

## Executive Summary

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The present Evaluation has two main parts. The first, covering Chapters 1 to 3, describes the structure of the starch industry, both globally and in the Community, and introduces the main policy measures applied to the sector within the Community.

The second part, in Chapter 4 to 7, considers the Questions posed by the Commission for this Evaluation. These focus upon the impact of policy upon the equilibrium in the market; the production channels (the *filière*) from farmer to processor and end-user; upon social and economic indicators of development; and upon the management of the implementation of the measures in the *filière*.

The report finally proceeds to a summary of its conclusions in Chapter 8.

Before introducing the key elements of this Evaluation, it is useful to comment upon the data available on the sector. Both internationally and within the Community, authoritative statistics about the starch industry are rare, in part because starch processors seek to protect their commercial interests by restricting the data that they disseminate. In the EU, however, the Commission regulates important segments of starch production; yet much key information is absent. For example, there is no comprehensive information about starch potato farm areas and yields.

There is also a frustrating lack of long time series of full, detailed foreign trade data relating to the sector, which meant that it has been impossible to derive unambiguous conclusions about important aspects of the Evaluation, such as those about export refunds. In the light of these remarks, it will be no surprise that one conclusion in the final chapter is that the collection and dissemination of data about the sector need to be improved.

### CHAPTER 1: THE STRUCTURE OF THE WORLD STARCH MARKET

Table E1 compares starch production by raw material in the EU, the US and the rest of the world. The US accounts for over half of the world's total output, and, in common with other regions of the world, maize is the main base product. However, the Community makes less than half its output from maize, and is the leader in the wheat and potato starch sectors. The only other major starch in the world is tapioca starch, produced mainly in South East Asia.

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**Table E1: Starch Output by Raw Material in the EU, US and Other Countries, 2000** (million tons)

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	Maize	Potatoes	Wheat	Other	Total
EU	3.9	1.8	2.8	0.0	<b>8.4</b>
US	24.6	0.0	0.3	0.0	<b>24.9</b>
Other Countries	10.9	0.8	1.1	2.5	<b>15.2</b>
World	39.4	2.6	4.1	2.5	<b>48.5</b>

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Source: European Commission (DG Agriculture, Unit C2), United States Department of Agriculture and LMC estimates.

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The main reasons for the larger scale of the US than the EU industry are that the US has a very large isoglucose sector, which has captured a substantial share of the domestic sweetener market from sugar, whereas the EU industry is subject to production quotas, and that the US also has a major starch-based ethanol sector, almost 100 times larger than that in the Community. For other starch-derived syrup products, such as glucose, fermentation products and polyhydric alcohols, EU production is 10% larger than that in the US; in native and modified starches, the Community's lead over the US in total output is 25%.

The Community's share of global starch demand rose from 15.0% to 15.3% between 1995 and 2000, and the annual growth rate in the EU was slightly over 4%. Over the next decade, we expect that the EU demand for starch products will grow at an average annual rate of under 3%, expanding the market from 7.4 million tons in 2000 to 9.8 million tons in 2010.

The Community's share of world exports of starch products in 2000 was just over 25%, but whereas it supplied slightly under a third of total native starch exports, and over a third of modified starch exports, it provided only 13% of global glucose and isoglucose exports.

## CHAPTER 2: COMMUNITY MARKETS FOR STARCH

Table E2 demonstrates that the composition of Community starch capacity and output is shifting steadily away from maize (whose use has grown very slowly) towards wheat as a base product, with both the absolute output and the share of starch potatoes declining since the imposition of production quotas in 1995/96. The economics of the raw materials has favoured the rapid expansion in the wheat starch share in domestic production.

Diagram E1 illustrates the net costs of wheat, maize and potatoes per ton of starch, after subtracting the value of by-product credits from the agricultural crop costs, and demonstrates the persistence of the economic attractions of wheat, which has very valuable by-products, primarily in the form of vital wheat gluten and wheat bran, while starch potatoes have only negligible by-product credits.

