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Sustainable agriculture in international programmes funded by Caritas Austria

Framework paper

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List of abbreviations

CA	Konservierende Landwirtschaft (Engl. *Conservation Agriculture*)
CMS	Cytoplasmatic Male Sterility
DNA	Deoxyribonucleic Acid
FAO	Food and Agriculture Organisation oft he United Nations
IFOAM	International Federation of Organic Agriculture Movements
NGO	Non-Governmental Organization
POP	Persistent Organic Pollutants

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1 Introduction

Around 800 million people worldwide suffer from hunger. With specific food security interventions, Caritas Austria is working to ensure that a future without hunger becomes a reality for everyone and that people have the chance to lead a healthy and productive life.

All activities contributing to ending hunger are integrated in the Caritas programme “Future without hunger”. The programme strategy “Future without hunger” aims at sustainably improving the food situation of 450,000 people and at feeding 50,000 undernourished or malnourished people, particularly children, over the period 2014 - 2018, together with the partner organisations in the priority countries of Caritas International Programme Work.

In this context, the promotion of smallholder agriculture is one of the most important measures supported by Caritas Austria. Smallholder farming families in rural areas of the Caritas Austria partner countries depend almost exclusively on earnings from agricultural production. At the same time, it is especially people in rural areas who particularly suffer from hunger. In 2015, Caritas Austria funded 55 projects comprising agriculture as an integral part and thus was able to reach around 340,000 people.

This paper aims at clearly stating the position of Caritas Austria with regard to agriculture, particularly addressing the following questions:

- What type of agriculture does Caritas Austria support in its programme “Future without hunger”?
- What measures with regard to maintenance of soil fertility, use of seeds, fertilisers and plant protection products are recommended by Caritas Austria and what kind of measures should not be encouraged?
- What are the current agricultural projects of Caritas Austria and what are the challenges faced by the partner organisations and the farmers in the implementation of a sustainable agriculture? What could be solutions to these challenges?

2 Summary of the position

2.1 General position:

Caritas Austria supports in its International Programmes

- Agricultural activities of smallholder farming families
- Agriculture that promotes **food sovereignty**
- Agriculture that enables farmers to produce and market products **beyond subsistence**
- **Diversification** of agriculture
- Certified organic agriculture
- **Other forms of sustainable agriculture** such as non-certified (also traditional) organic agriculture, conservation agriculture, integrated production, agroecology, permaculture etc.
- **Programmes that promote** farmer rights (Right over resources of production , Right to practice farming as per one's choice, Right to learn, advocate and give decisions, Right to organize and federate

2.2 Specific position

Maintenance of soil fertility

Caritas Austria promotes in its programmes the use of measures and techniques adapted to the location and aimed at maintaining or improving soil fertility such as conservation tillage, humus management, green manure, crop rotation etc.

Use of seeds

- In the interest of food sovereignty, the decision as to which seeds should be used is to be left to the farmer. Caritas Austria can play a supporting role by facilitating awareness raising and knowledge dissemination. On this basis, the farmer can take a **conscious and informed decision**.
- Caritas Austria **promotes the use of open pollinating varieties that are freely reproducible,** since they make farmers more independent from supply infrastructure and suppliers and generally reduce costs, do not require chemical fertilisers, are better adapted to local site requirements, have a higher resistance to diseases and climatic turbulences and can be multiplied further by the farmers.
- Caritas Austria **principally does not reject the use of hybrid seeds** in its programmes. It is essential that the following questions are addressed in advance and are assessed accordingly: Which type of seed is purchased? Where do the seeds come from? Are non-hybrid seeds available? Is additional input (e. g. chemical fertilisers) necessary? What is the long-term cost for cultivation (cost-benefit for farmers)?
- Caritas Austria promotes independence of the supported target groups from seed corporations.

- Caritas Austria does not fund the purchase and use of genetically modified seeds.

Seed distribution after disasters

- Ensuring survival of people after a disaster has top priority.
- If available, local non-hybrid seeds should be purchased and distributed.
- If non-hybrid seeds are not available, it must be guaranteed as a minimum standard that **no genetically modified seeds** are distributed. In the case of hybrid seeds, Caritas Austria gathers **information on the type of seeds distributed, if they are reproducible, the necessary input and long-term cost** and informs the target groups accordingly.

Promotion of cash crops

- Caritas Austria **promotes in its programmes the cultivation of cash crops as part of smallholder agriculture**. In addition to self-supply, families should be enabled to sell on local or regional markets any surplus or products cultivated exclusively for the market.
- Caritas Austria **does not promote purely export-oriented monocultural agriculture**. Generally, monocultures are only possible in industrial agriculture, farmers are made dependent on the market price and these cultures have an adverse effect on the environment and on soil fertility.

Use of fertilisers

- Caritas Austria **promotes in its programmes the use of organic fertilisers** produced by the farmers or purchased on the market.
- Caritas Austria **principally does not reject the use of artificial fertilisers in its programmes**. However, artificial fertilisers should only be used if organic fertilisers are not available, if it is required in crisis situations or if selective fertilisation proves to be necessary due to soil conditions or in addition to organic fertilisation.
- The programme work of Caritas Austria is focused on **diversification of agriculture and promotion of a sustainable and ecological production.** It aims at improving productivity by enhanced cultivation techniques without the need to use chemical fertilisers.

Plant protection measures

- Caritas Austria promotes in its programmes production and use of vegetable and mineral based **organic plant protection products** such as neem, chilli, ash, soap, garlic etc.
- Caritas Austria promotes in its programmes **preventive plant protection** such as intercropping, crop rotation etc. and integrative pest management.
- Purchase and use of synthetic plant protection products from Caritas Austria funds are approved only in cases of emergency and only if the appropriate safeguard measures are taken, for example if there is a risk of crop failure.

3 Definitions embraced by Caritas Austria

3.1 Traditional agriculture

Traditional agriculture emerged from a co-evolution of social and ecological systems and is based on empirical knowledge of farmers transmitted from generation to generation. Traditional land use systems are often characterised by crop diversity in the form of intercropping or agroforestry systems. As a result, yields can be stabilised in the long run, food variety can be increased and satisfactory yields can be achieved with a minimum of resources.[1] However, especially in tropical climates, traditional land use systems can be found, such as shifting cultivation and slash-and-burn or frequent burning down of vegetation. These systems may be ecologically inadequate and may lead to a deterioration of soil fertility in the long run.

