

**Aus dem Institut für Betriebswirtschaft, Agrarstruktur
und Ländliche Räume
und dem
Institut für Marktanalyse und Agrarhandelspolitik**

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Manuskript, zu finden in www.fal.de

**Braunschweig
Bundesforschungsanstalt für Landwirtschaft (FAL)
1999**

Impacts of Agenda 2000 on German Agriculture

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Abstract

The objective of this paper is to assess the probable effects of Agenda 2000 on German agriculture. Scenarios of the base situation as well as of Agenda cover both, high and low world market prices for cereals, price variations for oilseeds and modified measures are also considered. Complementary market, sector and farm models are used to assess changes in agricultural production and income, taking into account the structural characteristics of farming, natural conditions and farmers' adjustments. Results show that there will be a significant shift in arable crop production in favour of cereals and a reduction of beef production. Income effects are mainly determined by price changes, deficient compensation payments and premium restrictions either at regional, process or farm levels. Dairy and cattle farms are most affected. The digressive payment scheme mainly affects the large farms in East Germany.

Impacts of Agenda 2000 on German Agriculture

1 Introduction

The proposals of Agenda 2000 aim at a further reform of the Common Agricultural Policy with regard to WTO negotiations and to EU enlargement (EU-Kommission, 1997; AGRA-EUROPE, 1998). Principles of this reform are a further market liberalisation by means of reducing intervention prices and the stabilisation of farm income by direct payments either partially de-coupled or coupled with production. Member states are allowed to determine part of the headage payments within national envelopes or to transform beef and dairy-cow payments into grassland payments; at the same time they may restrict income transfers by farms with regard to labour input (modulation) or environmental standards (cross-compliance). The regulations are rather complex. Especially the large farms of East Germany will be affected by digressive payments and the general introduction of ceilings for 90 heads of eligible male beef cattle.

The objective of this paper is to assess the probable effects of Agenda 2000 on German agriculture, taking into account market, allocation and income aspects. It is based on an assessment made for the Federal Ministry of Agriculture aiming at the evaluation of Agenda 2000 as a whole and to work out alternative proposals for the modification of specific policy measures mainly affecting agricultural production and income (KLEINHANSS et al., 1998).

2 Models and scenarios

Policy changes like CAP reform 1992 and Agenda 2000 tend to include a combination of several market related policy instruments and whole sets of specific command and control measures focussing on regional or farm structural characteristics. Moreover,

policy makers want to know the probable impacts of policy changes on the markets, on the allocation of production, on income and income distribution as well as on budget expenditure and perhaps even on economic welfare.

Single economic models complying with all these questions are not available. Therefore, model-based policy impact assessment has often been restricted to either market or regional or farm aspects. By limiting the models and the scenarios to some narrowly defined segments of economic reality, however, essential interdependencies sometimes get out of sight. This seems to be the case with a study on sector impacts of Agenda 2000 commissioned by the European Commission (1998). Similarly, there are other studies made at the farm level which are often rather static and do not sufficiently take into account policy induced changes on production (COLSON and CHATTELLIER, 1997).

2.1 Characteristics of the models

To overcome these problems a system of complementary models has been used in the present study. It takes into account different decision levels and allows for more flexibility at both, regional and farm levels while also observing a certain market equilibrium. The characteristics of the model system are briefly described in the following.

Basically, the system consists of three independent models, a partial equilibrium (PE) model, a regionally differentiated sector model and a farm model; the latter two are process-analytical models¹. The models are linked by an iterative procedure of mutual interaction. The regional and the farm models allow for a detailed specification of agricultural policy assumptions and of individual regional and farm situations. They give detailed insight into the consequences on agricultural production of all the complex

¹ A similar approach is used by KIRSCHKE et al. (1998) mainly to policy assessment at the level of the New Laender.

changes in the frame of assumptions. However, a serious drawback of such supply oriented models is, that prices are exogenous. Prices matching the new quantities consequently have to be calculated separately. This can be done by shocking the PE model by the supply changes derived from the process-analytical models. The resulting prices are considered to represent a certain national or international market equilibrium including the supply side changes from the regionally differentiated sector model. Both models run interactively until an equilibrium of prices and quantities is reached.