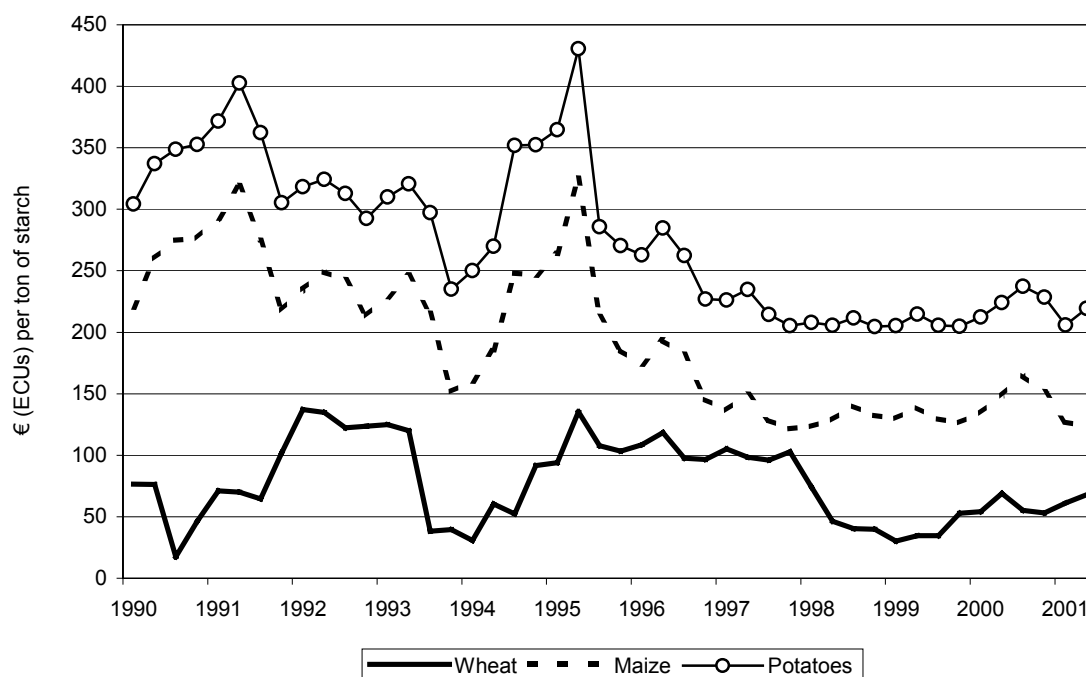
**Table E2: EU Starch Output by Raw Material, 1990-2001** (million tons, native starch)

	Maize	Wheat	Potatoes	Total
1990	3.2	1.1	1.1	5.4
1991	3.5	1.2	1.2	5.9
1992	3.5	1.3	1.5	6.3
1993	3.4	1.3	1.6	6.3
1994	3.4	1.5	1.3	6.1
1995	3.6	1.7	1.6	6.9
1996	3.6	1.8	1.9	7.2
1997	3.7	1.9	1.9	7.5
1998	3.8	2.2	1.7	7.6
1999	3.7	2.5	1.8	8.0
2000	3.9	2.8	1.8	8.4
2001	3.9	2.8	1.7	8.4

Notes: The wheat figure includes other cereals, such as oats, barley and rice.  
The figures refer to the current Community of 15 member states throughout the period.

Source: AAC, AGPM, UFE and LMC internal database.

**Diagram E1: Comparing the Net Costs of Starch Base Products in the Community**



Source: LMC, *Starch and Fermentation Analysis*, various issues, and LMC estimates

Estimates of the composition of starch production in the Community since 1992 are presented in Table E3. The highest growth rate has occurred in the manufacture of modified starches. However, the output of sweeteners (glucose syrups and their derivatives) expanded the most in absolute terms. Even the slowest growing of the three main segments, namely the production of native starches, grew by 25%, rising from 2.0 to 2.5 million tons between 1992 and 2000.

**Table E3: Community Starch Production by Type of Starch Product, 1992-2000**  
(million tons, native starch equivalent)

	Total	Native Starches	Modified Starches	Sweeteners
1992	6.3	2.0	1.2	3.1
1993	6.3	1.9	1.2	3.1
1994	6.1	1.7	1.2	3.2
1995	6.9	2.2	1.3	3.4
1996	7.2	2.0	1.6	3.7
1997	7.5	2.0	1.6	3.8
1998	7.6	2.0	1.6	3.9
1999	8.0	2.3	1.8	3.9
2000	8.4	2.5	1.9	4.0

Sources: LMC estimates based partly upon AAC and European Commission data (DG Agriculture, Unit C2).

### CHAPTER 3: POLICY IN THE EU STARCH SECTOR

The policies applied to the starch sector are regulated within the framework of the Common Market Organisation for Cereals. This helps to determine the domestic prices for cereals and starch potatoes, and also sets the area payments made to cereal farmers and their counterpart (direct payments to growers) for starch potato farmers. In addition, it regulates the system of production and export refunds for starch products.

The starch potato sector is covered by the CMO, but many of the measures that govern aspects of starch potato production and processing are specific to the sector. The minimum price paid for potatoes is linked in a fixed relationship to the intervention price for cereals. Until 1999/2000, there was also a fixed relationship between the direct payment to the growers of starch potatoes and the area payment for cereals; but from 2000/01 onwards, potato growers have received more generous compensation than cereal farmers for the Agenda 2000 intervention price cuts.

Since 1995/96, national production quotas have governed starch potato output, and since then, with the exception of the weather-affected 1998/99 crop year, total Community potato starch output has typically been very close to the overall quota.