In many traditional agricultural systems, farmers use organic farming methods without obtaining higher prices for their products. These agricultural systems frequently do not meet the production standards of certified organic agriculture but still can be considered as environmentally friendly and in many cases are similar to certified organic agriculture.[2]

3.2 Conventional agriculture

We consider as conventional agriculture the prevailing model of agricultural production for the world market. Conventional agriculture is characterised by a high level of mechanisation, high energy input on the basis of oil (fuel, artificial fertilisers), monocultures, large-scale livestock farming as well as the use of chemically synthesised inputs and of genetically modified organisms. This production model is based on an increase in productivity and on a profit-making mind-set, agricultural products are considered as merchandise that serves profit maximisation and that can be traded according to market conditions. Since the end of the Second World War, conventional agriculture has become more and more industrialised.

Industrial agriculture

"Industrial agriculture is a capital-intensive form of agriculture that replaces human and animal work by machines and by additionally purchased means of production (inputs)."[3] It comprises industrial cultivation of field crops as well as animal production based on technological progress and economic growth.[4] In the industrialised countries, where there is sufficient land, increase in labour productivity is achieved by mechanisation. However, where agricultural land is a limiting factor, productivity is obtained by the use of chemically

[1] FAO, 2009

[2] UNEP-UNCTAD CBTF, 2008

[3] IAASTD, 2009

[4] FAO, 2009

synthesised inputs.[5] In any case, a high energy input is necessary to increase productivity (transformation of oil into agricultural products).

3.3 Sustainable agriculture

Sustainable agriculture has emerged as a counter model to an industrialised, input-intensive and highly technological agriculture[6]. It is a generic term comprising i.a. the concepts of organic agriculture, of agroecology, of traditional agriculture, of integrated production or of biodynamic agriculture. The transitions between the individual production models are fluid and a clear distinction can only be made in the case of certified organic agriculture since it is regulated by law. Only certified organic agriculture excludes the use of chemically synthesised inputs.[7]

Organic agriculture (Ecological agriculture)

The use of the designation “organic” or similar terms is protected by law. Production of agricultural raw materials as well as their processing or import must comply with the EU regulation on organic agriculture and must be controlled and certified accordingly. The definition of organic agriculture is based on the legal foundations of EU Regulation No 834/2007 which is in force since 2014[8] and which defines how organic products are produced and prepared, how they are marketed and how products must be labelled. The principles comprise:

- the appropriate design and management of biological processes based on ecological systems using natural resources
- practicing land-related crop cultivation and livestock production
- excluding the use of genetically modified organisms
- the restriction of the use of external inputs
- the strict limitation of the use of chemically synthesised inputs to exceptional cases[9]
- the maintenance and enhancement of soil life and natural soil fertility
- the recycling of wastes and by-products of plant and animal origin

[5] Woodhouse, 2010

[6] Note: following the example of the “Green Revolution” which had its start primarily in Asia: Implementation of modern agricultural cultivation methods to increase agricultural production in developing countries as of the mid-1960s. A decisive factor was the introduction of new high-yield varieties of wheat, maize and rice, which provided considerably higher yields but at the same time required the use of larger quantities of water, energy, fertilizers and plant protection products and entailed an increasing mechanization.

http://www.spektrum.de/lexikon/geographie/gruene-revolution/3258

[7] Johannsen et al., 2005

[8] http://ec.europa.eu/agriculture/organic/eu-policy/eu-legislation/brief-overview_en

[9] Note: Exceptional cases, where the appropriate management practices do not exist, the external inputs are not available or would have unacceptable environmental impacts, EU regulation p. 12

- the maintenance of animal health by encouraging the natural immunological defence of the animal as well as the selection of appropriate breeds
- the maintenance of plant health by preventive measures
- the observance of a high level of animal welfare
- the feeding of livestock with organic feed

The regulation ties in with the definition and the principles of IFOAM (International Federation of Organic Agriculture Movements), whose aim is the worldwide introduction of organic agriculture:

> *"Organic Agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic Agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved."*

The four principles of IFOAM

The principle of health
Organic Agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible

The principle of ecology
Organic Agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.

The principle of fairness
Organic Agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.

The principle of care
Organic Agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment.

In order to enable consumers to distinguish organic farming products from products obtained by other cultivation methods, certification has been introduced. Compliance with the standards is ensured by the conclusion of an inspection contract as well as by regular inspection and certification performed by an independent inspection body. Organic products may be marketed if labelled appropriately.[10]

For products produced in consideration of the principles and values of organic agriculture, the expression “organic-by-intent” is used. However, also holdings not using chemically synthesised inputs may apply environmentally harmful practices, for example if they fail to take measures to prevent land degradation.[11] In contrast to “organic-by-intent” for products coming from non-certified organic agriculture, the term “organic-by-default” is used. Usually, for these products ecological production is not a quality criterion and therefore does not determine their market value. The term “organic-by-default” also refers to farmers who engage in organic farming because they don’t have access to external inputs.

[10] Niggli, 2015

[11] FAO, 2009

Conservation Agriculture (CA)

The cultivation method promoted by the Food and Agriculture Organisation of the United Nations (FAO) is based on three pillars: careful tillage, permanent soil cover (e. g. by mulch or catch crops) and change of crops (i. e. rotational cultivation of different crops and catch crops on the same field).[12] The combination of these three measures contributes to an efficient use of resources and has a positive impact on water management. The fact that the soil is not turned over and the upper soil layer is enriched by plant remains facilitates the activity of soil-dwelling organisms. This creates a self-regulating ecosystem, the soil can develop a healthy macropore system and stable soil aggregates are formed. Due to the vegetation cover, the surface run-off is decreased, rain water infiltrates the soil more easily, thus preventing soil erosion and deterioration. The intelligent use of ecological processes does not require any special technique or fertilisers which makes conservation agriculture also particularly suitable for resource-poor areas.[13]

Agroecology

Agroecology can either be described as a scientific discipline, as an agricultural practice or as a social and political movement. As a scientific discipline, agroecology deals with relations and dynamics in agroecosystems. Agroecological practices comprise i. a. crop rotation, intercropping and composting. As a social movement, agroecology has become more and more important in recent years. Agroecology and organic agriculture are sometimes used interchangeably, even if chemically synthesised inputs are not explicitly prohibited in agroecology.[14] Many NGOs such as Via Campesina or FIAN as well as the scientists who contributed to the World Agriculture Report published in 2009 advocate food sovereignty on the basis of agroecology.[15]

Agroforestry

Agroforestry systems combine the utilisation of wood plantations (trees, bushes, palm trees etc.) with the cultivation of crops or with animal husbandry on the same land. Agroforestry offers an opportunity to diversify crop growing in order to maintain soil fertility and to produce staple foods at the same time.[16] Agroforestry prevents humus depletion, is particularly appropriate for degraded sites and can in the long run make infertile soils available again for agricultural use.

