



CROSS-COMPLIANCE ASSESSMENT TOOL

**Policy-oriented research:
Scientific support to policies SSP**

Specific Targeted Research Project (STREP)

**Deliverable 4.4.1: Report on how to develop the indicators of impacts
of CC on food safety, animal welfare and health**

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1 Selected public health and animal welfare indicators

In area of public health and animal welfare some specific problems are faced: for public health the impact of the relevant standards can be mainly observed at the end of the overall food chain, whereas the SMRs refer to one single level of the chain, i.e. the farm level. Accordingly, already existing indicators on public health reflect the final outcome like the outbreak of a certain disease. Therefore it is difficult to select indicators which both target at the SMRs and refer to the final outcome as impact indicator. Especially in this area therefore response indicators will be the most appropriate ones.

Additionally, in this area and especially for animal welfare the number of existing indicators is limited and therefore a specific effort lies in the method of selection or in the further development of feasible indicators. A combination of desk research and case-study should help to at least recover part of the desired information

1.1 Selected SMRs to be addressed by indicators.

This selection will be based on the relevance of SMRs in terms of whether both, an economic impact and a respective impact on Animal Welfare and Public Health can be expected. The first impact assumption will be derived from the Cross Compliance project (see Section 3.3) and the second concluded from existing studies. For these selected SMRs the existence of direct or indirect indicators will be identified as explained at 2) and 3) or new ones will be developed as explained under 4. The coverage of the SMRs with existing indicators as well as available survey data in the respective case regions are therefore other important criteria for their involvement in the project.

The first impact assumption derived from the Cross Compliance project is based on the cost implications of compliance with SMRs for selected sectors. In addition to the scientific importance of SMRs in the fields of animal welfare and public health concluded from existing studies, they are suited to shortlist the SMRs to be involved in the project.

Furthermore there are many similar or same aspects mentioned in the legal acts. Thus it is reasonable to select those legal acts which cover preferably diversified fields of public health and animal welfare.

Another important criteria for the selection of SMR's is the expenditure of time for their assessment by the indicators. Since the interview part should not last longer than 40 minutes, it is meaningful to choose those SMR's whose assessment can be done quickly. That would be possible in case of a clear linkage between the SMR's e.g. if several SMR's can be assessed by indicators of the same indicator framework or within the same spatial areas.

The practicability of the indicator assessment of the SMRs is also a main criteria for their selection. Complex and expensive assessments which require specific expert knowledge are hard to realise. Therefore we will select only those SMRs that can be

surveyed without special expertise (i.e. for ethological or veterinary examinations) or qualification.

The following table gives a review of the legal acts / SMR's to be involved in the project, as well as a specification of the reasons for their selection and their survey:

Table 1: Overview of the selected SMRs in the area of Public Health and Animal Welfare and the specifications of their survey

Legal act	SMR's	Reasons for the selection of the SMR's	Survey specifications
Animal Registration Directive: Council Directive 92/102/EEC of 27 November 1992 on the identification and registration of animals (OJ L 355, 05.12.1992, p. 32)	Registration of farmers keeping animals	<ul style="list-style-type: none"> • According to LEI strong cost implications on farms • In compliance with existing indicator • The SMR applies to all areas of animal production (pigs, cattle, sheep, ...) 	<ul style="list-style-type: none"> • Indicator: Eurostat: government investments in food safety measures • Existing indicator data • Optional interview with food monitoring authorities • Own developed indicator: Degree of compliance: existing environmental data / own survey in the case regions
	Each farmer holds a register of all animals	<ul style="list-style-type: none"> • Studies prove high importance for animal welfare: Strong relevance for epidemics: KREISSL-DÖRFLER (2002); N. N. (2002E); SONNE (2006) • Epidemic impact on human health • In compliance with existing indicators • According to LEI strong cost implications on farms • The SMR applies to all areas of animal production (pigs, cattle, sheep, ...) 	<ul style="list-style-type: none"> • Own developed indicator: Membership in certification schemes: The indicator has to be surveyed in the case regions • Optional interview with food monitoring authorities • Own developed indicator: Degree of compliance: existing environmental data / own survey in the case regions
Food Law Regulation: Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing	Forbidden to have, process or feed unhealthy feed	<ul style="list-style-type: none"> • In compliance with existing indicators • According to LEI strong cost implications on farms • Studies prove high importance for animal welfare: VAN DEN BERG (1998); KOSS (2004); LENK (2007); MC LACHLAN & HUTZINGER (1990a) • Studies prove high importance for public health: VAN DEN BERG (1998); KOSS (2004); ABEL (1987); IARC (1997); LENK (2007); MC LACHLAN & HUTZINGER (1990a); WITTSIEPE et al. (2004) • The SMR applies to all areas of 	<ul style="list-style-type: none"> • Preexisting Indicator data: <ul style="list-style-type: none"> ○ EFSA: Salmonella in fresh pig / bovine meat; campylobacter in fresh / bovine meat; salmonella in feed material: measurement level of indicator data: national (DE, ES, AT,...) ○ WHO: foodborne diseases: Available indicator data: EU-level (EU 15 & EU 25); national level (EU 25 (few exceptions)) ○ Eurostat: Occurrence of salmonellosis: Available

the European Food Safety Authority and laying down procedures in matters of food safety (OJ L 31, 1.2.2002, p. 1)		animal production (pigs, cattle, sheep, ...)	<p>indicator data: EU-Level (EU 15 & EU 25); national level (EU 25)</p> <ul style="list-style-type: none"> • Own developed indicator: disease level of animals: to be surveyed in the case regions • Own developed indicator: Degree of compliance: existing environmental data / own survey in the case regions • Own developed indicator: Veterinary costs: to be surveyed locally
	Traceability of feed in all stages of production	<ul style="list-style-type: none"> • In compliance with existing indicators • According to LEI strong cost implications on farms • Studies prove high importance for animal welfare: Strong relevance for epidemics: KREISSL-DÖRFLER (2002); N. N. (2002E); SONNE (2006) • Studies prove high importance for public health: RÖBKEN (2006); HEESCHEN (2003) • The SMR applies to all areas of animal production (pigs, cattle, sheep, ...) 	<ul style="list-style-type: none"> • Own developed indicator: Membership in certification schemes: The indicator has to be surveyed in the case regions • Optional interview with food monitoring authorities • Own developed indicator: Degree of compliance: existing environmental data / own survey in the case regions
Regulation (EC) 999/2001 on prevention, control and eradication transmissible spongi-form encephalopathies	Immediate notification	<ul style="list-style-type: none"> • Studies prove high importance for animal welfare: WILESMITH et al. (1988); BRAUN et al. (1998); STAUFENBIEL & HÄMÄLÄINEN (2000); WELLS et al. (1987); OVELHEY (2005); CRANWELL et al. (1988); HENNING (2002) • Studies prove high importance for public health: BMELV (2007); WILL et al. (1996); BONS et al. (1997); COULTHART & CASHMAN (2001); KÜFEN (2003) • Studies prove strong cost implications on farms: DEFRA (2004) • In compliance with existing indicators 	<ul style="list-style-type: none"> • Indicators: <ul style="list-style-type: none"> ○ Own development: Membership in certification schemes: Indicator has to be surveyed in the case regions ○ Own developed indicator: Degree of compliance: existing environmental data / own survey in the case regions ○ If available: Eurostat: Controls and inspections of food and feed • Optional interview with food monitoring authorities
	Movement restrictions		
Pigs Directive: Council Directive 91/630/EEC of 19 November 1991 laying	Housing space	<ul style="list-style-type: none"> • In compliance with existing indicators • Studies prove high importance for animal welfare: HÖRNING (1993) & (2000); JENSEN & KYHN (2000); KAMINSKY (1993) • The Animal Needs Index (ANI) is an excellent and suitable indicator 	<ul style="list-style-type: none"> • Indicator framework: ANI • The ANI has to be surveyed in the case regions • Preexisting indicator data: farm-level (only in Austria) • Own developed indicator:

