PART I: SHORT HISTORY OF ORGANIC FARMING

The organic fruit production in Europe is not only a matter of statistics, regulations and tables but also has a meaningful historical background. So as an introduction, we can take a brief excursion back to the roots and the evolution of organic farming. (The following text is closely—but not entirely—based on an overview article of Gunter Vogt, 2000a.)

Organic farming’s origins in the first decades of the 20th century need to be understood in the context of five main aspects:

1. Since the end of the 19th century the “Life Reform Movement” (in German =Lebensreform-Bewegung) existed disapproving industrialization, urbanization and mechanization of the modern world. They called for a “natural way of living” including vegetarian nutrition, physical training, natural medicine and “back-to-the-country” movement.

2. In the early 1900s a new agricultural discipline appeared: the scientifically oriented agricultural sciences discovering, for example, nitrogen fixing bacteria. Among others Felix Löhnis, Lorenz Hilter and Raoul H. Francé investigated the ecology of soil organisms and developed a biological concept with soil fertility, decline of seed quality, increasing problems of plant diseases and pest infestations and, finally, diminished food quality as a consequence of the intensified nitrogen fertilization.

3. In the early 1920s a new agricultural discipline appeared: the scientifically oriented agricultural sciences discovering, for example, nitrogen fixing bacteria. Among others Felix Löhnis, Lorenz Hilter and Raoul H. Francé investigated the ecology of soil organisms and developed a biological concept with soil fertility, decline of seed quality, increasing problems of plant diseases and pest infestations and, finally, diminished food quality as a consequence of the intensified nitrogen fertilization.

4. Holistic views of nature with concepts of scientific-ecological and scientific-spiritual formed the background of organic farming.

5. Finally, farming cultures of the Far East with their highly developed sustainability served as examples to develop organic farming including composting and recycling of municipal organic waste.

ORGANIC FARMING IN GERMAN SPEAKING COUNTRIES

Natural Agriculture

Parts of the (initially) urban “Life Reform Movement” tried to realize their ideals working as farmers and gardeners. The concepts of Natural Agriculture included vegetarianism, healthy nutrition, farming without animals and a scientific (biological) understanding of soil fertility. Soil cultivation included rotting and mulching techniques, conservation tillage, green manuring, rock powder fertilization, assessment of organic matter cycling, recycling concepts for municipal wastes and human feces (Konemann, 1931, 1932, 1937).

The second source of organic farming had been Rudolf Steiner’s “Agricultural Lectures” (Landwirtschaftlicher Kurs) held at Koberwitz in 1924. The concepts of Biodynamic Agriculture are derived from Anthroposophy, at its roots an esoteric-occult world view. Nature is conceived as a spiritual-physical matrix. The key concept presented by Rudolf Steiner was the farm as a living organism and individuality characterized by “ego forces.” Thus he suggested an intimate personal relationship to nature forming the basis of farming.

The development of biodynamic agriculture was centered in provinces of former eastern Germany during the ’20s and ’30s. The present day worldwide well-known trademark Demeter was created in 1929/30. Aiming for a holistic view of nature, farming and science were and still are a central theme.

ORGANIC FARMING IS THE ONLY GROWING SECTOR OF AGRICULTURE.

Most European countries give subsidies to stimulate and to support organic production.

Organic Fruit Production in Europe

Franco Weibel

Research Institute of Organic Agriculture, Frick, Switzerland

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RESEARCH INSTITUTE OF ORGANIC AGRICULTURE (FIBL, IN GERMAN = FORSCHUNGSINSTITUT FÜR BIOLOGISCHEN LANDBAU)

FIBL, Ackerstrasse, CH-5070 Frick, admin@fibl.ch, http://www.fibl.ch

phone 0041 62 865 72 72, fax 0041 62 865 72 73

In 1974, the Research Institute of Organic Agriculture (FIBL) was constituted as a private foundation by organic farmers, scientists, politicians and representatives of industry near Basel (Switzerland). It has set itself the task of establishing practice-oriented agronomic and economic research and of making new findings available to the organic farmers. Today the institute has about 90 employees; there are three research departments and a department for advice and training.

Although a private foundation, FIBL is considerably funded by the federal government, the Swiss cantons and private institutions as well as by revenues from planning and advising. Currently its annual revenues in research are 4.5 million Euros and in training and extension 1.5 million Euros.