Permaculture

It is the ecological design of living spaces and refers to the creation and preservation of permanently sustainable ecological and economic systems.[17] The most important design principles are: adaptation to the natural factors of the location and exploitation of the natural potential; creation of cycles to stabilise the system (energy, materials, air, water cycle); diversity and linkage of natural, social and regional relations; autonomy and appropriate

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[12] http://www.afrika.info/newsroom/sambia-die-unbesungenen-heldinnen-des-klimawandels/#sthash.A4wEh6aM.dpuf

[13] http://www.eco-world.de/scripts/basics/econews/basics.prg?a_no=31684

[14] Wezel et al., 2009

[15] http://www.globalagriculture.org/index.php?id=2157

[16] Bender et al., 2009

[17] Ferguson and Lovell, 2014

density. The size and the composition of species in ecological systems are determined by natural conditions.

The principle of multiple use is in line with the (energy and effort saving) processes of nature.[18]

Biodynamic agriculture

Biodynamic agriculture[19] considers the material and spiritual dimension of food production.

Integrated production

Integrated production means a holistic production system that is based on the principles of sustainable development and that can be considered as a hybrid form of conventional and sustainable agriculture. The optimal combination of biological, technical and chemical processes should ensure environmental protection and profitability of the holding. Integrated plant protection considers all available plant protection methods in order to select the best method to ensure that the economic injury level is not passed. Chemical plant protection products are used in a targeted way and in addition to biological, biotechnical and mechanical measures.[20] Integrated production could be categorised between ecological and conventional agriculture.

[18] Permakultur Austria, 2015

[19] http://www.demeter.at/biodynamisch.html

[20] Oppermann et al., 2005; FAO, 2009

4 Reasons for organic agriculture

Contribution to food security

Increase in productivity and efficiency plays a major part in ensuring food security for smallholder farms. Organic agriculture can make an important contribution in this respect.[21] Self-supply with basic foodstuffs in the course of one year can be increased from 6.5 months with conventional production to up to 9.5 months with ecological production. Also food variety, measured against the number of available food classes, increases with the switch to organic farming, from 1.9 different product classes per household to 5.3.[22]

Alternative to industrial food production

Modern agricultural engineering with the use of chemically synthesised inputs, hybrid seeds, genetically modified organisms etc. has led to remarkable increases in productivity in the past few decades - higher yields per hectare, higher milk yields per cow, more food production per worker. Nevertheless, industrial agriculture could not resolve the problem of hunger. Industrial production, however, has far-reaching social, economic and environmental effects. Mechanical tillage, fertilisers and sprays or residues in food harm environment and human health and, by degrading entire (agricultural) ecosystems, affect the livelihood of millions of small farmers in rural areas. Small farmers and their families farm small areas which due to the limited resources, however, are used more efficiently than in industrial production.[23]

Ecological reasons

Monocultural production, use of chemically synthesised sprays and fertilisers, use of genetically modified organisms etc. lead to a variety of environmental problems which have negative effects on the resilience of global ecosystems. Consequences are i. a. humus depletion, soil erosion, heavier flood events due to the reduced water retention capacity of intensively farmed soils, greenhouse gas emissions, decrease of biodiversity, nitrate leaching, pesticide emissions as well as the presence of undesirable residues in foodstuff.[24] According to the FAO, a third of the soils worldwide needed for food production are already degraded. In Africa, around 65 per cent of arable land is too heavily damaged to continue to be used for food production.[25] Organic agriculture has a positive impact on natural resources, enhances the humus content of the soil and increases soil fertility. Soil compaction and soil erosion are significantly lower in organic agriculture than in conventional farming.[26] Due to the enhanced carbon sequestration capacity of organically farmed soils, organic farms can adapt to climate change more easily.[27] Furthermore, due to the lower energy use, the climate impact (CO2 emissions) is significantly smaller than in industrialised agriculture. Particularly in times of drought, organic agriculture can mitigate

[21] UNEP-UNCTAD CBTF, 2008

[22] Kalala et al., 2013

[23] Altieri, 2009

[24] Schader et al., Montpellier Panel Report 2014/2013

[25] Rockstrom et al., 2009

[26] Reganold et al., 1987; Niggli, 2007

[27] Olesen et al., 2006; UNEP-UNCTAD CBTF, 2008; Binta and Barbier, 2015

yield losses since organically farmed soils, due to their high humus content, have a higher capacity to retain water.[28]

Economic reasons

In developing and emerging countries, with a switch from traditional subsistence agriculture to organic agriculture, farmers can increase productivity while they partly or completely can renounce the use of external inputs, which reduces costs.[29] Furthermore, organic agriculture can contribute to reducing unilateral dependencies from certain inputs or product groups.[30] In organic agriculture, the share of manual or mechanical work is higher, which increases production costs in industrialised economic systems. In developing and emerging countries, however, manual labour costs are low, which also reduces production costs in organic agriculture.[31] A meta-analysis of 362 scientific studies shows that the yield obtained by organic farming methods is only approximately 20 % lower than the one obtained by conventional production. On the other hand, in tropical regions yields obtained by organic production would be 86 % higher than the ones obtained by conventional production.[32] To sum up it can be said that with organic agriculture or comparable farming methods based on agri-environmental principles yields in developing countries can be significantly improved and at the same time unilateral dependencies of farmers can be reduced. Increase in productivity is not obtained by the purchase of external inputs (chemically synthesised fertilisers, pesticides, seeds ...) but is based on locally available resources, adapted farming techniques and empirical knowledge of farmers.[33]

Contribution to community building, cooperation and education

Organic agriculture contributes to an increase of social capital at a local level. The creation of cooperatives as well as informal cooperation among farmers and neighbourhood assistance reduce labour costs and promote the transfer of knowledge which always implicates an increase of knowledge and the acquisition of new skills and capabilities. As a result, farmers get to better understand the systemic connections of the ecosystem. This enhances ability to adapt to unforeseen changes as well as resilience to negative environmental influences.[34]

Health reasons

With respect to nutritional and taste properties, organic products rank among the highest quality grades on the food market and do not contain any undesirable substances such as pesticide residues or elevated nitrate contents.[35] At the same time, organic products contain more valuable substances such as vitamin C, iron, magnesium and phosphor etc.[36]

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[28] Nemes, 2009

[29] Gibbon and Bolwig, 2007

[30] Rosegrant et al., 2006; Kalala et al., 2013

[31] Nemes, 2009

[32] de Ponti et al., 2012

[33] Niggli, 2012

[34] UNEP-UNCTAD CBTF, 2008

[35] Niggli, 2012

[36] Rembialkowska, 2004

5 Sustainable Agriculture in programs and projects funded by Caritas Austria

5.1 Soil as a basis for production

Figure 1: The Zai-technique, used in Burkina Faso in the Compass program. On the left, organic waste is being composted in holes which are then filled with corn seeds. This way, the plants get sufficient nutrients while the indentation holds back the water. On the right the result of conventional agriculture.

