



Pathways to phase-out contentious inputs from organic agriculture in Europe

Annex to deliverables D3.1 and D5.1: Version 1.1

Tables describing the use of various inputs during organic growing of important horticultural and arable crops across Europe.

Versions

Version: 1.0 (September 2018) First version

Version: 1.1 (31 October 2018) Text updated with latest information.

Funding

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No [774340 — Organic-PLUS]



Project Details:

Programme: **H2020, SUSTAINABLE FOOD SECURITY – RESILIENT AND RESOURCE-EFFICIENT VALUE CHAINS**

Call topic: **SFS-08-2017, (RIA) Organic inputs – contentious inputs in organic farming**

Project Title: **Pathways to phase-out contentious inputs from organic agriculture in Europe**

Project Acronym: **Organic Plus**

Proposal Number: **774340-2**

Lead Partner: **Coventry University**

Time Frame: **01/05/2018 – 31/04/2022**

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Deliverable Details

WP3 PLANT and WP5 SOIL

Task 3.1 and Task 5.1



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1. Summary

This Annex presents the results of the survey carried out in the frame of Tasks 3.1. and Task 5.1. A common table/questionnaire for both tasks was used in order to map the use of contentious inputs linked to plant protection (mainly Cu, S and mineral oils), and the use of peat, plastic and fertilisers used in growing, in 10 countries participating in Organic-PLUS (Denmark, France, Germany, Greece, Italy, Norway, Poland, Spain, Turkey and UK).

The survey was carried out mainly by interviewing one to three experienced advisors per crop, asking them to fill in a table describing a typical organic production of the relevant crop, emphasising the use of various inputs. An accompanying letter was used along with the questionnaire to explain the aim of this work, as presented below:

Organic Agriculture: Mapping the use of inputs in specific crops

This is a survey among ... (e.g. fill in: advisors within extension service.../standard organisation/other «expert»), carried out as an activity linked to the project «Organic PLUS»: Pathways to phase-out contentious inputs from organic agriculture in Europe. Contact: (name of person making the phone call and/or sending the e-mail).

Within the work package «Plant», we are especially interested in the use of copper, mineral oil and sulphur as plant protection measures. If possible, we also like to record other plant protection measures such as commercial beneficial organisms. Further, we are interested in whether growers and advisors are discussing, or if you have proposals for, alternatives for copper, paraffin oil and sulphur.

With the work package «Soil», we are mapping the use of plastics, especially for soil mulching, and further the use of peat in growing media, and animal-derived fertilisers such as manure from non-organic farms, meat and bone meal products and similar animal-derived materials. Also for these materials (plastic, peat and fertilisers) we aim at mapping the typical use in some important crops. Further, we like to know if growers and/or advisors have proposals or ideas for better solutions.

Please fill in the table below as detailed as you can, for the crop(s) that we have agreed about (possibly specify these crops, or list them in the table!) based on your general knowledge. We want to get information about at least 3-5 important crops, where a majority of the described growing inputs are used. In the project, we have an emphasis on aubergine, potatoes, tomatoes, citrus, and olives. If these crops are grown in your country, they are of special relevance to map. For other countries, look for crops using the most of inputs.

The mapping will be conducted in Denmark, France, Germany, Greece, possibly Italy, Norway, Poland, Spain, Turkey and United Kingdom. A report describing the results will be produced, and we will be pleased to send it to you.

Thanks a lot for your kind and very valuable assistance!

Here follows an example for organic growing of strawberries in Norway. Thereafter, an empty table for you to fill in. Please copy it if you fill in for more crops.

On behalf of the Organic PLUS project, NAME and CONTACT DETAILS for the contact person in COUNTRY

For Poland, the information was based on inputs recorded by a simple web survey from several producers. For UK, information was not compiled in crop tables. Instead, the largest organic growers' association, Soil Association (SA) interviewed several growers, and analysed the permissions to use restricted inputs that were given in one year. The information provided by SA is also included in this report. The collected raw material is presented in the following sections. Note that the names of the experts, consultants and growers interviewed are not presented to allow anonymity for the data given.

2. Annex I-Tables used for data collection

2.1 Denmark's Annex I-Tables

Name and position/title/function of the person filling in: consultants	
Region to which the information applies: Denmark	
<i>Crop</i>	<i>Apples</i>
Propagation material	No organic plant material is available, so conventional is used. Varieties: Discovery, Red Aroma, Santana, Alkmene, Rubinstein, Topaz and Holsteiner cox.
Cultivation system	Organic apple-orchards can be very intensive with 2500-3000 trees/ha on M9 or they can be more extensive with 400 trees/ha on M7 or A2 and everything in between. A few growers are using a plastic-roof above the tree row to protect the trees from rain and thereby avoid fungus-diseases (scab).
Fertilisation	The level of nitrogen is kept rather low in organic apple trees in Denmark, to prevent fungus-diseases. There is added about 40 kg N/ha/year, but given in the tree-row. Often the fertiliser is dry chicken manure from conventional or organic farms. Some farmers also add dry vinasse as a potassium-fertiliser. Some farmers also add micronutrients, if their leaf-analysis are showing a deficiency. Often there is added compost to improve the soil, either from municipal waste or from mushroom-production (very little N) Some apple growers are also egg-producers using the orchard as a chicken-run. These orchards are often fertilized too much because of the chicken manure and they are experiencing more fungus-disease problems.
Crop protection	The main crop protection is the choice of robust varieties. Jonagold and Elstar are hardly grown organically in Denmark because of their disease-problems. There are two groups of organic apple-growers in Denmark. Those who owns and uses a mist-sprayer (50%), and those who do not spray at all. The first group is mainly spraying with sulphur. Depending on the rainfall in spring, they might spray up till 25 times during the season. But normally less. The doses is around 4-6 kg/ha before flowering and 2-4 kg/ha after flowering. Copper as a plant protection-agent is not allowed in Denmark. Copper-fertilizers are legal, and in some cases, if leaf-samples are showing a Copper-deficiency a Copper-spray at green tip is added.

	<p>Both groups of growers are using pheromone dispersion against apple codling moths and others fruit moths.</p> <p>The spraying group will also if necessary use Neem against red apple aphid and pyrethrum against apple sawfly.</p> <p>The growers in the non-spraying group are putting up white sticking-plates against apple sawfly. Flower-strips are also popular to feed the natural enemies.</p> <p>No use of mineral oil.</p>
Plastics:	No plastic-mulch is used, while the trees then are eaten by mice and voles. Plastic-roof is as mentioned, sometimes used. Until now mainly at an experimental level. It works very good, but is also a big investment.
Peat:	no
Yields and harvest method:	7-20 ton/ha in average depending on the cultivars, soil, irrigation, age of trees, season, spraying or no spraying. Lowest yield in the non-sprayed group. But then they often sell the discarded apples to juice- and cider-factories
Machinery	<p>Soil preparation before planting: Harrowing, harrowing, harrowing, ploughing and harrowing (to wipe out perennial weed).</p> <p>Establishing of support-system (poles, wires etc) requires some machinery to put down the poles and to make the planting-holes.</p> <p>Every year (during the app. 15 years of cultivation) the apples are row-cultivated 3-5 times. The green stripes between the rows are cut 3- 5 times a year.</p> <p>The trees are pruned every year, some are using a machine for that, others are using electric hand-tools.</p> <p>I suggest all these operations will take about 300 hours/ha/year, but it will vary a lot with the season and the level of weeds.</p>
Irrigation	<p>Drip irrigation is often put up in the tree-rows, but not all orchards are having irrigation. Especially the trees and vigorous rootstocks (A2) can manage without irrigation.</p> <p>The consumption of water will vary with the year and the energy-consumption will vary with the type of pump etc.</p>
Alternatives/comments	I think, that all Danish organic apple-growers are using all possibilities to avoid contentious inputs

Name and position/title/function of the person filling in: cabbage grower	
Region to which the information applies: Denmark	
<i>Crop</i>	<i>Broccoli as example</i>
Propagation material	Pathenon

Cultivation system	Broccoli is planted on rows, 60 cm between the rows and 25 cm between the plants (67000 plants/ha). The plants are bought in Holland, and sprouted in peat pots. The cultivation in the rotation should have at least 3 years between cabbage varieties because of fear for Club Root (<i>Plasmodiophora brassicae</i>). Often clovergrass is used in the rotation to build up fertility in the soil, but clovergrass before cabbage is not advisable. The cabbage is planted ongoing every week, to spread the harvest.
Fertilisation	Farmer uses vinasse (distillery residues) or protamylasse (from potatoes starch industry) as a complement to the farmyard manure he spreads on the field before ploughing and planting. Soil samples are taken regularly to check if potassium and phosphorous is ok, as well as the pH. Broccoli is fertilised with up to 200 kg N/ha, 30-40 kg P/ha, 150-250 kg K/ha, 20-30 kg Mg/ha and 30-40 kg S/ha. Kieserite is used as Magnesium fertilizer if Vinasse or protamylasse does not contain enough according to soil or leaf samples
Crop protection	No chemical plant protection. Against insects (cabbage root fly, cabbage white butterfly), the planted cabbage is protected by insect net. If larvae still is a problem, Dipel is used. Against weeds, the crop is hoed two or three times, and hand weeded in between the plants.
Plastics:	For the earliest planted crop fibre cloth is used, to keep the lowest temperatures away. This is only for a small part of the area (1%)
Peat:	no
Yields and harvest method:	70% of the planted broccoli can be harvested and will yield about 350-500 g/plant. The Broccoli is cut by hand and collected on a rubber belt leading to an accompanying wagon.
Machinery	Ploughing and cultivating Egalisation Planting (fully automatic) Two times hoeing between the rows Hand weeding Tractor wagon for harvest
Irrigation	Irrigations starts when the net water evaporation is minus 20-25 mm. Normally there is irrigated 4 to 5 times a year with in average 30 mm/ha.
Alternatives/comments	Especially protamylasse is a problem, as it comes from the conventional potatoes industry. Potatoes is one of

	the most chemical using crops in Denmark, so residues will exist.
Name and position/title/function of the person filling in: tomato grower	
Region to which the information applies: Denmark	
<i>Crop</i>	<i>Greenhouse Tomatoes</i>
Propagation material	Four varieties, <i>Solanum lycopersicum</i> var. <i>Cerasiforme</i> , <i>Gemini</i> , <i>Roma</i> , <i>Sweet pea</i>
Cultivation system	In greenhouse, every year, 3,2 ha. Planting in January, plant material from Holland, 33000 plants pr. ha. Picking from April-November. Every year compost is added to greenhouse and mixed with a cultivator. Planting with 60 cm between two rows, plastic covering of soil between the rows, where water is supplied. Also drip water system is active, using collected rainwater. Plastic was introduced to prevent tomatoes mosaic virus, which spreads from emerging weed tomatoes from previous years
Fertilisation	A compost is made at the farm using organic cow manure, woodchips from deciduous trees, and grass cut. The composting process is stimulated by adding effective microorganisms. Of this compost 800 kg of N/ha is used. In addition, alfalfa pellets are used for fertilization along the year, every week. In total 200 kg N/ha is used.
Crop protection	No chemical plant protection is used against insects or fungi. Against insects, different biological natural enemies are used to fight attacks, when attacks can be noticed. Attacks seen every year: Spider mites, leaf miners, aphids. Sometimes beetle larvae. Products bought from www.Bioplant.dk Weeds in the soil with no plastic are removed in the first months, later, when the tomatoes shade for the soil there is no problem anymore. Grey mould is cut away and buried.
Plastics:	All tomatoes grow in soil covered by plastic foil 007. Plastic is used only once (unfortunately), too much work to recycle.
Peat:	no
Yields and harvest method:	Yields are dependent on variety but around 40 kg per m ² . Tomatoes are picked by hand and boxes are pulled with a chain system to the end of the greenhouse.
Machinery	Compost handling machines for turning, spreading and cultivation, tractor driven. Special designed fertilizer pellets made of Alfalfa spreading by disk coulter

Irrigation	Two types of irrigation, underneath the plastic by pipes and drip water for each plant. In total, the water consumption is 5 l per m ² per day. Water from rain fall is used in normal years this is sufficient.
Alternatives/comments	Alternatives for plastic have been called for but not found for a competing price. The virus attack has to be addressed, but when there is no danger, the plastic can be avoided. As for the grey mould and insect attacks, the co-workers are specifically trained to observe beginning attacks, to prevent the use of expensive biological control.