down minimum standards for the protection of pigs (OJ L 340, 11.12.1991, p. 33)		<p>framework to assess the SMR</p> <ul style="list-style-type: none"> • Timesaving assessment: SMR's to be evaluated by the ANI can be surveyed together 	<p>farm attributes: Indicator has to be surveyed in the case regions</p> <ul style="list-style-type: none"> • Own development: Degree of compliance • Animal production and welfare committee of the German Society for Animal breeding: Width of the drove alleyway: to be surveyed
	Condition of flooring	<ul style="list-style-type: none"> • In compliance with existing indicators • Studies prove high importance for animal welfare: GEYER (1979); VON BORELL (2002); PROBST (1989) • The Animal Needs Index is an excellent and suitable indicator framework to assess the SMR • Timesaving assessment: SMR's to be evaluated by the ANI can be surveyed together 	<ul style="list-style-type: none"> • Indicator framework: ANI • The ANI has to be surveyed in the case regions • Preexisting indicator data: farm-level (only in Austria) • Own development: Degree of compliance • Own developed indicator: Veterinary costs: to be surveyed locally
	Electrical circuits and equipment	<ul style="list-style-type: none"> • The Animal Needs Index is an excellent and suitable indicator framework to assess the SMR • In compliance with existing indicators • Timesaving assessment: SMR's to be evaluated by the ANI can be surveyed together 	<ul style="list-style-type: none"> • Indicator framework: ANI • The ANI has to be surveyed in the case regions • Preexisting indicator data: farm-level (only in Austria) • Own development: Degree of compliance
	Atmosphere	<ul style="list-style-type: none"> • The Animal Needs Index is an excellent and suitable indicator framework to assess the SMR • In compliance with existing indicators • Studies prove high importance for animal welfare: BOCKISCH et al. (1999); HARTUNG (1988); WAYNERT et al. (1999); SCHÄFFER et al. (2001); ALGERS et al. (1978); BUSSE (1990); BRUNSCH et al. (1992); WOLF & MARTEN (2002); BIANCA (1968); UNRATH (2004) • Timesaving assessment: SMR's to be evaluated by the ANI can be surveyed together 	<ul style="list-style-type: none"> • Indicator framework: ANI • The ANI has to be surveyed in the case regions • Preexisting indicator data: farm-level (only in Austria) • Own development: Degree of compliance
	Inspection of automated or mechanical equipment once a day	<ul style="list-style-type: none"> • In compliance with existing indicators • The Animal Needs Index can be used as indicator framework to assess the SMR • Timesaving assessment: SMR's to be evaluated by the ANI can be surveyed together 	<ul style="list-style-type: none"> • Indicator framework: ANI • The ANI has to be surveyed in the case regions • Preexisting indicator data: farm-level (only in Austria) • Own development:

			Degree of compliance
	Lightening	<ul style="list-style-type: none"> • The Animal Needs Index is an excellent and suitable indicator framework to assess the SMR • In compliance with existing indicators • Studies prove high importance for animal welfare: BOCKISCH et al. (1999); BUSSE (1990); WOLF & MARTEN (2002); UNRATH (2004) • Timesaving assessment: SMR´s to be evaluated by the ANI can be surveyed together 	<ul style="list-style-type: none"> • Indicator framework: ANI • The ANI has to be surveyed in the case regions • Preexisting indicator data: farm-level (only in Austria) • Own development: Degree of compliance
	Access to feed and water	<ul style="list-style-type: none"> • The Animal Needs Index is an excellent and suitable indicator framework to assess the SMR • In compliance with existing indicators • Studies prove high importance for animal welfare: HOY et al. (1995); STOLBA & WOODGUSH (1989); RÖBKEN (2006) • Timesaving assessment: SMR´s to be evaluated by the ANI can be surveyed together 	<ul style="list-style-type: none"> • Indicator framework: ANI • The ANI has to be surveyed in the case regions • Preexisting indicator data: farm-level (only in Austria) • Own development: Degree of compliance • Own developed indicator: Veterinary costs: to be surveyed locally
	Desinfection of housing and equipment	<ul style="list-style-type: none"> • The Animal Needs Index is an excellent and suitable indicator framework to assess the SMR • In compliance with existing indicators • Studies prove high importance for animal welfare: WENDT et al. (1998); UNRATH (2004); MEHLHORN (1985) • Studies prove high importance for public health: FEHLHABER (2003) • Timesaving assessment: SMR´s to be evaluated by the ANI can be surveyed together 	<ul style="list-style-type: none"> • Indicator framework: ANI • The ANI has to be surveyed in the case regions • Preexisting indicator data: farm-level (only in Austria) • Own development: Degree of compliance • Animal production and welfare committee of the German Society for Animal breeding: Muck out interval of the stables: to be surveyed
Animal Welfare Directive: Council Directive 98/58/EC of 20 July 1998 concerning the protection of animals kept for farming purposes (OJ	Knowledge of staff	<ul style="list-style-type: none"> • In compliance with existing indicators • Studies prove high importance for public health: PFANNHAUSER (2005); HENSGEN (2004); RÖBKEN (2006) • According to Lei strong cost implications on farms • High importance for animal welfare is obvious 	<ul style="list-style-type: none"> • Indicators: <ul style="list-style-type: none"> ○ Own development: farm attributes; membership in certification schemes: Indicators have to be surveyed in the case regions ○ Own development: Degree of compliance ○ Own developed indicator: Veterinary costs: to be surveyed locally

L 221, 8.8.1998, p. 23)	Animals must be cared when they are ill or injured	<ul style="list-style-type: none"> • The SMRs apply to all kinds of farm animals • According to Lei strong cost implications on farms • The high importance for animal welfare and public health is quite obvious • The Animal Needs Index is an excellent and suitable indicator framework to assess the SMR • Timesaving assessment: SMR's to be evaluated by the ANI can be surveyed together 	<ul style="list-style-type: none"> • Indicator framework: ANI • The ANI has to be surveyed in the case regions • Preexisting indicator data: farm-level (only in Austria) • Own development: Degree of compliance • Own developed indicator: Veterinary costs: to be surveyed locally
Regulation (EC) No 852/2004 of the European Parliament and of the Council of 29 April 2004 on the hygiene of foodstuffs (OJ L 139, 30.4.2004, p. 1)	Appropriate transport of live animals	<ul style="list-style-type: none"> • Studies prove high importance for animal welfare: SIEGEL (1987); TUSCHSCHERER & MANTEUFFEL (2000) • Studies prove high importance for public health: ALTER (1999); FEHLHABER & ALTER (1999); MAUERSBERGER (2002); FEHLHABER (2003) • In compliance with existing indicators 	<ul style="list-style-type: none"> • Indicators: <ul style="list-style-type: none"> ○ Own development: farm attributes; membership in certification schemes; disease level of animals; early deaths of animals (e.g. hyperplasia): Indicators have to be surveyed in the case regions ○ Own developed indicator: Degree of compliance: existing environmental data / own survey in the case regions ○ Animal production and welfare committee of the German Society for Animal breeding: Width of the drove alleyway: Indicator has to be surveyed in the case regions
	Measures relating to animal health with impact on public health	<ul style="list-style-type: none"> • In compliance with existing indicators • The Animal Needs Index is an excellent and suitable indicator framework to assess the SMR • Studies prove high importance for public health: RÖBKEN (2006); SAMITZ (2000); HILDEBRAND (2002); FEHLHABER (1999); PÖKER et al. (2004) • Studies prove high importance for animal welfare: Containment of zoonosis: RÖBKEN (2006); SAMITZ (2000); HILDEBRAND (2002) • Timesaving assessment: SMR's to be evaluated by the ANI can be surveyed together 	<ul style="list-style-type: none"> • Indicator framework: ANI • The ANI has to be surveyed in the case regions • Preexisting indicator data: farm-level (only in Austria) • Own development: Degree of compliance • Own developed indicator: Veterinary costs: to be surveyed locally
	Cleanliness of animals going to	<ul style="list-style-type: none"> • In compliance with existing indicators • The Animal Needs Index is an 	<ul style="list-style-type: none"> • Indicator framework: ANI • The ANI has to be surveyed in the case