5.1.1 Soil fertility

Some traditional farming methods (such as slash-and-burn, shifting cultivation and the yearly burning down of vegetation) but also exploitation of rainforests, agricultural mismanagement and erosion are the most frequent causes of man-made soil degradation. A lack of nutrient recirculation and one-sided cultivation increase the already rapid humus depletion under tropical climate conditions and lead to a significant decrease in soil fertility. Fertile soil, however, is the basis for long-term food security. This is why building up soil fertility is of utmost importance.[37]

Soil is particularly important in organic agriculture. One principle is to nourish the soil and not the plant. Organically farmed soils are characterised by a better soil structure, suffer less deterioration and do not erode as easily as conventionally farmed soils.[38] Soils sufficiently provided with nutrients ensure yield stability of the farm in the long run.[39] Since in organic agriculture no chemically synthesised fertilisers are used to enhance plant growth, maintenance of soil fertility is paramount for optimal yield performance.

[37] Friedrich, 2013

[38] Maeder et al., 2002

[39] Freyer, 2003

Soil fertility is based on biological (soil organisms), physical (soil structure) and chemical (nutrient supply) properties of soil.[40] In a fertile soil, soil organisms transform nutrients into crop yields, build up humus and protect the plants from diseases. Thanks to the activities of soil organisms, nutrients are made available for plants. A fertile soil is easy to cultivate, absorbs rainwater and retains it. Thanks to its filter function it contributes to clean groundwater and can more easily decompose harmful substances. Additionally, a fertile soil sequesters CO_2 and thus contributes to climate protection.

5.1.2 Soil protection measures

Conservation tillage[41]

Tillage plays an important role in agriculture as it influences soil properties and, as a consequence, plant growth. In conventional agriculture, soil is ploughed deeply while being turned over. Intensive tillage leads to humus depletion and encourages erosion. Therefore, tillage should be reduced to a minimum and conservation tillage methods should be used. This means that tillage should be reduced or avoided with the aim of preserving soil structure, soil organisms and soil organic matter. Soil is not turned over but only loosened. Soil fertility is ensured by permanent soil coverage, diversified crop rotations and by intercropping.

Reduced tillage can optimise the soil water regime and enhance humus formation.[42] Particularly for non-mechanised farms, conservation tillage is an advantageous alternative as it is less labour intensive. Conservation tillage is very well-suited for many tropical soils. However, weed control is a challenge. Mechanical weed control, adherence to crop rotation rules and the application of thick mulch layers can remedy this.[43]

Humus management

Humus is the decomposed organic matter in and on the soil and is in permanent process of depletion, transformation and formation. High humus content protects the soil from deterioration, rainwater can more easily penetrate into the upper soil layers and thus reduce erosion; it encourages nitrogen replacement and provides more nutrients to soil organisms, which minimise pests in the soil. Soils rich in humus are easier to till. Heavy, damp soils are rather rich in humus, dry sand and loess soils are rather poor in humus. Humus formation is the result of varied crop rotation and an adequate supply with organic matter. However, it usually takes several years to build up humus through crop rotation. A lack of humus usually can be compensated by the use of green manure or compost.

Crop rotation

If crop rotation is not planned thoughtfully enough, problems with pests and plant diseases will arise.[44] A diversified and extended crop rotation maintains soil fertility or increases it in

[40] Kolbe and Schuster, 2011

[41] also called low tillage or ploughless tillage

[42] Spiegel, 2010

[43] Weidmann et al., 2012

[44] Berner et al., 2013

the long run. Maintenance of soil fertility is ensured by the cultivation of legumes (clover-grass, beans, soya etc.), the alternation of deep-rooting and shallow-rooting plants and the cultivation of green manure crops. Humus-producing and humus-consuming crops should be rotated. Crop rotation also serves to control weed, diseases and pests and to feed farm animals with farm-grown fodder.[45] The more diversified the crop rotation, the more expertise and practical experience are required. These increased requirements are, however, definitely compensated by the positive effects on soil fertility and yield.

Green manure

Green manure means the addition of organic matter consisting of root and crop residues or the incorporation of entire plant populations, to enhance soil fertility.[46] Particularly the cultivation of legumes increases the nitrogen content of soil. The use of green manure increases the humus content which leads to an improvement of the soil structure and, thanks to the strong root penetration, to a stimulation of soil life. This can prevent soil degradation such as erosion and deterioration; it stops the leaching of nutrients and reduces disease and pest pressure.[47] Particularly on slopes, soil can be protected from erosion by using green manure. To enhance humus formation and soil structure, the use of deep-rooting plants (e. g. sunflowers, field beans, lupins) is recommendable. Green manures can also minimise disease and pest pressure and reduce weed growth. Moreover, they shade the soil and regulate temperature and water balance.[48]

5.1.3 Soil: What is supported by Caritas Austria?

Caritas Austria promotes in its programmes the use of measures and techniques adapted to the location and aimed at maintaining or improving soil fertility, such as conservation tillage, humus management, green manure, crop rotation etc.

5.1.4 Challenges faced in programme work

- Frequently among smallholder populations there is **too little knowledge** of soil fertility maintenance and of soils and nutrient cycles in general.
- The formation of humus via crop rotation frequently takes **several years**. If a family entirely depends on crop yields, they need short-term yields.
- In many regions, soils are deeply weathered and have a very **low humus content**.
- Severe soil erosion
- Water shortage

[45] Kolbe, 2008

[46] Freyer, 2003

[47] Berner et al., 2013

[48] Willer and Lernoud, 2015

- Due to the **high work effort** required, tillage area is limited. In most of the Caritas projects funded by Caritas Austria tillage is done manually without burning down vegetation beforehand, which, however, is very exhausting and labour-intensive.
- In some programme regions, **vegetation pressure** is very strong: many plants grow to a height of 3-4m and will very quickly form an impenetrable thicket. The work effort for tillage and weeding is very high.
- In some partner regions it is very common to **burn down** vegetation and then incorporate the ash and the charred residues by hoe. Although the ash, at least in the short term, has a fertilising effect, the negative impact of fire on soil and micro-organisms and the long-term consequences for soil fertility are given too little attention.
- Universities as well as research promotion schemes of agricultural groups still focus on conventional agriculture.