Name and position/title/function of the person filling in: Advisor ØRD, Advisor SEGES, consultant, advisor	
Region to which the information applies: Denmark	
<i>Crop</i>	<i>Potato for consumption</i>
Propagation material	Konsumtion:Ditta,Sava,Solist, Inova Marabel ,Carolus Starch: Kuras, Sarpo, Mira, Magnat
Cultivation system	One or two years of cereals before potatoes because this is best to prevent Rhizoctonia, if clover-grass preferable only annual ley.
Fertilisation	Oftest gødkes der med gylle økologisk/ikke økologisk. Usually slurry (better than manure) , of which the maximum amount allowed as conventional which is 50 kg NH ₄ ⁺ per ha. Fertilisation up to 110-130 kg NH ₄ ⁺ per ha. Too much N enhances Rhizoctonia. Slurry is analysed for N, P and K. Starch potatoes receive 140-150 kg NH ₄ ⁺ per ha. Soil analysis are taken. When Potassium and/or phosphorous is limited the farmers use Vinsasse, protamylasse or patentkali.
Crop protection	No chemical plant protection against blight. Some farmers (250 ha) use bio-prepare Proradix (Pseudomonas spp) against Rhizoctonia.
Plastics:	For the early spring potatoes, plastic is used for covering against frost and increasing the temperatures. Early potatoes maybe only 1% of all potatoes. The plastic is used 1-3 times
Peat:	no
Yields and harvest method:	Yields between 100 – 400 hkg/ha Growers often say 200 hkg/ha. Starch potatoes have the last 4 years had an average yield of 225 (Δ175-450) hkg/ha, with 35,7% starch. The lowest amount in the years where blight (Phytophthora) comes early, and growth is terminated early.
Machinery	In Denmark there are many stones, so usually the potato field is first cleaned for stones (put into swath and dug

	down), but sometimes removed. Hereafter ploughing of the field, two weed harrowings, two ridgings, irrigation , and picking up the potatoes. For the operations we use standard time and energy consumption
Irrigation	Irrigations starts when the net water evaporation is minus 20-25 mm. Normally there is irrigated 4 to 5 times a year with in average 30 mm/ha.
Alternatives/comments	Blight is a problem and to prevent devastating attacks, potatoes are pre-germinated, with heat boost. The laying of the potato seedlings after 1st of May is not advised. Some farmers try and prevent blight by spraying probiotica.

Name and position/title/function of the person filling in: Advisor ØRD, Consultant SEGES	
Region to which the information applies: Denmark	
<i>Crop</i>	<i>Spring Barley</i>
Propagation material	Evergreen, Laurikke, Quench
Cultivation system	Is grown in rotation with other crops, such as peas, wheat, rye, oats or potatoes. Usually 50% grass-clover on dairy farms, and 25% grass-clover on arable farms
Fertilisation	Usually slurry is used, before ploughing or after. This can be pig og dairy slurry. The amount of Nitrogen supplied is dependent on the previous crop, after grass-clover, no fertilizer is supplied, as the Nitrogen from the clover is sufficient. Usually the 50 kg of NH_4^+ comes from conventional livestock farmers, or as waste products from bone meal, (ØGRO), Potatoes starch industry (protamylasse), or yeast production (Vinasse) The use of compost from town garbage waste is being promoted, after Anaerobe fermentation. 50 kg of NH_4^+ /ha-year (Ammonium N) is the maximum allowed amount of conventional N in organic agriculture. When deficiencies are registered, Patentkali (25%K, 17%S, 6%Mg) or Manganese sulphate (32% Mn) are sprayed.
Crop protection	No chemical plant protection. Often variety mixtures are used to prevent especially fungi. Weed management when necessary with harrow, or hoe when seeded on 25 cm row. The latter is done when there is knowledge on high weed occurrence
Plastics:	no
Peat:	no
Yields and harvest method:	Yields between 20-65 hkg/ha highest yields on dairy farms, as they have high availability of Nitrogen in the

	soil and high carbon contents. Especially on clay soils the previous crop grass-clover N-value can have effect over more years, on sandy soils it wears out faster.
Machinery	Ploughing, cultivation, seeding and possible or cambridge rolling, harrowing or hoeing (2-3 times), harvest
Irrigation	On sandy soils normally 1-2 times 30 mm
Alternatives/comments	Very few growers try and avoid the conventional input of animal fertilizers, by moving green manure (grass) from one field to another. Organic manure or slurry can be hard to find.

Name and position/title/function of the person filling in: consultants	
Region to which the information applies: Denmark	
<i>Crop</i>	<i>Strawberry</i>
Propagation material	Only one grower is producing his own young plants. A few growers use certified organic frigoplants from KGL Phalaenopsis & Breeding Aps, produced in The Netherlands. Most growers ask for derogation to plant conventional, imported frigoplants. The current major cultivars are Rumba, Honeoye, Sonata, Symphony, Salsa and Malwina
Cultivation system	Open air cultivation is still the main production system. Strawberries are often cultivated in a diverse crop rotation with grain and vegetables. Mechanically weeded. Some parts of the production is tabletop in glasshouses almost all year round. Other parts are grown in polyethylen tunnels (tall enough for standing upright in them), mainly for the early market. I do not know the percentage of each system.
Fertilisation	Some manure is used in the year of planting, maybe around 80 kg N/ha. Often there is added no extra fertilizers in the following two cropping years. Some farmers though, are adding pig slurry right after cutting the top, right after harvest in early august. The level is about 30 kg N/ha/year. Normally the manure is from conventional farms, as no organic manure can be found
Crop protection	Crop protection is mainly done by cultivating only robust cultivars and having a good crop-rotation. Normally the only crop-protection agent in organic strawberries in open air in Denmark is ferriphosphate against slugs. There is no normal level for that, it is strictly connected to the amount of rain. In case of <i>Phytonemus pallidus</i> , the farmers use biological control with natural enemies.

	<p>Normally no fungicide sprays are used in strawberries in open air. No use of mineral oil.</p>
Plastics:	<p>Some (5%) growers are using black plastic-mulches to prevent weed.</p>
Peat:	<p>Normally no peat use in outdoor or tunnel production. In table-top production in greenhouses, peat is a main part of the pot-soil. They use about 5 liter/pot.. The one grower producing his own plants is using a peatmixture to root the runners.</p>
Yields and harvest method:	<p>8-12 ton/ha in average depending on the cultivar, soil, irrigation, year and harvest-method. Lowest yield in «Pick your self»-systems. In some fields and in some years, a yield about 20 T/ha is possible.</p>
Machinery	<p>Soil preparation before planting: Harrowing, harrowing, harrowing, plowing and harrowing (to wipe out perennial weed). Planting with a planting machine if in open field. In tunnels and in plastic mulch you plant by hand, but the plastic-covering is done by a machine. (bedopsætter og plastik-udlægger) Every year (during the three years of cultivation) the open-field strawberries are row-cultivated several times. Straw is spread out between the rows with a machine. The rows are cleaned with a machine (fingerhjul og radrenser) and the field is cleaned by hand 2-3 times. I suggest all these operations will take about 300 hours/ha/year, but it will vary a lot with the season and the level of weeds.</p>
Irrigation	<p>Irrigation is very relevant, and a standard in strawberry production. It is normal to use around 100 mm/year, In 2018 this was not enough. There is large difference in irrigation systems used.</p>
Alternatives/comments	<p>All Danish organic strawberry-growers are using a minimum of inputs.</p>

2.2 France's Annex I-Tables

Name and position/title/function of the person filling in:	organic horticulture advisor, Association Bio Normandie
Region to which the information applies:	Normandie
<i>Crop</i>	<i>Tomato</i>
Propagation material	Round: Paola (Cindel to a lesser extent, Matina in population but rarer) Old: very many varieties. The classics: Beef Heart, Horned Andean, Black Crimea, Bern Pink, Pineapple, Green Zebra.
Cultivation system	Under shelters (simple plastic tunnels, the most common, or multi-chapels), on diversified market garden farms for direct sale. Rotation often quite "poor" on crops under shelter: 2 to 3 years for return of Solanaceae in the same greenhouse (2 families of greenhouse summer vegetables that occupy the majority of surfaces: cucurbitaceae and Solanaceae).
Fertilisation	Cattle manure in general and when it's possible (from neighboring farms), but often difficult to spread under a greenhouse (passage of a spreader is difficult, market gardeners not often equipped with small spreaders). So spreading by hand (but tedious!) or using fertilizer in commercial caps. If bovine manure: doses around 30-40 t / ha, but often approximate dosage. If fertilizer plugs: almost always insufficient doses (because high cost). And it shows (undernourished crops)! On the whole, I observe rather lack of fertilization (stunted plants), very rarely excesses.
Crop protection:	Overall, very few products used. On tomato, only copper. But most gardeners do not use it, and agree to have mildew (leaf stripping, etc.). Those who use it are reluctant to make repeated passes and do not necessarily protect their crops throughout the season. The diversified market gardeners who cultivate tomato generally do not seek very high yields (not the primary goal). Some errors are noted for lack of information: some treat after the rain (whereas copper = preventive use). Some use the maximum dose (4 to 6 kg / ha) in a single pass, whereas fractionation at 400 g / ha is

	recommended for the first passages (in the absence of disease).
Plastics	Tomato often on woven tarpaulin (which keep about 10 years). Otherwise, plant mulch (mulch straw).
Peat	It is used for the production of seedlings (potting soil). Either purchased seedlings or self-produced on the farm. Often a mix of both: purchase of the earliest early plants, and self-production of the second series implanted later, often old varieties.
Yields and harvest method	No measurements made locally! I would say : Old varieties: 4 to 7 kg / ha Round hybrid varieties: 8 to 12 kg / ha
Machinery	Fertilization Tillage (or not in "Market gardening on living soil") Laying tarpaulins (or mulching) Planting staking Cut Irrigation Possible treatments or foliar fertilizers (purines, etc.) Harvest lifting
Irrigation	No statistical data. Watering 1 to 3 times a week in general, drip, 1 to 2 hours each time.
Alternatives/comments	Many organic market gardeners do not use inputs! Often they are limited to fertilization. But in Market gardening on living soil (more and more frequent in market garden plants), often no fertilizer inputs, but only organic matter of plant origin. A priori much less diseases and pests because the balance is created through the biological activity of the soil. As for the use of copper, it is far from systematic (I think the majority of market gardeners do not use it, but that would be to confirm ...). Copper alternatives recommended or used by market gardeners: leaf stripping (for aeration), lithothamne dusting or ash (to dry), citrus essential oils (not practiced but sometimes recommended for drying effect, type Prev B2 products), horsetail purses, comfrey juice.

Name and position/title/function of the person filling in:	organic horticulture advisors, Chambre d'Agriculture du Rhône
Region to which the information applies:	Région Auvergne – Rhône-Alpes
<i>Crop</i>	<i>tomato</i>

Propagation material	Paola, Cindel, Cobra, Estiva, Maestria, Marutschka "Old" varieties: Beef Heart, Horned Andean, Bern Pink
Cultivation system	Tunnel shelter 8m (height 3.80m) mainly Rotation with other vegetables from the range (different leaf vegetables, zucchini - cucumber, other Solanaceae (sweet pepper - aubergine, new potato), cruciferous vegetables
Fertilisation	We find a little bit of everything - A fresh manure base (30 to 50 T / ha / year) or manure compost (20 to 25T / ha / year) - A supplement in basic manure with a commercially complete organic fertilizer type 6.3.12 (1 to 3 T / ha or 80 to 100 uN / ha) or only Nitrogen with feather flour or pork silk or blood meal at the same level of intake of Nitrogen. - Sometimes a complement K (potassium) and Mg (patenkali) or only K - Sometimes cover manure in solid (complete fertilizer or nitrogen fertilizer) at a rate of 30 to 50 u N / intake, 1 to 3 intakes - Some cases of liquid cover manure (beet vinasse)
Crop protection:	Fungal protection essentially based on copper: - Preventing copper sulphate (Bordelaise porridge at 5 kg / ha), 0 to 3 applications between planting and early harvest. - "Curative" if observation of symptoms (mildew, cladosporiosis, botrytis, alternaria) with copper hydroxide (Kocide 35 at 3.5 kg / ha or Nordox at 1.6 kg / ha), 0 to 4 applications - No use of paraffin oil - Sulfur only if powdery mildew symptoms, or in case of spider mite attack (Thiovit 7.5kg / ha) Very rare insecticidal protection (biological control by auxiliaries), use of Bacillus Thuringiensis against fruit moth (elicoverpa) and Tuta absoluta. In the latter case, when the attack is successful, 1 treatment is done every 7 to 14 days alternating strain kustaki and strain aizawai
Plastics	- Tunnel cover (PE 200µ) - Mulching with either PE 20µ or degradable plastic or Canvas above ground 130 g / m ² . Covered area of the order of 60 to 90%.
Peat	Yes for the production of plants. The vast majority of plants are bought by market gardeners from producers of specialized plants using commercial organic potting soil.
Yields and harvest method	Very variable but an average of 10 - 12 kg / m ²

Machinery	Soil preparation Pose drip Mulching Planting trimming and trellising Harvests twice a week between late June and mid October.no references on time or energy consumption
Irrigation	From planting to final harvest : 4800 m ³ / ha (about 220 l / plant)
Alternatives/comments	Few original practices in tomato under shelter at market gardeners. The ones that exist are: <ul style="list-style-type: none"> - Cultivation without plastic mulching, straw cover - Plastic mulching only on the cultivated strip and dwarf clover seedlings between strips - Copper: use of foliar fertilizer based on copper gluconate (low dose of copper) - Biological control against <i>Tuta basoluta</i> with predatory bug <i>Macrolophus pigmaeus</i> maintained during the winter on calendula at the foot of the tunnel arches. - Fertilization: In our systems we find more often problems of under-fertilization with crops that are hungry, because of infertile soils and fertilization only before planting.

Name and position/title/function of the person filling in:	organic horticulture advisor, Bio Centre
Region to which the information applies:	Centre - Val de Loire, France
<i>Crop</i>	<i>Aubergine (eggplant)</i>
Propagation material	between 5000m ² and 6 ha, diversified market gardening, mainly for direct sale.
Cultivation system	Many varieties used: Falcon, Shakira, Black Beauty, Rosa Bianca, Clara...
Fertilisation	In majority: under cold tunnel (about 2.40 m height) More rarely: in the open field In rotation with all other greenhouse crops: spinach, lamb's lettuce, salad, Chinese cabbage, tomato, cucumber + green manures in some cases (sorghum for example)
Crop protection:	Fertilizers: composted manure (not from the farm), green waste compost (not from the farm), organic fertilizers in cork. Quantities brought are very variable. Composts origin : Organic farms if possible but there's few organic farms in this region...

