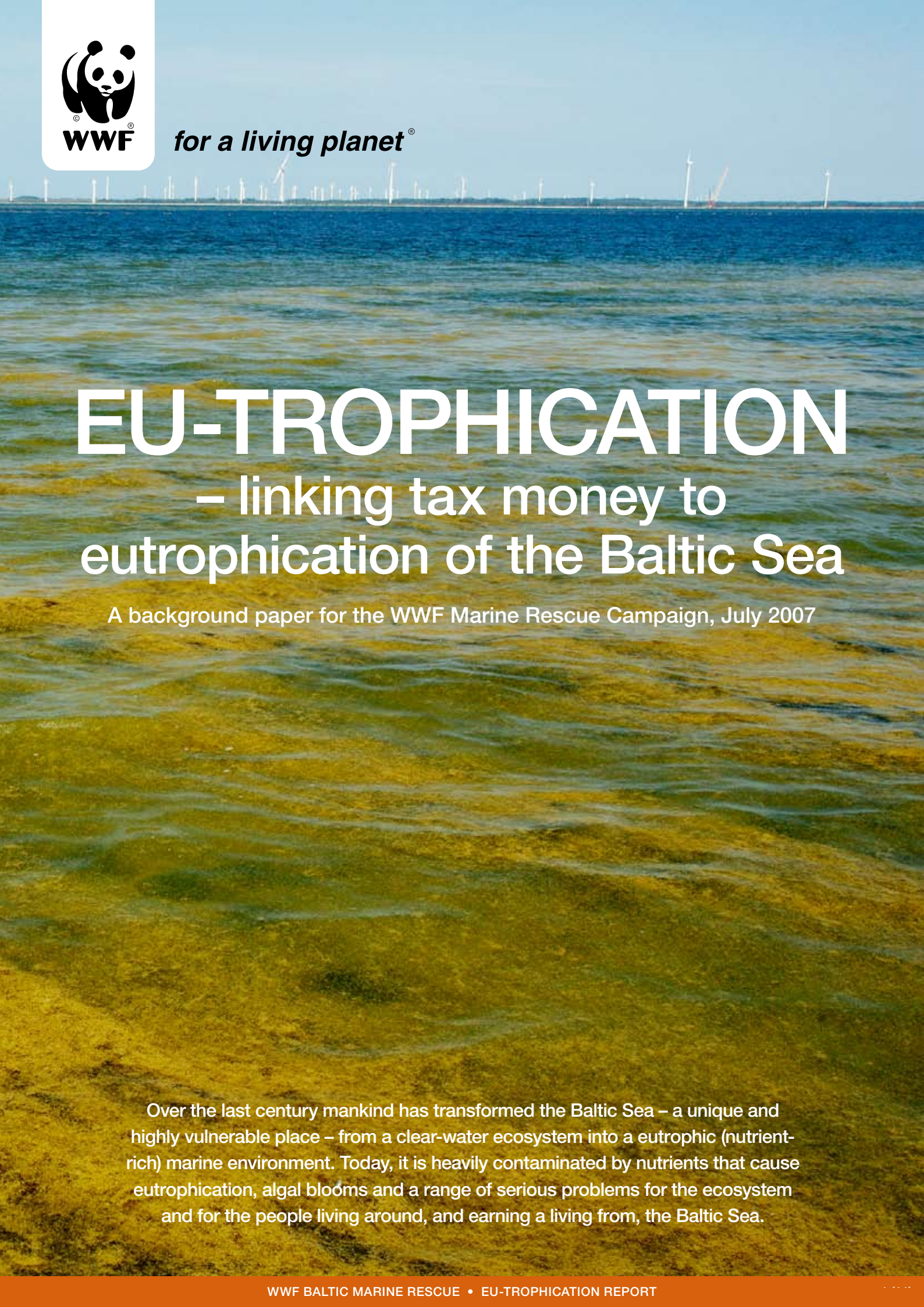

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EU-TROPHICATION
– linking tax money to eutrophication of the Baltic Sea

A background paper for the WWF Marine Rescue Campaign, July 2007

Over the last century mankind has transformed the Baltic Sea – a unique and highly vulnerable place – from a clear-water ecosystem into a eutrophic (nutrient-rich) marine environment. Today, it is heavily contaminated by nutrients that cause eutrophication, algal blooms and a range of serious problems for the ecosystem and for the people living around, and earning a living from, the Baltic Sea.