Quotas were introduced after the failure of earlier warnings from the Council of Ministers that output should be capped voluntarily, after a period of rapid expansion. Table E4 describes the trend in national quotas, and reveals both the initial growth in the German quota (as the reserve, established to allow for irreversible investments and for the effects of modernised East German factories coming on stream, was subsequently incorporated into its quota) and the recent reductions in the national quotas. These reductions were made to the quotas so as to offset the additional budgetary costs caused by the higher level of compensation granted to potato farmers (via direct payments) than to their cereal counterparts for the intervention price cuts that were made under the Agenda 2000 reforms.

**Table E4: Potato Starch Quotas and Production Reserve, 1995/96-2001/02** ('000 tons of starch)

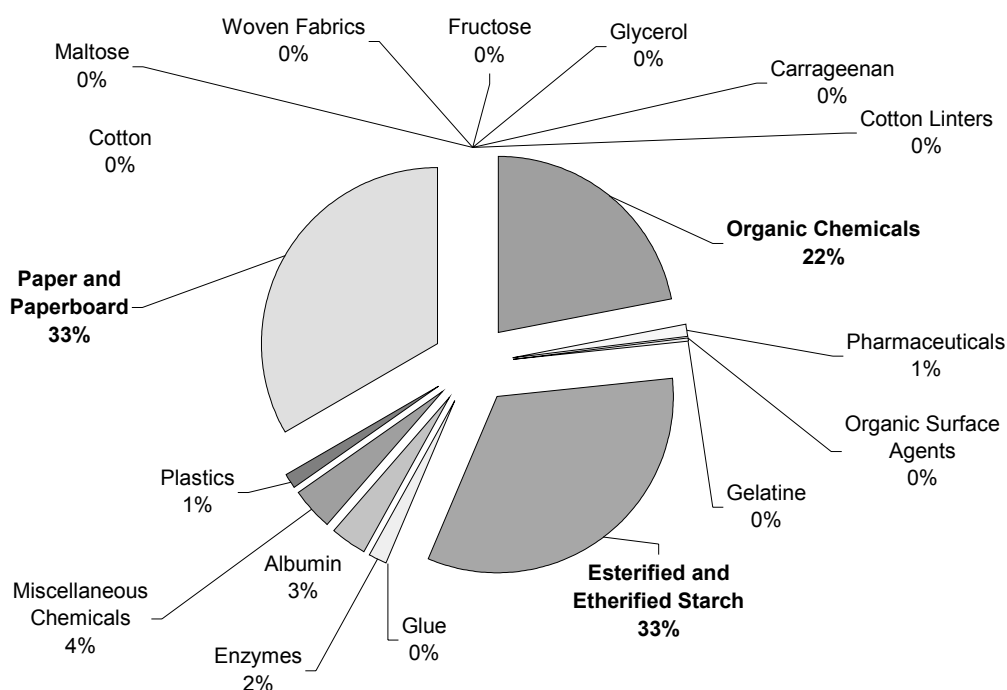
	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02
Denmark	178	178	178	178	178	173	168
Germany							
Quota	592	592	696	696	696	677	656
Reserve		105					
Spain	2	2	2	2	2	2	2
France	282	282	282	282	282	274	265
Netherlands	538	538	538	538	538	523	507
Austria	49	49	49	49	49	48	48
Finland	55	55	55	55	55	54	53
Sweden	64	64	64	64	64	63	62
Total Quotas	1,760	1,760	1,864	1,864	1,864	1,814	1,762
Reserve		105					
<b>Combined Total</b>	<b>1,760</b>	<b>1,864</b>	<b>1,864</b>	<b>1,864</b>	<b>1,864</b>	<b>1,814</b>	<b>1,762</b>

Source: European Commission (DG Agriculture, Unit C2).

The system of production refunds is an important element of the policy affecting the starch sector. Refunds are provided to starch end-use companies that produce approved products, namely those products that receive little or no import tariff protection from imports of competing products made outside the Community. The refunds are intended to provide local end-users making these approved products with compensation for the difference between the price of the cereals incorporated into EU starch and the price of cereals incorporated in the starch used in the manufacture of approved products in third countries. The production refunds take US Gulf export prices as the relevant world market price for reference, and take account of the freight costs that are incurred to bring US maize into the Community.

Diagram E2 depicts the allocation of production refunds by end-use sector. Just three end-uses dominate: paper products, the group of esterified and etherified modified starches (the so-called esters and ethers), and organic chemicals. The esters and ethers are intermediate products, whose largest single customer is the paper industry, which is therefore, directly and indirectly, the most important recipient of production refunds.

