

FARMING IN PRACTICE

Site-specific agriculture is key for sustainable rural development



Abstract

Agriculture performs a variety of roles. Besides food, it has to provide fodder and raw materials for construction, energetic or chemical purposes. Additionally, agriculture creates income, is a pillar of rural social life and cultural heritage and contributes to the conservation of natural resources. To be appropriate to the location, cultivation methods must be adapted to local environmental conditions, take the cultural context into account and be based on existing knowledge.

In developing countries, increasing and stabilising yields and income through site-specific agriculture is an important driver of rural development and poverty reduction. One of the key factors in overcoming hunger and poverty is for poor peasants to become farmers whose production is economically, ecologically and socially sustainable.

The global food system is at a crossroads as agriculture must address hunger and malnutrition against a backdrop of population growth (Gerland et al., 2014), biodiversity loss (Mace et al., 2018) and climate change. While past efforts strongly focused on boosting agricultural output, today's challenges demand a new approach. The main focus lies rather on sustainable food systems which produce more with fewer negative consequences (Otsuka & Muraoka, 2017 & Walter et al., 2017). There is increasing recognition that a future-oriented farming sector must respect social and environmental standards while sustaining rural livelihoods.

For this purpose, various approaches are currently being discussed, such as "climate-smart agriculture" (Chandra et al., 2017), "regenerative agriculture" (Gosnell et al., 2019), "sustainable intensification" (Garnett et al., 2013 & Godfray & Garnett, 2014), "integrated farming systems" or the broader approach of "agroecology" (Wezel et al. 2020). Welthungerhilfe has set itself the task of supporting forms of agriculture that contribute to the fulfilment

of the right to food, provide sufficient and nutritious food, and ensure productivity gains, economic diversification and income generation in rural areas, while at the same time responding to sustainability and climate change mitigation and adaptation requirements. Appropriate agricultural practices have to meet the needs of the local communities, which are often characterised by small-scale farming and a high proportion of employment in the agricultural sector (Fan & Rue, 2020). As most of the approaches referred to above have been developed according to particular conditions of specific locations, they may not be entirely appropriate in other places, but they still contain a pool of relevant elements that can be successfully applied in other locations.

The high expectations on the multifunctionality of agriculture can only be fulfilled in a sustainable way when site-specific strategies are developed and implemented – strategies which consider the individual environmental conditions, the level of social and economic development and the cultural background in the different locations. Moreover, these strategies must be permanently adapted to changing framework conditions. Climate change is one of the greatest challenges in this context (cf. Sections on agrobiodiversity, agro-pastoralism and climate change). Another one is the pressure on natural resources that has been growing for a long time, above all due to population increase and changing consumption patterns. In many locations, high external input and resource-intensive agricultural systems, which are frequently associated with industrialised agriculture (Gowdy & Baveye, 2019), have resulted in the overuse of natural resources and a loss of biodiversity.

With increasing scarcity of agricultural land (Barbier & Hochard, 2018) and, even more so, water resources (Fitton et al. 2019, – cf. Sections on land, agro-pastoralism and water) on the one hand and the pressure for increasing production on the other, traditional cultivation methods are often no longer adequate nor sustainable (Struik & Kuyper, 2017).

Production techniques are called for which selected aspects of traditional knowledge are taken into consideration but at the same time include innovative approaches and are continually adaptable to environmental, societal and market conditions.

Sustainable agriculture features the appropriate use of local natural resources, including renewable energy sources. It is based on integrated production methods which recycle a high proportion of organic farm residues from plants and livestock. Organic agriculture strongly pursues these criteria. It renounces genetically modified seeds, synthetic pesticides, chemical fertilisers and, to a large extent, mineral fertilisers; it rejects the use of growth accelerators (antibiotics, hormones) and complies with high standards of animal welfare. In some locations, however, it is difficult to implement organic agriculture and maintain a reasonable level of productivity, for example when soils are depleted, and manure and other organic inputs are simultaneously not available in sufficient quantities (Meemken & Qaim 2018).

