquid separation. Liquids could be used for fertilisation and solids, after composting, could be cost-effectively transported to short and medium distance destination, such as specialized farms outside the vulnerable zone.

REFERENCES

- Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources. Official Journal of the European Union L375, 31st December 1991, 1-8.
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