Plastics	Biological protection often used against mites and aphids (Biological control with living organisms: introduction of crop aids, bought from groups like Koppert or Biobest, and / or establishment of plants that attract natural auxiliaries (flowers ...)); Black soap against mites and aphids; Very rarely: sulfur against mites.
Peat	Soil mulching: Very often: woven fabric A little less often: plastic mulching (often biodegradable) A little less often: bare, no mulching used
Yields and harvest method	In the nursery (it seems to me that potting soil contains mostly peat) to make the seedlings.
Machinery	40t/ha/year
Irrigation	Tillage and preparation of the board: often at the tiller or using hand tools Plantation: manual Culture maintenance: pruning and trellising: manual Harvesting: manual Picking up: manual
Alternatives/comments	Necessarily irrigated plants
<i>Crop</i>	The use of green manures is developing in greenhouse , to create a maximum of biomass and to enrich the soil.

Name and position/title/function of the person filling in:	GRAB
Region to which the information applies:	Sud of France
<i>Crop</i>	<i>Olive tree</i>
Propagation material	Aglandau, Picholine, Salonenque
Cultivation system	In field
Fertilisation	Commercial organic fertilizers brought in the spring.
Crop protection:	Clay or Spinosad on fly Copper on peacock's eye, 2 to 3 applications / year
Plastics	
Peat	Used in nursery «one of the weak points is the production of seedlings in the nursery which requires a lot of water and nitrogen, as well as other elements and synthetic hormones for rhizogenesis”
Yields and harvest method	
Machinery	
Irrigation	

Alternatives/comments	In biodynamy : Michel Faure 0475262827 Plants companions of the olive tree to maintain auxiliaries near the orchards
Name and position/title/function of the person filling in:	ITAB (Technical institut in organic farming)
Region to which the information applies:	France
<i>Crop</i>	<i>Tomato</i>
Propagation material	<p>Many varieties are available. Essentially F1 hybrids of indeterminate varieties (under shelter) and determined (full field, for industry, limited to South East of France). <i>Undetermined varieties = varieties that can grow indefinitely, up to several meters long (15-20 bunches of fruit can be harvested); Specific varieties, used rather in the open field, have a bushy habit and limited growth at 6-8 bouquets.</i></p> <p>There is a large segmentation (shapes, color, caliber ...) especially since the renewal of the "old" varieties for which there are now F1 hybrid versions.</p>
Cultivation system	<p>Culture under shelter (tunnels in market gardening/horticulture, multichapelles plastic and some glass greenhouses). Variable height from 2m50 to more than 6m (8 in the new "cathedrals" recommended by the builders for reasons of climate management.</p> <p>Simple rotation (even simplistic): until recently there were tomatoes every year in greenhouses, with a winter crop between 2 tomatoes (in the best case). Otherwise, the basic rotation was tomato (year 1), green manure or winter vegetable (lamb's lettuce, salad, spinach) or nothing, cucumber (year 2), green manure or winter vegetable or nothing ... and back tomato. The tightening of rotational regulations will encourage farmers to more diversify their rotations (at least towards tomato-cucumber rotation above), or even to lengthen it by including green manures. Ideally it would take at least 4 years between 2 tomato crops.</p> <p>No culture under cover (= no implantation of tomato in a vegetal cover or in a vegetable mulch).</p> <p>In open fields, the rotations are more extensives.</p>
Fertilisation	<p>Before planting, Amendment and fertilization are brought: fertilizer / manure or farm compost if available - 30 to 40 T / ha; otherwise fertilizer in commercial cork + catch-up "minerals" with Patenkali 200-300kg / ha or</p>

	<p>natural phosphates depending on soil tests and needs of the plant.</p> <p>It exist a fertilization of "catch-up" during cultivation for long summer crops (liquid fertilizer via the drip system) or fertilization at the foot of each plant. The first system is very (too) close to the conventional ferti-irrigation, even if it is organic fertilizers that are used (from the trade: beet vinasse, seaweed fertilizer, etc). The quantity depends on the expected yield, the desired culture time...</p>
Crop protection:	<p>Biological control and the use of bumblebees are almost systematic in undercover cultivation.</p> <p>There are few phytosanitary interventions (except mildew, in this case copper use but in very small doses). Sulfur is sometimes used sparingly against mites and powdery mildew (but with a deleterious effect on pollinators and greenhouse plastic).</p> <p>In the field, the problem is close to the potato concerning mildew.</p>
Plastics	<p>Plastic is used in "mass": for blankets of greenhouses (more and more multichapelles are besides double inflatable wall). The service life is variable (3-10 years depending on the initial quality of the plastic, the region, the sunshine, the bleaching of greenhouses or not in summer, and the use or not of sulfur). Soil mulching is not systematic, but widespread (with polyethylene or polypropylene, varying in thickness depending on the type of mulching).</p>
Peat	<p>The use is mandatory for the production of seedlings.</p> <p>The clumps used are squares of 7 or 8 cm on the side.</p> <p>The potting soil is composed mostly of peat (90-95% in conventional potting soil).</p> <p>For information, we make about 150 tomatoes plants with 70L of potting soil.</p> <p>The search for alternatives is underway at potting manufacturers and at some experimental stations.</p> <p>Private specifications (especially for export to Switzerland) impose potting soil with less than 70% peat.</p>
Yields and harvest method	<p>In a lambda market gardener, around 10-15kg / m², in red round tomato / bunch with modern varieties over 3 months of production.</p> <p>In intensive system, up to 40 kg / m² (for info, 70 to 80kg in conventional), over 5 months.</p>
Machinery	<ul style="list-style-type: none"> - Decompaction of the soil (heavy cultivator), - Amendment, fertilization - Soil preparation (eg rotobeach)

	<ul style="list-style-type: none"> - Preparation of boards (cultirateau, cultibutte) - Planting and pallissage manuals - Regular manual maintenance (suckering, thinning, trellising/palissage, harvesting) - Grubbing
Irrigation	From 20 cL (centiliters) per plant (beginning of cycle) per day to 3-4 cL depending on the stage and the region. Reduction possible (to have tomatoes more tasty ...) or not (to extend harvests ...). Quite variable depending on the regions. Watering drip under shelter, sprinkling in the field (hence the worries of late blight/mildew).
Alternatives/comments	See potato for full field Alternative to plastic for greenhouses: glass, but the cost of a glass greenhouse is 3 times higher than that of a plastic greenhouse ...

Name and position/title/function of the person filling in:	ITAB (Technical institut in organic farming)
Region to which the information applies:	France
<i>Crop</i>	<i>Salads</i>
Propagation material	Too frequent renewal of the ranges to give names of variety (lifespan of 3 to 5 years max). Very segmented range (lettuce, oak leaf, batavia...). Focus on Bremia resistance and aphids.
Cultivation system	All systems exist. Very intensive rotations, especially under shelter in the south: rotation with melon, then 3 salads, then melon again... with problem of fatigue of soil, diseases (sclerotinia), ...
Fertilisation	Use of green fertilizers recommended, to fight against the soil's fatigue and certain pests. Fertilisation dependent on the production season and full field / shelter. Organic background fertilisation usually suffices. No fertilisation is dedicated to the salad, the excess of nitrogen being often detrimental.
Crop protection:	Very frequent soil mulching in organic farming. The pest control is limited (the products damage the foliage, hardly reach the pests ...) Sometimes a little copper (in foliar fertilizer because no AMM copper on bremia lettuce) !!! Or SDN (stimulator of natural defenses). Little effect. In general, diseased cultures are destroyed because the

	market does not accept any defect (0 aphids, no blight due to mildew).
Plastics	Greenhouse cover, forcing sail for early and late crops, mulching (almost systematic, except summer).
Peat	For plant production (see Argumentation for tomato). About 1000 lettuce plants with 70 L of potting soil.
Yields and harvest method	40-60 T / ha, on several successive series (40-60T for the first series, but 2 or 3 series could follow one another).
Machinery	<ul style="list-style-type: none"> • Floor preparation, • Mulching, • Planting (manual or mechanical depending on the material available and the presence or absence of mulching), • Manual harvest
Irrigation	Very variable. Soil necessarily full of water at the plantation, then rational irrigation (in the morning).
Alternatives/comments	SDN (stimulator of natural defenses) to fight against fungal diseases and aphids. Few results in deux national French research projects (Casdar 4P and Casdar HE projects). Surely things to dig further...

Name and position/title/function of the person filling in:	ITAB (Technical institut in organic farming)
Region to which the information applies:	France
<i>Crop</i>	patatoes
Propagation material	Allians, Nicola, Ditta, Agata, (Charlotte, Bintje, Ostara : these 3 varieties are "references" known to consumers, and demanded by the distribution. They are produced in AB, but less and less because they are not adapted (average resistance to mildew).) Huge varietal range in potatoes (more than 600 varieties in Europe, with a maximum of around 50 used in AB and available in organic plants, the varieties used and those available in organic plants are not necessarily the same ...). Very segmented range (depending on the use of the potato), but the organic market is mainly based on varieties "firm flesh" (French specificity).
Cultivation system	In general, field cultivation, on large surfaces. It exists limited greenhouse culture for early production, on very small surfaces.

	<p>Rotations are very variable depending on the region and on the production system (vegetable / market gardener), but the potato is usually at the head of rotation.</p> <p>It's implanted after meadow or after cereal + green manure in field system. It's implanted after vegetables + green fertilizer in horticulture, or after vegetable + other vegetable ...</p>
Fertilisation	<p>Fertilization before the crop, no catch-up during cultivation.</p> <p>It's done according to the previous. If necessary, manure is bring on plowed soil (preferred a composted manure) at the rate of 15-30 tons per ha.</p> <p>In general, it's bring in spring, before planting (March / April).</p>
Crop protection:	<p>Main problem = mildew (late blight) = Phytophthora infestans.</p> <p>Unique means of struggle = Copper in different formulations (sulfate, hydroxide, oxide, oxychloride ...).</p> <p>Low application rates at the beginning of the season (200-300 g of Cu metal per hectare per passage), reaching 500 or 600 under high pressure, taking care to respect the maximum dose of 6 kg / ha / year) .</p> <p>According to Esco Copper sorite early 2018: these doses are sufficient in most areas ... except in coastal areas, with high hygrometry. However, more than half of the potato production is centered in the Brittany and Haut de France regions, which receive a lot of rain, and then where these doses are insufficient, and the alternatives are not efficient enough.</p>
Plastics	<p>No plastic on potatoes (excepted for early crop that can be made punctually under cover, or in the field under polyethylene mulch = cultivation with mulch placed on the ground).</p>
Peat	<p>Never for potato</p>
Yields and harvest method	<p>Yields: 15 to 25 T / ha, depending on the varieties and regions.</p> <p>Very strong regional and annual variations, depending on the climatic conditions and the pressure of mildew, and of course on the variety used.</p>
Machinery	<p>In "intensive" system (which represents more and more important volumes):</p> <ul style="list-style-type: none"> - Labor, Fertilization, - Billonnage (formation of mounds, with very deep furrows), - Stone removal (removal of pebbles in the mound, and burial in the furrows),

	<ul style="list-style-type: none"> - Fine preparation of the mound, - Plantation, - Hedges and possible weeding, - Fungicidal organic treatments (rarer insecticides), - Topkill (grinding, burning), - Pulling. <p>In more classical system:</p> <ul style="list-style-type: none"> - Plowing, fertilization, - Soil preparation, - Plantation, - Successive burrowing and ridging, - Fungicidal treatment (and insecticides if necessary), - topkill, - Harvest. <p>Patatoes are culture that requires a lot of interventions, with very heavy equipment, with important consequences on the ground (beyond the use of contentious inputs).</p>
Irrigation	<p>Irrigation is limited to the least watered areas (central region, southern Hauts de France) and / or periods of drought.</p> <p>In 2018, yields were very strongly impacted by drought because irrigation is not possible or not planned everywhere (for example in Brittany or in Hauts de France).</p>
Alternatives/comments	<p>No interesting alternative practices in "fight" against pests / diseases.</p> <p>The main levers concern:</p> <ul style="list-style-type: none"> - The plant material (use adapted varieties, tolerant to diseases, and corresponding to the expectations of the market) => need to work on the selection, - The use of Decision Aid Tools to optimize the use of inputs.

Name and position/title/function of the person filling in:	ITAB (Technical institut in organic farming)
Region to which the information applies:	France
<i>Crop</i>	<i>Carot</i>
Propagation material	Hybrid varieties essentially (Maestro, in particular). Not necessarily available in organic seeds.
Cultivation system	Open-field cultivation for early cultivation (summer-fall harvest) and conservation (fall winter harvest). Production under shelter for early crops (spring harvest, in boots, exclusively). Culture in small tunnel or

	greenhouse (see description tomato sheet), according to producers. No culture under cover. Rotation of about 5-6 years, between vegetable crops. Very variable from one producer to another.
Fertilisation	Amendment or farm fertilization if available (preferred composted products). Otherwise commercial plug fertilizer. To be done in 1 month or 1 month and a half before sowing No fertilization in culture.
Crop protection:	Preparation of soil and false seeding. Burning to control weeds. Systematic sails to fight the carrot fly. Manual weeding is almost always obligatory, in addition to mechanical hoeing. No treatment in cultivation.
Plastics	Insect protection veils.
Peat	No
Yields and harvest method	30 T / ha in market garden system (horticulture); up to 60 in specialized production.
Machinery	Plowing, fine preparation of the soil, False seeding, Pre-emergent burn, Antiinsect veiling, Successive bins (mechanical or manual), Picking up (manual or mechanical).
Irrigation	Regular needs (emergence then growth phase) but variable depending on the region, soil, climate.
Alternatives/comments	GAEC Pierrepont (Lessay, 50) One of the biggest producers of organic carrots in France Use no or very few sails to fight the fly

Name and position/title/function of the person filling in:	organic horticulture technician – FRAB AuRA
Region to which the information applies:	Auvergne (France) – groupe of around 100 organic gardeners
<i>Crop</i>	<i>Tomato</i>
Propagation material	Old varieties (many cultivars populations mainly) + some modern (the most used: Paola, Estiva, Cindel, Previa).
Cultivation system	Mainly under unheated tunnel, in the ground. In a very diversified system (rotation of about 3-4 years).