SUMMARY

Over the last century mankind has transformed the Baltic Sea – a unique and highly vulnerable place – from a clear-water ecosystem into a eutrophic (nutrient-rich) marine environment. Today, it is heavily contaminated by nutrients that cause eutrophication, algal blooms and a range of serious problems for the ecosystem and for the people living around, and earning a living from, the Baltic Sea.

The main nutrients responsible for this pollution are nitrogen and phosphorus. Of the estimated 1,010,000 tonnes of nitrogen and 34,500 tonnes of phosphorus that are deposited annually in the Baltic Sea, roughly half come from the agricultural sector.

The European Union's current agricultural policy promotes the intensification and concentration of agricultural production, and one of the results is to encourage the extensive use of artificial fertilisers. By giving large subsidies through the Common Agricultural Policy (CAP), without setting and enforcing strict environmental policies and measures against nutrient overload, the authorities are promoting nutrient-intensive farming – Eutro-farming – and in effect causing the problem.

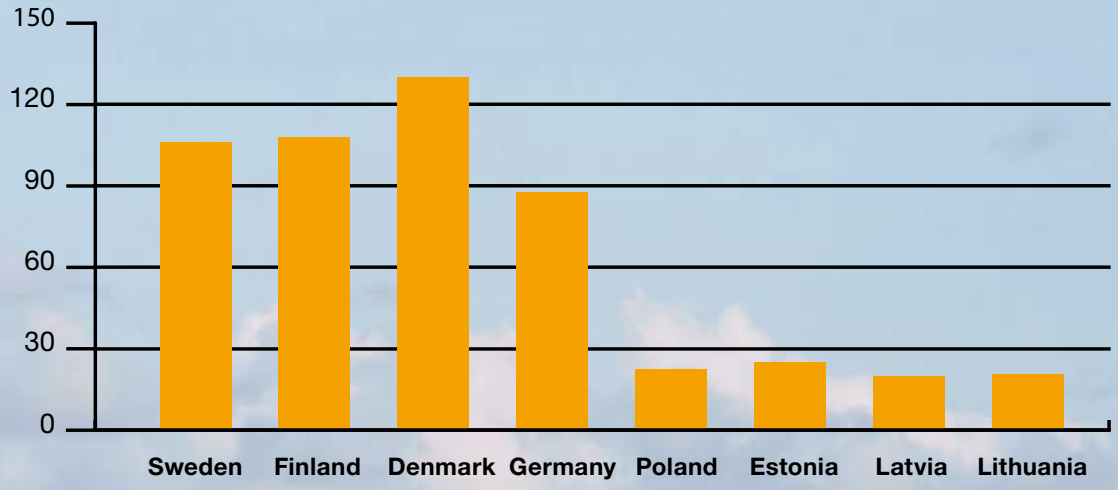
In fact, by tracing the money from the tax-payer, via the EU CAP budget to agricultural subsidies in the Baltic Sea Countries, one can establish how much each tax-payer in each country around the Baltic is unwittingly contributing to Eutro-farming and ultimately to Baltic Sea eutrophication. On average, every single person in the region contributes €65 a year in taxes that promote Eutro-farming and the eutrophication of the Baltic Sea.

No one actually wants to cause the eutrophication of the Baltic Sea or to contribute to the kind of farming that plays a large part in creating it, but modern European farming operates in a subsidy-driven market where actors act rationally to increase yields and profits.

Numerous measures are needed to reverse the Baltic Sea's increasing eutrophication. Even though there are areas where more research is required, we already know more than enough to start acting on the problem today.

It is now a matter of the highest urgency that the EU and its Member States develop and implement regulations and policies that end subsidies to Eutro-farming and instead direct their support to sustainable farming methods that avoid nutrient run-off that is dangerous to the Baltic Sea.

This report summarizes and explains some facts and figures used in WWF's eutrophication campaign. It is not an empirical analysis but rather a compilation of information that already exists in the public domain.