5.1.5 Possible solutions

- **Awareness raising, training and regular counselling** for partner organisations and the target groups of the projects
- Protection against erosion
- **Improvement of agricultural techniques** (conservation tillage, crop rotation, green manure etc.)
- Tree plantation
- **Adapted mechanisation to reduce work effort:** use of simple, robust tools and machines within co-operatives (similar to machine rings), better use of **biomass** (mulching, incorporation or composting of crop residues, domestic waste, animal dung, useful plant species etc.)
- Awareness raising on **keeping/requirements of livestock** (animal husbandry) and their usefulness for soil fertility and agricultural production.
- **Advocacy** on the issues of organic and sustainable agriculture

5.2 Seeds

Figure 2: open pollinating seeds produced through the Compass program in Ethiopia

5.2.1 Plant breeding

Today's crop plants are the result of the selection and breeding work done by farmers over thousands of years. Their knowledge of plant propagation is closely linked to the respective plant variety and the location. Particularly in organic agriculture it is important that the seeds used are adapted to local growing conditions and that the use of chemically synthesised inputs is not necessary. Conventional plant breeding is aimed at obtaining maximum yields, short ripening periods, mechanical harvestability, transportability and storability. The selection criteria applied by the farmers are rather adaptability, vitality, resistance, long harvest periods (to facilitate manual harvesting), good taste, cooking characteristics. By observation and experimentation farmers learn to deal with changes and thus to adapt to climate change. This deliberate development results in non-hybrid and healthy plants fully capable of reproduction.

Plant breeding as well as the seed market nowadays are dominated by a few companies which refinance breeding activities by selling seeds or variety licences. Plant breeding concentrates on a few well-selling and potentially profitable plant species (e. g. maize, rice, wheat, soya) or plant varieties. Other promising species are neglected (also by research). This trend led to a significant reduction of crop diversity in the last few decades. By the merger of agrochemical companies and seed producers (e. g. Bayer, Monsanto) dependencies are created to maximise profits. The patenting of varieties and plant traits aims at preventing and legally prohibiting the re-use of crop seeds.

The increase of genetically modified varieties and the patenting of organisms as well as the increasing concentration on the seed market require alternative approaches in plant

breeding for organic farming. Breeding and use of seeds should comply with the ethical principles of organic agriculture and take into account criteria such as safeguarding plant integrity, preservation and enhancement of genetic diversity, compliance with crossing barriers as well as the interaction of the plant with soil and climate. The use of genetically modified organisms is prohibited in organic agriculture as DNA is exchanged across species boundaries.

5.2.2 Seed multiplication

Generative multiplication

Multiplication of crops from seed is referred to as generative multiplication or sexual propagation. Non-hybrid or reproducible varieties pass on their traits to their offspring. This means that the specific traits of a variety can be preserved and multiplied. The traits of a variety do not change abruptly but are passed on to subsequent generations in a continuous flow. Non-hybrid varieties comprise:[49]

Local varieties

Those have been cultivated and multiplied in a certain region over a long period of time. These varieties are particularly easy to multiply in their region of origin because they are optimally adapted to local conditions.

Old horticultural cultivars

These are old commercial varieties which due to new breeding methods are being increasingly displaced.

New varieties from organic breeding

In organic agriculture, breeding is done with non-hybrid varieties. Seeds must have natural reproductive power and a high degree of vitality to adapt to a certain location.

Vegetative multiplication

Multiplication by using offshoots is referred to as asexual propagation. The offspring's genetic material is the same as the parent generation's. An adaptation to changing environmental conditions is not possible. Vegetative multiplication of crops uses cuttings (e. g. manioc), division (e. g. chive), runners (e. g. mints), underground tubers (e. g. potatoes), secondary shoots (banana) or bulblets (e. g. garlic). To encourage rooting or to prevent diseases, rooting hormones and synthetic pesticides are often used, a method which, however, is questionable from the point of view of organic agriculture.

In-vitro-multiplication/cell and tissue cultures

Plant parts, tissue parts or individual cells are cultivated under sterile conditions on a nutrient medium. The cultivated plant parts develop into shoots which subsequently are planted out in the greenhouse or in the field. In-vitro-multiplication allows to multiply genetically identical plants within a very short time. From the point of view of organic

[49] Heistinger, 2004

agriculture, addition of synthetic phytohormones and cultivation on artificial nutrient media are questionable methods.[50]

Hybrid seeds

To obtain hybrid seeds, inbred lines, which are preferably unrelated, are crossed and certain traits such as size, form, colour or particular robustness are enhanced over many generations. This results in a predominance of desired traits, with a uniform appearance, identical traits and a high yield. These positive traits only concern the first sowing. After multiplication of the hybrids, only a small proportion of the offspring reaches the performance level of their parents. This is why for a new cultivation, new hybrid seeds must be used. The use of hybrid seeds is problematic because the drop in performance can be serious in case of seed-saving and farmers can become dependent on seed companies. Nevertheless, also in market-oriented organic agriculture, hybrid seeds are increasingly used, particularly for vegetables, to meet the criteria of consumers/supermarkets. The outer appearance of the seeds does not reveal the breeding method used. It cannot be determined either whether the seed is a hybrid or a non-hybrid variety.[51]

CMS hybrids

CMS (cytoplasmatic male sterility) hybrids are the result of a fusion of cells and cell nucleuses foreign to the species.[52] The desired traits, as in the case of hybrid seeds, only appear in the first generation. The CMS technique is not directly associated with genetic engineering because the new combination does not occur at DNA level. However, these cell fusion practices must be critically questioned.[53]

5.2.3 Seeds: What is supported by Caritas Austria?

- In the interest of food sovereignty, the decision as to which seeds should be used is to be left to the farmer. Implementing partners can play a supporting role by facilitating awareness raising and knowledge dissemination. On this basis, the farmer can take a **conscious and informed decision**.
- Caritas Austria **promotes the use of open pollinating (freely reproducible) seeds and varieties** as they make farmers more independent from supply infrastructure and suppliers and generally involve lower costs, do not require chemical fertilisers, are better adapted to local site requirements, have a higher resistance to diseases and climatic turbulences and can be multiplied further by the farmers.
- Caritas Austria **principally does not reject the use of hybrid seeds** in its programmes. It is essential that the following questions are addressed in advance and are assessed accordingly: Which type of seed is purchased? Where do the seeds come from? Are non-hybrid seeds available? Is additional input (e. g. chemical fertilisers) necessary? What is the long-term cost for cultivation (cost-benefit for farmers)?