	slaughter	<p>excellent and suitable indicator framework to assess the SMR</p> <ul style="list-style-type: none"> • Studies prove high importance for public health: FEHLHABER (2003) • Studies prove high importance for animal welfare: HOY et al. (1997); ZALUDIK (2002) • Timesaving assessment: SMR´s to be evaluated by the ANI can be surveyed together 	<p>regions</p> <ul style="list-style-type: none"> • Preexisting indicator data: farm-level (only in Austria) • Own development: Degree of compliance
	Good health and training of personnel	<ul style="list-style-type: none"> • The Animal Needs Index can be used as indirect indicator • In compliance with existing indicators • Studies prove high importance for animal welfare: KRÄMER (2002); MÜLLER et al. (1996) • Studies prove high importance for public health: FEHLHABER (2003); PFANNHAUSER (2005); HENSGEN (2004); RÖBKEN (2006) • Timesaving assessment: SMR´s to be evaluated by the ANI can be surveyed together 	<ul style="list-style-type: none"> • Indicator framework: ANI • The ANI has to be surveyed in the case regions • Preexisting indicator data: farm-level (only in Austria) • Own developed indicator: Farm attributes: Indicator has to be surveyed in the case regions • Own development: Degree of compliance
	Correct use of feed additives, veterinarian drugs, pesticides	<ul style="list-style-type: none"> • In compliance with existing indicators • Studies prove high importance for animal welfare: GEIER & OSTER (2000) • Studies prove high importance for public health: GEIER & OSTER (2000) 	<ul style="list-style-type: none"> • Indicators: <ul style="list-style-type: none"> ○ Own development: Membership in certification schemes, diseases of animals; early deaths of animals: Indicators have to be surveyed in the case regions ○ If available: Eurostat: Controls and inspections of food and feed ○ Own developed indicator: milk yield: Available CAPRI-data (NUTS0-2) ○ Own developed indicator: number of offspring: Available CAPRI-data (NUTS0) ○ Own developed indicator: Degree of compliance: existing environmental data / own survey in the case regions • Optional interview with food monitoring authorities
	Record keeping of nature and	<ul style="list-style-type: none"> • In compliance with existing indicators 	<ul style="list-style-type: none"> • Indicators: <ul style="list-style-type: none"> ○ Own development: Membership in

	origin of feed, treatments and dates of withdrawal periods, occurrence of diseases, reports on checks		certification schemes: Indicator has to be surveyed in the case regions ○ Degree of compliance: existing environmental data / own survey in the case regions • Optional interview with food monitoring authorities
	Control contamination	<ul style="list-style-type: none"> • In compliance with existing indicators • Studies prove high importance for animal welfare: KRÄMER (2002); MÜLLER et al. (1996) • Studies prove high importance for public health: KRÄMER (2002); MÜLLER et al. (1996) 	<ul style="list-style-type: none"> • Animal production and welfare committee of the German Society for Animal breeding: muck out interval of the stables • Qwn developed Indicators: <ul style="list-style-type: none"> ○ Membership in certification schemes; disease level of animals, farm attributes: indicators have to be surveyed in the case regions ○ Degree of compliance: existing environmental data / own survey in the case regions ○ Milk yield: Available CAPRI-data (NUTS0-2) ○ Own developed indicator: number of offspring; Available CAPRI-data (NUTS0)

1.2 Selection of indicators for the SMRs

The choice of SMRs to be involved in this study coheres with the selection of existing indicators. But for some of the relevant SMRs additional indicators have been developed which are addressed in the targeted surveys. They mainly refer to all farm-level related SMRs like husbandry system requirements for Animal Welfare and Health or are results of the CAPRI model.

Whereas every suitable indicator will be involved in the second prototype, only EU-wide indicators are to be implemented in the first one.

The main criteria for the selection of indicators for the second prototype of the tool are mentioned and described in the following:

- Spatial level of indicator data

At a first step indicators that are directly and regularly surveyed at European level will be identified. For Public Health existing SMRs hardly are addressed by any

existing indicators, therefore mainly response indicators will be used. Animal Welfare is so far not addressed at all by any EU-wide indicator.

Not all of the available indicators are surveyed in all European Member States (e.g. the Eurostat indicator on safety investments). But in most cases at least those Member States are covered in which the case studies will be explored.

The spatial level and aggregation of reference data is also of high importance for the differentiation of indicators in the first and second prototype of the tool to be developed.

- Time dimension of indicator data

Not for all existing and relevant indicators a time set in the important period, i.e. before implementing CC and after exists. In order to evaluate the effects of introducing CC a set before the respective implementation year and after that year as well as the foreseen future survey is relevant.

- Significance for the SMRs

The selection of indicators also depends on their significance for the respective SMRs to be assessed. There has to be a clear link between indicator values and the final evaluation of the SMRs which reflect important aspects of animal welfare and public health. This connection should be proved by studies.

- Practicability of the indicators

The practical realisation of the surveys imply the use of appropriate indicators. Therefore it is advised to select those indicators which enable the collection of indicator data in a preferably simple, inexpensive and time-saving way, for instance by inspection of the farm, declaration of the farmer or usage of his facilities.

- Level of measurement

Especially for own developed indicators and those which have to be surveyed the level of measurement plays an important role. Because most surveys will presumably be passed at farm level it is necessary to select indicators which are feasible to collect the data there.

Regarding these criteria a choice of indicators is made. Because of the restricted availability of existing suitable indicators in the fields of animal welfare and public health it is necessary to develop own indicators that focus on the specific aspects of the SMRs.

The following table indicates the indicators to be used for Public Health and Animal Welfare as well as a detailed description of the reasons for their selection:

Table 2: Overview of all selected indicators in the area of Public Health and Animal Welfare

Reference area	Organisation / Indicator framework	Selected indicators	Reasons for the selection of the indicators
Public health	EFSA: Infectious food-borne	Salmonella in fresh pig meat	<ul style="list-style-type: none"> • Available Data for the selected case regions • Available indicator data: national level