The research activities of FIBL are organized in the following departments and groups:

- Livestock Department with groups Animal Health, Animal Husbandry and Breeding, Parasitology.
- Landscape, Economics Department with groups Landscape and Biodiversity, Socio-Economics and Standards.
Organic-Biological Agriculture
In the ’50s and ’60s the “Swiss Farmers’ Movement for a Native Rural Culture” (Schweizer Bauern-Heimatbewegung) searched for alternatives to the industrialization of farming which would save a rural way of living in the modern world. Initiated by their leader Hans Müller and especially his wife Maria Müller, the farmers developed an original ecological farming practice. Organic-biological agriculture was characterized by ley farming (mixed livestock and pasture), sheet composting and conservation tillage. They acquired traditional techniques, the knowledge of Natural Agriculture, Anglo-Saxon organic farming and partly experiences of Dynamic agriculture. Hans Peter Rusch’s concept of nature as “Cycle of Lively Particles” (Kreislauf lebendiger Substanz) and his soil test provided the theoretical background. For the marketing, grower cooperatives were founded and they still exist. The organic-biological movement is an example of a successful, strongly farmer-driven initiative.

Last but not least, the energy and "drive" of both the biodynamic and the organic-biological movements in Switzerland led in 1974 to the foundation of the private Research Institute of Organic Farming (Forschungsinstitut für Biologischen Landbau, FiBL) near Basel in Switzerland. Today FiBL is the largest research institute in the world for organic agriculture with about 90 employees. Also in Switzerland, at Sissach, the first international congress of IFOAM (Int. Federation of Organic Movements) was held in 1977.

Biological and Ecological Farming
The "Natural Agriculture" of the ’20s and ’30s was followed by two predominantly practical and science-based ecological farming systems: Biologische Landwirtschaft in the ’50s and ’60s and Ecological Agriculture in the ’80s and ’90s. Both systems partly abandoned some principles of the Life Reform Movement (e.g., farming without animals). They incorporated new knowledge of science, e.g., rhizosphere dynamics, systems ecology, etc. They developed ecological technologies and methods of plant cultivation and animal husbandry. In Germany in 1988 several associations joined together in the AGOEL umbrella organization. Similar organizations are Bio-Suisse in Switzerland and Ernteverband in Austria. The European Union (EU) set the legal basis of organic farming, food processing and labeling with the Ordinance 2002/91 in 1991 (EEC, 2000).

Beside organic standards of single states, label organizations, the EU and IFOAM, in the late ’90s also FAO and WHO have set, in form of the so-called “Codex Alimentarius” standards and definitions on organic produce (FAO/WHO, 1999). These standards are particularly important for worldwide trading and WTO agreements.

Organic Farming in the United Kingdom and in the USA
The development of organic farming in these countries is based on a similar context of origin: vegetarian food reform and back-to-the-land movement, scientific-biological concept of soil fertility (Sir Albert Howard, Selman A. Waksmann), declining soil fertility (Dust Bowl, neglected humus economy), decreasing food quality (Sir Robert McCarrison), a holistic view of nature and farming cultures of the Far East (Franklin H. King).

The main impulse for organic farming in Great Britain and in the USA was the work of Sir Albert Howard in India on plant breeding, plant health, composting (Indore process) and recycling of municipal organic waste. He also emphasized that agricultural research should always take into account the whole farming system rather than relying on partial interventions.

In 1943 Lady Eve Balfour founded the "Soil Association," which still exists, and initiated the Haughey Experiment to compare scientifically different farming systems. Further pioneers of British organic farming were Newman Turner and Friend Sykes (humus farming) and Sir George Stapledon (grassland cultivation).

In the United States the “Friends of the Earth,” a group of scientists and politicians, aimed to broaden an awareness of ecological problems, especially the Dust Bowl and other soil-related problems. They published the journal The Land and Edward H. Faulkner and Louis Bromfield proposed a sustainable soil cultivation based on sheet composting, a "trash mulch system" combining green manuring and conservation tillage. A spokesman of the organic farming movement became the publisher J. I. Rodel of the journal Organic Farming and Gardening.

Organic Farming in France and Japan
In France organic farming was established only during the ’60s, based on concepts that are comparable to the German and Anglo-Saxon science-based organic farming. The still active pioneer was Claude Aubert and the association “Nature et Progrès.” Fertilization and soil improvement with sea weeds are essential elements in the method “Boucher-LeMaire.”