The advantage of such an interactive model system is to be seen in its limited complexity which makes it easier to handle and to evaluate. The models used in the context of this paper are the following:

- The partial equilibrium model **GAPsi** draws the main product markets of EU agriculture as well as the individual EU member countries and the rest of the world (FRENZ and MANEGOLD, 1995).
- The process analysis model **RAUMIS** is regionally differentiated into 334 regions representing agricultural production units at the level of administrative districts. At the sector level, aggregated inputs and outputs equal the corresponding positions in the national agricultural accounts (HENRICHSMeyer, 1996).
- The farm model **BEMO** is a mixed-integer linear programming approach based on existing farms (KLEINHANSS, 1996). Representative samples of farms are derived from large sets of farm accounting data. Farms are selected with regard to the existing or a projected structural distribution of farms.

Since a special aggregation scheme for BEMO has not yet been implemented (see JACOBS, 1998), the iterative process described above is concerning GAPsi and RAUMIS

alone. However, BEMO always shares the use of the final price sets and makes available special information on producer reactions according to farm types and farm sizes.

In view of evaluating policy alternatives, the model system provides many criteria to be considered. Prominent criteria are factor input, product output and farm income. Differentiation according to farm size, farm type, production process and regional aspects provides insight into the economic effects of policy alternatives. At the sector level there are –besides and in addition to the respective aggregates of the pre-mentioned economic variables – a few other criteria which are properly macro economic: WTO export limitations, national financial funds and most of all the welfare effects of the policy changes. Presently, an in-depth evaluation of the overall economic effects of changes in agricultural policy is, however, not possible because the model system lacks a computable general equilibrium (CGE) model. Such a model would show the extent to which different sectors of the economy are affected by alternative agricultural policy assumptions and provide the information for a ranking of policy alternatives with regard to general economic preference.

2.2 Scenarios

The analysis of Agenda 2000 effects is carried out for the year 2005, i. e. only the final implementation and no intermediate steps of the reform are considered. Scenarios are determined taking into account available baseline projections for important commodities, national experts' opinions and model calculations with GAPsi.

The **base situation** is supposed to represent a status with CAP reform of 1992 being realised. Intervention prices are kept constant, WTO restrictions are maintained by means of supply control measures. CAP instruments include compensatory payments for cereals,

oilseeds, protein crops and beef. With regard to budget constraints eligibility criteria based on livestock density and ceilings for expenditure are used in the beef sector. Supply control in the cereals sector is realised by obligatory set-aside. In the oilseed sector regional guarantee areas, payments restricted to certain portions of base areas (in the New Laender) and a special set-aside provision are applied to comply with the Blair-House commitment.

Because of major uncertainties with respect to the development of future world commodity prices two series of model calculations are carried out considering either high or low world prices.

- The first base scenario refers to baseline projections by OECD and FAPRI (OECD, 1998, FAPRI, 1998, USDA, 1998) assuming world market prices for wheat above the actual EU intervention price (**Bas_H**). On this condition, EU wheat can be exported to world markets without subsidies since WTO export restrictions do not come into effect. Obligatory set-aside can be reduced to 5 % of the base areas (considered to be the minimum rate). Coarse grains exports are within WTO limits. The oilseeds area must be kept 10 % below guaranteed levels.
- The other base scenario centres on world cereal prices ranging below EU intervention levels (**Bas_L**). Such prices were observed in 1998 and before 1996 (FAPRI, 1997). EU market prices are stabilised by intervention purchases and exports are subsidised. In order to comply with WTO restrictions, EU cereals production has to be controlled by obligatory set-aside at a rate of 27 % of the base area. The guarantee area for oilseeds has to be reduced by the same rate.