	diseases		<p>(DE, ES, AT, NL, CZ,...)</p> <ul style="list-style-type: none"> • Appropriate time dimension of the data • Significance for public health (KRÄMER, 2002; KUNZ, 1993; MÜLLER et al., 1996; FEHLHABER, 2003) • At least indirect Relevance for SMRs • Significance for animal welfare (FEHLHABER, 2003; ALTER, 1999; MAUERSBERGER, 2002): Premortal stress of animals for slaughter increases the risk of microbiological zoonoses)
		Salmonella in fresh bovine meat	<ul style="list-style-type: none"> • Available Data for the selected case regions • Available indicator data: national level (DE, ES, AT, CZ,...) • Appropriate time dimension of the data • Significance for public health (KRÄMER, 2002; KUNZ, 1993; MÜLLER et al., 1996; FEHLHABER, 2003) • At least indirect relevance for SMRs • Significance for animal welfare (FEHLHABER, 2003; ALTER, 1999; MAUERSBERGER, 2002): Premortal stress of animals for slaughter increases the risk of microbiological zoonoses)
		Salmonella in feed material	<ul style="list-style-type: none"> • Available Data for the selected case regions • Available indicator data: national level (DE, ES, NL, AT, CZ,...) • Appropriate time dimension of the data • Significance for public health (KRÄMER, 2002; KUNZ, 1993; MÜLLER et al., 1996; FEHLHABER, 2003) • Relevance for SMRs
		Campylobacter in fresh pig meat	<ul style="list-style-type: none"> • Campylobacteriosis is the most frequently reported zoonosis in the EU (EFSA, 2007) → Significance for public health (KRÄMER, 2002; MÜLLER et al., 1996; FEHLHABER, 2003) • At least indirect relevance for SMRs • Significance for animal welfare (FEHLHABER, 2003; ALTER, 1999; MAUERSBERGER, 2002): Premortal stress of animals for slaughter increases the risk of microbiological zoonoses) • Available data in at least two case regions • Available indicator data: national level (DE, ES, NL, AT,...)
		Campylobacter in fresh bovine meat	<ul style="list-style-type: none"> • Campylobacteriosis is the most frequently reported zoonosis in the EU (EFSA, 2007) → Significance for public health (KRÄMER, 2002; MÜLLER et al. 1996; FEHLHABER, 2003) • At least indirect relevance for SMRs

		<ul style="list-style-type: none"> •Significance for animal welfare (FEHLHABER, 2003; ALTER, 1999; MAUERSBERGER, 2002): Premortal stress of animals for slaughter increases the risk of microbiological zoonoses) •Available data in the case regions •Available indicator data: national level (DE, IT, NL, ES, CZ, AT,...)
WHO: Environment and health indicators	Incidence rate for all type of food-borne illness, food-borne infections & intoxications per 100000 population	<ul style="list-style-type: none"> •Significance for public health •At least Indirect relevance for SMRs •Available data in at least two case regions •Available indicator data: EU-level (EU 25 & EU 15); national level (EU 25 (few exceptions))
Eurostat: Indicators of public health	Government investments food safety measures	<ul style="list-style-type: none"> •Available data for the selected case regions •Available indicator data: national level (BE, CZ, DK, DE, IE, GR, ES, IT, MT, NL, AT, SI, UK, CH) •Suitable time dimension •Significance for public health •The government investments have financial effects on the farmer
	Occurrence of salmonellosis	<ul style="list-style-type: none"> •Available Data for the selected case regions •Available indicator data: EU-level (EU 25 & EU 15); national level (EU 25) •Appropriate time dimension of the data •Significance for public health (KRÄMER, 2002; MÜLLER et al., 1996) •At least indirect relevance for SMRs
	<p>In development: Controls and inspections of food and feed (to be specified)</p> <p>Application is advised but depending on the availability of indicator data. The data will be published in 2008 (in a pocketbook).</p>	<ul style="list-style-type: none"> •Significance for public health (KRÄMER, 2002) •Relevance for SMRs
Own development	Degree of compliance	<ul style="list-style-type: none"> •Relevance for SMRs •High significance for public health (LEI) •The degree of compliance has financial effects on the farmer (LEI)
	Membership in certification schemes	<ul style="list-style-type: none"> •High significance for public health (FEHLHABER, 2003) •The membership in certification schemes has financial effects on the farmer (QS, 2007) •Data can also be surveyed •Relevance for SMRs •Practicability of the indicator
	Veterinary costs per animal per year	<ul style="list-style-type: none"> •Significance for public health •Data has to be surveyed

			<ul style="list-style-type: none"> •Relevance for SMRs •Practicability of the indicator
Animal welfare	Animal Needs Index 35L/2000 for cattle	Space allowance	<ul style="list-style-type: none"> •Good availability of data in Austria
		Lying & rising	<ul style="list-style-type: none"> •Relevance for SMRs
		Stall size & boundaries	<ul style="list-style-type: none"> •Most of the respective SMRs have strong cost implications on the farmer
		Movement of tether	<ul style="list-style-type: none"> •Appropriate time dimension
		Yards / pasture	<ul style="list-style-type: none"> •The Animal Needs Index or several of its indicators can be used to assess the standard of animal welfare in other case regions
		Softness, cleanliness & slipperiness of the lying area	<ul style="list-style-type: none"> •High significance of the Animal Needs Index for animal welfare (HÖRNING, 2004; OFNER, 2003; AMON, 2002; BARTUSSEK, 1988, 1990 & 1995)
		Daylight in animal house	<ul style="list-style-type: none"> •Suitable spatial level
		Air quality	<ul style="list-style-type: none"> •Practicability of the indicators
		Technical condition of equipment	
		Cleanliness of pens / feeding/drinking areas	
		Cleanliness of animals	
	Animal health		
	Animal Needs Index 35L/1995 for feeding pigs	Width of feeding grounds	<ul style="list-style-type: none"> •Good availability of data in Austria •Relevance for SMRs
		Watering place	<ul style="list-style-type: none"> •Most of the respective SMRs have strong cost implications on the farmer
		Temp. access to watering place	<ul style="list-style-type: none"> •Appropriate time dimension
		Space allowance	<ul style="list-style-type: none"> •The Animal Needs Index or several of its indicators can be used to assess the standard of animal welfare in other case regions
		Yards and pasture	<ul style="list-style-type: none"> •High significance of the Animal Needs Index for animal welfare (HÖRNING, 2004; OFNER, 2003; AMON, 2002; BARTUSSEK, 1988, 1990 & 1995)
		Softness, cleanliness & slipperiness of the lying area	<ul style="list-style-type: none"> •Suitable spatial level
		Daylight in animal house	<ul style="list-style-type: none"> •Practicability of the indicators
		Air quality	
		Technical condition of equipment	
		Cleanliness of pens / feeding/drinking areas	
		Record keeping in animal house	
	Animal health		
	Animal production and welfare committee of the German Society for Animal breeding	Muck out interval of the stables	<ul style="list-style-type: none"> •Relevance for the SMRs •Practicability of the indicator •Significance for animal welfare (BOCKISCH et al., 1999) •Significance for public health
		Width of the drove alleyways	<ul style="list-style-type: none"> •Relevance for the SMRs •Practicability of the indicator •Significance for animal welfare (BOCKISCH et al., 1999)
	Own development	Degree of compliance: proportion of breaches by SMR [%]	<ul style="list-style-type: none"> •Relevance for SMRs •High significance for animal welfare (LEI) •The degree of compliance has financial effects on the farmer (LEI) •IEEP-data available
		Membership in certification schemes:	<ul style="list-style-type: none"> •The membership in certification schemes has financial effects on the farmer (QS, 2007)

	certification and type of certification scheme	<ul style="list-style-type: none"> •Data can also be surveyed •Relevance for SMRs •Practicability of the indicator
	Farm attributes: training intervall of personel, stocking rate of animal transports (m ² /animal), type of housing system	<ul style="list-style-type: none"> •Significance for animal welfare (ROUSING et al., 2000; BOCKISCH et al., 1999; VON BORELL & VAN DEN WEGHE, 1999) •Relevance for SMRs •Practicability of the indicator
	Average Milk yield per cow per year (l/cow)	<ul style="list-style-type: none"> •Significance for animal welfare: depends on the occurrence of udder diseases (ROUSING et al., 2000 & 2002; VON BORELL & VAN DEN WEGHE, 1999) •Relevance for SMRs •Practicability of the indicator •CAPRI-data available (NUTS2)
	% of early deaths per year	<ul style="list-style-type: none"> •Significance for animal welfare (ROUSING et al. 2000 & 2002; MANTECA & VELARDE, 2007, KNIERIM et al., 2003; WILLEN, 2004) •Relevance for SMRs •Practicability of the indicator
	Number of offspring per animal per year	<ul style="list-style-type: none"> •Significance for animal welfare (HÖRNING, 2004) •Relevance for SMRs •Practicability of the indicator •CAPRI-data available (NUTS0)
	Disease level: Number and kinds of diseases per animal per year	<ul style="list-style-type: none"> •Significance for animal welfare “disease can be regarded as an important welfare indicator, because it is in many cases associated with negative experiences such as pain, discomfort or distress” (ROUSING et al., 2000 & 2002; HUGHES & CURTIS, 1997; VON BORELL & VAN DEN WEGHE, 1999; KNIERIM et al., 2003; WILLEN, 2004) •Relevance for SMRs •Practicability of the indicator
	Veterinary costs per animal per year	<ul style="list-style-type: none"> •High significance for animal welfare •Data has to be surveyed •Relevance for SMRs •Practicability of the indicator

Whereas table 2 provides a short review of the indicator selection, a more detailed description of the indicators, their measurement, assessment and availability is given in the Annex.