In Japan an environmental and consumers’ movement, not agriculture itself, initiated organic farming at the end of the ’60s. Urban consumers demanding healthy food founded cooperatives to link producers and consumers. These arrangements between households and farms—called "teilki," meaning partnership—include buying the whole harvest and working personally on the farm and thus learning from each other.

Conclusions
The main principles, elements and driving forces of organic farming are similar and surprisingly stable almost from the beginnings of organic agriculture, 100 years ago. With some simplifications they can be summarized as follows:
- Being able to farm without synthetic agrochemicals and, for the future, without genetically modified organisms.
- Biological understanding of soil fertility and cultivation—to build up and maintain high soil fertility.
- Farming by using ecological interactions— to maintain natural cycles and processes that are as closed as is feasible, to promote and conserve biodiversity.
- To keep, feed and breed livestock, respecting ethical principles.
- Producing high quality food with a holistic view of quality including aspects of sensory, health, environment and social fairness.
- Scientific knowledge but also philosophical approaches and farmer experiences as starting points, backgrounds and driving forces of development.
- An alternative way of living including visions of a “new” society.

Today a worldwide professionalization of the organic farm business can be observed. This is reflected not only by the turnover of goods and money with organic produce but also by the increasing number of standards, ordinances, certification offices, research activities, etc.

In the context of decreasing confidence of the consumers, mainly in the industrialized countries, toward the conventional farm business and the increasing need to preserve biodiversity, intact landscapes and sustainable land use it is no wonder that organic agriculture is the only growing sector of agriculture.

Beside the ongoing task to find technical improvements, an important challenge of the future certainly will consist of forming the production and market expansion in a sustainable way without losing the high credibility of the technical and the ethical values of organic agriculture.
PART II: ORGANIC FRUIT GROWING IN EUROPE IN THE BEGINNING OF THE 21ST CENTURY

Production Area and State Subsidies

At present time, organic fruit production is biggest in southern Europe and France (Table 1). In southern Europe countries predominantly olives, grapes, dry fruit and apples are grown. In Greece organic production has not become an important trend yet. The organically cultivated area is probably largest in Italy. Accurate surface data are known for South Tyrol with 540 ha of intensive organic table fruit production. However, for the south of Italy information is somewhat unclear (Lindhard and Callesen, 1999). A situation of boom occurs in France where 42% of the organic fruit area was in transition in 2001. Such an intensity of production growth certainly needs very careful preparation on the marketing side in order to prevent unexpected surprises with the selling and the price of the produce.

In central and northern Europe the area grown with organic fruit and berry is less than 300 ha (1235 acres) per country. Germany is an exception having almost 1000 ha (2471 acres). Apples and strawberries are the most important species. For the northern countries it is very difficult to find how extensive the production is. For this reason different attempts are ongoing to create fewer easy-to-communicate umbrella labels. Up to now, however, only France and since 2001 Germany have created a “state” label to certify this lowest production level (∈ab = agriculture biologique in France, the “Oekopruefzeichen” in Germany). Switzerland is in this respect an exception because the private and traditional label of the organic association of growers, transformers and traders “BIO-SUISSE” has an almost dominating status. First, this fact is strengthening considerably the unity and power of the Swiss Organic Movement as well as in marketing and political activities. Secondly, it renders any creation of a state label unnecessary.

Concerning the allowed input agents for plant protection, animal husbandry, fertilization and food processing, each EU country is maintaining, besides the EU ordinance 2092/91, its national laws and registration rules. This is the reason why, for example, the use of copper is allowed in most European countries (as it is in the EU ordinance), except in Denmark and The Netherlands. This unevenness is causing difficult production problems for organic fruit growers of these latter countries. Apart from EU or national legislation each private label organization can set up even more restrictions, but not less. The recently founded European Group of Researchers in Organic Fruit (EUGROF) is presently putting together