The **Agenda 2000** scenarios principally include the measures defined in the draft regulations (AGRA-EUROPE, 1998), i. e. price reductions in the cereals, beef and milk

sectors, acreage payments for Grandes-Cultures (depending on price changes of cereals), no set-aside obligation, increased headage payments for male beef cattle and suckler cows, new payments for dairy cows and cuts in payments by farms (digression). Beef payments are determined within the limits of national envelopes. Supplementary to the changes in intervention prices two different levels of market prices, a higher one (**Age_H**) and a lower one (**Age_L**), have been assumed for cereals. For beef a 25 % reduction of market prices is assumed. Optional measures to be taken in national competence, such as payments for grassland, modifications of ceilings and reductions of payments are assessed through model variations.

3 Impacts of Agenda 2000 at regional and sector level

The presentation of results mainly focuses on changes in agricultural production and income at sector level. In addition, results on the variation of oilseed prices and the alternative introduction of grassland premia are given. Income effects are further differentiated by farm types and size, including variations in the digressive payment scheme and ceilings of beef premia up to 90 male cattle.

3.1 Land use and crop production

In the arable sector mainly cereals, oilseeds, protein crops and set-aside will be affected by economic conditions of the Agenda proposals. The general economic conditions of Agenda are comparable with those of the small producer scheme of CAP92. All those crops and activities formerly favoured by high compensation payments will be negatively affected by the reduced level of acreage based payments. The main changes under conditions of scenario Age_H are:

- The Agenda proposals go at the expense of set-aside; a reduction by 56 % is expected at sector level (see table 1). Set-aside becomes voluntary and is shifted onto less favourable land. Positive allocation effects derive from these changes.
- The relative competitive position of cereals improves through the conformity of payments for Grandes-Cultures. The production of cereals rises by 13 % to approximately 8 mio. tons. In West Germany the grain area is to expand strongly, especially on larger farms. Since a majority of small farms is already using the small producer scheme in the base scenario, most adjustments in the Grandes-Cultures sector have already taken place. The high share of cereals in arable land illustrates that a more homogeneous crop rotation is to be expected.
- Production of forage maize will become less favourable in Southern Germany since uniform reference yields will be used instead of specific ones for maize and other cereals; therefore maize will get about 200 DM/ha lower payments than in the previous situation. Moreover maize production also depends on the competitive capacity of intensive beef fattening.
- A decrease of the food oilseed area by about 40 % is expected at the sector level. Major regional differences are observed due to reductions of payments and the relaxing of payment restrictions. In Western Germany, for example, there is a reduction of oilseeds below the average while in parts of the New Laender, e.g. Sachsen-Anhalt, Saxonia and Thuringia there is an increase.

Table 1: Impacts of Agenda 2000 on production and income at sector level (without digressive payments)

Scenario		Bas_H	Bas_L	Relative change	
				Age_H to Bas_H (%)	Age_L to Bas_L (%)
Land use					
Cereals	1000 ha	7052	5677	13.4	35.2
Oilseeds (food)	1000 ha	821	662	-42.3	-34.1
Set-aside	1000 ha	873	2432	-63.3	-74.5
Production					
Cereals	1000 t	48527	38892	12.2	34.4
Oilseeds	1000 t	2881	2300	-40.5	-31.9
Milk	1000 t	26916	26916	1.3	1.3
Beef	1000 t	1376	1371	-9.4	-6.1
Income					
Gross production	Mio. ECU	32073	30777	-6.5	-4.3
Inputs and depreciation	Mio. ECU	25446	24710	-0.8	1.6
Subsidies	Mio. ECU	4700	4778	26.1	28.3
Net value added at factor costs	Mio. ECU	10931	10449	-5.8	-3.4