**Diagram E2: Production Refunds by End-Use, 2000/01**

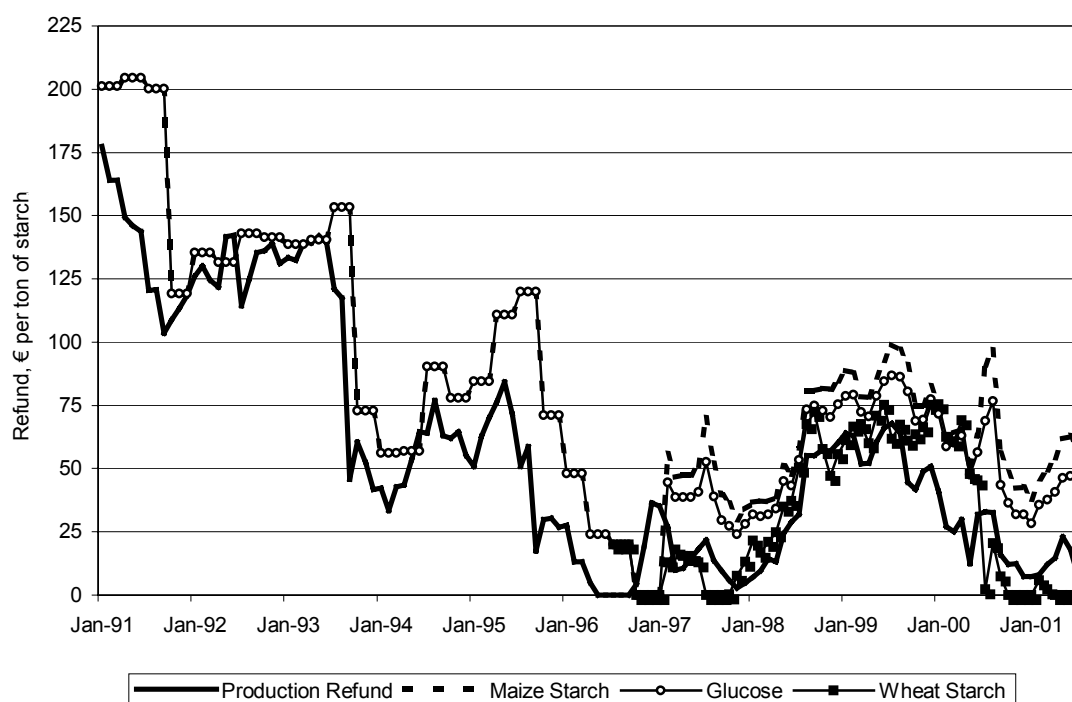


Source: European Commission (DG Agriculture, Unit C2).

Export refunds are provided to compensate for the effect of cereal price differences in the competition that occurs in third country export markets for starch-containing products. The relevant price difference is considered to be that between the f.o.b. prices in EU export ports and in the US Gulf. The categories of products that are eligible for export refunds are the Annex I basic agricultural products, listed in Article 32.3 of the Treaty of Amsterdam, and the non-Annex I more processed products, originally defined in Council Regulation 616/66.

In July 2000, the range of products entitled to non-Annex I export refunds was reduced. A significant change affecting starch products was the removal of the right to residual export refunds (i.e., incremental refunds on top of production refunds) from all approved products, with the sole exception of the category of the esterified and etherified modified starches.

**Diagram E3: Production Refund (for All Starches) and Export Refunds for Maize and Wheat Starch, and for Glucose, January 1991-July 2001 (€ per ton)**



Source: European Commission (DG Agriculture, Unit C2).

Diagram E3 plots the production and export refunds for starch products since January 1991. Production refunds are the same for all base products, but are calculated solely in terms of maize. Separate export refunds are fixed for wheat starch and maize starch (whose refund is applied to potato starch). In addition, the export refund for glucose is derived via a mixed calculation as a weighted average of the refunds for maize and wheat starch. The production refund has always been below the export refunds for maize starch and for glucose, but there have been occasions when the wheat export refund has been below the production refund.

The budgetary cost to the Commission of measures specific to the starch sector is summarised in Table E5. It should be noted that the costs incorporated into the table include the production and export refunds on cereal starches, but take no account of the area payments to which the growers of cereals are entitled, since these payments would be made whether or not the cereals that the farmers harvest are processed into starch, and thus are not viewed as a cost that is specifically attributable to starch production. For starch potatoes, the costs included in the table are those for production and export refunds, as well for specific starch potato measures, in the form of the starch premium payments made to potato starch producers and the direct payments made to starch potato growers.

The total budgetary costs listed in Table E5 were highest in 1993. Between 1994 and 2000, they first fell, before rising and virtually regaining the 1994 level in 2000. (A major reason for the flat cost trend is that area payments for cereals have not been included, since they are not specific to the starch sector; but some non-starch export refunds are included; thus, the values should be viewed only as indicative of trends.) Because of the growing role played by direct payments to potato growers within the overall total, specific payments made to the potato starch sector have risen considerably since 1993, while those on cereal starches have fallen. Also, as intervention prices for cereals have been reduced and brought closer to world market levels, the outlays on production and export refunds have shrunk significantly.