In 2005, the European Union gave €11.6 billion in subsidies to farms in the eight Baltic member states. A mere 10% of this supported sustainable practices so the rest, €10.4 billion, went to Eutro-farming. On average, every person in the region contributed €65. Since the amount of subsidies contributed by each member state differs greatly, as do the sizes of the population, the subsidy per citizen varies. Per capita tax payments to Eutro-farming from Swedes, Finns and Danes were €106, €108 and €130 respectively, while payments from citizens in the new EU member states were roughly €20 per person. Source: European Commission and www.farmsubsidy.org

1. THE CATCHMENT AREA

The Baltic Sea is surrounded by nine countries, all of which, apart from Russia, are EU Member States. The sea also drains approximately a third of Belarus and parts of Ukraine, Slovakia and the Czech Republic and is virtually the sole recipient of drainage water from Finland, Estonia, Latvia, Lithuania and Poland. Sweden, Denmark and Germany also drain into the North Sea and the Kattegat, and in Germany's case only a minor part of its waters drain into the Baltic.

The Baltic Sea has a surface area of 420,000 km² and a catchment area extending over some 1.7 million km², and is home to nearly 90 million people. The population densities in the region vary from more than 500 inhabitants/km² in the urban areas of Poland, Germany and Denmark, to less than 10 inhabitants/km² in the northern parts of Finland and Sweden. There are 11 cities with more than 500,000 citizens in the catchment area, and almost 15 million people live within 10 km of the coastline. Nutrients and hazardous substances from cities, farmland, commercially managed forests, industry and power plants, transport and other human activities from the entire catchment area drain into the sea. Pollutants from an even larger area can enter the Baltic Sea from the air. Emissions and discharges from shipping and fish farms also enter the sea directly.

2. EUTROPHICATION

The Baltic Sea is heavily contaminated by nutrients: mainly nitrogen and phosphorus, which cause eutrophication, algal blooms and a range of serious problems for the ecosystem and the people living around, and earning a living from, the sea. When large quantities of nutrients enter its waters, the sea becomes fertilised, over-stimulating the growth of naturally occurring algae.

The presence of massive quantities of nutrients promotes excessive plant growth and decay and severely reduces the general water quality. The enhanced growth of choking aquatic vegetation or phytoplankton because of the eutrophication disrupts the ecosystem's normal functions, causing a variety of problems. One of the most obvious is the yearly occurrence of algal blooms, a seasonal rapid increase in the amount of algae, in the Baltic Sea. Algal bloom concentrations can reach millions of cells per millilitre. As more algae and plants grow, others die and this dead organic matter becomes food for the bacteria that decompose it. With more food available, the bacteria increase in number and use up the dissolved oxygen in the water. As the oxygen levels decrease, fish, and other aquatic organisms which need this oxygen, die. This has resulted in huge areas of marine wasteland and approximately 70,000 km², or about one sixth of the Baltic Sea, now consists of these dead, oxygen starved zones.

Algal blooms are also a concern as some species of algae produce neurotoxins. At the high cell concentrations reached during some blooms, these toxins can have severe biological impacts on marine fauna and on humans.

3. OVERLOADING THE BALTIC

The predominant nutrients are nitrogen and phosphorus. In 2000, an estimated 1,010,000 tonnes of nitrogen and 34,500 tonnes of phosphorus were deposited into the Baltic Sea[1]. Nearly half of this originated from the agricultural sector, while the rest originated from other human activities such as poorly treated sewage, industrial processes, traffic and forestry, and various natural sources.

Where and how agriculture is practiced in the Baltic Sea region is more or less in the hands of the landowners and the market. Traditional physical and spatial planning has very little to do with where and how things are now produced. At the same time it is an accepted fact that agricultural run-off depends on what is grown, how it is grown, and what soil it is grown in, as well as on the climatic and hydrological conditions. Without a functioning policy with requirements to set aside certain areas where farming is not permitted, to restore freshwater ecosystems or to ban certain farming methods in certain areas, the problem will only continue to grow.

4. EUTRO-FARMING

Another important issue is the high level of artificial fertiliser now being used in agriculture. Fifty years ago farms mainly made use of the nutrients they produced, such as manure, by putting it back into the soil. However, following the extensive industrialisation of farming in Western Europe during the 1960s and 1970s, farms began using artificial fertilisers instead, increasing the amount of nutrients put into the system. From 1950 to 1980, the amounts of nitrogen and phosphorus used increased dramatically in proportion to their outputs in the form of agriculturally produced foodstuffs, creating a nutrient surplus.

The difference between the amounts of nutrients needed to support agricultural plant growth and the export of agricultural products creates a surplus which is offloaded onto the environment and subsequently deposited in the Baltic Sea. The largest surplus is in Denmark, Sweden, Finland and in the West of Germany, all countries which have predominantly fertiliser-intensive farming. The new Member States have so far used significantly smaller amounts of artificial fertilisers but are rapidly catching up.