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### TABLE 1

<table>
<thead>
<tr>
<th>Country</th>
<th>Production area (ha)</th>
<th>Species</th>
<th>Subsidies in Euro per ha and year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portugal</td>
<td>16,333</td>
<td>Olives, grapes, dry fruit and most other species</td>
<td>180-603 depending on species and whether irrigated or not</td>
</tr>
<tr>
<td>Spain</td>
<td>2,215</td>
<td>Apples, pears, peaches, citrus, olives</td>
<td>460</td>
</tr>
<tr>
<td>Italy</td>
<td>152,000 (including vegetables)</td>
<td>Olives, grapes, citrus, apple, etc. In South Tyrol, 540 ha of organic pipfruit production</td>
<td>460</td>
</tr>
<tr>
<td>Greece</td>
<td>several hundred</td>
<td>Olives, grapes</td>
<td>Grapes: 608</td>
</tr>
<tr>
<td>France</td>
<td>7,000 of which 3,000 in transition</td>
<td>Chestnut (approx. 3,500 ha), apples (approx. 820 ha), pears, peaches, plums, apricots, cherries</td>
<td>762 the first 3 years</td>
</tr>
<tr>
<td>Switzerland</td>
<td>360 (additionally 6,000-8,000 t pipfruit per year for organic apple juice production from high stem trees)</td>
<td>Apple (220 ha), pears, apricot, cherries, plums berries, kiwi</td>
<td>1200 + transition subsidies (amounts and duration [2-5 years] depending on the province) + direct payments of the Federation for ecological performances to increase biodiversity (same amounts as Integrated fruit growers get)</td>
</tr>
<tr>
<td>Austria</td>
<td>598</td>
<td>Apples, currants, strawberries, pears, etc.</td>
<td>727</td>
</tr>
<tr>
<td>Belgium</td>
<td>209</td>
<td>Apples, pears, strawberries</td>
<td>744 first 2 years, then 842</td>
</tr>
<tr>
<td>Germany</td>
<td>980</td>
<td>most species except olives, citrus</td>
<td>511 in province Baden Württemberg</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>320</td>
<td>Apples, pears, strawberries</td>
<td>11,344 the first 5 years</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>456</td>
<td>Apples, pears, plums, cherries</td>
<td>706 distributed over the first 5 years</td>
</tr>
<tr>
<td>Denmark</td>
<td>306</td>
<td>Black currants, strawberries, apples, sweet cherries</td>
<td>406 the first 2 years; then 4 years a gradual reduction to 0.</td>
</tr>
<tr>
<td>Norway</td>
<td>57</td>
<td>Apples, pears, plums, diff. berries</td>
<td>727 the first 2 years then 182</td>
</tr>
<tr>
<td>Sweden</td>
<td>189</td>
<td>Strawberries, apples, other berries</td>
<td>0</td>
</tr>
</tbody>
</table>
an overview list with the registration status of all important organic plant protection products for organic fruit production (Weibel, 2001). Also with other important products for organ-
ic fruit production such as Neem oil, Quassin, and lime sulfur the organic trend. Disruption with pheromones or Calcium polysulfide (Lime Sul-
dry) the registration situation is not at all homoge-
nous across Europe. In Switzerland the Research Institute of Organic Farming, con-
tracted by BIO-SUISSE, is releasing yearly a list of the allowed products which is posted to all organ-
farmers (“Hilfstoffliste”; it can be or-
dered at www.fhhl.ch). The products of this list have been tested organic compatibility.

Secondly, the organic market share of organic produce including fruit are clearly in the hands of supermarket chains (57%, 73% and more than 90%, respec-
tively, of the organic market [Michelsen et al., 1999]). The differences in market structures have a great influence on the production and communication strategies that the organic growers and retailers undertake.

In most European countries the proportion of organically produced fruit is still less than 1% of the total fruit production. For Italy the estimation is 1 to 2%, for The Netherlands 2% and for Switzerland 4 to 5% market share. The poll of Lindhard and Callesen (1999) shows that in all countries the tendency is increasing. Nevertheless it means that organic fruit still is a niche market. Why is that so? For supermarket chains and it is the supermarket chains who, in fact, have the main potential for the future mar-
ket expansion—organic fruit is still a “new” product. Their skill to handle, position and ad-
vertise organic fruit for this new generation of the larger retail stores, is an important reason why organic fruit growing compared to IFP do or can occur by higher costs for:

1. Weed control/understory management: Because organic growers have to compete with conventional systems, trees are very sensitive to weed competition. Besides more laborious and machinery costs for the mechanical tillage of the weed strips, 30-40 additional hours per hectare are needed for hand hoeing to cleave the area around the stems from weeds (if this were not done, heavy vole damages can occur). (Our) experi-
ments to find modern-type weed control options are not yet promising. However there is certainly an interesting potential for organic fruit growing to discover.
3. Hand work for blossom thinning: many organic fruit farms spend 70 to 120 and occasionally even more labor hours for blossom thinning to control biennial bearing and to increase fruit quality.

4. Vole control: as there are no organic rodenticides available, organic growers often spend more than 30 Lh/ha for mice control with traps and or special CO₂ exhausters.

