

## **Principles & Practices for the Sustainable Production of Cereals**

This document compiles in form of a table basic principles and practices for the sustainable production of cereals in Europe<sup>1</sup>, for the mainstream market. The principles and practices provide recommendations for producers to continuously improve the sustainability of their agricultural practices along the three pillars of sustainability: economic, social and environmental. They cover in particular wheat, durum wheat, barley, oats, rye, sorghum, maize and rice.

It is a working document meant to be revised and improved on the basis of feedback received from producers over the years. In addition, it might be completed later on with guidelines based on local innovations and adapted to local prevailing conditions (according to the region and its climates, ecological variables, farming systems, cultures etc) as well as respecting national laws and regulations. In effect, legal requirements at local, national and regional levels are taken as the minimum requirement.

The structure of the Principles and Practices for the Sustainable Production of Cereals is as follows:

- 1 - Sustainable farming system
- 2 - Economic sustainability
- 3 – Social sustainability
- 4 – Environmental sustainability

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<sup>1</sup> Europe is defined by the UN as a continent. (Western Europe, Eastern Europe, the former Yugoslavia, Estonia, Latvia, Lithuania, Bielorussia, Ukraine)

<b><u>Chapter</u></b>	<b><u>Principle</u></b>	<b><u>Sustainable Agricultural Practice</u></b>
<b>1. Sustainable Farming System</b>		
<i>General concept: Good management of a farming system constitutes the grassroots of the system's economic, environmental and social sustainability. Therefore, it is recommended to first pay attention to planning and managing well the overall farm system itself. In addition, cereals are typically grown in rotation with other crops. It is thus important to tackle the sustainability of their production through a common approach for all farming operations.</i>		
<b>1.1 - Site selection and management</b>	1.1.1 Site history and specificities (such as topographic, ecological, social conditions etc) shall be properly taken into account when planning and managing new plantations	<ul style="list-style-type: none"> <li>a. The producer must be aware of the site history.</li> <li>b. The producer must be aware of its location within the area and of any regulations on site (sensitive area, catchments area, protected area, vicinity of habitat, tourist zone, etc).</li> <li>c. Soil analysis must be carried out per field or per group of homogeneous fields.</li> <li>d. Risks should be identified (pollution coming from the environment or an industrial site).</li> </ul>
<b>1.2 – Planting material</b>	1.2.1 The choice of species and varieties should be adapted to the agro-climatic conditions of the area.	<ul style="list-style-type: none"> <li>a. The choice of variety must take into account agronomic performance appropriate to the local conditions as well as market demand.</li> </ul>
	1.2.2 The seed quality, treatment should contribute to the overall sustainability on the farm.	<ul style="list-style-type: none"> <li>a. Good quality seeds with defined origin must be used.</li> <li>b. Only seed treatments legally approved in the country of cereals production may be used.</li> <li>c. Sowing must be carried out at best possible climatic conditions, with seeding density adapted to dates, soil types, estimated losses.</li> <li>d. The sowing of any GMO must comply with all existing regulations in the country of production.</li> <li>e. If GMOs are sown, their handling must ensure the proper traceability of the grain and the indication of GMO must be clearly stipulated to the buyer.</li> <li>f. GM crops, if any on the farm, must be handled and stored separately from other crops to avoid mixing.</li> </ul>
<b>1.3 Integrated crop management</b>	1.3.1 Rotation practices should be sought as an important tool of integrated management of cereal production as well as diversified source of income for the farm.	<ul style="list-style-type: none"> <li>a. The crop rotation management should maintain soil conditions, minimize risks of nitrate leaching, and reduce pest development in order to optimize crop health</li> <li>b. Or the planning of the crop should take into account the previous crops (protection against pests and diseases, especially fusarium, intercropping management, fertilisation)</li> </ul>
	1.3.2 Special cultivation techniques shall be used in order to maintain or improve the physical and biological characteristics of the soil as well as to reduce mineralization and leaching of nutrients. Proper use of inputs, as well as	<ul style="list-style-type: none"> <li>a. Farming systems and cultivation techniques used on farm should prevent damage to the environment, e.g. soil erosion and pollution.</li> </ul>