Fertilisation	Fertilization is based on compost mainly dehydrated commercial pellets (some gardeners use farm compost), often supplemented with commercial organic fertilizer and sometimes mineral (potassium in particular). Most of the inputs are brought before planting.
Crop protection:	Copper is used by a minority of market gardeners (less than 1 or 2 in the group). It is used sometimes as a preventive but especially as soon as the first symptoms of diseases appear. Some gardeners use herbal preparations (decoctions, nettle maceration, comfrey, horsetail, etc.) as plant stimulant (phytostimulants). Some apply biodynamic preparations.
Plastics	Greenhouses are almost exclusively made with plastic (only 1 market gardener on the hundred Auvergnat gardeners is equipped with glass greenhouses). 2 to 3 market gardeners use plastic mulch, mainly 130 g woven fabric.
Peat	Peat is used for the production of seedlings.
Yields and harvest method	Average of 10 kg / m ² (= 100 t / ha) but very variable depending on the variety and production conditions.
Machinery	<ul style="list-style-type: none"> • Preparation of the soil: usually tractor, sometimes tiller. • Establishment of irrigation (mostly drip), • Planting, • pruning, • trellising, • treatments, • harvesting: exclusively manual
Irrigation	Data not available
Alternatives/comments	Use of self-made herbal preparations to enhance the resistance of culture to diseases: <ul style="list-style-type: none"> - In foliar pulverization: Corinne Pigeard in Viscomtat (63). - In contribution to the soil via irrigation: Marie-Claude Patiès-Moncelon in Beaune d'Allier (03).

Name and position/title/function of the person filling in:	vegetables and soft fruits producer /horticulture teacher
Region to which the information applies:	Clermont Ferrand/Auvergne/France:
<i>Crop</i>	Strawberries, tomatoes, potatoes and squash, and Herbs
Propagation material	Mainly Charlotte, but also Mara des bois and Garigette.

Cultivation system	Cultivation in soil, light and sandy, rich in organic matter. My field is located along a brook. Continental climate, fairly mild springs and dry summers. Winters can be harsh. No protection at all for small fruits. Insect proof used for leeks, carrots, and cabbage though. 1m high tunnels.
Fertilisation	I essentially use horse manure collected in a farm nearby. Mainly horse dung and few straw, and I can also collect grass when I cut it on my field. I apply the two around may and july, on layers on pathways. I dont have a precise quantity used as I use plants as indicators of the fertility. If nothing is needed, I dont apply. I'm correctingt fertilisation depending on the crop (tomatoes and cucurbits greedy for instance). No commercial fertiliser is applid. Ashes sometimes, after potatoes, or before garlic. Calcium applied every two years.
Crop protection:	I dont use any crop protection. Baking soda two to three times on tomatoes in spring. No copper, no oils, no sulfur. I have pests sometimes and accept them. It's a part of my commercial success, as my customers don't have any doubt about my methods. I can sell with a higher price.
Plastics	No plastic mulch used yet. However, as I used them while teaching at Marmilhat (the school), I got the impression that it can improve weeding greatly, and I'm thinking about buying few rolls to try them on my farm, for strawberries at first, and maybe for squash also. I have a tiny tunnel for melons and sweet potatoes, 30 square meters, bought three years ago. I use a lot of plastic pots. They are 100% recycled as I got them from a horticulturist nearby. I got thousands of them, only used once.
Peat	I buy professionnall substrat (floragard) to start my tomatoes and herbs. It contains peat. Its exceptionnal quality helps me to keep my plants in containers for weeks. I heard recently that this brand is about to stop being sold, as peat starts to be criticized in sourcing. I buy ten 70 liters bags a year.
Yields and harvest method	I never estimated my production. 100 square meters yield 12 kilograms of strawberries every week during a month. Its about a ton per hectare.
Machinery	Water pump and cultivator. 50 liters gazoil every year. Water pump used four hours every week in summer, cultivator ten hours in spring.

Irrigation	My half hectare field receives 10 cubic meters of water every week in full summer. Its extremely low, as I try to maintain path covered and plants in good condition, but not soaked. The brook along my field is weak every end of summer. I take great care to pump water when its possible and not as severe lows.
Alternatives/comments	I think I'm one of the most carefull growers regarding plastic, or peat used. I'm working on a total less than an hectare, and my results are not enough to live only on that activity. I teach also, which help financially. I don't want to have impacts on environment if money is only the goal. My activity provides me with satisfaction, one of the most important is sustainability.

2.3 Germany's Annex I-Tables

Country:	Germany
Region referred to:	Ba-Wü, Donau, Schwäbische Alb
Approximate nr. of farms that you consult:	50
Farm type(s):	[90%] Arable farming/mixed farming [] Vegetable [10%] Fodder [] Fruits [] Wine
Most important crops across all farms that you consult:	Cereals, Fodder
Region: Ba-Wü, Donau, Schwäbische Alb	
Crop	<i>Cereal</i>
Propagation material	
Which varieties are dominating?	Varieties from own farm, from organic breeders, Exceptions: when no or not enough seeds are available
Fertilization	
What is the most relevant fertilization on the farms?	Slurry, farm yard manure, compost, purchased fertilizer
How relevant is the purchase of commercial fertilizers? Which fertilizers are bought?	Minor lime, sulfur
How relevant is the purchase of fertilizers from conventional farms?	sometimes farm yard manure
Give reasons for the purchase of fertilizers from conventional farms	Arable farming, not much livestock, yield increase
Plant protection	
What are the major diseases and pests for this crop? What are the problems of the farmers in this context?	Plant louse, cereal leaf beetles (<i>Oulema melanopus</i>), fungal disease, mice
How relevant is the use of copper, sulfur and/or mineral oil?	Not relevant
In your experience, what are the most successful strategies to avoid these inputs?	variety, crop rotation
Which alternative do you NOT recommend?	
Plastic mulch	
How relevant is the use of plastic mulch?	(regarding horticulture)
In your experience, what are the most successful strategies to avoid these inputs?	
Which alternative(s) do you NOT recommend?	
Yield	
Please give the mean yield of this crop (in t/ha)	

Peat	<i>(regarding horticulture)</i>
How relevant is the use of peat for this crop? At which point during the vegetation period it used?	
In your experience, what are the most successful strategies to avoid these inputs?	
Which alternative(s) do you NOT recommend?	
Irrigation	
Is irrigation typically used for this crop?	<input type="checkbox"/> Yes <input type="checkbox"/> NO
Comments	

Country:	Germany
Region referred to:	Ba-Wü, Nordwürttemberg (Hohenlohe)
Approximate nr. of farms that you consult:	100
Farm type(s):	<input checked="" type="checkbox"/> Arable farming/mixed farming <input type="checkbox"/> Vegetable <input checked="" type="checkbox"/> Fodder <input type="checkbox"/> Fruits <input type="checkbox"/> Wine
Most important crops across all farms that you consult:	Cereal, potato, fodder (arable and grasland)
Region:	
Crop	<i>Winter wheat</i>
Propagation material	Ecological
Which varieties are dominating?	Conventional breedings are progressively replaced by organic breedings like: Butaro, Wiwa...
Fertilization	
What is the most relevant fertilization on the farms?	Farm fertilizer (cattle slurry, manure) and lime
How relevant is the purchase of commercial fertilizers? Which fertilizers are bought?	No relevance
How relevant is the purchase of fertilizers from conventional farms?	No relevance
Give reasons for the purchase of fertilizers from conventional farms	
Plant protection	
What are the major diseases and pests for this crop? What are the problems of the farmers in this context?	Bunt (Tilletia), yellow rust (due to different varieties less and less a problem), in some years brown rust
How relevant is the use of copper, sulfur and/or mineral oil? Give approximate amount per area (e.g. kg/ha)	Not relevant
In your experience, what are the most successful strategies to avoid these inputs?	Resistent varieties, increase of humus, examination of following crop regarding bunt spores, possible

	dressing with Tillecur or purchase of Z-seeds
Which alternative do you NOT recommend?	
Plastic mulch	<i>(Regarding horticulture)</i>
How relevant is the use of plastic mulch?	
In your experience, what are the most successful strategies to avoid these inputs?	
Which alternative(s) do you NOT recommend?	
Yield	
Please give the mean yield of this crop (in t/ha)	3-5 t/ha
Peat	<i>(Regarding horticulture)</i>
How relevant is the use of peat for this crop? At which point during the vegetation period it used?	
In your experience, what are the most successful strategies to avoid these inputs?	
Which alternative(s) do you NOT recommend?	
Irrigation	
Is irrigation typically used for this crop?	[] Yes [X] NO
Comments	

Questionnaire for advisors

Country:	Germany
Region referred to:	Ba-Wü, Nordwürttemberg (Hohenlohe)
Approximate nr. of farms that you consult:	100
Farm type(s):	[x] Arable farming/mixed farming [] Vegetable [x] Fodder [] Fruits [] Wine
Most important crops across all farms that you consult:	Cereal, potato, fodder (arable and grasland)
Region:	
Crop	<i>Potatoes</i>
Propagation material	Ecological
Which varieties are dominating?	Only conventional breedings like: Agria, Ditta, Marena, Melina, Nicola, Annabelle, Rosara, Belana, Allians.....
Fertilization	
What is the most relevant fertilization on the farms?	Farm fertilizer (cattle slurry, manure), lime and phosphorus
How relevant is the purchase of commercial fertilizers? Which fertilizers are bought?	Relatively low. Depending on soil analysis, lime, phosphorus and micronutrients are bought.

How relevant is the purchase of fertilizers from conventional farms?	No relevance
Give reasons for the purchase of fertilizers from conventional farms	
Plant protection	
What are the major diseases and pests for this crop? What are the problems of the farmers in this context?	Late blight, wire worm, potato beetle, rhizoctonia. Late blight comes first, then comes the wire worm. Rhizoctonia is manageable and against potato beetle Novodor and Neem is used.
How relevant is the use of copper, sulfur and/or mineral oil? Give approximate amount per area (e.g. kg/ha)	With demeter, copper is not allowed for potatoes. Some farms would use it if legal.
In your experience, what are the most successful strategies to avoid these inputs?	Wide crop rotation, varieties, increase of humus
Which alternative do you NOT recommend?	
Plastic mulch	<i>(Regarding horticulture)</i>
How relevant is the use of plastic mulch?	
In your experience, what are the most successful strategies to avoid these inputs?	
Which alternative(s) do you NOT recommend?	
Yield	
Please give the mean yield of this crop (in t/ha)	15-35 t/ha
Peat	<i>(Regarding horticulture)</i>
How relevant is the use of peat for this crop? At which point during the vegetation period it used?	
In your experience, what are the most successful strategies to avoid these inputs?	
Which alternative(s) do you NOT recommend?	
Irrigation	
Is irrigation typically used for this crop?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> NO

Country:	Germany
Region referred to:	Ba-Wü, Nordwürttemberg (Hohenlohe)
Approximate nr. of farms that you consult:	100
Farm type(s):	<input checked="" type="checkbox"/> Arable farming/mixed farming <input type="checkbox"/> Vegetable <input checked="" type="checkbox"/> Fodder <input type="checkbox"/> Fruits <input type="checkbox"/> Wine
Most important crops across all farms that you consult:	Cereal, potato, fodder (arable and grasland)
Region:	

Crop	<i>Potatoes</i>
Propagation material	Ecological
Which varieties are dominating?	Only conventional breedings like: Agria, Ditta, Marena, Melina, Nicola, Annabelle, Rosara, Belana, Allians.....
Fertilization	
What is the most relevant fertilization on the farms?	Farm fertilizer (cattle slurry, manure), lime and phosphorus
How relevant is the purchase of commercial fertilizers? Which fertilizers are bought?	Relatively low. Depending on soil analysis, lime, phosphorus and micronutrients are bought.
How relevant is the purchase of fertilizers from conventional farms?	No relevance
Give reasons for the purchase of fertilizers from conventional farms	
Plant protection	
What are the major diseases and pests for this crop? What are the problems of the farmers in this context?	Late blight, wire worm, potato beetle, rhizoctonia. Late blight comes first, then comes the wire worm. Rhizoctonia is manageable and against potato beetle Novodor and Neem is used.
How relevant is the use of copper, sulfur and/or mineral oil? Give approximate amount per area (e.g. kg/ha)	With demeter, copper is not allowed for potatoes. Some farms would use it if legal.
In your experience, what are the most successful strategies to avoid these inputs?	Wide crop rotation, varieties, increase of humus
Which alternative do you NOT recommend?	
Plastic mulch	<i>(Regarding horticulture)</i>
How relevant is the use of plastic mulch?	
In your experience, what are the most successful strategies to avoid these inputs?	
Which alternative(s) do you NOT recommend?	
Yield	
Please give the mean yield of this crop (in t/ha)	15-35 t/ha
Peat	<i>(Regarding horticulture)</i>
How relevant is the use of peat for this crop? At which point during the vegetation period it used?	
In your experience, what are the most successful strategies to avoid these inputs?	
Which alternative(s) do you NOT recommend?	
Irrigation	
Is irrigation typically used for this crop?	[] Yes [X] NO
Comments	