Source: RAUMIS

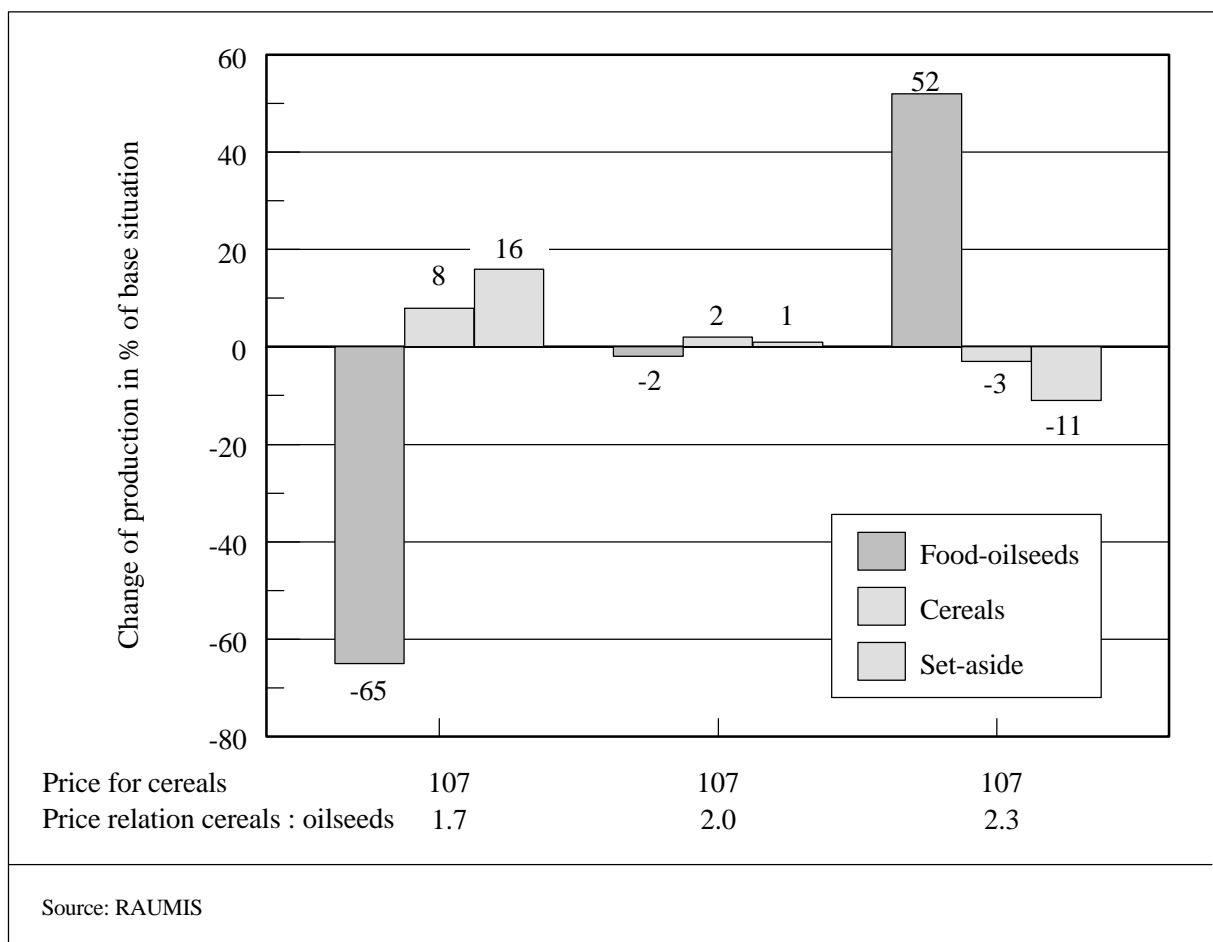
3.1.1 Sensitivity analysis for oilseeds

Model calculations for different scenarios underline the importance of grain-oilseed price relations on oilseed production (BARKAOUI et al., 1998; KLEINHANSS et al., 1998; EU-COMMISSION, 1998). Due to the uncertainty about these relations a sensitivity analysis is made assuming three different oilseed prices; oilseed rape is assumed to value 1.7, 2.0 and 2.3 times the cereal price of 107 ECU/t.