	adequate soil tillage should be made to maintain good soil fertility and prevent soil pollution, increasing salinity and erosion.	
	1.3.3 Fertilization should be well balanced in order to provide the appropriate allowance of nutrients to the crop, taking into account soil resources, crop nutrients needs, climatic conditions and surface, groundwater and contamination risks.	<ul style="list-style-type: none"> <li>a. Analyse the cereal's nutrient needs and quality based on its requirement and on the available supply (in the soil, from crop residues and from organic fertilisation). Define a fertilization plan.</li> <li>b. When required, it should be made use of known and registered mineral fertilizers and ingredients only.</li> <li>c. Planting a catch crop that would capture nitrates is recommended where appropriate.</li> <li>d. Chopping and incorporation of crop residues as well as organic manure or compost can help improve soil fertility by increasing organic matter content, improve nutrient and water retention and reduce erosion.</li> <li>e. Adequate amount and proper fractioning of N fertilization taking into account soil resources, crop needs, climatic conditions, surface and groundwater, efficiency and leaching risks.</li> <li>f. The last nitrogen input during the growth should be adapted following a crop analysis when technology is available on farm at economical price (This concerns wheat, durum wheat, barley and maize production).</li> <li>g. Phosphate and potash fertilization application must be based on crop needs, fertilization history, crop residues and soil content.</li> <li>h. The management of farm inputs must conform to all local regulations (nitrate sensitive area, protected sites, etc.).</li> <li>i. Straw management must conform to the legislation in force (e.g. for burning and what are exemptions cases).</li> </ul>
	1.3.4 The use of sludge has to be managed very carefully on the basis of proper risk assessment to avoid contamination of agricultural raw materials.	<ul style="list-style-type: none"> <li>a. The use of sewage, sludge/slurry and organic fertilisation must strictly comply with legislation. As example, food industry sludge could be used if strictly complying with legislation. Neither urban and industrial residues water nor sludge shall be spread on vegetation.. Untreated human sludge must not be applied to farm land.</li> </ul>
	1.3.5 Protection of crops against pest, diseases and weeds shall be achieved as much as possible with minimal reliance on pesticides. In particular, the use of Integrated Pest Management (IPM) systems is strongly encouraged.	<ul style="list-style-type: none"> <li>a. The risk of potential yield loss (and risk of loss of quality criterias) must be assessed before any treatment. The treatment must be justified and recognized integrated pest management techniques must be used. Non chemical pest treatments are encouraged over chemical treatments.</li> <li>b. The crop protection product utilized must be appropriate and nationally registered. Management tools (information sources, weather forecasts, health monitoring systems or field control, etc.) must be used before treatment to assess the risk. Use must not exceed maximum authorized doses and must conform to pre-harvest intervals.</li> </ul>

	1.3.6 Agricultural inputs shall be chosen, handled and stored with great precaution as per label instructions.	<ul style="list-style-type: none"> <li>a. Crop protection products storage is locked, well ventilated and located away from other products. Storage and all products stored must comply with legislation</li> <li>b. Farm staff must follow label instructions &amp; legislation in force.</li> <li>c. Surplus spray mix and washings must be disposed of according to local legislation and prevent surface and groundwater contamination.</li> <li>d. Non target areas should be protected with appropriate protective measures (e.g. buffer strips).</li> <li>e. Spray equipment must be adapted, maintained and calibrated on a regular basis.</li> </ul>
<b>1.4 Sustainability Management system</b>		
	1.4.1 A functioning sustainability system geared towards continuous improvement must be maintained on the farm.	<ul style="list-style-type: none"> <li>a. The farm should be managed in an organised way so as to ensure continuous improvement towards sustainable production practices over time.</li> <li>b. The producer and all people working on the farm shall be aware of the relevance of their specific responsibilities and contribution to the economic, social and environmental sustainability of the farm.</li> <li>c. Existing practices shall be examined critically by the producer in view of adapting or changing them in order to improve the farm overall sustainability management system</li> </ul>
	1.4.2 Reliable information regarding the various inputs and techniques used as well as results of the farm shall be properly recorded. These are necessary to ensure the credibility of the farm's performance and help on possible verification procedures.	<ul style="list-style-type: none"> <li>a. Producers are expected to keep reliable documentation regarding their progress in meeting the sustainable production practices and to enable tracing back the product.</li> <li>b. Record belongs to the producers and shall be disclosed only with their approval and only to independent third controlling parties.</li> </ul>
	1.4.3 Producers shall take the opportunity of accessing valuable information, required know-how and support services such as production techniques and tools to continuously improve the overall farm sustainability.	<ul style="list-style-type: none"> <li>a. Regular advice shall be sought by producers on how to get access to improved cereals production technologies and tools. Producers should go for self training or self information with existing tools.</li> <li>b. If indicated, advice shall be sought by producers on how to access and make use of instruments and tools (e.g. credit) allowing for improved financial management.</li> </ul>
<b>2 Economic Sustainability</b>		
<i>General concept: Farming systems can only be sustainable if they are economically viable. An adequate net farm income is necessary to support an acceptable standard of living for farmers as well as to ensure the investment needed to improve the farm economic, social and environmental performances in the long-term. Farming systems can only be sustainable if they are productive, competitive and efficient.</i>		
<b>2.1.Safety, quality and transparency</b>	2.1.1 Growing, harvest, and post-harvest processes and facilities shall ensure product safety and quality of agricultural products as well as transparency of its production	<ul style="list-style-type: none"> <li>a. All equipment used for harvesting, transportation handling, conveying and loading of grain must be clean as possible.</li> <li>b. The harvest should be by single variety or groups of variety, and keep proper traceability according to the demands of the buyers.</li> </ul>