[50] Messmer et al., 2012

[51] Heistinger, 2004

[52] Messmer et al., 2012

[53] Stopper, 2015

- Caritas Austria promotes independence of the supported target groups from seed corporations.
- Caritas Austria does not fund in its programmes the purchase and use of genetically modified seeds.

5.2.4 Challenges faced in programme work

- The **advantages of non-hybrid seeds** are often **not sufficiently known** to producers, consumers and agricultural advisers.
- Many of the peasant target groups have a poor level of education and a lack of knowledge of the economic aspects involved in the use of production factors.
- The availability of high-quality non-hybrid seeds becomes increasingly difficult.
- In some of the partner countries there are government institutions which can provide improved propagating seeds but regrettably **supply problems** have occurred time and again.
- In some countries, government authorities as well as NGOs or seed producers **distribute hybrid seeds and artificial fertilisers** to the farmers.
- Seed corporations have discovered developing and emerging countries as sales markets and exercise an increasingly strong influence on national governments in order to enforce their interests.

5.2.5 Possible solutions

- **Awareness raising, training and regular counselling** for partner organisations and target groups about the advantages of individual seed multiplication and of traditional seeds.
- **Training** for agricultural advisers working in the projects
- Promotion of programmes for the **production and distribution of non-hybrid seeds** (fields for seed multiplication, seed exchange platforms etc.)
- Cultivation of **different varieties** to minimise the risk of crop failures.
- Demonstration plots / field trials for reserach and comparison
- Promotion of programmes for the **production and distribution**
- Promotion and continued breeding of high-yield **local varieties, that are freely reproducible,** in cooperation with local NGOs, government agencies and research institutes, maintenance of an ongoing **dialogue** with national seed institutes. **Small farmers should be turned into plant breeders**
- Advocacy work

5.2.6 Seed distribution in disaster situations

In disaster situations, usually any kind of seed is in short supply. In the short term, due to the disaster local non-hybrid seeds can usually not be found in the necessary quantities.

Seed distribution after disasters: What is supported by Caritas Austria?

- Ensuring survival of people after a disaster has top priority.
- If available, local non-hybrid seeds should be purchased and distributed.
- If non-hybrid seeds are not available, it must be guaranteed as a minimum standard that **no genetically modified seeds** are distributed and that in the case of hybrid seeds Caritas Austria gathers **detailed information on the type of seeds distributed, necessary input and long-term cost** and informs the target groups accordingly.

5.2.7 Cash crops

Cash crops are agricultural products that are produced exclusively for the market and are not used for self-supply of farmers or a country. Production of cash crops is the production of foodstuff or other agricultural products not intended for supply to the population.[54] Diversified and productive cultivation systems can contribute to reducing dependency on imports. It is in particular certified organic agriculture in developing countries that produces foodstuffs for export.[55]

Cash crops: What is supported by Caritas Austria?

- Caritas Austria **promotes in its programmes the cultivation of cash crops as part of smallholder agriculture**. In addition to self-supply, families should be enabled to sell any surplus or products cultivated exclusively for the market on local or regional markets.
- Caritas Austria **does not promote purely export-oriented monocultural agriculture.** Generally, monocultures can only be maintained in industrial agriculture, farmers are made dependent on the market price and these cultures have an adverse effect on the environment and on soil fertility.

[54] IAASTD, 2009

[55] FAO, 2009

5.3 Fertilisers

Figure 3: the production of vermicompost through the SEFBIN program in India

To enhance plant growth, many farmers add nutrients in the form of readily soluble chemically synthesised fertilisers. Particularly the use of nitrogen fertilisers enhances plant growth but at the same time makes plants more vulnerable to pest infestation and leads to soil acidification and, in the long run, to soil degradation. According to the FAO, due to the use of chemically synthesised fertilisers a third of the soils worldwide are already degraded to an extent that makes them unusable for agriculture.[56]

In organic agriculture, the nutrients that plants need are added by low tillage, crop rotation, green manure and direct fertilisation with compost, dung, liquid manure or commercial organic fertilisers. Nutrient supply of the crops should be ensured by an internal nutrient cycle. Livestock manure produced by the farm plays a decisive role, even in farms without livestock. Moreover, loss of nutrients can be avoided by the use of appropriate crop cultivation methods. By way of green manure, soil fertility can be deliberately improved.

In organic agriculture, use of synthetically produced fertilisers is not allowed. In this case, nitrogen supply is ensured through the natural fixation of atmospheric nitrogen by nitrogen-fixing crops (legumes). Legumes can fix sufficient nitrogen from the air to substitute nitrogen fertilisers.[57] Utilisation of natural nitrogen fixation for agricultural productivity is based on the latest research and is, in contrast to fossil nitrogen production, efficient and yielding also in the long run.[58]

[56] FAO 2015

[57] Badgley et al., 2007

[58] Niggli, 2007

5.3.1 Fertilisers in organic agriculture

Dung

Dung is a mixture of animal excrements and bedding and is a valuable organic fertiliser containing a large number of nutrients. Quality of dung largely depends on storage and the level of maturity. Fresh dung limits plant growth whereas mature dung stored for a longer time has a significantly better effect on soil structure and plant yield. In dry areas, dung can be stored in pits in order to reduce the risk of desiccation.

Liquid manure/slurry

Liquid manure mainly consists of excrements and urine of farmed animals. Slurry almost exclusively consists of urine. Liquid manure and slurry contain a large amount of immediately available nitrogen and other mineralising substances which can be absorbed by the plant immediately. However, the application of too large quantities can lead to a leaching out of nutrients into groundwater.[59]

Plant slurries are natural plant protection and plant strengthening agents used in organic plant protection as fertilisers and against fungus diseases. Thanks to their high nitrogen and potassium contents, they are well-suited for the fertilisation of plants with a high nutrient uptake such as maize, tomatoes or cabbage. For the production of plant slurries, 1 kg of fresh and roughly cut suitable plants (e. g. nettles, horsetail, onion etc.) is steeped in 10 litres of water. Then, the slurry has to ferment for 1 to 2 weeks during which the bound mineral substances from the leaf mass are transformed into plant-available nutrients (e. g. nitrogen). Plant slurries must be diluted with water before use.