Country:	Germany
Region referred to:	Ba-Wü, Bodensee
Approximate nr. of farms that you consult:	40
Farm type(s):	[] Arable farming/mixed farming [x] Vegetable [] Fodder [] Fruits [] Wine
Most important crops across all farms that you consult:	Under glas: Cucumber, Tomato, Paprika, Field: Cabbage, Cellerie, Salat
Region: BaWü, Bodensee	
Crop	<i>Tomato in greenhouse (no german field tomatoes in organic farming!)</i>
Propagation material	
Which varieties are dominating?	Roterno, Lyterno, Agro, Baylee, Tica, several others
Fertilization	
What is the most relevant fertilization on the farms?	Purchased fertilizer: Horn dung, Maltaflor, Florapell. and other manure compost
How relevant is the purchase of commercial fertilizers? Which fertilizers are bought?	Highly relevant in greenhouse. In organic farming there is practically no organic certified fertilizer available for purchase!
How relevant is the purchase of fertilizers from conventional farms?	Relevant to some extend for horse manure, farm yard manure with farms that do not have own manure and Cooperation.
Give reasons for the purchase of fertilizers from conventional farms	No bio-manure readily available in this region, Phosphorus amounts in soil to high
Plant protection	
What are the major diseases and pests for this crop? What are the problems of the farmers in this context?	White fly, red spider mite, phytophthora
How relevant is the use of copper, sulfur and/or mineral oil? Give approximate amount per area (e.g. kg/ha)	Not that relevant. Most likely sulfur against red spider mite. But it is not used by the mentioned farms.
In your experience, what are the most successful strategies to avoid these inputs?	Use of beneficials against white fly and res spider mite. Climate regulation and stock maintenance with phytophthora, planning to end crop when pathogen is appearing.
Which alternative do you NOT recommend?	
Plastic mulch	<i>(Regarding horticulture)</i>

How relevant is the use of plastic mulch?	Not much
In your experience, what are the most successful strategies to avoid these inputs?	In greenhouses they use more mulch. It increases soil moisture, suppresses weed, supports soil fauna through a steady input of nutrients as well as their turnover.
Which alternative(s) do you NOT recommend?	
Yield	
Please give the mean yield of this crop (in t/ha)	It varies extremely with farms. It depends on the use of heat and if planting is done earlier. Direct marketing farms may have 15-25kg/m ²
Peat	<i>(Regarding horticulture)</i>
How relevant is the use of peat for this crop? At which point during the vegetation period it used?	Very relevant for operations producing seedlings. In bigger tomato growers buy the seedlings. Some smaller tomato growers produce seedlings themselves and do not use peat.
In your experience, what are the most successful strategies to avoid these inputs?	Own seedling production with own soil mixture. Soil can be mixed from several individual ingredients (Partially with coconut fibre). Due to holiday season the plant growers did not give details on their mixtures yet.
Which alternative(s) do you NOT recommend?	
Irrigation	
Is irrigation typically used for this crop?	[x] Yes [] NO
Comments	

Country:			
Farm size:	Total	Arable	Grassland
	6,69ha 6.69 ha	1 ha	5,69 ha 6.59 ha
Livestock:	Animal	Nr. of animals	
Crops:	Vegetables, grass-clover, meadow		
Typical crop rotation on the farm(s)	1) Cabbage		
	2) Fruit		
	3) Root/Leaf		
Region: North Rhine Westfalia (Detmold)			
Crop			
Propagation material			

Which varieties are dominating?	Vegetables: In the field and greenhouse
Fertilization	
Please describe along the growing period, the application time (month/season) and quantity (per application and unit land area) of fertilisers from the farm itself, and any commercial fertilisers used	Winter/spring time Approx. 30 t composted conventional horse manure, received for free from the neighbor, about one third on the arable land, two thirds on the grassland From time to time horn shavings on leek and cabbage (in the field)
If no additional fertilizer is bought, give reasons why	-
Plant protection	
What are the major diseases and pests for this crop? What are your problems?	Cabbage fly, lice (in the field), spider mite (greenhouse)
Do you use copper, sulfur and/or mineral oil? If yes: Please give amount (e.g. kg/ha)	No
If no copper, sulfur and/or mineral oil is used: What are your strategies? If alternative inputs are used: Please give amount (e.g. kg/ha)	
What is your experience with the strategy? Is improvement needed?	-
Have you tested other strategies? How did they work?	-
Plastic	
Is plastic of any kind used at any time during the vegetation period? (Mulch, cover, tunnel, etc. NOT packing material)	3 foil tunnels - Coverage soil during growing period at greenhouse cultures and cultures of foil house tomato, cucumber, egg plant, pepper, zucchini (outdoors) as suppression of wild herbs - cultivation protection nets for cabbage fly etc. (in the field)
If no: What is your alternative for the use of plastic?	-
What is your experience with the strategy? Is improvement needed?	Very good, unfortunately necessary, viz. now with advanced age, for health reason and because there is neither money nor time to weed everything every 1 to 2 weeks like in the past.

Have you tested other strategies? How did they work?	-
Peat	
Is peat used at any point of the production chain? If yes: Please give estimated peat amount used per area	- for seedling cultivation - about 2.500 liters per year (field and (pre-) breeding greenhouses)
If no: What is your alternative for the use of peat?	-
What is your experience with the strategy? Is improvement needed?	- good - better an alternative without or with fewer peat
Have you tested other strategies? How did they work?	For many years produced own soil for cultivation with foliage components, a lot of wild herbs if you do not want to steam. Too time consuming now for reasons of health and time
Yield	
Please give the mean yield for this crop (in t/ha)	
Irrigation	
Is irrigation used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> NO

2.4 Greece's Annex I-Tables

Name and position/title/function of the person filling in: TECHNICAL ADVISOR	
Region to which the information applies: Greece	
<i>Crop</i>	<i>Broccoli (open field)</i>
Propagation material	1) Parthenon 2) Naxos
Cultivation system:	Open field soil. Crop rotation with zucchini. The irrigation system is drip irrigation.
Fertilisation:	Before planting: All organic fertilisers 125 kg/1000 m ² POLYSULPHATE (48%S, 14%K ₂ O, 6%Mg, 17%Ca) 120 kg/1000 m ² BIOILSA (11%N) 30 kg/1000 m ² NEOGEN (chicken manure) https://www.kipoefodia.gr/neogen-%CE%B2%CE%B9%CE%BF%CE%BB%CE%BF%CE%B3%CE%B9%CE%BA%CE%BF-%CE%B5%CE%B4%CE%B1%CF%86%CE%BF%CE%B2%CE%B5%CE%BB%CF%84%CE%B9%CF%89%CF%84%CE%B9%CE%BA%CE%BF-p-425.html During the growing period: All organic fertilisers 5 lit/1000 m ² BETABIO FULL (3%N, 4%P, 3%K) fertigation every 7 days 5 L/1000 m ² AZOMIN (4%N, organic N) fertigation every 7 days.
Crop protection:	Cooper 1.5 kg/ha
Plastics:	No
Peat:	No
Yields and harvest method:	Harvest by hand. 9,000-11,600 kg/ha
Machinery:	Ploughing once per year Rotary tiller before planting
Irrigation	Drip irrigation: 3-6 cm ³ per 1000 m ² depending on the growing stage of the plant
Alternatives/comments:	Nature Breaker (Pyrethrins): 2 applications every 7-10 days dose: 0.6 kg/ha Bactospeine (<i>Bacillus thuringiensis</i> subsp kurstaki): 6-8 applications every 7-10 days dose: 1 kg /ha

Name and position/title/function of the person filling in: TECHNICAL ADVISOR	
Region to which the information applies: GREECE	
<i>Crop</i>	<i>Greenhouse Tomato</i>
Propagation material	1) Elpida 2) Bellfort

	3)Ducati 4)Nissos 5)Sonato
Cultivation system:	Greenhouse soil. Plastic greenhouse. Height: 3.5 m Crop rotation with cucumber or zucchini The soil is covered with white plastic which is perforated every 50 cm where the plants are transplanted. The irrigation system is drip irrigation.
Fertilisation:	Before planting: <u>All organic fertilisers</u> 60 kg/1000 m ² POLYSULPHATE (48%S,14%K ₂ O,6%Mg,17%Ca) 15 kg/1000 m ² TOP-N (13%N, 42% C organic) 40 kg/1000 m ² DUALSPORE ACTIVATOR (25% C organic, 7%Fulvic, 1,2% N organic, C/N 20,8%) http://www.microspore.com/wp-content/uploads/2015/02/CATALOGUE_ENG_1.4_WEB.pdf During the growing period: <u>All organic fertilisers</u> 3 lit/1000 m ² BETABIO FULL (3%N, 4%P, 3%K) fertigation every 4 days 3 lit/1000 m ² AZOMIN (4,5% organic N) fertigation every 4 days 5 lit/1000 m ² POTASSIO BIOLOGICO (8,5% organic K) fertigation every 4 days
Crop protection:	Cooper: 4 kg / ha Sulphur: 2-3 applications on to flowering dose: 3 kg/ha
Plastics:	The soil is covered with white plastic which is perforated every 50 cm where the plants are transplanted.
Peat:	No
Yields and harvest method:	Harvest by hand. 50 - 70 kg/ha
Machinery:	Rotary tiller before planting
Irrigation	Drip irrigation: 3-6 cm ³ per 1000m ² depending on the growing stage of the plant
Alternatives/comments:	Acaridoil (Potassium salts of fatty acids): 3-4 applications every 7-10 days dose:19 kg /ha Bactospeine (Bacillus thuringiensis subsp kurstaki): 6-8 applications every 7-10 days dose: 1 kg/ha Laser: 2 applications every 10 days dose: 0.25 kg/ha Serenade max: 2-4 applications dose: 2.5-4 kg/ha

Name and position/title/function of the person filling in: TECHNICAL ADVISOR	
Region to which the information applies: GREECE	
<i>Crop</i>	<i>Potato</i>
Propagation material	Spunta

	Marfona Juerla Kennebec
Cultivation system:	Crop rotation with legumes, cereals and corns. Vegetables can also be used in crop rotation cycles. Plantation space is 15-25 cm between the plants
Fertilisation:	Low copper grade fertilizers Plant defence stimulators;) Agrimartin (based on sheeps manure) 20-30 lt /ha. Application before the sowing Femvigor before the sowing, during plantation and during the cultivation period 4000-5000 kg / ha Axion-N (organic bio-stimulator N 14%), 10-20 kg/ha Macrocystis (physical extract of <i>Macrocystis nteglifolia</i> (0.8-1 L per ha with irrigation
Crop protection:	Average use of cooper 5-10 kg / ha Applications against of <i>Phytophthora infestans</i> 6-12 applications per year according to the outside weather conditions and the infection intensity
Plastics:	No plastics are used
Peat:	No
Yields and harvest method:	20-25 tonnes per ha
Machinery:	Plough every 1 years (4 h/ha) Manure spreader (4h/ha) Fertilizer spreader (2 h/ha)
Irrigation	30 m ³ per ha per application Seeding and germination phase 0.3 – 0.8 mm/day Plantation row covering: 2-2.5 mm/day Full coverage 4-4.5 mm /day
Alternatives/comments:	

Name and position/title/function of the person filling in: TECHNICAL ADVISOR	
Region to which the information applies: GREECE	
<i>Crop</i>	<i>Apple</i>
Propagation material	1) Golden Delicious 2) Red Delicious 3) Gala 4) Fuji
Cultivation system:	Cultivation in the soil with good drainage potential. Optimum PH 6.5 The irrigation system is drip irrigation. Cultivation in a depth of 0.4 m for optimum grow of the young trees.
Fertilisation:	N (100-150 gr / tree / year) in the 2nd year. Increase these quantity per 100 g per tree per year taking into

	<p>account the general health of the tree. Manure usually from chicken (poultry) farms is used.</p> <p>Active pellets (chicken manure): 1–5 kg per tree</p> <p>Copper sulfate: 1-1.5 kg per tree</p>
Crop protection:	Cooper 150 gr/1000m ²
Plastics:	No plastics are used
Peat:	No
Yields and harvest method:	15000-20000 kg/ha, harvesting is usually done by hand
Machinery:	<p>Plough every 2 years (4 h/ha)</p> <p>Manure spreader (3h/ha)</p> <p>Fertilizer spreader (3 h/ha)</p> <p>Sprayer for copper/sulphur/biological control (1 h/ha pr. operation)</p> <p>Tractor for collecting harvest (2 h/ha)</p>
Irrigation	Drip irrigation: 5-10 cm ³ per 1000m ² depending on the growing stage of the plant
Alternatives/comments:	<p>Bactospeine or Xentarli (Bacillus thuringiensis): First application in flowering 2-4 applications every 8-10 days dose:300 L /1000 m²</p> <p>Parafin oil SUPPORT 200 L/1000m²</p> <p>Admiral: 225 L/ 1000 m²</p> <p>I know other farmers also cultivating organic apples but more or less use the same techniques and methods described here</p>