The calculations show that at a price relation of 1:1.7 there is a sharp decrease in oilseed production caused by both, the uniform payment and lower prices for oilseeds. At a price relation of 1:2.0, there is almost no change in food-oilseed production against the baseline at sector level. At the regional level an increase in oilseed cultivation occurs in regions affected by the Blair House restriction in the base situation, (the south of the New

Laender of Germany and the north of Bavaria). On the other hand, oilseed production will be sharply reduced in regions affected by significant reductions in payments. At an assumed price relation of 1:2.3 oilseed supplies will be extended by up to 50 % compared to the base situation, while set-aside becomes less competitive. In all cases, non-food oilseeds on set-aside land will not be produced any more without set-aside obligation.

Figure 1: Impacts of Agenda 2000 and varied price relations on the cropping area of cereals, food-oilseeds and set-aside



3.2 The beef and dairy sector

For the model calculations, it was assumed that the national envelopes are used to increase headage payments, taking into account upper limits for total payments and national

ceilings for eligible livestock. Due to these restrictions, the payments will not completely compensate the income loss resulting from price decreases.

The proposed dairy cow premium is linked to the *milk* quota. Still, if the lowering of intervention price is passed on fully to farm gate prices, significant income losses must be expected even if payments are at their upper limit. The increase of milk quota by 2 % in the EU will lead to a rising milk production, which in turn will add to pressures on the EU-internal milk price. Although deficient compensation of price reductions result in a devaluation of the milk quota, this effect will remain limited.

Beef production is significantly affected by the reform proposals. Headage payments will become a main factor determining economic competitiveness. The payment for male beef cattle is limited by ceilings for premium rights and the financial envelope. Therefore, headage payments cannot fully compensate for price decrease. Due to the decline in the number of bulls, heifers and calves for fattening, beef production will be curbed by approximately 9 %, assuming a reduction of farm gate prices of 25 % (scenario Age_H). Under the conditions of scenario Age_L with lower feed prices beef production will decrease by 6 % only. A further reduction must be expected, if the ceiling for 90 male beef cattle and digressive payments per farm are applied. They would especially hit beef production in East Germany, but have not been considered in the sector modelling (see chapter 3.4).

The option of using the whole national financial envelopes of beef and dairy payments for a uniform **grassland payment** of 225 DM/hectare, has been assessed. Beef production would be reduced by almost 13 %. Due to the lower costs for inputs and depreciation, grassland payments result in reductions of net value added at factor costs by 5,1 %. Regions with extensive grassland systems are benefiting most from grassland payments.

The proposals for the beef regime will increase the intensity of policy interventions and will lead to high administrative activity and increasing budgetary costs. The payments are not de-coupled from production and will heavily distort beef production depending on being eligible for payments or not.

3.3 Income effects of Agenda 2000

The income effects of Agenda are determined by several factors, i. e. price changes, the level and type of compensation, budget constraints, ceilings for transfer payments and last not least adjustments at farm level. In case of high world market prices for cereals (scenario Age_H), income losses in the Grandes-Cultures sector are determined by the effects of reduced payments for oilseeds, pulses and set-aside. For milk and beef producers a significant income loss is to be expected. The expansion of headage payments will increase total subsidies by 26 % (see table 1). Net value added at factor costs is expected to fall by 6 % (scenario Age_H). Assuming low world cereals prices (scenario Age_L), income losses would reach only 3.4 % due to positive allocation effects resulting from the suspension of obligatory set-aside and lower feed grain prices. Thus, regions with high shares of oilseeds, beef and dairy in total production value are affected most by Agenda 2000.

3.4 Income effects of ceilings and digressive payments

The above mentioned income figures do not take into account digressive payments by farms and the general introduction of ceilings of headage payments to 90 heads of male cattle. These problems are rather specific for Germany; due to their structure, mainly large farms in the New Laender will be affected. Therefore two additional variations are assessed within the scenario of Agenda (Age_H):

- Age_H_nDP: Agenda without digressive payments
- Age_H_nDP/C: Agenda without digressive payments, without payment restrictions for 90 male cattle and without payment supplements for extensive cattle holding.