	methods and traceability	<ul style="list-style-type: none"> <li>c. Temporary storage on the field or outside the regular store should be possible for a few days and means should be taken to minimize weather impact and prevent bird, rodent and animal entry.</li> <li>d. Grain stored for more than a few days must have a moisture content and temperature suitable for storage. If drying is necessary, proper drying device should be used. Over-drying and heat damage must be avoided.</li> <li>e. Facilities must be made suitable for storage and clean before use.</li> <li>f. Bird, rodent and domestic animal entry to all grain storage must be prevented.</li> <li>g. The variety or group of varieties is stored individually according to the demands of the buyers.</li> <li>h. The storage conditions should be monitored.</li> <li>i. Post-harvest treatments must be carried out only if needed and with full transparency on the registered product used. Information on the treatment should be provided to the client.</li> </ul>
<b>2.2 Financial structure</b>	2.2.1 It shall be sought to achieve long-term stability of the farm income allowing for proper investments and workforce payment	<ul style="list-style-type: none"> <li>a. Producers shall apply sound financial management to ensure the investment needed to improve the farm economic, social and environmental performances in the long-term long term viability</li> </ul>
	2.2.2 In this view, the farm's cost-benefit structure shall be optimised in accordance with market characteristics and customer demand	<ul style="list-style-type: none"> <li>a. The cost-benefit structure should be optimised to ensure long term economic viability. Producers should develop and implement a plan in order to optimise the farm's cost-benefit structure - including levels of waste and defects to be kept as low as possible and yield, safety and quality of products as high as possible</li> </ul>
<b>2.3 Relation to the market</b>	2.3.1 Producers should strive to optimize profitability while achieving the optimal yields of products with the best characteristics that can be sold at best prices, while at the same time supporting the lowest possible cost.	<ul style="list-style-type: none"> <li>a. Producers shall make sure to have access to relevant technical and market information and tools in order to optimize his/her economic return.</li> </ul>
	2.3.2 Producers shall get organised and select efficient trading channels in order to be able to get the best price for their products.	<ul style="list-style-type: none"> <li>a. Producers shall negotiate in open and honest terms attractive prices with their clients (optimum in quantity and quality), and try to develop long-term trading relationships with them.</li> <li>b. Producers shall get organised in groups, if indicated, to get better access to support services and improve the position in bargaining prices, (through a better knowledge of market overview)</li> <li>c. Timing of cereals deliveries shall be optimised and efficient trading channels selected to receive the best price for and share of the product value.</li> <li>d. Trading channels have to respect the traceability of the quality of products.</li> </ul>
<b>2.4 Diversification</b>	2.4.1 Diversification shall be sought if appropriate in order to increase productivity as well as reduce risk linked with market fluctuations	<ul style="list-style-type: none"> <li>a. Producers shall look to diversify the sources of income by growing alternative commodities on the farm, either for on-farm consumption or to be sold externally, as well as through the development of non-farming activities.</li> </ul>