Name and position/title/function of the person filling in: TECHNICAL ADVISOR	
Region to which the information applies: GREECE	
<i>Crop</i>	<i>Orange</i>
Propagation material	<p>1) Merlin</p> <p>2) Valencia</p>
Cultivation system:	<p>Cultivation in the soil with good drainage potential.</p> <p>The irrigation system is drip irrigation.</p> <p>Cultivation in a depth of 0.3 m for optimum grow of the young trees.</p>
Fertilisation:	<p>N (100-150 gr / tree / year) in the 2nd year. Increase these quantity per 100 g per tree per year taking into account the general health of the tree. Manure usually from chicken (poultry) farms is used.</p> <p>Active pellets (chicken manure): 1–5 kg per tree</p> <p>Copper sulfate: 1-1.5 kg per tree</p>
Crop protection:	Cooper 300 gr / 1000 m ²
Plastics:	No
Peat:	No

Yields and harvest method:	12000-20000 kg/ha, harvesting is usually done by hand
Machinery:	Plough every 2 years (4 h/ha) Manure spreader (3h/ha) Fertilizer spreader (3 h/ha) Sprayer for copper/sulphur/biological control (1 h/ha pr. operation) Tractor for collecting harvest (2 h/ha)
Irrigation	Drip irrigation: 4-7cm ³ per 1000m ² depending on the growing stage of the plant
Alternatives/comments:	Bactospeine or Xentarli (Bacillus thuringiensis): Application when first larvae appears. Applications every 6 days dose:150 L/1000 m ² Parafinic oil SUPPORT 250 L/1000m ² Admiral: 100 L/ 1000 m ²

Name and position/title/function of the person filling in: Consultant	
Region to which the information applies: Greece	
<i>Crop</i>	<i>Olives</i>
Propagation material	Chondrolia Conservolea Kalamata
Cultivation system:	Cultivated in soil, in open field, no crop rotation
Fertilisation:	Animal manure, applied in the soil around the canopy Application period: early to late winter Up to 6 tons/ha/yr K-Mg sulfate, from 0 to 500 kg/ha/yr Borate, from 0 to 50 kg/ha/yr Plant extracts (seaweed, nettle) sprayed on the trees, from May to August, up to 80 kg/ha/yr
Crop protection:	Copper application ranges from 1 to 2 (to less sensitive olive cvs) up to 6 kg Cu/ha/yr, depending on weather conditions in particular areas, owner's knowledge, and cultivar sensitivity (cvs Kalamata and Chondrolia more sensitive than cv Conservolea). Rarely, mineral oils in <4 kg/ha/yr for scale pests Sulfur, up to 1 time per year as acaricide, only in areas with crop damages (<20% of the olive cultivation land in the country)
Plastics:	Soil covering is not applied
Peat:	No peat used
Yields and harvest method:	In the On year, it is from 2000-8000 kg/ha In the Off year, it is <1000 kg/ha
Machinery:	In all application below tractor with proper machinery or light truck is used

	<p>Pest management, 5 times/yr, 1.5 hrs/applic/ha, total 7.5 hrs/ha</p> <p>Weed management, 2 times/yr soil cultivator, 1.5 hrs/applic/ha, total 3 hrs/ha</p> <p>Weed cutter, 2 times/yr, 1 hr/applic/ha, total 2 hrs/ha</p> <p>Manure application, 6 hrs/ha/yr</p> <p>Harvest, 20 hrs/ha/yr in On year, 6 hrs/ha/yr in Off year</p>
Irrigation	<p>From 0 to 400 mm/ha/yr</p> <p>0.47-0.6 kWh/m³</p>
Alternatives/comments:	<p>No, everybody is using repeatedly Cu over each year, and, in some cases, mineral oils and sulfur.</p> <p>Bacillus thuringiensis for insect protection (1 application per year, <2 kg/ha)</p> <p>Traps (various types, wet or dry, 1 every one or two trees) for olive fruit fly</p> <p>Rotenone (foliar application, <2 kg/ha/yr) for olive fruit fly (in >20% of farms)</p>

2.5 Italy's Annex I-Tables

Name, district: Catania, Sicily (ITA), organic citrus advisor	
Region to which the information applies: Sicily	
<i>Crop</i>	<i>Citrus</i>
Propagation material	<p>Only few nurseries produce organic citrus plants; "conventional" plants can only be used if organic plants are not available.</p> <p>Blood and blonde oranges are grown. Major blood orange varieties are <i>Tarocco</i>, <i>Moro</i> and <i>Sanguinello</i> and among blonde oranges <i>Navelina</i> and <i>Valencia</i> are the most widespread varieties. <i>Nova</i> and clementine <i>Comune</i> are common mandarin-type varieties and among lemons, the Italian variety <i>Femminello siracusano</i>, less susceptible to Mal Secco, is the most cultivated.</p>
Cultivation system:	<p>Farmers use their own soil, organically certified. Soil is mechanically cultivated between rows while weeds along the row are mowed.</p> <p>Sulphur (about 400 Kg/ha) is occasionally distributed in winter along plant rows to lower the soil pH. This practice is limited to plants grafted on citrange <i>Carrizo</i> rootstock which suffer for high soil pH.</p> <p>Between rows, especially in young orchards, faba bean (<i>Vicia faba minor</i>) is used as green manure.</p>
Fertilisation:	<p>In late winter up to 4 tons of cattle manure/ha is distributed.</p> <p>If not available, up to 800 kg/ha of organic soil improver or organic fertilizer is applied. During spring and summer organic nitrogen (f.p. Nifert) or vegetable distillery slops (borlanda: f.p. Kappabios) or potassium sulphate are applied as fertilizers.</p> <p>Iron chelate is also used for citrange rootstocks.</p> <p>A few farms are starting to inoculate plants with mycorrhizal fungi.</p> <p>1-2 foliar sprays of organic nitrogen and micronutrients or vegetable distillery slops (borlanda: f.p. Kappabios) are also carried out especially on young plants.</p>
Crop protection	<p>Azadirachtin is used on young plants against <i>Phyllocnistis citrella</i>. A few farms apply Sulphur proteinate (f.p. Sulfar) to control scales and mites. It is used at 300 g/hl and is applied 1 or 2 times per year. Spray volume used is 2000-2500 l/ha.</p> <p>Mineral oil is applied 1 or 2 times per year (one in summer and, if necessary, one in winter) at 1.5-2% targeting insects and/or mites. A few farms apply Cynoyl Z (sulphur-brown seaweed based compound) as</p>

	<p>alternative to mineral oil at rate of 0,5-1 litres/100 litres of water</p> <p>According to pest presence, rearing of the beneficials <i>Aphytis melinus</i> and/or <i>Cryptolaemus montrouzieri</i> and/or <i>Leptomastix dactylopii</i> is common practice.</p> <p>For medfly control Spintor Fly or attract and kill traps are used.</p> <p>Copper is used in autumn-winter in orange and mandarins to control pathogens (<i>Phytophthora</i> spp., <i>Alternaria</i> spp., <i>Colletotrichum</i> spp., <i>Pseudomonas syringae</i>). 1 or 2 yearly applications are performed. It is generally applied as copper oxychloride at rate of 350 g/hl or copper hydroxide at rate of 200 g/hl.</p> <p>In Lemon orchards, due to the Mal Secco disease, 3 or 4 copper applications per year are necessary. A few farms are starting to use low copper grade fertilizers (Cu 2-6%), which they apply by foliar spray, to reduce the amount of copper per ha.</p>
Plastics:	White plastic film wrapped around the trunk is used to protect the trunk of young plants (up to 3-4 years old).
Peat:	No use
Yields and harvest method:	About 20-25 tons per ha for orange and "mandarins" and 30 tons per ha for lemons. Harvested by hands.
Machinery:	1 plough per year in spring between rows (3 h/ha) 1 harrowing in summer between rows (2 h/ha) 2-3 weed mowing (2h/ha) along the row
Irrigation	The most used irrigation system consists in two under-canopy sprinklers per plant which wet about 1.5 meter soil round the plant. System is now changing and all new plantings are going to be served by drip irrigation. 2000-3000 m ³ /ha/year
Alternatives/comments:	

Name, district: Catania, Sicily (ITA), organic citrus advisor and organic citrus farmer	
Region to which the information applies: Sicily	
<i>Crop</i>	<i>Citrus</i>
Propagation material	<p>Only few nurseries produce organic citrus plants; "conventional" plants can only be used if organic plants are not available.</p> <p>Blood and blonde oranges are grown. Major blood orange variety is <i>Tarocco</i>, with many clones (i.e. <i>Scirè</i>, <i>Nucellare</i>, <i>Sciara</i>, <i>Meli</i> etc.); <i>Moro</i> and <i>Sanguinello</i> blood varieties are now less cultivated. Among blonde oranges, <i>Navelina</i> and <i>Valencia</i> are the most</p>

	widespread varieties. <i>Nova</i> and clementine <i>Comune</i> are common mandarin-type cultivars and among lemons, the Italian varieties <i>Femminello siracusano</i> , <i>Monachello</i> and <i>Femminello Zagara Bianca</i> , less susceptible to Mal Secco disease, are the most cultivated.
Cultivation system:	Farmers use their own soil, organically certified. Soil is mechanically cultivated between rows while weeds along the row are mowed. Between rows, especially in young orchards, faba bean (<i>Vicia faba minor</i>) is used as green manure.
Fertilisation:	In late winter up to 4-6 tons of cattle manure/ha is distributed. If not available, up to 1000 kg/ha of organic fertilizer is applied. During spring and summer organic nitrogen (f.p. Nifert 100 kg/ha or Protamix 100 kg/ha) and/or potassium sulphate (200 kg/ha) are applied as fertilizers. 1-2 foliar sprays of organic nitrogen and micronutrients are also carried out especially on young plants.
Crop protection	Azadirachtin is used on young plants against leafminers. A few farms apply Sulphur proteinate (f.p. Sulfar) to control scales and mites. It is used at 300 g/hl and is applied 1 or 2 times per year. Spray volume used is 2000-2500 l/ha. Mineral oil is applied 1 or 2 times per year (one in summer and, if necessary, one in winter) at 1.5-2% targeting insects and/or mites. According to pest presence, rearing of the beneficials <i>Aphytis melinus</i> to control the most damaging scale (<i>Aonidiella aurantii</i>) and/or <i>Cryptolaemus montrouzieri</i> to control mealy bugs is common practice. For medfly control Spintor Fly is used. Copper is used in autumn-winter in orange and mandarins to control pathogens (<i>Phytophthora</i> spp., <i>Alternaria</i> spp., <i>Colletotrichum</i> spp., <i>Pseudomonas syringae</i>). 1 or 2 yearly applications are performed. It is generally applied as copper oxychloride at rate of 350 g/hl or copper hydroxide at rate of 200 g/hl. In Lemon orchards, because of Mal Secco disease, 3 or 4 copper applications per year are necessary. A few farms are starting to use low copper grade fertilizers (Cu 2-6%), which they apply by foliar spray, to reduce the amount of copper per ha.
Plastics:	White plastic film is used to protect the trunk of young plants (up to 3-4 years old).
Peat:	No use

Yields and harvest method:	About 18-22 tons per ha for orange and "mandarins" and 25 tons per ha for lemons. Harvested by hands.
Machinery:	1 plough per year in spring between rows (3 h/ha) 1 harrowing in summer between rows (2 h/ha) 2-3 weed mowing (2h/ha if performed by tractor or 5-6h/ha if performed by hand along the row))
Irrigation	The most used irrigation system consists in two under-canopy sprinklers per plant which wet about 1.5 meter soil round the plant. System is now changing and all new plantings are going to be served by drip irrigation. 1500-3000 m ³ /ha/year
Alternatives/comments:	Currently it is not possible to manage a citrus orchard without copper and mineral oil. Yield and quality of fruits will be severely affected.

Name, district: Catania, Sicily (ITA), organic citrus advisor	
Region to which the information applies: Sicily	
<i>Crop</i>	<i>Citrus</i>
Propagation material	Only few nurseries produce organic citrus plants; "conventional" plants can only be used if organic plants are not available. Blood and blonde oranges are grown. Major blood orange variety is <i>Tarocco</i> , with many clones (i.e. <i>Scirè</i> , <i>Nucellare</i>); <i>Moro</i> and <i>Sanguinello</i> blood varieties are now less cultivated. Among blonde oranges, <i>Navelina</i> is the most widespread variety. <i>Nova</i> and <i>Avana</i> mandarin are common mandarin-type cultivars and among lemons, the Italian varieties <i>Femminello Zagara Bianca</i> , <i>Monachello</i> , less susceptible to Mal Secco, are the most cultivated.
Cultivation system:	Farmers use their own soil, organically certified. Soil is mechanically cultivated between rows while weeds along the row are mowed. Between rows, especially in young orchards, faba bean (<i>Vicia faba minor</i>) is used as green manure.
Fertilisation:	In winter up to 3-5 tons of manure/ha is distributed. If not available, up to 1000 kg/ha of organic fertilizer is applied. During spring and summer organic nitrogen and/or potassium sulphate (250 kg/ha) are applied as fertilizers. 1-2 foliar sprays of organic nitrogen and micronutrients are also carried out especially on young plants.
Crop protection	Azadirachtin is used on young plants against leafminers. Spray volume used is 2000-2500 l/ha.