Between 2002 and 2004, the eight Baltic Sea countries had an average total surplus of 56 kg of nitrogen and 11 kg of phosphorus per hectare per year[2]. This demonstrates that the nitrogen available from manure and other farming products and processes could be sufficient if it were used efficiently instead of being treated as a cheap and abundant commodity or even considered a waste product. The use of mineral fertilisers, certainly in some countries and possibly around the Baltic as a whole, could be dramatically reduced or even abolished without causing a shortage of nitrogen. The use of phosphates from mineral fertilisers could also be substantially reduced without ill effects.

Today, agricultural policy promotes the intensification and concentration of agricultural production with enormous local surpluses of nutrients in small areas – a phenomenon we call Eutro-farming. These practices inevitably lead to an excess run-off of nitrogen and phosphorus. The solution is to use less or no artificial fertilisers and to balance the number of animals per farm with the acreage of available land on which to spread fertiliser.

From 1950 to 1980, the inputs of nitrogen and phosphorus increased strongly in relation to their outputs in the form of agriculturally produced foodstuffs, creating a nutrient surplus.

5. THE NITROGEN AND PHOSPHORUS VILLAINS

The amounts of nitrogen and phosphorus deposited in the Baltic Sea vary widely between different EU Member States. In absolute terms, most of the nutrients come from Poland, followed by Sweden and Finland. However, on a per capita level, Finland, Sweden and the Baltic states seem to be the worst culprits, as Polish agriculture deposits are only 25-50% of what is released per capita in Finland, Sweden and the Baltic states. Per hectare of farmland, the surplus of nitrogen is also higher in Sweden, Finland and Denmark. As some of the countries also have other drainage areas apart from the Baltic Sea, the figures for nutrient run-off into the Baltic for Denmark are not conclusive, and cannot be calculated for Germany as only a small part of the country drains into its waters.

To receive support under the CAP, farmers are in theory obliged to fulfil the demands of certain EU directives, such as the Nitrate Directive, in a system of cross-compliance (a requirement to comply with environmental and other regulations in order to receive support). However in practice the Nitrate Directive is ineffective in large parts of Sweden and Finland since the levels of nitrogen allowed are too high, while other countries, such as Denmark, are granted exceptions. A further failing is that the Nitrate Directive only covers nitrogen, but for the current Baltic Sea nutrient problem, and the algae blooms, the level of phosphorus is a key factor in most regions. Consequently, a binding phosphorus regulation with strict limits is essential to limiting the problem of eutrophication.

TABLE 2: DEPOSITION OF NITROGEN (N) AND PHOSPHORUS (P) TO THE BALTIC 2000 BY EU MEMBER STATES, TONNES, ALL SOURCES

Country	N total	N, kg/person	P	P, kg/person
Sweden	168,153	18.7	4,969	0.56
Finland	103,939	20	4,840	0.93
Denmark	80,724	14.9	1,857	0.34
Germany	71,745	—	487	—
Poland	226,136	5.9	12,645	0.33
Estonia	28,924	20.7	965	0.69
Latvia	70,073	30,5	2,207	0.96
Lithuania	50,775	14,5	1,896	0.54
Total	800,469		29,886	

Source: Helsinki Commission: Baltic Sea Environmental Proceedings 100: Nutrient Pollution to the Baltic Sea 2000, tables 4,5 and 10.

6. SUBSIDIES

Agriculture is undeniably responsible for a substantial part of the nutrient overload that is causing this eutrophication. This would be bad enough if it were caused by a market where pollution was simply a by-product, but in this case the polluter is even being paid by governments in the EU Member States and by the EU itself to pollute. By providing large subsidies to agricultural practices through the Common Agricultural Policy (CAP) without setting and enforcing strict environmental policies and measures against nutrient overload, the authorities are in effect causing the eutrophication: they are feeding the monster.

The OECD (1998) has defined environmentally harmful subsidies as: “all kinds of financial supports and regulations that are put in place to enhance the competitiveness of certain products, processes or regions, and that, together with the prevailing taxation regime, (unintentionally) discriminate against sound environmental practices.”[3]

With this definition, payments under the CAP may be considered to constitute one of the largest environmentally harmful subsidies (EHS) in place in the EU and perhaps anywhere in the world.

7. FARM SUBSIDIES IN THE BALTIC EU REGION

The European Union subsidises agriculture by a range of payments through the CAP. In total, yearly CAP payments to farms and associated businesses in the EU Member States amount to €50 billion. This equals 34% of total farm revenue.