<b>3. Social Sustainability</b>		
<i>General concept: Social sustainability should allow for sound working and living conditions for cereal farmers, their families and rural communities.</i>		
<b>3.1 Labour conditions</b>	3.1.1 A cordial and pleasant working environment free of any type of discrimination shall be promoted. It should be free of any type of discrimination as per ILO Convention 111 on Discrimination and ILO Convention 100 on Equal Remuneration and free of disciplinary practices as per the Universal Declaration of Human Rights.	a. A safe and cordial working environment free of any type of discrimination shall be promoted. Day labourers and seasonal workers should be managed in a way that is as close as possible with those applied to permanent employees.
	3.1.1 Work performed by workers must be on the basis of recognised employment relationship established as much as possible through national law and practice.	a. The work performed must be on the basis of recognised employment relationship established through national law and practice. The contract must include remuneration on the basis of recognised wages, the number of working hours, rules concerning overtime work. Employment conditions must comply with regard to worker age, leave, and pensions.
	3.1.2 Working hours must comply with national and local laws. Overtime performed during the harvest season notably is acceptable but must be duly compensated.	<ul style="list-style-type: none"> <li>• Daily working hours for registered employees should not exceed the maximum number of hours set by national regulations.</li> <li>• Registered employees should be conceded for every six working days at least one day of rest, covered by their salary.</li> <li>• Overtime work shall be demanded only in exceptional circumstances over a short-term period due to the business cycle, notably during the harvest season. Overtime should be compensated adequately.</li> <li>• Registered employees who have worked at the farm for more than one year should have a period of paid leave.</li> </ul>
	3.1.3 Wages and benefits received by workers must comply as a minimum with local and national legislation.	<ul style="list-style-type: none"> <li>• Wages and benefits of permanent employees should meet or exceed the minimum required under local and national laws.</li> <li>• All employees and workers should receive remuneration in accordance with their tasks and abilities while having equal work opportunities. They should be able to receive wages in legal tender/ currency. Compensation with merchandise, vouchers, tokens or any other symbolic means may be agreed upon with the employee or worker without creating any form of dependency.</li> <li>• Deductions should not be made from wages for disciplinary purposes.</li> </ul>
	3.1.4 Working conditions must comply with applicable laws as well as international Conventions and Recommendations related to occupational health and safety as per the ILO Encyclopedia on Health and Safety <sup>2</sup> .	<p>a. Measures should be promoted to prevent accidents and injuries that can be caused in the working environment and in general on the farm property, complying with the prevailing legislation.</p> <p>b. Protective equipment where necessary must be available and used by the farm staff and be in compliance with legislation.</p>

<sup>2</sup> Specific ILO conventions and recommendations include: Occupational Safety & Health Convention 155 and its accompanying Recommendation 164; Occupational Health Services Convention 161 and its accompanying Recommendation 171; and Convention 170 concerning safety in the use of chemicals at work and its accompanying Recommendation 177.