1.3 Selection of indicators for the first prototype of the tool

In the first prototype of the tool only EU-wide indicators (at European scale) will be involved. Therefore only 6 of the already selected indicators will be implemented:

- **WHO:** Environment and health indicators: Incidence rate for all type of food-borne illness, food-borne infections & intoxications per 100000 population: The indicator data is available on European level (EU 15 and EU 25) and on national level (NUTS0: 25 Member states with few data gaps).
- **Eurostat:** Indicators of public health: Occurrence of salmonellosis: Die The indicator data is available on European level (EU 15 & EU 25) and national level (member states EU 25).
- **Eurostat:** Indicators of public health: Government investments in food safety measures: The indicator data is available in most Member states (NUTS0) of the EU 15. The can be aggregated on European Level.
- **Own developed indicator data:**
 - **Number of offspring per sow/cow per year:** Reliable indicator data on NUTS0-level is available in the CAPRI data base up to the year 2004. On NUTS2-level the CAPRI data is not reliable. Moreover there is Eurostat data available up to the year 2007.
 - **Average milk yield per cow per year (l/cow):** Reliable indicator data is available in the CAPRI data based on NUTS0, NUTS1 and NUTS2 level until the year 2004. Further data is available in the Eurostat database up to the year 2006.
 - **Degree of compliance:** We can use the data of the IEEP-Project „Evaluation of the application of cross compliance as forseen under regulation 1782/2003“. This data includes in addition to the total numbers of SMR inspections and breaches the proportions of breaches by SMR on NUTS0 level.

1.3.1 Weighting of indicators

Given that the indicator “degree of compliance” which specifies the proportions of breaches by SMR only refers to the legal acts No. 1-8a (environmental issues, registration of farm animals), it is necessary to translate its values into the SMRs of the legal acts No. 9-18 as well as the Regulation (EC) No. 852/2004 that are focussed on the issues of public health or animal welfare.

The “degree of compliance” with legal acts / SMRs depends among others on the existing costs of compliance, the quality of the monitoring system (first of all the control frequencies) and the probability to uncover breaches respectively. It will be tried to gather in an indirect way some information that could be helpful in making a best estimate of compliance, be it necessarily a tentative one. For example, we will estimate the cost implications for compliant farms in several EU countries based on secondary information (desk study review of existing literature and grey reports) as well as a case study. When this information is available, and relying on an economic approach to compliance, legal acts / SMRs that have the same or similar cost implications could for example be assumed to lead to a similar “degree of compliance” with the mandatory standards and thus to similar proportions of breaches by SMR.

But this approach holds several problems. Because of the incompleteness of the existing data it is very difficult to estimate the proportions of breaches. For the regulation (EC) No. 852/2004 to be involved are even no figures available.

Furthermore the existing data proves to be not reliable for some countries. The monitoring data of Luxembourg, e.g. declares a proportion of breaches of Directive 92/102/EEC of 137.5 %. Another problem is the use of the categories of evaluation (empty cell, -, +, ++) to describe the level of cost implications in the study, that leads due to a rough classification to a very limited comparability of the legal acts and SMRs respectively. But the main problem of this approach is the weak statistical correlation between the “degree of compliance” data and the categorical cost implications proved by a low correlation coefficient of $r = 0.35$.

Regarding these issues, the best option is to weight the indicator data for the respective countries by calculating the arithmetic average of the proportions of breaches. The results will be used as characteristic “degree of compliance”-values for the SMRs of the relevant legal acts in the area of public health and animal welfare.

The weighting of the “degree of compliance” data for the relevant legal acts is described in more detail in the Annex II of this report.

2 Case study research

2.1 General procedure

To get sufficient reliable information about the farmer’s behaviour in the fields of animal welfare and public health a desk study and an in-depth case study will be conducted. The desk study aims at surveying the existing literature and detail studies done in this field at member state level. It will include both officially published and grey literature. Based on this a general and systematized picture of the state of the research will be made. It is hoped for that this will provide further insight into the available data, as well as into the existing heterogeneity between member states. This latter info will be useful when attempts will be made to generalize assumptions based on case study information.

The desk study includes surveying the current literature on animal welfare and public health. This information will be scanned and be brought into a more general framework, allowing for a systematic comparison of results over member states. This study will also help to identify gaps in the information, which might be of use in further specifying the case study set-up.

Whereas the desk study aims at existing literature and studies at member state level the in-depth case study to be conducted in Austria will provide the following specific type of information:

- **Standard of animal welfare:** Specific interview-based (interviews of the farmers and experts) and practical (e.g. the ANI) assessments of important animal welfare issues
- **Standard of public health:** Interview-based assessments of important public health issues (e.g. traceability of feed in all stages of production)

- **Memberships in certification schemes:** The membership in certification schemes (also used as an indicator for animal welfare and public health) gives relevant and detailed information about the quality of animal welfare and the applied measures to improve public health. This is an important criteria for the creation of the different scenarios
- **Farmer’s level of knowledge of “Cross Compliance”:** Interview-based assessments that will focus on the farmer’s point of view. Its results will be used as criteria for the creation of the scenarios
- **Compliance behaviour of the farmers:** Interview-based assessments of the farmer’s attitude and behaviour concerning the European “Cross Compliance” policy
- **Costs of compliance:** As the expected main influence of the farmer’s compliance behaviour the determination of the costs of compliance is crucial for the project. Their assessment will be interview-based
- **Farming systems:** The type farming system plays an important role especially for the standard of animal welfare. It will be used as criteria for the creation of scenarios
- **Effectiveness of the monitoring system:** Assessments that base on interviews with the farmers on local experts
- **Animal welfare requirements:** Additional interview-based information from local voluntary certification standards
- **Other relevant farm conditions:** Interview-based assessments of farm conditions that will be used as criteria for the creation of scenarios (e.g. live stock, annual sales, ...)