**Table E5: The Budgetary Costs of the Measures Specific to the Starch Regime, 1993-2000** (million Euros)

	1993	1994	1995	1996	1997	1998	1999	2000
<b>Total Export Refunds on Annex I Processed Products by Raw Material</b>	<b>432.34</b>	<b>234.90</b>	<b>188.00</b>	<b>85.94</b>	<b>92.18</b>	<b>83.96</b>	<b>127.24</b>	<b>143.02</b>
of which: Maize	363.02	133.83	81.50	45.62	35.61	26.62	41.98	48.36
Wheat and Other Cereals	69.32	101.07	72.10	18.73	37.71	40.23	55.59	57.17
Potato	-	-	34.40	21.59	18.86	17.11	29.68	37.49
<b>Total Export Refunds on non-Annex I Processed Products by Raw Material</b>	<b>43.75</b>	<b>25.67</b>	<b>39.12</b>	<b>12.07</b>	<b>19.99</b>	<b>31.07</b>	<b>39.33</b>	<b>41.50</b>
of which: Maize	27.25	17.60	26.84	9.31	15.26	24.22	30.07	28.95
Wheat and Other Cereals	2.51	1.27	0.98	0.14	0.23	0.80	1.65	2.79
Potato	13.98	6.81	11.30	2.61	4.51	6.05	7.62	9.76
<b>Total Production Refunds by Type of Starch</b>	<b>363.64</b>	<b>185.72</b>	<b>132.40</b>	<b>96.92</b>	<b>59.69</b>	<b>49.54</b>	<b>169.25</b>	<b>168.15</b>
of which: Maize	305.29	95.39	102.60	55.43	33.68	27.99	86.31	94.04
Wheat	14.19	24.94	29.10	13.73	7.60	7.02	27.52	25.52
Other Cereals			0.50	0.46	0.19	0.31	0.50	0.82
Potato	44.17	65.40	0.20	27.30	18.22	14.23	54.92	47.76
<b>Total Specific Potato Starch Expenditures</b>	<b>51.98</b>	<b>100.32</b>	<b>182.80</b>	<b>177.08</b>	<b>208.56</b>	<b>204.36</b>	<b>182.90</b>	<b>193.19</b>
Potato Starch Premium	36.65	100.32	71.90	36.10	42.41	41.64	37.27	39.10
Direct Payments to Potato Farmers			54.70	140.98	166.15	162.72	145.63	154.09
Other Payments to the Potato Starch Sector	15.34		56.20					
<b>Total Costs by Raw Material</b>	<b>891.72</b>	<b>546.61</b>	<b>542.32</b>	<b>372.00</b>	<b>380.42</b>	<b>368.94</b>	<b>518.73</b>	<b>545.85</b>
of which: Maize	695.57	246.82	210.94	110.36	84.55	78.84	158.36	171.35
Wheat and Other Cereals	86.01	127.27	102.68	33.06	45.73	48.35	85.25	86.30
Potato	110.13	172.52	228.70	228.59	250.14	241.75	275.12	288.21

Note 1: The only costs included in this table are those considered to be specific to the starch regime. Hence, they exclude area payments to cereal farmers supplying starch processors.

Note 2: The non-Annex I export data were only provided in detail for 1999 and 2000. In the previous years, we have only been able to obtain volume data. We have assumed in this table that the average export refund paid per ton of starch used in non-Annex I products moved exactly in parallel with the export refund on maize starch in the same year.

Note 3: Non-Annex I export refunds have been allocated between maize and wheat on the basis of the division of export tonnages of non-Annex I products as wheat or maize in origin.

Note 4: The official statistics only give two categories for non-Annex I products, wheat and maize, because potato starch receives exactly the same export refund as maize starch. This table assumes that potato starch export refunds for the non-Annex I products are exactly half of the refunds paid on non-Annex I exports of modified starches.

Note 5: The Annex I export refunds for maize and wheat include important non-starch items, notably refunds on compound animal feed (for maize) and on wheat flour and durum wheat semolina (for wheat). These represent a significant proportion of the total export refunds, but the data were not available to enable us to exclude these refunds from the totals.

Note 6: Export refunds for glucose products are all allocated to the maize line in Annex I processed products by convention. Data are not available to allow us to identify them separately.

Note 7: Because of the various qualifications mentioned in the previous Notes to this table, the rows in this table should be interpreted as indicative of the underlying trend, rather than a precise indication of the costs attributable to specific policies applies to the starch sector.

Source: FEOGA and DG Enterprise

## CHAPTER 4: THE IMPACT OF POLICY ON THE STARCH MARKET EQUILIBRIUM

The Questions in Chapter 4 in relation to the starch market equilibrium were as follows:

*4.1: To what extent did the production refund ensure an outlet for Community starch products among producers of approved products?*

*4.2: To what extent did the export refunds ensure an outlet for the Community starch products?*

*4.3: Did the production and export refunds play a significant role in the demand for Community base products?*

*4.4 Did the amounts of the production and export refunds ensure at a reasonable cost an outlet for the Community starch products?*

These Questions raised complex issues, for example, the final question was divided into three further lengthy subsidiary questions about the suitability of a single production refund for all base products; the suitability of the same export refund for maize and potato starches; and the suitability of a single export refund for glucose.