	<p>Mineral oil is applied 1 or 2 times per year (one in summer and, if necessary, one in winter) at 1.5-2% targeting insects and/or mites.</p> <p>According to pest presence, rearing of the beneficials <i>Aphytis</i> spp. and/or <i>Cryptolaemus montrouzieri</i> and/or <i>Leptomastix dactylopii</i> is common practice.</p> <p>For medfly control Spintor Fly is used.</p> <p>Copper is used in autumn-winter in orange and mandarins to control pathogens (<i>Phytophthora</i> spp., <i>Alternaria</i> spp., <i>Colletotrichum</i> spp., <i>Pseudomonas syringae</i>). 1 or 2 yearly applications are performed. It is generally applied as copper oxychloride at rate of 350 g/hl or copper hydroxide at rate of 150-200 g/hl.</p> <p>In Lemon orchards, because of Mal Secco disease, 2 - 4 copper applications per year are performed. A few farms are starting to use low copper grade fertilizers (Cu 2-6%), which they apply by foliar spray, to reduce the amount of copper per ha.</p>
Plastics:	No plastic is used during the growing.
Peat:	No use
Yields and harvest method:	<p>About 20 tons per ha for orange and "mandarins" and 25 tons per ha for lemons.</p> <p>Harvested by hands.</p>
Machinery:	<p>1 plough per year in spring between rows (3 h/ha)</p> <p>1 harrowing in summer between rows (2 h/ha)</p> <p>2-3 weed mowing (2h/ha if performed by tractor or 5-6h/ha if performed by hand along the row))</p>
Irrigation	<p>The most used irrigation system consists in two under-canopy sprinklers per plant which wet about 1.5 meter soil round the plant. System is now changing and all new plantings are going to be served by drip irrigation.</p> <p>1500-3000 m³/ha/year</p>
Alternatives/comments:	Currently it is not possible to manage a citrus orchard without copper and mineral oil. Yield and quality of fruits will be severely affected.

Name, district: advisor for organic olives	
Region to which the information applies: Sicily	
<i>Crop</i>	<i>Olive</i>
Propagation material	<p>Only few nurseries produce organic olive plants; "conventional" plants can only be used if organic plants are not available.</p> <p>Major varieties are <i>Nocellara Etnea</i> and <i>Tonda Iblea</i> which are grown almost exclusively for olive oil production.</p>
Cultivation system:	Farmers use their own soil, organically certified.

	Soil is mechanically cultivated.
Fertilisation:	Up to 2-3 tons of manure/ha is distributed before planting.
Crop protection	For olive fruit fly control Spintor Fly or attract and kill traps are used. Copper is used in autumn-winter to control pathogens (<i>Spilocaea oleagina</i> and <i>Pseudomonas savastanoi</i>). 2 or 3 applications per year of copper oxychloride at rate of 350-500 g/hl are performed. In substitution of copper oxychloride, Bordeaux mixture is applied (after harvest) at rate of 1%. Depending on pest presence mineral oil is applied once a year during summer time at rate of 1.5-2% targeting scales.
Plastics:	No plastic is used
Peat:	No use during any stage of the production cycle.
Yields and harvest method:	Olive production is not constant, every other year yields reach about 15-20 tons per ha. In low production years the average yield is 4-5 tons per ha. Harvest is done by hands with the help of nets on the ground under the canopy.
Machinery:	1 plough in spring (3-4 h/ha) 1-3 arrowings for weed control (2 h/ha)
Irrigation	No irrigation is provided. The only exception occurs in the first years after planting but it is limited to emergency irrigation.
Alternatives/comments:	None

Name, district: Calabria, "conventional" and organic olive advisor	
Region to which the information applies: Calabria	
<i>Crop</i>	<i>Olive</i>
Propagation material	Only few nurseries produce organic olive plants; "conventional" plants can only be used if organic plants are not available. Major variety is <i>Carolea</i> which is grown almost exclusively for olive oil production.
Cultivation system:	Farmers use their own soil, organically certified. Soil is mechanically cultivated.
Fertilisation:	Up to 2-3 tons of manure/ha is distributed before planting upon availability. In substitution of manure organic fertilizers are used. Micronutrients, mainly boron, and amino acids are generally applied once in spring by foliar spray.
Crop protection	For olive fruit fly control Spintor Fly is used.

	<p>Copper is used in autumn-winter to control pathogens (<i>Colletotrichum gleosporioides</i>, <i>Spilocaea oleagina</i> and <i>Pseudomonas savastanoi</i>). A total of 4 to 8 copper applications per year are performed. Used compound can be copper oxychloride at rate of 350-500 g/hl, copper hydroxide at rate of 150-200 g/hl or Bordeaux mixture (after harvest) at rate of 0.8-1%.</p> <p>Depending on pest presence mineral oil is applied during summer time at rate of 1.5-2% targeting scales (in average one application every other year).</p> <p>No use of sulphur.</p>
Plastics:	No plastic is used
Peat:	No use during any stage of the production cycle.
Yields and harvest method:	Olive production is not constant, every other year yields reach about 18-24 tons per ha. In low production years the average yield is 5-6 tons per ha. Harvest is done by hands with the help of nets on the ground under the canopy. A few large farms use mechanical harvesting.
Machinery:	<p>1 plough in spring (3-4 h/ha)</p> <p>1-3 arrowings for weed control (2 h/ha)</p> <p>In case of mechanical harvesting, soil rolling is usual practice (2 h/ha)</p>
Irrigation	No irrigation is provided.
Alternatives/comments:	

Name, district: territory of Siracusa, Sicily (ITA), advisor for organic vegetable and citrus productions	
Region to which the information applies: Sicily	
<i>Crop</i>	<i>Potato</i>
Propagation material,	<p>Organic potato seeds are generally available. "conventional" seed can only be used if organic once is not available.</p> <p>Major grown variety is Spunta.</p>
Cultivation system	<p>Farmers use their own soil which is organically certified. Soil is mechanically cultivated before seeding.</p> <p>The cultivation of potato is part of a crop rotation in which this crop is grown every three years. Rotation include at least one crop as green manure (mostly a graminacea crop) and other crops for yield. Seeding of potato is generally carried out in September for early production or at the end of December/beginning of January. This latter is the most common and preferred timing.</p>
Fertilisation:	At the start of a new rotation, during ploughing, up to 1000 kg/ha of organic fertilizer is applied.

	During the plant growing season, organic nitrogen or a 5-4-4 organic fertilizers are applied.
Crop protection:	Generally 1-2 applications of sulphur-copper based compounds are used to reduce the input of copper. Main use of copper is for control of downy mildew of potato. 8 to 12 applications per year of copper by using either copper oxychloride at rate of 350 g/hl or copper hydroxide at rate of 200 g/hl are performed. The number of applications depends on weather conditions. Average application volume is 1000 l/ha. The average copper use is up to 15.0 kg/ha per year. A few farms are starting to use low copper grade fertilizers (Cu 2-6%), which they apply by foliar spray, to reduce the amount of copper per ha. No oil is used. <i>Bacillus thuringiensis</i> is used for lepidoptera control
Plastics:	No use of plastic materials during growing.
Peat:	No use of peat in any stage of the production cycle.
Yields and harvest method:	Yield generally ranges between 25 and 40 tons per hectare. Harvested by hands.
Machinery:	Growing potatoes involves extensive ground preparation. Ploughing and successive arrowing are needed before the soil reaches a suitable condition (soft, well-drained and well-aerated) for seeding (4 h/ha). Ridging is carried out after 10-20 days from seeding and it is repeated to cover the growing tubers (2h/ha). Potato harvesters unearth the tubers which are then collected by hands
Irrigation	Drip irrigation is preferred. 500 to 700 mm/year of water is needed to grow potatoes

Name, district: territories of Siracusa and Ragusa, Sicily (ITA), advisor for organic vegetable productions	
Region to which the information applies: Sicily	
<i>Crop</i>	<i>Potato</i>
Propagation material,	Organic potato seeds are generally available. "conventional" potato seed can only be used if organic once is not available. Major grown varieties are Ditta, Nicola, Spunta. Seed of a variety resistant to late blight, named Carolus, is available on the market.
Cultivation system	Farmers use their own soil which is organically certified. Soil is mechanically cultivated before seeding.

	<p>Potato is grown in rotation of three years, alternating with other, dissimilar crops (generally rotation include at least one crop as green manure such as grass or legume). Carrot is one of the most common crop grown in the territories of Siracusa in rotation with potato.</p> <p>Seeding of potato is generally carried out in September for early production or at the end of December/beginning of January. This latter is the most common and preferred timing.</p>
Fertilisation:	<p>At the start of a new rotation, during ploughing, up to 800 kg/ha of organic fertilizer is applied.</p> <p>During the plant growing season, organic nitrogen and potassium sulphate are applied as fertilizers.</p>
Crop protection:	<p>Main use of copper is for control of potato late blight. Up to 12 applications per year of copper by using either copper oxychloride at rate of 350 g/hl or copper hydroxide at rate of 200 g/hl are performed. The number of applications depends on weather conditions. Average application volume is 1000 l/ha. The average copper use is up to 15.0 kg/ha per year.</p> <p>Sulphur compounds are occasionally used and generally as sulphur-copper based compounds in order to reduce the inputs of copper.</p> <p>No oil is used.</p> <p>In case of lepidoptera control, <i>Bacillus thuringiensis</i> is used</p>
Plastics:	No use of plastic materials during growing.
Peat:	No use of peat in any stage of the production cycle.
Yields and harvest method:	<p>Yield generally ranges between 20 and 30 tons per hectare. In case of an early strong late blight attack the yield can be severely affected up to the complete destruction of the crop.</p> <p>Harvested by hands.</p>
Machinery:	<p>Growing potatoes involves extensive ground preparation. Ploughing and successive arrowing are needed before the soil reaches a suitable condition (soft, well-drained and well-aerated) for seeding (4 h/ha).</p> <p>Ridging is carried out after 10 days from seeding and it is repeated to cover the growing tubers (2h/ha).</p> <p>Potato harvesters unearth the tubers which are then collected by hands</p>
Irrigation	<p>Drip irrigation is preferred.</p> <p>500 to 700 mm/year of water is needed to grow potatoes</p>

Name, district: Siracusa and Ragusa provinces, Sicily (ITA), advisor for organic vegetable productions

Region to which the information applies: Sicily	
<i>Crop</i>	<i>Tomato</i> (protected crop)
Propagation material,	<p>Only few nurseries produce organic vegetables; "conventional" plants can only be used if organic plants are not available.</p> <p>Medium-Large tomato varieties and Cherry tomato varieties are grown.</p>
Cultivation system	<p>Farmers use their own soil which is organically certified. Tomato is grown in greenhouses whose structure are either made of iron or wood. In both cases the greenhouse covering consists of transparent plastic film (with EVA 12%) which is generally changed every two years. Openings are protected by nets to avoid the entrance to insects.</p> <p>Soil solarization is usual practice during summer, generally in July-August. Soil is mechanically cultivated and the entire soil ground is mulched with a black plastic film before transplant.</p> <p>The cultivation of tomato is part of a crop rotation including at least one crop as green manure and one crop diverse from the solanacea family (generally a brassica species). Tomato is generally transplanted at the end of August or at the end of October/beginning of November to reduce losses due to the late blight tomato disease.</p>
Fertilisation:	<p>Once a year, generally in October, up to 800 kg/ha of organic fertilizer is applied. During spring and summer organic nitrogen (f.p. Dominus) or potassium sulphate are applied as fertilizers. 4-3-3 organic fertilizer is also used and, if necessary, iron chelate is provided.</p> <p>A few farms are starting to inoculate plants with mycorrhizal fungi.</p>
Crop protection:	<p>3 to 6 applications per year of copper hydroxide at rate of 150-200 g/hl are performed. The number of applications depends on air humidity. Average application volume is 1000 l/ha. Ultra fine mineral oils at rate of 0.5% are exclusively used. 1 or 2 applications per year are carried out with an application volume of 1000 l/ha. Mineral oils are generally applied for their repellent effect on insects or mites.</p> <p>Application are performed at early stage of tomato growth in absence of bumble bees in the greenhouses.</p> <p>2.5-5 kg/ha of sulphur per year is applied. Main use of sulphur is for control of mites and tomato powdery mildew.</p> <p>Maltodextrin 49%, light mineral oils are used to control white flies. Potassium bicarbonate 85% is used to control tomato powdery mildew. Biological Control Agents</p>

	<p>(<i>Trichoderma harzianum</i> against soil-born diseases, <i>Bacillus subtilis</i> or <i>Bacillus amyloliquefacens</i> 25% against grey mould disease) are also used</p> <p>According to pest presence, rearing of the beneficials <i>Amblyseius swirskii</i> and <i>Phytoseiulus persimilis</i> is common practice.</p> <p>For <i>Tuta absoluta</i> control, <i>Bacillus thuringiensis</i> and Azadirachtin are applied and the sexual confusion through the homogeneous distribution of the pheromone (800-1000 dispenser for hectare) in the growing environment is used.</p>
Plastics:	Black (or in few cases white) plastic film is used as mulching and is changed after each cultivation.
Peat:	The use is limited to nurseries.
Yields and harvest method:	Yield is generally reduced by 30-40% with respect to the "conventional" crop which is about 4-5 kg per square metres. Harvested by hands.
Machinery:	1 harrowing per year (3 h/ha)
Irrigation	Drip irrigation. About 1500-2000 m ³ /ha/year