The general procedure to be applied in this case study is focussed on the development of farm scenarios. Its working steps are described in the following table 3:

Table 3: Working stages of the case study

Stages of the case study research	Working steps
1. Design of the case study protocol	a) Determination of the required skills
	b) Determination of the analysis approach
	c) Develop and review of the protocol
2. Conduction of the case study	a) Preparation for the data collection
	b) Distribution of the questionnaire
	c) Conduction of the interviews
3. Analysis of the case study evidence	a) Appliance of the analytic strategy
	b) Creation of different scenarios on the basis of existing and assessed indicators
4. Development of conclusions, and implications based on the evidence	a) Application of the different scenarios as a reference for the other case regions
	b) Desk research for the other case regions / member states

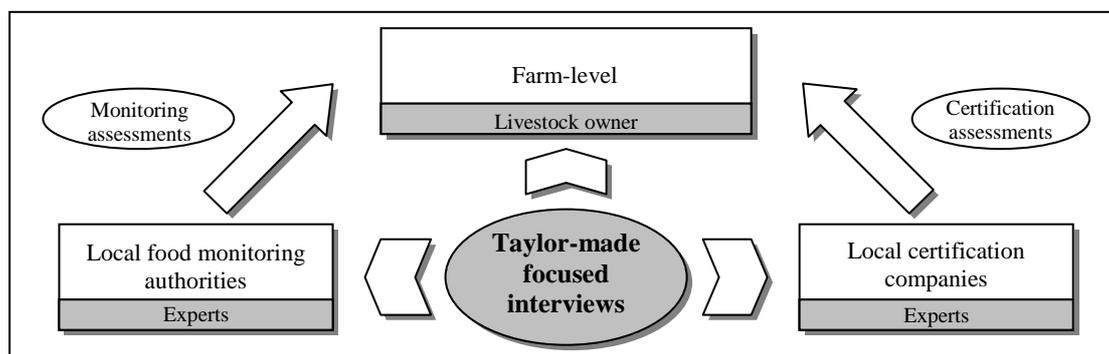
The collection of topic-related data is the basis of case studies. But it can also be a major source of error. Therefore it first has to be ensured that the used data is reliable.

The case study in the fields of animal welfare and public health will be based on the following sources of information:

- **Pre-existing indicator data:** Especially in the field of public health existing indicator data is available (existing data on desk research and previous info on the case study)
- **Data of own developed indicators:** Most of them derive from indicator data gathered in the CAPRI model database
- **General, structural, country-specific and problem-based information:** Relevant case study information e.g. the rural development plans or the “costs of compliance” derived from the LEI-project
- **Interviews:** For the case study assessments the choice of the adequate interview type plays an important role. For this case study targeted, semi-standardised Interviews will be passed. By focussing on different topical priorities they provide a differentiated view of the topic. The interviews will base on taylor-made questionnaires which refer to the different points of view and the specific knowledge of the interviewed persons
- **Direct observations (e.g. ANI):** The investigator makes a site visit to gather data. The observations could be formal or casual activities, but the reliability of the observation is the main concern. Using at least two observers is one way to guard against this problem

In order to gain additional as well as reliable information without becoming dependent on a single informant the case study will be passed on three different levels of measurement. In addition to the farm-level assessments, there will be interviews with experts of local food monitoring authorities and certification companies which have wide experience in controlling the compliance with certain standards in the fields of animal welfare and public health. By seeking the same data from other sources we can verify its authenticity. The following diagram provides an overview of the different measurement levels of the case study:

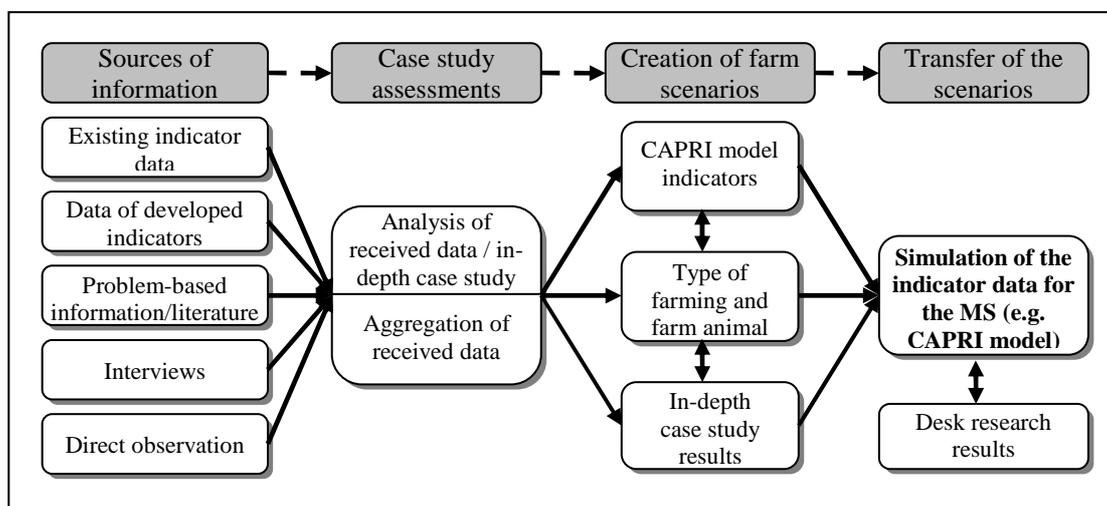
Diagram 1: Measurement levels of the case study



Whereas the interviews and interview-based assessments will be the most important sources for the case study information, existing and own developed (e.g. on the basis of the CAPRI model) indicator data as well as country-specific, general, structural and problem-based information will be used as cornerstones to create different scenarios which will be used as reference for the other case regions regarding their different conditions. This procedure enables a better comparability of the case study

results with the help of the CAPRI model. In diagram 2 a short overview of the methodology to be applied for the case study is given:

Diagram 2: Overview of the methodology of the case study



The choice of farm scenarios to be used for the case study should be restricted to a total number of two to six scenarios. Whereas the scenarios should address to the different farm conditions, they base on the available indicator data. A short characterisation of the indicators to be used as main criteria for the creation of the farm scenarios is given in the following table:

Table 4: Characterisation of the indicators to be used as criteria for the creation of farm scenarios

Indicator	Unit of indicator	Availability of indicator
Farmer's income	€ / hectare or head	CAPRI model (NUTS2)
Herd size	Number of animals	CAPRI model (NUTS2)
Animal density	Animals / hectare	CAPRI model (NUTS2)
Yield	kg	CAPRI model (NUTS2)
Type of farming	Organic or conventional farming	Eurostat (NUTS0)
Type of farm animal	Pigs or cattle	Eurostat (NUTS0)

With the help of the CAPRI model the created farm scenarios will be simulated. In this connection the results of the desk research at member state level have to be considered.

2.2 Specifications of the case study in Austria

2.2.1 Country profile

The choice of the member state in which the case study will be passed is a crucial point of the case study design. The main reasons for the selection of Austria are mentioned in the following:

- **High number of organic farms:** Austria has with 11.9 % the highest proportion of organic farms in agriculture in Europe (Lebensministerium, Austria, 2007). Because it is usually illegal for a non-certified farm to call itself or its product organic, the membership in certification schemes (also used as an indicator for animal welfare and public health) gives relevant and detailed information about the quality of animal welfare and the applied measures to improve public health.
- **High standard of animal welfare:** Due to the high proportion of organic farming within the Austrian agriculture, its mainly extensive livestock husbandry and the research progress especially in the field of animal welfare assessment, Austria achieved a very high standard of animal welfare in Europe. Therefore it is also plenty information about relevant research projects available which can be used for the desk study part.
- **Region of mainly extensive farming practices:** Austria offers a mixture of extensive and intensive animal husbandry. This allows an assessment of farms ranging from extensive to intensive farming practices.
- **Cooperation with the AREC Raumberg-Gumpenstein:** As the biggest agency of the Ministry for Agriculture and Forestry, Environment and Water Management of Austria the AREC Raumberg-Gumpenstein is the centre for research and education of the rural society. The AREC Raumberg-Gumpenstein has its head office in the municipality Irdning in the north of Styria (distance to Vienna amounts to 270 km, to Graz 140 km, and to Salzburg 235 km). Besides there are two branches in Wels and Lambach as well as branch offices in Admont, Piber, Winklhof and Kobenz.

As developers (Prof. H. Bartussek) of the Animal Needs Index (ANI), which became in 1995 the official system for assessing housing conditions in terms of animal welfare for organic farms in Austria they have the right expertise, experience and contacts to local authorities and certification companies that are crucial for the case study assessments. They would conduct the surveys for us at least in the field of animal welfare and evaluate the assessments of the ANI.