In the case of production refunds, the conclusion that was drawn was that the refunds have broadly maintained the outlets for Community starch products among producers of approved products, since such producers continue to rely overwhelmingly upon domestic starch products for their starch inputs. If one assesses success in terms of maintaining the domestic market shares of local producers of the approved products, the conclusion is often different. For some organic chemicals, such as lysine and citric acid in particular, the share of indirect imports of starch products in the Community market has risen considerably, in the form of rising imports of approved products.

For export refunds, it was concluded that the refunds have also played an important role in helping to maintain outlets for Community starch products. However, although outlets in one of the most important starch-using export sectors — the paper industry — have been maintained, it was felt that the industry does not gain any significant benefit from export refunds. A surprising result revealed by the Comext export data (but which is unclear from the more limited export licence data that were available for the Evaluation) is that there is a clear empirical link between the level of export refunds and the incentives to export starch products, apart from potato starch.

The Evaluation concluded that production and export refunds had a significant effect upon the demand for the main base products, namely maize, wheat and starch potatoes, grown within the Community. Recently, 16% of total maize production, 5-6% of total common wheat output and the entire production of starch potatoes were processed into starch. These proportions translate into a demand for approximately six million tons of maize, five million tons of wheat and nine million tons of potatoes.

The reasonableness of production and export refunds was questioned in a few cases. For example, whereas the appropriate production refund for potato starch was found to be the same as that for maize, it was concluded that the refund for wheat should be determined separately, and would be typically slightly lower. Yet, comparisons of export prices of potato and maize starch implied that potato starch warranted a lower export refund than maize starch. The single export refund for glucose was supported, since it is nearly impossible to distinguish at a reasonable cost the base product used, but it was argued that the 25:75 wheat:maize mixed calculation that determines the refund should be revised to give equal weight to the wheat and maize starch refunds.



## CHAPTER 5: THE IMPACT OF POLICY ON PRODUCTION CHANNELS

The main Questions in relation to the policy on production channels were as follows:

*5.1: Did the support measures for potato starch contribute significantly to maintaining the potato starch production channel?*

*5.2: Did the measures for the potato starch sector ensure at a reasonable cost the competitiveness of the Community market for potato starch versus grain starches?*

*5.3: Did the production and export refunds on starch products contribute at a reasonable cost to maintaining the channels of production and use of native products?*

The Evaluation concluded that the support measures for the potato starch sector have made starch potatoes more attractive to farmers than alternative crops and provided profits to processors in most years. There was a degree of excessive investment in the sector in the early 1990s, reflected in a sharp expansion in potato starch capacity. The imposition of production quotas halted further heavy investment in the sector, but evidence of the continuing attraction of starch potato output is provided by the decision of farmers and processors to produce up to the quota limit, supported by indications that starch potatoes are more profitable than the main alternative crops (in Germany, some growers make specific yearly payments for starch potato delivery rights).

The direct payments to starch potato farmers have created two forms of divergence between the treatment of starch potato and cereal farmers. One is through the higher compensation granted to potato farmers in the Agenda 2000 reforms; the other is that, while the same reforms have harmonised area payments per hectare for cereals and oilseeds, the total direct payments per hectare of starch potatoes will, by 2002/03, typically be €400 higher than the area payments per hectare for the main arable crops.

Among some end-users, there is perceived to be a bias towards export sales and away from local sales of potato starch, noting the contrast between the declining and small share of the domestic starch market supplied by potato starch (16.5% in 2000), and its continuing high share of the total EU export sales of starch products (over 50%).

Industrial users of starch with the highest value added per Euro of production or export refund have the least need for refunds, since starch is a minor cost item. This applies to paper makers, for example. For some organic chemical companies, by contrast, refunds are a cost effective means of securing domestic outlets for local starch. It is recommended that there should be threshold levels for the share of starch costs in the value of end-products, below which production or export refunds would not be granted. Also, there is no reason to treat producers of protected products more generously than the producers of unprotected products in the refunds that they receive when exporting.

The Inward Processing Regime (IPR) is very little used in the Community starch sector, partly because of the restrictions that surround its use. Accordingly, it is not really an alternative under present circumstances to the current system of export refunds.

Including by-product credits in export refund calculations makes a modest difference to estimates of the appropriate level of refunds. It should be noted that the compensation should not aim to bring net wheat costs (net of by-product credits) down to the same level as maize. Its objective is to compensate for differences between base product prices within the Community and in the main competitor countries in export markets. If the net cost of wheat (net of by-product credits) per ton of starch is often lower than the net cost of maize, this is to be regarded as a reflection of the commercial realities of the cost competitiveness of wheat over maize as a starch raw material in the Community.