In 2005 the eight Baltic EU Member States paid a total of €29 billion in membership fees to the Union. Out of this, roughly €14 billion were contributions to the CAP, in other words, farm subsidies. Every citizen in the Baltic region paid an average €95 to farm subsidies in the Union.

The same year, these countries received €11.6 billion in CAP spending on domestic agriculture and associated sectors. The citizens in these countries thus contributed on average €72.13 per person to farming in the region through CAP payments. Obviously CAP contributions and population sizes differ greatly in the different countries and so the level of subsidy per citizen varies a great deal; payments from Danes, Finns and Swedes were €144, €120 and €118 per citizen respectively, while payments from Latvians and Lithuanians amounted to €22 and €23 per person (table 3).

Of course, a substantial amount of the citizens and farms in some of these countries, such as Germany, are located outside the Baltic Sea drainage area. However, this does not necessarily have any effect on the average per capita payment levels.

TABLE 3: MEMBER STATE CONTRIBUTIONS TO CAP, SPENDING ETC, 2005, MILLION EUROS

Country	CAP contribution	CAP spending	Population	CAP spend p.p. (€)*
Sweden	1,287	957	9	118.06
Finland	755	904	5.2	119.87
Denmark	945	1,228	5.4	144.48
Germany	9,727	6,522	82.5	97.34
Poland	1,148	1,542	38.2	24.81
Estonia	47	77	1.4	27.72
Latvia	61	118	2.3	21.90
Lithuania	97	266	3.5	22.88
Total/average	14,067	11,614	147.5	72.13

** CAP spending per person, calculated as average citizen spending on payments through CAP in the Baltic region*
Sources: EU-upplysningen and Farmsubsidy.org

Regulations and standards on farming in the catchment area must be increased to a level where only sustainable eutrophication is accepted.

8. SUBSIDIES ON FARM LEVEL

Without subsidies through the CAP, many European farms would have difficulty surviving. The European agricultural sector is protected against international competition and kept alive through payments made from a range of contributions under the current system. This becomes even more obvious when considering the EU contributions on an individual farm level (table 4).

TABLE 4: AVERAGE ANNUAL CAP SUBSIDIES TO FARMS, ACREAGE AND WORKERS, EUROS 2005

Country	Payment per farm	Payment per hectare	Payment per farmworker
Sweden	12,618	272	12,143
Finland	11,127	370	11,127
Denmark	20,759	382	16,755
Germany	14,357	348	8,588
Poland	652	87	647
Estonia	1,922	92	1,895
Latvia	915	71	825
Lithuania	814	85	997

Source: Farmsubsidy.org

9. SUBSIDIES FOR EU-TROPHICATION

The subsidies mentioned above cover all forms of support from the EU to farmers and their organisations, and in turn reflect a wide variety of services farmers provide to the rest of society, in addition to food production. This means that the support they receive cannot be seen as dedicated to specific uses, such as mineral fertilisers.

However, it would be irrelevant to split hairs as to how much of these subsidies are in effect used in practices that contribute to eutrophication of the Baltic Sea. In essence, any and all farming that does not have sufficient restrictions on the use and releases of nutrients, contributes to the problem. Only a very small portion, about 10%, of the subsidies are used for measures to reduce the environmental impact of farming. This means that approximately 90% of all farming subsidies in the Baltic catchment area, $10.4 billion per year, are allocated to Eutro-farming as an EHS. This is truly a case of EU-trophication.

It should also be noted that no farmers actually want to cause eutrophication through the release of nutrients. They operate in a system that forces them to compete and increase their revenues and yields, and which does not set stringent demands for environmental performance. Any single farmer, who sets higher standards than others, will immediately become less competitive. EU-farming is a political problem and can only be solved on the political level by a fundamental re-orientation of the subsidies.