- **Available indicator data:** Especially in the area of animal welfare the availability of indicators is very restricted. The selection of Austria allows the application of the ANI and its existing data without paying a license fee. In the field of public health Austria offers an above-average data availability for the respective indicators.
- **Low flight / travel and accommodation expenses:** There are several air connections between the airport of Cologne/Bonn and the airports of Graz, Salzburg and Linz. They offer frequent and cheap direct air connections to Düsseldorf (TuiFly), Köln/Bonn (TuiFly), Frankfurt am Main. Travelling by car is also possible and relatively inexpensive.
- **No language barriers:** Because of the absence of language barriers for German / English speaking persons the survey costs are reduced.

2.2.2 Selection of Styria as case region

Within Austria there are several regions which are suitable as case regions. The choice of Styria offers many advantages. These are mentioned in the following:

- **Highest number of pig farms in Austria (Statistik Austria, 2007)**
- **Second highest number of cattle farms in Austria (Statistik Austria, 2007)**
- **Low travel expenses:** Because of the localisation of the AREC Raumberg-Gumpenstein in Styria, the expenses for travelling are reduced to a minimum.
- **Low survey expenses / personnel costs:** In addition to the travelling expenses the expenditure of time for the travelling and the survey assessments is minimised.

2.2.3 Costs of the case study

The costs of the case study in Styria can be distinguished in the arising daily allowance of the personnel, the travelling expenses (mileage allowance) as well as arising expenses for the carriage of passengers in cars. They have to be covered with the CCAT budget of the University of Bonn that amounts to 15.372 Euros at present (primary 16.900 Euros). The cost rates of the Styrian case study are listed in the following table 5:

Table 5: Cost rates of the Styrian case study

Matter of expense	Germany	Austria
Daily allowance	1 day: 30 € / person 14-24 h: 24 € / person 8-14 h: 12 € / person	1 day: 27,90 € / person 2/3 day: 18,60 € / person 1/3 day: 9,30 € / person night: 15,30 € / person
Personnel costs	Covered by project	Approx. 30 € /person & hour
Mileage allowance	0,30 € / km	0,356 € / km
Costs for the carriage of passengers in cars	0,02 € / person & km	0,043 € / person & km
Accommodation costs	Approx. 70 € / night	Approx. 70€ / night

Given that the surveys will be conducted by members of staff of the AREC-Raumberg-Gumpenstein there will not be a need for paying a license fee for using the ANI.

Because the quality of the farm assessments depends on the education and training of the investigator it is highly recommended to consign a research Assistant of the AREC-Raumberg-Gumpenstein to conduct the specific ANI assessments. The personnel costs for the research assistant would amount to approximately 30 € per hour (scaled by age and work experience).

From the head of the department of husbandry and housing techniques of the AREC-Raumberg-Gumpenstein, Dr. Elfriede Ofner-Schröck, a detailed estimation of costs for 50 case study assessments (which should be conducted to reach statistical relevance) is given in the following table 6:

Table 6: Estimation of costs for 50 case study assessments

Cost category	Entries	Fixed amount	
Personnel costs	25 days: <ul style="list-style-type: none"> • 9 hours per diem • 30 € per hour 	6750 ,-- €	
Travelling expenses	25 travels by car of 500 km: <ul style="list-style-type: none"> • 0,38 € per km 	4750,-- €	
	Daily allowance:	• 25 daily rates of 27,90 €	697,50 €
		• 20 night rates of 15,30 €	306,-- €
Total costs		12.503,50 €	

To assure a correct conduction of the assessments and the interviews the attendance of one project member is advised. Therefore additional to the total costs of the case study assessments displayed in table 5.6 accommodation costs for one project member would arise.

2.2.4 Organisation of the case study

Regarding the following reasons a suitable time period for the case study assessments would be January and / or February 2009:

- **Higher significance of the case study assessments:** Because the legal acts / SMRs in the fields of animal welfare and public health reached Cross-Compliance-Relevance in beginning of 2006 and 2007, the significance of the case study results will probably be higher.
- **Good time-referenced availability of the farmers:** Whereas the farmers have plenty of farm work in during spring, summer and autumn, their best availability and willingness to take part in the assessments and interviews will be in winter.
- **In January / February the farm animals will be in the stables:** This is necessary for the assessment of the ANI.

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Annex I Characterisation of the indicators to be used in the area of public health and animal welfare

Reference area	Organisation / Indicator framework	Relevant Indicators	Survey	Level of measurement	Spatial level	Data availability before CC (2002-2005)	Data availability after CC (2006/07)	Region / Member State / case region of the project (bold)	Dimension of indicators	Availability of data	Data source	URL for data source
Public Health	EFSA: Infectious food-borne diseases	Salmonella in fresh pig meat	Annual (2000-2005)	Product-level	National NUTS 0	yes	not yet	Germany (2000-2005), Spain, Austria (2002-05), Netherlands (2002-05), Czech Republic (2005), ...	% of positive samples	Digital	EFSA	http://www.efsa.europa.eu/cs_p/KSe/arch.do
		Salmonella in fresh bovine meat	Annual (2001-2005)	Product-level	National NUTS 0	yes	not yet	Germany, Spain (2002-05), Czech Republic (2004-05), Austria (2002-04), ...	% of positive samples	Digital		http://www.efsa.europa.eu/cs_p/KSe/arch.do
		Salmonella in feed material	Annual (2001-2005)	Product-level	National NUTS 0	yes	not yet	Germany, Netherlands, Austria (2001-03), Spain, Czech Republic (2004), ...	% of positive samples	Digital		http://www.efsa.europa.eu/cs_p/KSe/arch.do
		Campylobacter in fresh pig meat	Annual (2002-2005)	Product-level	National NUTS 0	yes	Not yet	Germany, Spain, Netherlands, Austria (2005), ...	% of positive samples	Digital		http://www.efsa.europa.eu/cs_p/KSe/arch.do
		Campylobacter in fresh bovine meat	Annual (2002-2005)	Product-level	National NUTS 0	yes	Not yet	Germany (2005), Italy, Netherlands, Spain (2005), Czech Republic (2004), Austria (2004)	% of positive samples	Digital		http://www.efsa.europa.eu/cs_p/KSe/arch.do
	WHO: Environment and health Indicators	Incidence rate for all type of food-borne illness	Annual (1987-2005)	Sector-level (health facilities)	National NUTS 0	yes	not yet	EU 15 / EU 25 (with few data gaps) Germany (2001-05), Czech Republic (2001-05),	Number of cases per hundred thousand population	Digital	WHO	http://data.euro.who.int/hfad/

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		food-borne infections & intoxications per 100000 population						Netherlands (2001-05), Spain (2001.02) , ...				
Eurostat: Indicators of public health		Government investments in food safety measures	Annual (1991-2006)	Sector-level	National NUTS 0	yes	yes (2006)	Germany (-2005), Belgium (-2005), Czech Republic (2002-2005) , Denmark, Ireland (-2005), Italy (1991-2001; 2005), Greece (-2005), Spain (-2005) , Netherlands, Austria , Slovenia (1996-2005), Switzerland (1992; 1994; 1996; 1998; 2000; 2002; 2004), Finland, UK (-2005)	Million €	Digital		http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996.45323734&_dad=portal&_schema=PORTAL&screen=welcomeref&open=/&product=EU_MASTER_food_safety&depth=2
		Occurrence of salmonellosis	Annual (1994-2005)	Sector-level	National & EU 15 (1995-2004) & EU 25 (1995-2004) NUTS 0	yes	not yet	EU-27 (including Spain, Czech Republic, Austria) + Macedonia, Turkey, Switzerland	Occurrence per 100000 people	Digital	Eurostat	http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996.39140985&_dad=portal&_schema=PORTAL&screen=detailref&language=de&product=sdi_ph&root=sdi_ph/sdi_ph/sdi_ph1300
		In development: Controls and inspections of food and feed (to be specified)	Annual (to be specified)	Sector-level	National & EU NUTS 0	not yet	not yet	EU-27	In development	Paper		In development
	Own development	Degree of Compliance	Annual	Sector-level	NUTS0 EU level	not yet	2005, 2006	Austria, Belgium (Flanders, Wallonia), Germany,	Proportion of breaches by SMR /	Paper	IIEP / CC study	http://ec.europa.eu/agriculture/eval/reports/cross_compli