## CHAPTER 6: THE IMPACT OF POLICY ON INCOME AND RURAL DEVELOPMENT

The Questions regarding the impact of policy on income and rural development were:

*6.1: Did the grain and potato starch regime contribute significantly to supporting the income of farmers concerned, in particular of the starch potato producers? The role of the production structures will be examined in particular.*

*6.2: Did the grain and potato starch regime contribute significantly to supporting the income of the rural population in the areas concerned?*

*6.3: To what extent did the Community policy for the grain and potato starch sector contribute to the economic and social development of the rural areas concerned?*

*6.4: Did the Community policy for the sector of grain and potato starch contribute at a reasonable cost to the development of the rural areas concerned?*

The starch potato regime definitely helped to support the income of starch potato farmers; the major role played in processing by cooperatively owned factories reinforced this conclusion. The policy for cereal starch, however, has no significant influence on the income of cereal farmers in starch producing areas. This is partly because it is impossible to know exactly from which areas domestic cereal starch processors obtain their raw materials. Therefore, it is very difficult to relate the activities of the starch industry to specific income benefits in well defined rural areas. Accordingly, we cannot draw any conclusion whether the measures related to cereal starch production influence the incomes of the rural populations concerned in the production of the grain used by the starch sector.

From the regional data that is analysed in this Evaluation, and which relate to fairly large geographical regions, one cannot draw any firm conclusion either as to whether the presence of a starch potato industry contributes significantly to supporting the income of the rural population, or whether it contributes significantly to the economic and social development in the starch potato producing regions.

The costs of support to the potato starch sector include a degree of deadweight in two main respects. One is in the determination of export refunds, for which potato starch at present receives the same refund as maize starch. However, the analysis suggests that no residual export refund (over and above the production refund) is warranted on exports of native potato starch, by virtue of the premium that potato starch enjoys over native maize starch in the export market. This corresponds to deadweight of the order of €40 per ton on average on exports of potato starch.

The other element of deadweight in the current measures is provided by evidence of some farmers' willingness to pay an annual fee for starch potato delivery rights in Germany, for example, when such payments are absent from cereal or oilseed production costs. This is interpreted as an indicator of the so-called economic rent, or the extra profit, earned on starch potato farming per hectare.

The average sum paid for these delivery rights in Germany has recently been over €300 per hectare. If this is a fair reflection of the situation in the Community as a whole, this represents three quarters of the additional sum (mentioned in the discussion of Chapter 5) of approximately €400 per hectare (€50 per ton of starch) that growers receive in the form of direct payments associated with planting one hectare of starch potatoes, rather than the area payments that they would receive from planting the same hectare to cereals instead.

## CHAPTER 7: MANAGEMENT METHODS IN THE SECTOR

The Questions posed about the management methods applied to the sector were:

*7.1: To what extent did the starch scale (in French, le barème féculier) in force contribute to the monitoring of the actual Community potato starch production?*

*7.2: Did the technical coefficients in force for the calculation of production and export refunds ensure appropriate compensation of the price differences?*

*7.3: Did the single amounts of export refunds for maize and potato starch on the one hand, and for various types of glucose on the other hand, ensure appropriate compensation of the price differences?*

*7.4: Did the management mechanisms and the administrative systems installed in the grain and potato starch sector, in particular the production quota, the fixing of refunds and the monitoring of licences, ensure efficient management of the sector?*

There are indications that the starch potato payment scale underestimates the actual starch production that is achieved from the potatoes processed for starch. The precise magnitude of the underestimate is difficult to assess, not only because a great deal of the basic data that are needed to undertake the analysis were not available to us, but also because the analysis would need to draw upon specialised technical knowledge.

Therefore, while the *barème féculier* contributes to the monitoring of Community potato starch output, it does not do so as accurately as it could in terms of the overall analysis of supply/demand balances in the sector. In order to ensure that the production quota meets its intended purpose, we recommend that the Commission undertakes a technical review of the actual starch recoveries that are achieved by starch processors using modern technology and amends the *barème féculier* appropriately.

During the course of interviews with processors and end-users, we encountered no evidence that there is any noteworthy disparity between the administrative technical coefficients applied to the administration of refunds and the empirical values of the coefficients with modern processing techniques.

The introduction of different export refunds for potato and maize starch is judged to be economically judicious, since potato starch commands a sizeable premium over maize starch in the export market, but not inside the Community. It is also considered appropriate to amend the mixed calculation for the export refund for glucose and its products to reflect the greater importance of wheat as a raw material in recent years.

The instrument of management that is most widely criticised in interviews in the sector is the T5 Customs document used for esterified and etherified starches. It is seen as an unnecessary administrative burden. However, the system has been needed in the past to avoid fraud, and the ease with which processors could attempt to circumvent the controls in the absence of the T5 form calls for the continuation of such measures.

When the number of jobs in the public and private sectors related to the administration of the measures of the starch regime is compared with the value added in the starch industry, each full-time job corresponds to €1.68 million of value added in the *filière*. This represents a high ratio of administrative staff to the overall value addition. Once one allows for the full costs of such staff and their non-wage expenses, it is conceivable that as much as 5% of the sector's value added could be absorbed in administrative expenses.