The assessment is based on 833 farms in Western Germany and on 140 farms in the New Laender. The sample of the western part represents a farm structure forecast for the year 2005. In the sample for East German farms larger than 500 ha are over-represented. The option of splitting up large farms into smaller ones is not included in the model.

Figure 2: Income effects of Agenda by farm groups

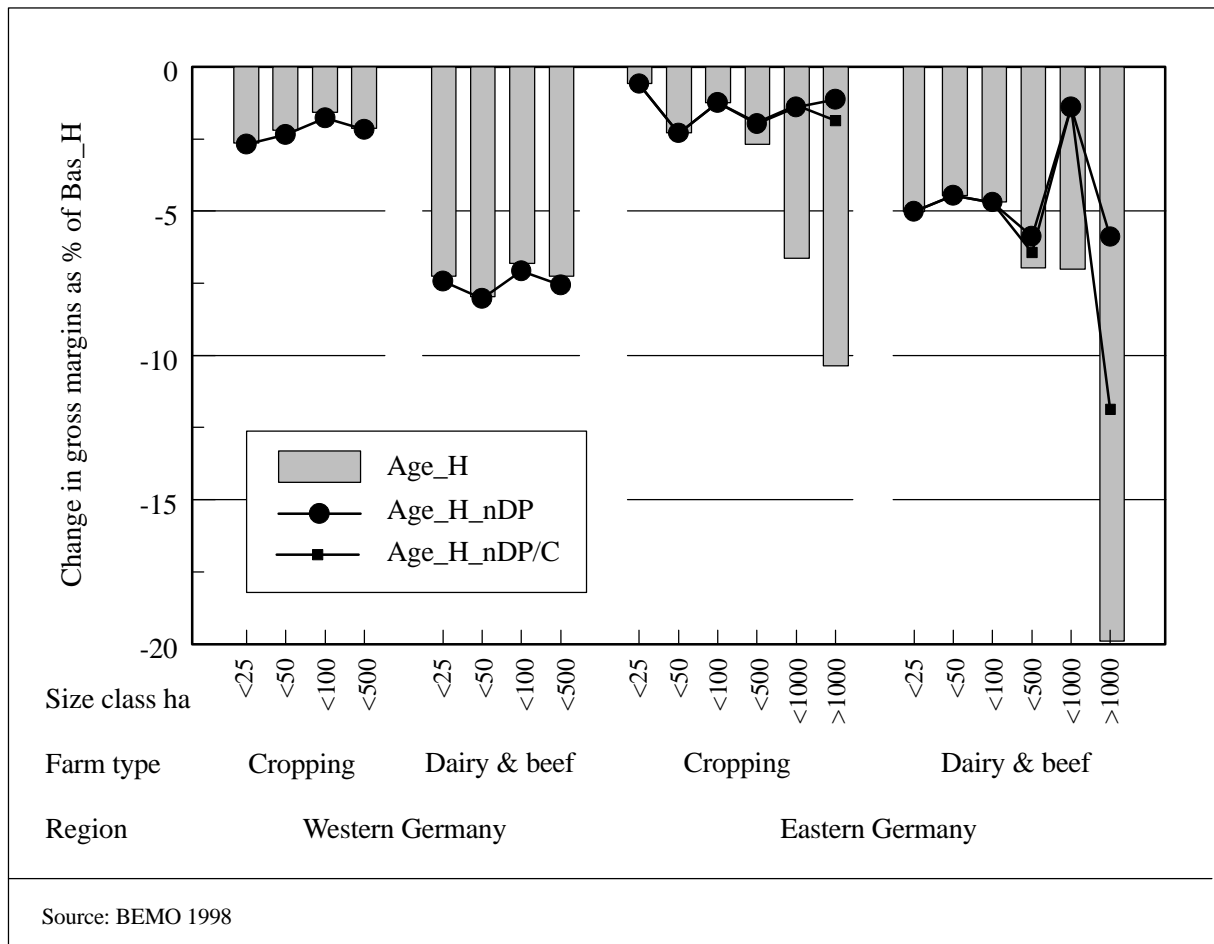


Figure 2 shows income effects of Agenda 2000 in cropping and dairy & beef farms² according to size classes and regions. Cropping farms in *Western Germany* show income losses in the range of 2 to 3 % of gross margins. They are mainly induced by uniform payments and the resulting adjustment in the arable sector, as well as by income losses in the beef and dairy sector. Dairy & beef farms will have higher income losses of 7 to 8 % of gross margins. Income losses are mainly determined by deficient dairy-cow premia and less favourable economic conditions of intensive beef fattening based on forage maize. Compared to CAP 92 acreage payments for maize are less favourable than headage payments, therefore it is no longer efficient to produce beef beyond the 2 LU/ha or beyond the 90 male cattle ceiling.

Large farms in the *New Laender* face big income loss. Due to payment reductions of up to 25 % almost all large cropping farms and some of dairy & beef farms larger than 500 ha are affected. Gross margins will be reduced by up to 11 % in large sized cropping farms. Dairy & beef farms larger than 1000 ha will have income losses of about 20 %. Part of the income loss is induced by payment restrictions up to 90 male cattle. Income effects in farms less than 500 ha are in the same order of magnitude as in the western part of the country.

Scenario Age_H_nDP shows that large cropping farms would face the same income effects as the smaller ones if payments would not be reduced by the digressive payment scheme. Large dairy & beef farms are always affected by the ceiling for 90 male cattle. If this measure would not be introduced, income effects would be in the range of 6 to 7 % which is a little bit less for this farm type than in Western Germany.

² Income effects for other farm types are not shown. Income effects of pig farms are at the same level as for cropping farms, those for mixed farms are in-between cropping and dairy & beef farms.