Compost

Compost is plant and/or animal matter, decayed and decomposed by bacteria and fungi. Incorporation of compost has a positive effect on soil life, enhances the formation of humus in the soil and thus improves soil fertility. While compost obtained from plant matter has a lower nitrogen efficiency, compost obtained from dung has a high nitrogen content.[60] The application of compost optimises soil structure, enhances the water retention capacity of soil and thus increases the drought resistance of crops. Nutrients in compost remain available to the plants over a longer period of time.[61]

Vermicompost

Vermicompost is the product of a composting process using compost worms. However, an increased effort is to be expected for its production. Vermicompost does not have to be turned over to ensure oxygen supply. Moreover, a liquid fertiliser, the so-called ‘vermiwash’ which can be used as foliar fertiliser, can be prepared from vermicompost.[62]

[59] Berner et al., 2013

[60] Berner et al., 2013

[61] Weidmann et al., 2012

[62] Weidmann et al., 2012

Commercial organic fertiliser

If livestock manure produced by the farm is not available in sufficient quantities, commercial organic fertiliser of animal or plant origin can be purchased in addition. The most important types are horn fertiliser, hair meal, meat and bone meal, feather meal and legume fertiliser.[63]

Mineral fertilisers

To compensate loss of nutrients, commercial mineral fertilisers may be used to a limited extent. Useful measures for need assessment are soil analyses, close observation, the keeping of records as well as consultations with the responsible adviser. To counteract soil acidification and a subsequently reduced nutrient availability, lime can be added to the soil. In locations with a very low pH-value, liming can enhance nutrient availability, soil life and soil structure. The phosphorus- and potassium-based fertilisers used in organic agriculture act slowly.[64]

5.3.2 Fertilisers: What is supported by Caritas Austria?

- Caritas Austria **promotes in its programmes the use of organic fertilisers** produced by the farmers or purchased on the market.
- Caritas Austria **principally does not reject the use of artificial fertilisers in its programmes**. However, artificial fertilisers should only be used if organic fertilisers are not available, if required in crisis situations or if selective fertilisation proves to be necessary due to soil conditions or in addition to organic fertilisation.
- The programme work of Caritas Austria is focused on the **diversification of agriculture and the promotion of a sustainable ecological production.** It aims at improving productivity by enhanced cultivation techniques without the need to use chemical fertilisers.

5.3.3 Challenges faced in programme work

- Frequently among population there is **little awareness** of organic agriculture and of the fact that it implies avoidance of artificial fertilisers.
- **Climatic challenges** for the production of organic fertilisers such as a lack of water or of organic matter.
- **Socio-economic challenges**: long-term investment in soil versus short-term need of a good harvest to secure food supply for the family.
- The production of organic fertilisers for large areas requires sufficient **livestock numbers** or high quantities of **organic matter** as well as an increased **work effort**. The use of organic fertilisers (dung, compost) is therefore mainly reduced to vegetable cultivation.

[63] Möller and Schultheiß, 2014

[64] Köstenbauer, 2015

- **Soil analyses** which would be necessary to decide on the efficient use of chemical fertilisers are very **expensive**.
- In some project regions, agricultural schools do not receive any or only insufficient support from the government but are given **free hybrid seeds and fertilisers** from seed corporation stakeholders and thus continue to teach and support conventional agriculture.
- **Supply with mineral nutrients** (e. g. phosphorus) is a challenge and may in specific cases require an addition from external sources.
- **Due to the cultivation of monocultures, many soils are leached to such an extent** that soil fertility can only be improved in the long run and yields cannot be obtained any more without the use of artificial fertilisers.

5.3.4 Possible solutions

- Awareness raising, training and regular counselling for the target groups
- **Training** for agronomists working in the projects
- **Ongoing** awareness raising and advising provided by technical Caritas staff to farmers
- Support for the target groups regarding production and application of organic fertilisers, for example by animal husbandry
- Use of **demonstration fields** in the villages
- **Restoring or improving soil fertility of degraded soils** by the use of appropriate agricultural techniques such as agroforestry, green manure, afforestation etc.
- Field trials for research and comparison
- **Advocacy work** in the field of organic agriculture

5.4 Plant protection

Figure 4: pest control in the PRASA program in Luozi in the Democratic Republic of Congo: tabacco plants are planted near the edges of the field. The leaves are being dried, ground and mixem with Neem or ash, dissolved in water and subsequently spread on the field.

Plant protection in organic agriculture is a system-oriented approach and requires a complex and knowledge-intensive way of proceeding. Organic agriculture has to respond to many diseases and pests which are also relevant in conventional agriculture and which can cause yield losses. Authorised plant protection products are only used in organic agriculture when all other preliminary preventive measures have been rigorously undertaken and systematically exhausted.

To protect crops in organic agriculture not only direct measures but primarily preventive measures are taken to promote plant health. The use of plant protection measures requires a solid understanding of systemic connections, knowledge of the different measures as well as practical experience.[65] The aim of plant protection in organic agriculture is not to eradicate all pests and diseases but to achieve an economically tolerable level.

[65] Borowski et al., 2009

5.4.1 Preventive plant protection measures

Promotion of beneficial organisms

In arable farming, self-regulation through the promotion of beneficial organisms plays an important role. The conservation and creation of habitats with abundant food supply and retreat possibilities for beneficial organisms such as the plantation of hedges, the building of dry stone walls, the setting up of flower strips etc. can contribute to promoting beneficial organisms.[66]

Crop rotation

An appropriate, locally adapted crop rotation serves to maintain and enhance soil fertility and has, at the same time, a positive impact on plant health. A diversified crop rotation can reduce vulnerability to pest insects and diseases.[67] In addition, a varied and thoughtful crop rotation effectively reduces weed growth.

Tillage

The basis of plant protection in organic agriculture is a healthy soil which is biologically active and thus has phytosanitary potential.[68] To obtain maximum root penetration and the best possible plant development, optimum tillage practices are decisive. Bad tillage practices can restrict root growth, lead to stress for the plants and can make them vulnerable to pest infestation and diseases.

Seed selection and sowing

When it comes to seed selection it is important to ensure that resistant and robust varieties are used. Locally adapted crop species and varieties can better cope with diseases and pests and therefore can help to avoid the application of plant protection products. Furthermore, time and intensity of sowing have an effect on plant resistance, on weed growth and on fungus pressure. A sufficient plant density is important to keep weed infestation at a low level. The placement depth is also a decisive factor and can facilitate weed control.[69]

Intercropping

Intercropping is the simultaneous cultivation of several crops in the same field. The individual plants extract different amounts of nutrients from the soil and are meant to complement each other. The fact that the different plants need different nutrients ensures that nutrients are exploited in a more consistent and effective way. Massive spread of pests and diseases, which is particularly a problem in monocultures, is impeded by intercropping. The cultivated area being permanently overgrown, soil is protected from erosion and the constant shading reduces excessive sun exposure and drying up.[70] Intercropping plays an essential preventive role particularly in vegetable cultivation but requires considerable

[66] Bundesanstalt für Landwirtschaft und Ernährung (Federal Office for Agriculture and Food), 2014

[67] Freyer, 2003

[68] Borowski et al., 2009

[69] Bundesanstalt für Landwirtschaft und Ernährung (Federal Office for Agriculture and Food), 2014

[70] Wikipedia

experience and knowledge on certain interrelations and may, if applied incorrectly, also lead to growth inhibition.