		c. First-aid boxes must be available.
	3.1.5 All forms of forced labour are prohibited as per ILO Convention 29 on forced labor and ILO Convention 105 on the abolition of forced.	a. Forced child labour shall neither be used nor supported.
	3.1.6 Workers and their families shall have access to potable water as well as suitable sanitary, housing and transportation infrastructures and services.	a. Workers and their families if living on the farm shall access to suitable infrastructure and services (e.g. living areas, lavatories...) b. All farm workers and their families should have access to health services.
	3.1.7 Workers must be free to form and join trade unions of their choice as well as to bargain collectively as per ILO Convention 87 on Freedom of Association and Protection of the Right to Organize and ILO Convention 98 on the Right to Organize and Collective Bargaining.	a. Staff should be free to establish, and to join organisations of their own choice.
	3.1.8 Child labour with limits defined by national laws <sup>3</sup> is prohibited, as per ILO Convention 138 and its accompanying Recommendation 146 on Child Labor as well as ILO Convention 182 and its accompanying Convention 190 on the worst forms of child labor.	<ul style="list-style-type: none"> <li>• Producers should be aware of the problem of child labour and monitor carefully the individual situation of each child permanently living on the farm who is under work minimum age referred by national laws.</li> <li>• In particular, children below the minimum working age referred by national laws should not be recruited as permanent workers or day labourers.</li> <li>• For cultural and socio-economic reasons, children under the work minimum age referred by national laws shall be allowed to accompany their parents during harvesting periods. It shall be ensured that they are not forced to work, do not work long hours and are not exposed to hazardous or heavy work.</li> <li>• The individual situation of the children involved should be considered in relation to all actions implemented in order to eliminate child labour. All measures taken shall be designed to actually improve the living conditions of the individual child.</li> <li>• Young workers under the age of 18 are should not be exposed to situations in the workplace that are hazardous, unsafe or unhealthy, even more so than any other workers.</li> </ul>
	3.1.6 Producers shall be committed to assure children the access to adequate education as well as to support the education of farm employees and workers,	<ul style="list-style-type: none"> <li>• Children below the minimum working age referred by national laws, living permanently or temporarily on the farm, should participate in educational programmes comparable with the formal school system.</li> <li>• Education programmes for workers' children who are at school age should be promoted.</li> </ul>
3.2 Training	3.2.1 Producers shall be committed to support the training of farm employees and workers on all aspects of sustainable agricultural practices.	a. Employees should be provided with basic training required for or related to their area of work. b. Training of workers for the correct handling and use of substances or materials that are hazardous or harmful for human health must be promoted. c. Knowledge and awareness of charters for good practice and guidelines should be

<sup>3</sup> According to the ILO Conventions, the definition of 'child labor' varies from one country to another one. The minimum age is usually 15, except in countries where children need to go to school until an higher age (16 for example); in that case the higher age is the minimum age for hiring people. The ILO also provides for a list of countries where children can be hired at the age of 14 (or even 12 for light work)

		promoted. All farm workers should have a presentation of the objectives and principles of good agricultural practices.
<b>3.3 Strengthening the local economy</b>	3.3.1 Cereal production should contribute to improve the social and economic livelihoods of producers and provide economic benefits to local communities	<ul style="list-style-type: none"> <li>a. Equal rights have to be provided to local communities with regard to recruitment of permanent and temporary personnel if possible, thus contributing to the build-up of sustainable livelihoods.</li> <li>b. Producers should strive to be active members in their community, trying to contribute to their further development.</li> <li>c. Producers should look to collaborate with the local community on aspects of environmental protection, health, safety and basic professional training.</li> <li>d. Producers should look to establish a continuous dialog with the local community, in order to share the experience gained with the implementation of the present recommendations.</li> </ul>
<b>4. Environmental sustainability</b>		
General concept: Cereal production should limit its impact on the environment as well as preserve natural resources		
<b>4.1 Impact on the environment</b>	4.1.1 It should be ensured that farming practices do not have adverse impact on the local environment.	<ul style="list-style-type: none"> <li>a. Producers should understand and assess the impact of their agricultural activities on the environment through the use of environmental performance indicators.</li> <li>b. The farm should be managed so as to follow the following recommendations: awareness of legal requirements and charters of good agricultural practices; knowledge and respect of existing ecosystems, biodiversity and environment quality; training of farm staff in good agricultural practices, self-assessment, monitoring of indicators.</li> </ul>
<b>4.2 Soil conservation</b>	4.2.1 The cultivation techniques used on the farm must maintain or enhance the soil structure and fertility	<ul style="list-style-type: none"> <li>a. Soil erosion and loss shall be prevented by biological as well as mechanical control methods.</li> <li>b. Producers and workers shall match cultivation methods and timing to prevailing soil conditions.</li> <li>c. They shall avoid steeply sloping fields for cultivation or follow contours with operations for soil preparation as much as possible as well as regularly maintain vehicles, especially tyre pressures.</li> <li>d. They shall also plant hedges to maintain the soil in steep areas especially as well as use crops to cover soil in the rotation, as permanent covers or as winter cover crops.</li> </ul>
<b>4.3 Water conservation</b>	4.3.1 The volume and quality of water used shall be properly managed and preserved or improved.	<ul style="list-style-type: none"> <li>a. The irrigation processes must be adjusted to crop needs (assessment of soil drought).</li> <li>b. The water quality should be suitable for the agricultural purpose.</li> <li>c. The replenishment and depletion of water source for irrigation purpose should be balanced. The use of water sources must comply with local regulations.</li> </ul>
	4.3.2 The use of inputs as well as release of wastewater shall be properly managed in order to preserve surrounding water	<ul style="list-style-type: none"> <li>a. Sources of water shall be carefully and regularly assessed for their microbial, chemical and mineral content, and properly managed in accordance with the assessment results.</li> </ul>