Conclusions are that beef production will mainly be affected by reductions of premia due to the digressive payment scheme and the general introduction of ceilings for 90 male cattle. The reduction of livestock numbers to less than half since the 1989 inventory will therefore continue beyond the economic transformation in the New Länder. A farm structure will be imposed which will be less competitive. Structural implications are also true for the arable and dairy sector. For farms entitled to get more than 100 000 ECU of payments, the question is how to thwart the digressive payment scheme by splitting up the farm into smaller ones. Other forms of payment restriction based on labour force or environmental standards will have significant impacts on income distribution as well (KLEINHANSS and MANEGOLD, 1998). It is not clear whether or not policy goals can be reached.

4 Conclusions

The Agenda 2000 proposals seem to be justified with regard to market liberalisation and a better integration of EU into world markets especially in the cereal, oilseed and beef sectors (TANGERMANN, 1998; HENRICHSMEYER, 1998). The regulations proposed for Grandes-Cultures can be seen as a further step towards de-coupling transfer payments from production. This will increase the chance that transfer payments might be acceptable to fall into the Green Box'at the next round of WTO negotiations. Yet, the introduction of uniform payments remains inconsistent, as exceptions for pulses, durum wheat and irrigated land persists. The deficient de-coupling of the payments will continue to cause negative allocation effects. Production potentials can be realised especially in the cereal sector taking into account the relatively promising price projections at the world market. It will also avoid miss-allocation of land use due to obligatory set-aside.

However, the over-administration especially in the livestock sector will even increase. One may doubt that such a system can be handled efficiently. One alternative would be a further liberalisation and de-coupling of direct payments. Rather than digressive payments for individual farms, payments should be digressive in time (WISSENSCHAFT-LICHER BEIRAT, 1997, TANGERMANN, 1997).

Although there are still some weaknesses in the modelling approach, it seems to be necessary to go further on in the direction of a complementary framework. If data are available such a system could be extended to other EU-countries.

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