Other forms of agriculture can also be performed in an environmentally friendly manner – when they use modern means of production in crop cultivation and animal husbandry that help to advance the farming systems by respecting the principles of sustainable use of natural resources as well as ethical norms for animal welfare (Plumecocq et al., 2018). Both improved seeds and irrigation and mechanisation aimed to increase yields can be employed in the various forms of sustainable agriculture, within the respective framework of their specific standards and regulations. In practice, deciding which mix of methods best serves the needs and potentials of farmers has to be guided by the environmental, social and political specificities of the farming area (Muller et al., 2017). This approach takes up key elements of agroecology which are particularly suitable for a successful reduction of poverty and hunger (Gliessmann & Tittonell, 2014). Agroecology aims at food systems that are equally strong in environmental, economic, social and agronomic dimensions (Gliessmann, 2020).

In many regions, smallholder farming has a high significance regarding food security and livelihoods. Properly managed, diversified smallholder agriculture tends to be less vulnerable to pests, plant diseases, price volatility and environmental shocks

Agroecology

is understood by many stakeholders as a core component for sustainable food systems. The approach generally aims at food systems, and is equally strong in environmental, economic, social/cultural and agronomic dimensions. However, there are different definitions of the concept of agroecology, which comprises a plurality of aspects and approaches. Hence, it opens space for interpretation and critique. Agroecology is, for example, often defined as science, practice and a movement, merging the goal of maintaining biodiversity in agricultural systems with benefiting farmers. This, however, is frequently coupled with a transformation ideology.

The United Nations Food and Agriculture Organization (FAO) has defined 10 interlinked and interdependent elements of agroecology which can be grouped into three sectors:

1. *Common characteristics of agroecological systems:*
Diversity, synergies, efficiency, resilience, recycling, co-creation and sharing of knowledge foundational practices and innovation approaches
2. *Context features:*
Human and social values, culture and food traditions
3. *Enabling environment:*
Responsible governance, circular and solidarity economy

Agroecological farming is best understood as a guiding principle and a practical approach that develops over time rather than as prescribing a static set of practices. Unlike the related concept of organic agriculture, it is explicitly uncoded and unrestricted. Agroecology can take advantage of a multiplicity of solutions, combining technology and traditional knowledge to improve inputs and outputs of the agricultural process. Agroecological systems include organic farming, permaculture, low external input sustainable agriculture and agroforestry (Niggli & Riedel, 2020).

than large-scale monoculture farming (Feliciano, 2019). At the same time, smallholders are prone to considerable risks; many of them have only weak economic resilience and hardly any alternative income options. Turning small-scale and subsistence

agriculture into an economically viable, socially and ecologically sustainable productive sector is one of the most important factors in overcoming hunger and poverty in rural areas. Family farms are well suited to achieve these requirements (Graeub et al., 2016 & Swaminathan, 2014) – provided they are able to obtain the necessary resources, including land, energy and financial means for investments (irrigation, mechanisation, etc.), and enjoy reliable access to seeds and other agricultural inputs, to relevant information (weather forecasts, market data) and to education, advisory services and research (cf. Section on financial services and Section on energy). Here, the development and promotion of appropriate digitalisation can make a significant contribution (Braumoh, 2020). It can facilitate access to important information as well as to agricultural extension, machinery and financial services.

And it can help optimise the application of fertilisers or irrigation and thus support the conservation of the environment and scarce resources.

The promotion of an enabling environment by the government and local governmental institutions is a further precondition for farmers, especially smallholders, to develop their potential (Jayne et al., 2018). It includes supportive policies, public investments, institutions and corresponding research priorities. Here, supporting adequate participation of the communities can be backed by NGOs such as WHH. Above all, agricultural strategies should secure sustainable food supplies. Prerequisites needed here include improved crop protection and technologically appropriate processing and storage to reduce post-harvest losses and guarantee food safety (e.g. Chegere, 2018). In the medium run, agriculture must progress beyond local self-sufficiency; surpluses have to be produced, and rural economies should be supported to diversify their production and their income sources. Workers in agriculture should also be able to enjoy a decent standard of living. Particular attention ought to be paid to living conditions of casual workers, who have received little attention in development strategies to date.

Strategies should promote value addition and support the local economy as a whole. This includes improved trade with urban markets based on a diversified offer of food and other rural products with competitive quality standards. Effective markets, transportation and investment in processing capacities form the physical and economic infrastructure

for these efforts to succeed (cf. Section on rural economy).