5. Tree material: the obligation to use certified organic trees for new plantations increases the costs of the orchard setup by about 10%. The tree quality of the few organic nurseries is frequently not satisfying yet. The high standard of the conventional trees is setting a difficult-to-achieve organic threshold mark.

In the interpretation of the economic data in Figure 2 it has to be taken in consideration that in Switzerland during the last years of IFP Golden Delicious, Gloster, Idared and other "old" main varieties have achieved only half of the price which has been taken for this model calculation. Thus, in cases with "old" varieties the organic production is or can be even much more profitable than shown in the model calculation. However, the model calculation also shows that organic fruit growing is depending existentially on a considerably higher farmgate price for the product (32% in this case).

The fact that the farmgate price for organic fruit is 30% or more higher than conventional fruit can lead to an extremely high selling price at the point of sale if packers and retailers apply routinely the same margins on the product (usually 28-32% in Switzerland). Average supermarket consumers, however, are not willing to pay these excessive prices. In Switzerland, the retailers and supermarket chains have therefore reduced their percentage margins toward the absolute margins (in money units) that they have on conventional fruit. This led to the consumer and grower friendly situation that the prices at the point of sale are usually around only 32 to 40% (and only rarely up to 70%) higher than for conventional fruit.

Another important economic advantage for the growers is that the market is not saturated and that they are usually sold out rather quickly. Thus they have lower costs for storage, less storage risks to bear and are under less pressure to reduce the price or to attempt costly selling activities.

Perspectives Have to be Formed Actively

On the marketing side, there is a clear tendency that supermarkets aim for a simple “substitution” of the conventional by organic fruit. So they demand the same requirements for the organic fruit as for conventional or IFP such as en-vogue varieties and perfect external quality, not taking in consideration what this means in terms of a credible sustainable production. Because this market pressure is feeding back to the growers in a way that they also tend to carry out just a “substitute organic” so rather plant disease sensitive world varieties than less known tolerant or resistant varieties and apply some of the sprays rather for cosmetic reasons than for the plant health. Even though only natural inputs are used, the question arises whether this tendency is still in accordance with the idea—and with the consumer expectation—of organic farming. In Switzerland, until today BIOSUISSE could defend separate sorting standards for organic fruit tolerating, for example, some small spots of scab, sooty blotch, small healed insect damages and smaller fruit sizes. On the other hand, skin color prescriptions, as a good indicator of inner fruit quality, are more strict than for conventional apples. A
successful step toward better communication with the organic fruit consumers is that "Coop," the second biggest supermarket chain of Switzerland, has introduced a new marketing concept to ease the market introduction of unknown, mainly scab-resistant apple varieties (Weibel and Grab, 2000). This concept is informing and guiding the apple consumer primarily by different taste groups. These groups are also visualized by different colors of the packing labels. The variety names remain indicated but are of secondary importance.

In Switzerland, the described discussion on the sorting prescription takes place at a yearly preharvest meeting among organic fruit growers and retailers. It demands considerable communication efforts on one hand. On the other hand, it is a rewarding exchange, finally, for the benefit of all partners.

REFERENCES

WEB SITES
BIO-SUISSE: http://www.bio-suisse.ch (g, f, e)
Coop: http://naturaplan.coop.ch/d/natur/ (ge, fr)
European Standards for organic agriculture: http://www.lfe.bayern.de/oeko/fort_vo.html (ge)
FiBL, Research Institute of Organic Farming: http://www.fibl.ch (ge, fr, en)
Migros: http://www.migros.ch (ge, fr)
Swiss Standards for organic agriculture: http://www.admin.ch/ch/d/si/c919_18.html (ge, fr, it)

From the passage provided, the transition to organic farming and the necessity of effective communication with consumers have been emphasized. The introduction of new apple varieties that are scab-resistant and the implementation of a marketing concept by Coop, the second largest supermarket chain in Switzerland, are highlighted. This concept involves sorting apples into different taste groups, visually represented by various colored packing labels. The variety names are still included but are secondary in importance.

The process of discussing the sorting prescription for organic fruit occurs annually during a preharvest meeting among organic fruit growers and retailers in Switzerland. This process demands considerable communication efforts, yet it is considered rewarding for all partners involved.

The references cited include a variety of books and research papers, ranging from early 20th-century agricultural practices to more recent developments in organic farming. These sources provide a comprehensive understanding of the historical and contemporary context of organic fruit production.