	sources	<p>b. Pollution of waterways on or near the farm shall be prevented and minimised, where unavoidable.</p> <p>c. Untreated sewage water shall not be used for irrigation.</p>
<b>4.4 Biodiversity conservation</b>	4.4.1 Cereal farming practices should maintain the integrity of the habitat for animal and plant species, preserving biodiversity on and around the farm	a. Producers are encouraged to have a biodiversity action plan for their farm which explains how provision is made for wildlife habitats and food sources through hedges, field margins, extensive pasture, etc.
<b>4.5 Waste management</b>	4.5.1 The optimum use of waste and by-products should be promoted and proper disposal of waste should be ensured.	<p>a. Waste and by-products of cereal harvesting and processing should be handled according to the principles of reduction, reuse and recycling.</p> <p>b. Used containers which have held substances that are potentially hazardous, e.g. crop protection products and antimicrobials, must be disposed of in a proper manner which removes the hazard.</p>
<b>4.6 Energy conservation</b>	4.6.1 The use of non-renewable resources should be minimized, and the use of renewable energies (e.g. use of by-products as bio fuels) should be explored.	<p>a. An energy assessment should be performed in order to identify areas for minimizing the use of non-renewable resources and maximizing the use of renewable energies (e.g. organic fuels).</p> <p>b. An increase in efficiency of energy should be sought.</p>
<b>4.7 Air conservation</b>	4.7.1 Proper use of energy and inputs should be made to minimize greenhouse gas release / atmospheric contaminants.	<p>a. Green house gas releases should be minimized through adequate use of energy and inputs.</p> <p>b. Possibilities of CO<sub>2</sub> sink functions and recovery of waste gases should be explored.</p>

## Annex: ACCS – additional sources of information:

- ◇ <http://www.assuredproduce.co.uk/Aproduce/> sections 10 - 13 deal with welfare of staff, energy use and the environment in Horticulture
- ◇ to protect the environment while producing food, AFS assurance schemes refer to Defra codes of good agricultural practice, which can be found here: <http://www.defra.gov.uk/envirion/cogap/cogap.htm> and for the use of pesticides: [http://www.pesticides.gov.uk/fg\\_cop.asp](http://www.pesticides.gov.uk/fg_cop.asp)
- ◇ Training of sprayer operators: <http://nroso.nptc.org.uk/>
- ◇ Testing of Agricultural Sprayers: <http://www.aea.uk.com/sprayer/index.htm>
- ◇ Crop Protection Management Plans, Voluntary Initiative: <http://www.voluntaryinitiative.org.uk/Content/CPMPs.asp>
- ◇ Soil protection requirements: <http://www.defra.gov.uk/farm/capreform/pubs/pdf/Soil-hb.pdf>
- ◇ Fertiliser recommendations (RB209) <http://www.defra.gov.uk/envirion/pollute/rb209/index.htm>
- ◇ Code of Practice for pesticide use [http://www.pesticides.gov.uk/safe\\_use.asp?id=64](http://www.pesticides.gov.uk/safe_use.asp?id=64)
- ◇ Local Environment Risk Assessment For Pesticides: [http://www.pesticides.gov.uk/safe\\_use.asp?id=207](http://www.pesticides.gov.uk/safe_use.asp?id=207)
- ◇ Market Information for cereal growers: <http://www.hgca.com/content.template/16/0/Markets/Markets/Markets%20Home%20Page.msp>
- ◇ Cereal Sellers Checklist: [http://www.hgca.com/document.aspx?fn=load&media\\_id=1323&publicationId=1595](http://www.hgca.com/document.aspx?fn=load&media_id=1323&publicationId=1595)