Both the development of local value chains and integration in regional and international markets, including adapting to the required health/food safety and social standards as well as accessing certifications, ought to be supported (cf. Section on agricultural trade).

Public transfer payments to farmers are justified for rendered services which are not compensated by the market (e.g. environmental conservation, climate change mitigation and adaptation, food security, social security – e.g. Jones et al., 2020), however, the compensation payments have to be transparent and equitable.

In addition, measures have to be taken to make the sector attractive for the next generation. Keeping youth in rural areas requires creating on- and off-farm employment, as well as providing education and recreational programmes. All measures and policies have to observe fair women's ownership, the respect of women's rights and gender equity (cf. Section on gender justice).

Rural poverty can only be reduced by building an economically viable agri-food sector which is simultaneously socially and ecologically sustainable. The necessary process of structural change which goes hand in hand with this will lead to increased specialisation and division of labour, changing social practices with regard to access to land, water and capital and increasing emergence of wage labour along with new and unprecedented social risks and disruptions. These will have to be cushioned by appropriate legislation and effective social security measures (cf. Section on social security).

As the core of sustainable food systems, the agricultural sector performs a wide range of functions. First of all, it has to ensure food and nutrition security and help realise the right to adequate food (cf. Section on the human right to food). In doing so, it also supports a balanced, healthy diet (while tackling malnutrition and undernutrition) and the prevention of diseases. Economic and livelihood as well as cultural aspects are just as important. Farming enables the rural population to produce raw products (such as for energy generating) and adequate income; through traded and export products, the sector can contribute to national income (taxes, foreign currency), thus allowing social security and

other sectors to develop and grow (cf. Section on rural economy, Section on agricultural trade and Section on social security). Farming maintains the preservation of cultural assets and provides identity

and pride. And last but not least, it plays an important role in the conservation of natural resources such as soil, water, air and biodiversity as well as in climate change adaptation and mitigation.

Welthungerhilfe's involvement in relation to site-specific agriculture:

- Supporting local communities and empowering them for a meaningful participation in the development of specific agricultural strategies.
- Supporting smallholder farming to increase productivity and farmers' incomes. The cultivation methods applied are innovative and efficiency-focused and are based on up-to-date knowledge. They take into consideration the needs for adaptation to climate change challenges as well as sustainability requirements. We support access to the necessary knowledge and resources (loans, infrastructure, seeds, information, etc.).
- Orienting cultivation methods towards a diversity of plants and varieties. The focus is on sustainable use of natural resources (soil, water, biodiversity, energy). Agroforestry and integrated farming systems are significant in this context and are therefore promoted, as are integrated crop protection systems, breeding of adapted seeds, sustainable irrigation management and measures to improve soil fertility (compost, mulching, crop rotation, erosion control and soil conservation techniques).
- Supporting appropriate methods of keeping and feeding livestock, including measures for growing fodder crops and veterinary provision.
- Promoting measures to support avoidance of post-harvest losses (e. g. storage) to increase the availability of food, ensure food safety and create jobs.
- Promoting marketing activities (local, regional and export) and the processing of agricultural primary produce for strengthening the local economy. This can take place in partnership with the private sector in order to use existing know-how, capital and logistics structures.

Welthungerhilfe's demands relating to the implementation of site-specific agriculture:

- Poverty eradication and food security must be at the core of national agricultural policy in countries affected by hunger. An adequate and meaningful participation of local communities has to be ensured.
- Governments should develop and implement a policy agenda for agricultural extension focusing on food security and income generation of the rural poor.
- Agriculture should retain and further enhance the high priority it has been attributed by national governments and international development organisations, and its funding ought to be raised accordingly. Promotion of a site-specific agriculture is a central part of the food system and an important tool for realising the human right to food.
- Industrialised countries must revise internal protection policies where these impair the agricultural development of poor countries by distorting the markets.
- Development projects and private business should not use technologies or make investments which clash with the conservation of natural resources and the implementation of the right to an adequate standard of living in the recipient countries. Ability to demonstrate compliance with minimum standards such as Global Compact should be given, e.g. through certification.

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Contacts:

Policy & External Relations
policy@welthungerhilfe.de

Sector Strategy, Knowledge & Learning Unit
sectorsupport@welthungerhilfe.de