TABLE 5: SHARES OF SUBSIDIES TO SUSTAINABLE AGRICULTURE AND EUTRO-FARMING, PER CITIZEN

Country	CAP spend	To sustainable agriculture	Eutro-farming
Sweden	118.06	11.80	106.25
Finland	119.87	11.99	107.88
Denmark	144.48	14.45	130.03
Germany	97.34	9.73	87.61
Poland	24.81	2.48	22.33
Estonia	27.72	2.77	24.95
Latvia	21.90	2.19	19.71
Lithuania	22.88	2.29	20.59
Average	72.13	7.21	64.92

Sources: Farmsubsidy.org, European Commission

10. CLEAN SUBSIDIES AND ACTION

It can be argued that the European agricultural sector needs the support and protection of a system of subsidies. Undeniably the sector provides valuable services in food production and, additionally, in the preservation of landscapes and biodiversity. Many, if not all, governments have financial systems in place to increase the competitiveness and productivity of farms. In fact, every year the OECD countries give subsidies amounting to some $300 billion to different economic sectors.

However, such a system of subsidies need not be as environmentally harmful as the CAP is to the Baltic Sea today. In fact, the EU Commission has identified EHS as an unwanted political driving force and has a Working Group looking at the issue.

In general, the CAP needs revising so that it is targeted towards sustainable and non-eutrophying agriculture, and financial subsidies should be made dependent on environmental performance. While to some extent this is formally the case today through the demands for cross-compliance, the demands are too low, performance is not monitored, and transgressions are not sanctioned. The system of cross-compliance must be strengthened, monitored and enforced.

Such a system would have extraordinarily strong support from European citizens. In a recent EU poll (Special Eurobarometer 276), the European public overwhelmingly endorsed the use of cross-compliance regulations to promote environmental standards. Over eight in every ten (83%) respondents said that they believe it is justified to reduce direct payments to farmers, should they fail to respect environmental standards.

In the summer vast areas of the Baltic Sea are covered by a greenish toxic slime. This satellite photo from NASA shows the algal bloom in the Baltic Sea on July 11, 2005.

11. SOLUTIONS

It is now of the highest urgency that the EU and its Member States develop and implement regulations and policies that prevent subsidies being paid for agricultural practices that contribute to the eutrophication of the Baltic Sea.

To begin with, there should be no agricultural subsidies without full cross-compliance with all existing environmental EU directives, in particular the Nitrates Directive and the Water Framework Directive. Comprehensive monitoring schemes and sanctions for countries that do not follow such regulations and standards must be implemented and enforced.

Secondly, regulations and standards for farming in the catchment area must be increased to a level where only a sustainable level of eutrophication is accepted. Revision and regionalisation of the Nitrates Directive (including assigning the whole catchment area as a nitrogen-sensitive area) together with an agreement on a Phosphorus Directive are important steps. Regulations must also be put in place to prevent hidden subsidies for unregulated increased production, for example from the rural development programme or structural funds.

In order to achieve progress in the short and mid-term perspectives, the relevant Member States must protect, and the EU must encourage, the restoration and creation of wetlands and freshwater ecosystems where these are effective to reduce nutrient run-off, and they must implement a substantial general tax on the use of mineral fertiliser, at least in the Baltic region. A few countries already have such a tax – albeit too small – where the income from the tax is returned to the farmers for improvements in farming practices and environmental performance.

Good farming practices and regulation of land use for farming must be further developed and implemented in EU as well as in national legislation. This also means that a landscape and catchment-area perspective is needed. Fortunately, there are already several good examples in the region to build from.

Farms and landowners must be required to set aside certain land areas, and authorities need to support the restoration of freshwater ecosystems and ban certain crops or farming practices in certain sensitive areas. Finally, this should all be reflected as a strong element of the Baltic Sea Action Plan that is currently being developed by the Baltic Sea countries within the HELCOM framework.

END NOTES

[1] Helsinki Commission (2005) Baltic Marine Environmental Protection Commission. Baltic Sea Environmental Proceedings, No.100: Nutrient Pollution to the Baltic Sea in 2000 (HELCOM BSEP 100).

[2] Actual results from the EU part supported the project on Baltic Ecological Recycling Agriculture and Society (BERAS). Surplus of plant nutrients in the agriculture of today compared to Ecological Recycling Agriculture (ERA) in the Baltic Sea Drainage area (2002-2004), and Växtnäringens flöde genom jordbruk och samhälle, 2000. Both by Artur Granstedt, Department of Ecology and Crop production, Swedish University of Agricultural Sciences, Uppsala, Sweden.

[3] Carolina Valsecchi, Patrick ten Brink, Malcolm Fergusson, Samuela Bassi, Ian Skinner and Marc Pallemaerts (2007) Reforming Environmentally Harmful Subsidies (EHS) Report to the European Commission, Institute for European Environmental Policy (IEEP), Ecologic, FEEM and IVM 15.

CREDITS

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