5.4.2 Mechanical/physical plant protection procedures

These comprise for example manual removal of pests or of diseased plant parts, controlling of weed by hoeing, harrowing or weeding, sieving of weed seeds during seed collection, tilt traps for voles, fences against wild animals or bird protection nets. Thermal plant protection includes weed control by means of flaming devices or infra-red equipment, such as the incineration of infested plant remains and warm water treatment for Spanish onions.[71]

5.4.3 Organic plant protection

Organic plant protection refers to the use of beneficial organisms for the treatment of plant diseases or plant pests. Organic plant protection is particularly relevant in horticulture for the control of spider mites, white flies, aphids or other pests.[72]

Plant strengthening agents

Plant strengthening agents are substances serving to maintain plant health. The use of plant strengthening agents, apart from authorised plant protection products, is the only direct measure in organic agriculture permitting to react to influences that induce plant diseases. These include seaweed and stone meals, bentonite, herbal extracts, herb slurries and teas (e. g. nettle, onion, garlic ...), compost extracts, homoeopathic preparations as well as combinations of the preparations mentioned above.

Biotechnical plant protection

Biotechnical plant protection utilises the natural reactions of pests to physical and chemical stimuli. By means of coloured panels or light pests can be attracted, observed or controlled. Attractants serve to attract pests. Acoustic methods can be used to scare birds, for example. Repellents are used to deter pests from attacking certain crops. Pheromones are specific messengers within a species, used for communication.[73]

Authorised plant protection products

In principle, only products of plant or animal origin may be used in certified organic farming. Furthermore, micro-organisms may be used for biological pest control (e. g. bacillus thuringiensis). Also permitted are substances traditionally used in organic agriculture (processed minerals, oils, sulphur, copper salts). The following active substances of plant protection products are also suitable for use in tropical climates:

[71] Szith, 2009

[72] Szith, 2009

[73] Szith, 2009

Azadirachtin

It is produced from the seeds of the neem tree (*Azadirachta indica*) and is used as an insecticide mainly in fruit cultivation and in horticulture. Neem ingredients are very bitter and act as antifeedant but also disrupt the metamorphosis of insects, inducing for example moulting disorders or crippled wings. They also affect the reproduction of pests. Neem products do not affect beneficial organisms or only slightly. An easily produced pesticide is the extract from crushed neem leaves steeped in water (plant slurry). More effort is required when the seeds are pestled or ground and pressed to extract their oil as a natural insecticide.

Pyrethrin

Pyrethrin is derived from the dried flowers of chrysanthemums (*Chrysanthemum cinerareaefolium*). Important growing countries are Kenya, Tanzania and Rwanda. Pyrethrin acts as a contact poison, penetrates the nervous system of the insects via their skin and leads to paralyses and coordination disorders within a very short time. However, pyrethrin does not spare beneficial organisms.[74]

Quassia

Quassin extracts derived from the quassia tree are contact and stomach poisons and are used as insecticides, particularly against aphids and potato beetles. Due to their narrow spectrum of activity, their negative effect on beneficial organisms is considered to be relatively low.[75]

Other plants acting as plant protection products

Apart from the natural active substances mentioned above, there is a number of other tropical plants which may be used as plant protection products or for storage protection, such as *Lantana camara, Vernonia amygdalina* or *Tephrosia vogelii*. Their effect is based on their strong bitterness (antifeedants) as well as on substances toxic to insects.

Plant protection products acting as repellent

Moreover, the fragrances (essential oils) of numerous plants have a repellent effect on insects and predators. This effect is mainly used in vegetable cultivation (intercropping) but can also be applied in the form of plant extracts as so called repellents. Plants used for this purpose are for instance garlic, lemon, chilli peppers (pungency), eucalyptus etc.

Bacillus thuringiensis

It is an aerobic bacterium used as insecticide and acting particularly against young caterpillars of lepidoptera pests.[76]

[74] Beye, 1977

[75] Kühne and Friedrich, 2015

[76] Kaiser-Alexnat, 2012

5.4.4 Plant protection: What is supported by Caritas Austria?

- Caritas Austria promotes in its programmes production and use of vegetable and mineral based **organic plant protection products** such as neem, chilli, ash, soap, garlic etc.
- Caritas Austria promotes in its programmes **preventive plant protection** such as intercropping, crop rotation etc.
- Purchase and use of synthetic plant protection products from Caritas Austria funds are approved in cases of emergency and in compliance with appropriate safeguard measures, e. g. if there is a risk of crop failure.

5.4.5 Challenges faced in programme work

- Even if many partner countries of Caritas Austria have acceded to the Stockholm convention[77], synthetic plant protection products that are internationally banned (DDT, Thiodan, Endosulfan etc.) are sold on their markets. Farmers **are often not aware of the danger** posed by these products and frequently use them without taking any safeguard measures.
- There is only **partial local knowledge** of organic plant protection products.
- Due to the lack of funds and equipment, production and application of **large quantities of plant protection products** frequently are not possible or can only cover small areas.
- Target groups of Caritas projects also use pesticides, even if this is not provided for in the project description and not funded by Caritas.
- In some project regions there are large programmes funded by governments or international organisations promoting chemical plant protection products.

5.4.6 Possible solutions

- **Awareness raising, training and regular counselling** for partner organisations and the target groups of the Caritas Austria programmes
- **Training** on the topic of plant protection for agricultural advisers working in the projects
- Information on the risks of synthetic plant protection products and on alternative methods and their application, giving farmers the opportunity to make a conscious and informed decision
- Application of integrated pest management (IPM) approach
- Support for the target groups with regard to production and application of natural plant protection products
- **Advocacy work** in the field of organic agriculture

[77] The Stockholm Convention on Persistent Organic Pollutants, also called POPs Convention, is an internationally binding legal instrument that aims to eliminate or restrict the production and use of certain persistent organic pollutants (POPs). The Convention entered into force on 17 May 2004.
www.wikipedia.https://en.wikipedia.org/wiki/Persistent_organic_pollutant

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