## **CHAPTER 8: CONCLUSIONS**

The conclusions will be summarised under three headings: production refunds, export refunds and specific measures applied to the potato starch sector.

### **Production Refunds**

Regarding the application of a single production refund, the Evaluation concludes that it is still appropriate to set the same refund for maize, potato and minor cereal starches. However, a different refund is appropriate for wheat, and this refund, in common with that for maize, should take account of by-product credits.

We also conclude that the definition of approved products for granting production refunds should seek to avoid deadweight by introducing a requirement that the starch content should exceed a minimum threshold, e.g., 5% of the value of the end-product.

We conclude that by introducing different production refunds for wheat and maize, it should be possible to make the whole refund system more flexible in terms of the pre-fixation period for refunds. It would also have the benefit of making the management of export licences more flexible and reduce the need for bureaucratic intervention.

### **Export Refunds**

In keeping with the discussion of production refunds, it is concluded that the export refund calculations for wheat and maize should take account of by-product credits.

As noted in the context of Chapter 5, it is concluded that there is no reason to treat the producers of protected products more generously than the producers of unprotected products in the refunds that they are entitled to receive when exporting their output.

We favour continuing to use a mixed calculation for determining export refunds on glucose, but to do so by applying equal 50:50 weights (as opposed to the current 25:75 weights) to the refunds on wheat and maize starches.

It is noted that Comext export data for Annex I starch export products suggest that there is an empirical correlation between the level of the export refund and the incentives to export native maize and wheat starches, as well as glucose products. This correlation provides a possible indication that these incentives go beyond the full compensation for price differences in base products. Priority should be given to undertaking an analysis of comprehensive export licence data since 1992 for the main starch product categories to determine whether the correlation found in this Evaluation on the basis of Comext statistics applies also to the export licence statistics. If the correlation is also found in the export licence data, the reason for the correlation should be examined to deduce whether it is related to the method employed to calculate the export refund.

### **Potato Starch**

Whereas the study concluded that maize and potato starch should receive the same production refunds, analysis of recent export price relativities suggests that, unlike the case with native maize starch, native potato starch does not require any residual export refund, over and above the production refund, to compensate for price differences.

We also concluded that the potato starch premium has been needed by processors to compensate them for the innate disadvantages they suffer by virtue of the absence of

valuable by-products from potato processing and the shorter campaigns that they have than other starch processors. Evidence provided by the Dutch potato starch industry revealed that the costs of producing potato starch are considerably higher than those of producing cereal starches, caused by these factors.

We examined the annual accounts of a major starch potato company, and concluded that, with the benefit of the starch premium, this company made a profit in four of the latest five years for which results were available; without the premium, it would have made losses in four out of the five years.

The harmonisation of area payments between cereals and oilseeds is an important new element of the CAP. It is recommended that the direct payments to starch potato growers should be reviewed in relation to this new policy. It is considered significant that there is strong evidence of the profitability of starch potato production in the payments made by some farmers for delivery rights, as mentioned above. These exceeded €300 per hectare per annum in our German sample. This figure is to be compared with the estimate in this Evaluation that the budgetary cost of direct payments to starch potato farmers, when expressed per hectare, will, by 2002/03, give rise to the equivalent of close to €400 per hectare higher revenue for starch potato farmers than the average area payments for cereals or oilseeds.

Approximately 20% (€80) of this higher income per hectare is the consequence of the decision to compensate starch potato growers, via the direct payments, for 75% of the intervention price reductions made under Agenda 2000, instead of the 48.4% compensation made to cereal farmers via higher area payments. The remaining €320 or so extra payment is a direct consequence of the higher starch yields per hectare obtained in starch potato cultivation. It is significant that this is close to the magnitude of the payments made for delivery rights by some German starch potato farmers, and suggests that much of the benefit from direct payments is reflected in the higher profitability of starch potato farming, and in the market's valuation of delivery rights.

We conclude from the analysis of budgetary costs that, if one takes account only of the costs of the potato starch premia and of the divergence created in the compensation arrangements for reduction in intervention prices under Agenda 2000 between (a) the 75% compensation criterion adopted for potato direct payments and (b) the 48.4% compensation applied to cereal area payments since 2000/01, then the net budgetary cost to the Commission of creating one full time job in rural areas as a result of the measures in the starch potato sector is currently in the region of €8,000 per annum.

If, instead, one takes the view that, in view of the policy decision to harmonise the area payments for cereals and oilseeds from 2002/03, the appropriate point of reference for budgetary costs is one that measures these costs per hectare of land, the cost of employment generation via the measures in the starch potato sector is much higher. In this case, our analysis in the final chapter concludes that, taking the area payments for cereals as the point of reference for evaluating the opportunity costs to the Commission's budget of the direct payments to starch potato farmers on each hectare of the crop, the net budgetary cost of creating one full time job in rural areas as a result of starch potato policies will be in the region of €18,000 per annum by 2002/03.