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								Denmark, Greece, Spain, Finland, France, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Sweden, SI, England, Scotland, Slovakia, Hungary, Latvia, Estonia, Cyprus, Northern Ireland, Wales	Breaches as a percentage of inspected farms / Percentage of non-compliant farms			ance/index_en.htm
		Membership in certification schemes	to be specified	Sector-level	to be surveyed	not yet (Data from LEI)	not yet (Data from LEI)	Case regions	Number, date of certification and type of certification scheme	To be surveyed	LEI / Own survey	-
Animal welfare	Animal Needs Index TGI 35L/2000 for cattle	Space allowance	Existing data before 2003	Animal-level & Production system-level	Farm NUTS 0 to NUTS 3 (only Austria)	yes	to be surveyed	Austria	m ² /AWU	Paper / to be surveyed	LFZ Raumberg-Gumpenstein	
		Lying & rising							comfortable – very restrictive			
		Stall size & boundaries							comfortable – very restrictive			
		Movement of tether							m			
		Yards / pasture							Days / year			
		Softness, cleanliness & slipperiness of the lying area							Very soft / clean / good grip – very hard / very soiled / very slippery			
		Daylight in animal house							Open fronted housing – very dark			
		Air quality							Open fronted housing – very bad			
		Technical condition of							Good - bad			

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		equipment																Clean - soiled		
		Cleanliness of pens / feeding/drink areas																Clean - soiled		
		Cleanliness of animals																Very good – very bad		
	Animal Needs Index 35L/1995 for feeding pigs	Existing data before 2003	Width of feeding grounds	Animal-level & Production system-level	Farm NUTS 0 to NUTS 3 (only Austria)	yes	To be surveyed	Austria	cm/Animal	Paper / to be surveyed	LFZ Raumberg-Gumpenstein	-								Animals/watering place
			Watering place																	h/day
			Temp. access to watering place																	m ² /animal
			Space allowance																	h/day
			Yards and pasture																	Very soft / clean / good grip – very hard / very soiled / very slippery
			Softness, cleanliness & slipperiness of the lying area																	Optimal – very dark
			Daylight in animal house																	Optimal – very bad
			Air quality																	Good – very bad
			Technical condition of equipment																	Clean – very soiled
			Cleanliness of pens / feeding/drink areas																	Complete - inexistent
Record keeping in animal house																				

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		Animal health							Very good – very bad			
	Animal production and welfare committee of the German Society for Animal breeding	Muck out interval of the stables	Annual	Production-system-level	farm	To be surveyed	To be surveyed	Case regions	Times per year	To be surveyed	Own survey	-
		Width of the drove alleyway	Annual	Production-system-level	farm	To be surveyed	To be surveyed	Case regions	meter	To be surveyed	Own survey	-
	Own development	Degree of Compliance	Annual	Sector-level	NUTS0 EU-level	not yet	2005, 2006	Austria, Belgium (Flanders, Wallonia), Germany, Denmark, Greece, Spain, Finland, France, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Sweden, SI, England, Scotland, Slovakia, Hungary, Latvia, Estonia, Cyprus, Northern Ireland, Wales	Proportion of breaches by SMR / Breaches as a percentage of inspected farms / Percentage of non-compliant farms	Paper	IIEP / CC study	http://ec.europa.eu/agriculture/eval/reports/cross_compliance/index_en.htm
		Farm attributes	Annual	Sector-level	Farm	To be surveyed	To be surveyed	Case regions	training intervall of personel, stocking rate of animal transports (m ² /animal), type of housing system, muck out interval of the stables, width of drove alleyway (m)	To be surveyed	Own survey	-
	Milk yield	Annual	Sector-level /	Farm NUTS0-2	Existing CAPRI /	CAPRI data (-2004) /	EU 25	Milk yield per cow per year	Digital / to be surveyed	CAPRI / EURO-	http://epp.eurostat.ec.europa.eu/porta	

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			animal level	EU-level	Eurostat data	Eurostat data (2005.06)		(kg/cow)		STAT	/page?_pageid=0.1136206.0.45570467&_dad=portal&_schema=PORTAL
	Early Deaths	Annual	Sector-level	Farm	To be surveyed	To be surveyed	Case regions	Number of deaths per year / percentage of early deaths of the total number of animals	To be surveyed	Own survey	-
	Number of offspring	Annual	Sector-level	Farm NUTS0 EU-level	Existing CAPRI / Eurostat data	CAPRI data (-2004) / Eurostat data (2005-07)	EU 25	Number of offspring per cow / sow per year	Digital / to be surveyed	CAPRI / EURO-STAT	http://epp.eurostat.ec.europa.eu/porta/page?_pageid=0.1136206.0.45570467&_dad=portal&_schema=PORTAL
	Disease level	Annual	Sector-level	Farm	To be surveyed	To be surveyed	Case regions	Number and kinds of diseases per animal per year	To be surveyed	Own survey	-
	Membership in certification schemes	to be specified	Sector-level	to be surveyed	not yet (Data from LEI) / to be surveyed	not yet (Data from LEI) / to be surveyed	Case Regions	Number, date of certification and type of certification scheme	To be surveyed	LEI / Own survey	-



Annex II Weighting of the “degree of compliance” for the fields of animal welfare and public health

MS	Proportion of breaches by legal act / SMR [%]									Arithmetic Average: Characteristic values for the SMRs of the relevant legal acts No. 11, 12, 17, 18 and Regulation (EC) 852/2004
	1	2	3	4	5	6	7	8	8a	
AT	0,28	2,3	0,35	5,5	0,14	15,9	24,1		30,5	9,88
BE (F)	0,1	-	-	0,2	0,1	-	0,3	6,1	3,0	1,63
BE (W)	s.u.	2,2	-	0,6	32,7*	38,8	29,1		85,5	31,48
DE	s.u.	0,2	2,2	8,3	0,01*	19,5	33,0		27,2	12,91
DK	-	-	-	-	-	-	most		-	-
EL	-	-	-	-	-	-	18,6		49,9	34,25
ES	0,04	-	-	11,6	1,1	3,9	11,7		4,8	5,52
FI	-	8,7	-	24,7	-	41,2			-	24,87
FR	-	-	-	9,7	-	9,6	48,1	-	30,3	24,42
IE	-	3,9	-	-	-	12,0	20,6		14,7	12,8
IT	0,1	0,2	-	3,4	-	-	2,8		0,4	1,38
LU	-	48,0	-	20,0	9,5	137,5	86,0		62,5	60,58
MT	-	-	-	-	7,7	20,0				13,85
NL	s.u.	-	-	0,2	0,1*	-	0,3	6,1	3,0	1,94
PT	-	-	7,0	3,0	-	25,0				11,68
SE	-	-	-	3,0	-	1,1	19,2	41,3	4,1	13,74
SI	-	-	-	most	-	second	third	fourth	fifth	-

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UK (E)	-	-	0,3	0,8	-	0,1	6,3		1,3	1,76
UK (NI)	10,0	20,0	28,0	8,0	-	29,0	10,0	7,0	-	16,0
UK (S)	-	14,7	-	26,4	-	47,7				29,6
UK (W)	-	5,0	-	6,0	-	17,0	39,4		12,0	15,88

* Legal act 1 & 5

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