Name, district: territory of Siracusa, Sicily (ITA), advisor for organic vegetable productions	
Region to which the information applies: Sicily	
<i>Crop</i>	<i>Tomato</i> (protected crop)
Propagation material	Only few nurseries produce organic vegetables; "conventional" plants can only be used if organic plants are not available. No resistant varieties to downy mildew are available. Large and Cherry tomato varieties are grown.
Cultivation system:	Farmers use their own soil which is organically certified. Tomato is grown in greenhouses whose structure is either made of iron or wood. In both cases the greenhouse covering consists of transparent plastic film (with EVA 12% - 15%) which is generally changed every two years. Openings are protected by nets to avoid the entrance to insects. Soil solarization is usual practice during summer, generally in July-August. Soil is mechanically cultivated and the entire soil ground is mulched with a black plastic film before transplant. The cultivation of tomato is part of a crop rotation which include at least one crop as green manure and one crop different from the solanacea family (generally a brassica

	species). Tomato is generally transplanted at the end of August or at the end of October
Fertilisation	Once a year, generally before transplanting, up to 1000 kg/ha of organic fertilizer is applied. During the crop growing season, organic nitrogen (f.p. Nifert) and potassium sulphate are applied as fertilizers. A 5-4-4 organic fertilizer is also used. Iron chelate is also used. A few farms are starting to inoculate plants with mycorrhizal fungi.
Crop protection	Main use of copper is for control of downy mildew of tomato. 5 to 8 applications per year of copper hydroxide at rate of 150-200 g/hl are performed. The number of applications depends on air humidity. Average interval is of two weeks. Average application volume is 1000 l/ha. A few farms are starting to use low copper grade fertilizers (Cu 2-6%), which they apply by foliar spray, to reduce the amount of copper per ha. No oil is used. Sulphur compounds are used only once or twice at early crop growth stage when bumble bees are not used for pollination. 2.5-5 kg/ha of sulphur per year is applied. Main use of sulphur is for control of mites and tomato powdery mildew. Maltodextrin 49% is used to control white flies. Potassium bicarbonate 85% is used to control tomato powdery mildew, 3-4 applications per year are generally performed. Biological Control Agents (<i>Trichoderma harzianum</i> against soil born diseases, <i>Bacillus subtilis</i> or <i>Bacillus amyloliquefacens</i> 25% against grey mould disease) are also used. According to pest presence, rearing of the beneficial <i>Phytoseiulus persimilis</i> is common practice. For <i>Tuta absoluta</i> control, <i>Bacillus thuringiensis</i> and Azadirachtin are applied.
Plastics:	White-Black plastic film is used as mulching which is changed after each cultivation.
Peat:	The use is limited to nurseries.
Yields and harvest method:	Yield is generally reduced by 20-30% with respect to the "conventional" crop. Yield is about 3 kg per square metres. Harvested by hands.
Machinery:	1 arrowing per year (3 h/ha)
Irrigation	Drip irrigation. About 1200-1800 m ³ /ha/year
Alternatives/comments:	

2.6 Norway's Annex I-Tables

Name and position/title/function of the person filling in: NLR Trøndelag	
Region to which the information applies: Trøndelag	
<i>Crop</i>	<i>Potato</i>
Propagation material	Publically certified Norwegian seed potatoes; new seed material purchased each 4 th year. Several cultivars are used such as Troll, Folva, Ariel, Solist and many more.
Cultivation system:	Crop rotation with cereals, grass or vegetables. Potatoes should not be grown more often than each 4 th year.
Fertilisation:	Pre-crop: Ryegrass or green fodder to reduce weeds, or a young ley, which will release N. 10-30 tons per ha of animal manure or compost, or a similar (N) amount applied with dried poultry manure, Marihøne or FK Grønn. If pH is too high, leaves are fertilised with Mn, Zn (Mantrac, Zintrac). Poor growth may be supported by leaf fertilisation with PHC Organic Plant Feed (made from molasse of sugar canes).
Crop protection:	Rows are mechanically cleaned or harrowed each second week dependent on the weather, until the canopy closes and eliminates the need for weed control. Late blight is controlled by preventive efforts: Careful sorting and pre-growth of seed potatoes, resistant cultivars, rows placed to dry off rapidly upon rain, removal of infected plants, burning or mechanical removal of canopy if/when attacked, harvest by dry weather conditions and careful storage.
Plastics:	Early cultivars are covered by plastic and/or agryl nets.
Peat:	No
Yields and harvest method:	20 tons per ha. Potato harvester, possibly on a tractor.
Machinery:	Ploughing, harrowing or other tillage, manure application, seed planting, row cleaning and harrowing, removal of canopy (thermic or mechanical), harvesting.
Irrigation	Not in Trøndelag

Name and position/title/function of the person filling in: NLR Viken, advisor organic greenhouse	
Region to which the information applies: There are only few organic tomato producers in Norway, they are in Vestfold and Rogaland counties	
<i>Crop</i>	<i>Tomato in greenhouse</i>
Propagation material	Main source is imported young plants, but some produces their own young plants form seeds. When growing in soil plants are grafted.

Cultivation system:	<p>Of the 10200 m² in total used for production of organic greenhouse tomato, at 4000 m² the plants are grown in soil, and at the rest plants are grown in grow-bags. Planting is usually done in the beginning of February first harvest is about 8 weeks later and the production ends in November.</p> <p>Young plants are planted (3-4 plants per m²) in soil or growbags. As they grow one or two branches is kept and put on wire, the rest are removed. The branches grow up the wire (work is done through out the season to secure the plants to the wire). This way the branches can grow from 7-12 meters long. Leaves are removed from the bottom of the plants and the branches are hanging from the wire in a way so that the top are always around 3- 4 meters over the ground.</p> <p>The fruits are harvested by hand a few times a week from about 8 weeks after planting till the end of production. Plants are watered with drip irrigation.</p>
Fertilisation:	<p>Soil is fertilized with solid organic manure before planting in late winter / early spring. Growth media in bags come already mixed with solid organic manure. In soil production organic manure from own farm can be used, when producing in bags the organic manure is commercial.</p> <p>Commercial solid organic manure are usually composted chicken manure in pellets.</p> <p>Throughout the season liquid organic manure is added through irrigation system. Mainly vinasse products. Liquid manure is mainly commercial, but one grower uses pig slurry from close by farm.</p>
Crop protection:	<p>Mainly beneficial organisms are used for plant protection:</p> <p>Macrolophus 1-2/m² once a year</p> <p><i>Phytoseiulus persimilis</i>, used when needed</p> <p>Nematodes against scarid fly</p> <p>Sulphur is used against fungus like downery mildew.</p>
Plastics:	<p>Growing bags are wrapped in plastic, one grower is trying out degradable plastic on bags.</p> <p>In houses where they grow in bags, plastics is also used to cover the floor underneath the bags.</p>
Peat:	<p>On 4000 m² , the growing media is soil.</p> <p>On 6,200 m², the growing media is peat in growbags with a small amount of other additives like moss, sand, clay and organic manure.</p> <p>I total about 150 m³ of peat is used per ha and year.</p>
Yields and harvest method:	<p>For standard round tomato about 40 kg / m² /year, for small tomatoes and cocktail about 20 kg / m² /year</p>

Machinery:	Most labor is manual. Some use wagons for raising the workers to the level of the crop. These are battery driven
Irrigation	Irrigation is done by drip irrigation systems, in growbags about 700 L /m ² a year.
Alternatives/comments:	Hanasand Gaard, Stig Jacob Hanasand; stig.jakob@hanasandgard.no Eirik Voll: Eirik.voll@lysa.net

Name and position/title/function of the person filling in: NLR Trøndelag	
Region to which the information applies: Trøndelag	
<i>Crop</i>	<i>Carrot</i>
Propagation material	Pelletised or natural seeds, not coated with chemicals. Common varieties Triton, Nominator, Romance.
Cultivation system:	Crop rotation with cereals, grass or potato. Preferably 7 years between each carrot crop.
Fertilisation:	Precrop: Ryegrass for weed control, or young ley which may release N. 10-20 tons/ha animal manure or compost, or a similar amount (of N) applied with dried poultry manure, Marihøne or FK Grønn. Often required to apply B with the fertiliser, or as a leaf fertiliser. . If pH is too high, leaves are fertilised with Mn, Zn (Mantrac, Zintrac). Poor growth may be supported by leaf fertilisation with PHC Organic Plant Feed (made from molasse of sugar canes).
Crop protection:	Weeds are controlled by burning one or more times before planting of seeds. Rows are cleaned by tractor equipment and/or manually. Serenade may be used to protect against fungal disease. Insect nets (0.6 mm) are used to protect against carrot fly (<i>Psila rosae</i>) and carrot psyllid (<i>Trioza apicalis</i>).
Plastics:	Early cultivars are covered by plastic.
Peat:	No
Yields and harvest method:	40 -50 tons/ha, uptake by hand or special machine
Machinery:	Ploughing, harrowing or other tillage, manure application, seed planting, thermal weed control (by tractor), row cleaning (by tractor), harvesting, manually or by tractor.
Irrigation	No
Alternatives/comments:	Insect nets may not be required in windy areas

Name, district: NLR Agder

<i>Crop</i>	<i>Strawberries</i>
Propagation material, which varieties are dominating?	<p>Some production of young plants for cv. <i>Rondo</i> (remontating)</p> <p>Some certified young plants produced in Norway</p> <p>Some imported, ready-for-production young plants</p> <p>Organic young plants must be ordered on advance; conventional plants can only be used if organic are not available. Organic young plants for export (e.g. to Norway) is under way.</p> <p>The current major cultivar is <i>Sonata</i>; upcoming are <i>Sensation</i> and <i>Faith</i>. Remontating <i>Rondo</i> (Norwegian variety) has been used by some. In other regions than South-Norway, <i>Polka</i> (Norwegian cv) has been used. <i>Korona</i> is not resistant enough against mildew.</p>
Cultivation system:	<p>Farmers use their own soil, organically certified, crop rotation 2-3 years with perennial ley. All growing is on plastic-covered beds (drill) with drip irrigation. In between these beds, strips of grass. Beds should be wide enough, and planted stripes slim enough, to ensure berries will be located on the plastic and not on the edges and where beds meet grass stripes and a grass mower is used to cut grass. All growing occurs in plastic tunnels to protect plants against grey mould (<i>Botrytis cinerea</i>). Tunnels contain 5 rows and are 8 m high.</p>
Fertilisation:	<p>Before planting: 30 – 40 tons of cattle manure/ha</p> <p>In years where berries will be harvested: 400 kg/total ha in spring with dried chicken manure + meat and bone meal and vinasse, «Marihøne Pluss 8-4-5», applied in a row on top of the plastic in early spring to be solubilized before the tunnels are mounted shortly before flowering. Later in the season on light soils, and when growth is a bit weak, supplementing fertilisation with Pioneer Complete 6-1-3 Organic fertiliser.</p> <p>In the autumn, cv. <i>Sonata</i> on light soils will receive 200 kg/total ha of Marihøne Pluss 8-4-5.</p>
Crop protection:	<p>Thiovit (sulphur) each 8.-12. day from start of growth in early spring to onset of flowering. Dose: 500 g Thiovit/100 litres of water; initially 40 litres/1000 m row, later, on large plants up to 100 litres/1000 m row.</p> <p>Serenade (beneficial bacteria) once per week against mildew and <i>B. cinerea</i>, more often if the weather is moist.</p> <p>Beneficial nematode <i>Heterorhabditis bacteriophora</i> against larvae of strawberry weevils.</p> <p>Beneficial mite <i>Neoseiulus cucumeris</i> twice against strawberry mites, spinning mites and trips. Dose varies</p>

	<p>from state of infection, usually 800 mites/m of row per application.</p> <p>Beneficial mite <i>Amblyseius montodorensis</i> against white fly, 50 – 100 mites/m.</p> <p>Sonata very susceptible to iron deficiency; regular leaf applications of 2 x 1000 ml Ferritrac/ha. Other leaf applications as required from plant analysis of leaves.</p>
Plastics:	<p>Soil covering: Black polyethylene plastic 0.05 µm, for a short growing period up to 2 seasons, degradable plastics 30 – 40 µm.</p> <p>Fibre cloth standard 18 – 19 g/m² used in early season, and for protection against night frost during flowering.</p> <p>Nets against insects have been tested, but reduced pollination and made damage to plants.</p>
Peat:	When growing in restricted growing media, peat might be included; not much used yet.
Yields and harvest method:	17-21 tons per ha and year. Harvested by hand
Machinery	<p>Plough every 3 years (2 h/ha)</p> <p>Plant machine (6 h/ha)</p> <p>Manure spreader (1h/ha)</p> <p>Fertilizer spreader (1 h/ha)</p> <p>Sprayer for copper/sulphur/biological control (0,5 h/ha pr. operation)</p> <p>Tractor for collecting harvest (1 h/ha)</p>
Alternatives/comments:	Strawberry yields without these inputs will be 1-2 tons per ha and year. Without plastic cover of soil, weed problems are significant (<i>Elytria repens</i> , <i>Poa annua</i>), and tunnels are required to reduce <i>B. cinerea</i> . Without plant protection, mildew gets a big problem in tunnels.

Name, district: NLR Vest	
<i>Crop</i>	<i>Apple</i>
Propagation material, which varieties are dominating?	Planting of 2-year old trees with branches. Traditionally, trees were produced nationally and delivered in pots in mid-summer, but imported, non-organic trees with bare roots are now taking over due to problems with witches' broom (<i>Taphrina betulina</i>) in the Norwegian production of fruit trees. Varieties Discovery and Red Aroma are the most common in organic apple growing in Norway.
Cultivation system:	Apple growers usually own their land. Pre-crop before a planned conversion is often grassland, but established orchards may also be converted. Fruit trees should not be planted in soil where fruit trees were formerly grown. It this is required anyway, planting rows should be

	<p>relocated between former rows, in “fresh” soil. Trees will usually be on the land for 20-25 years. The modern system of planting is a dense system with strings, with spacing 0.9 m between trees and 3.5 m between rows. This gives about 3000 trees per ha. The normal height of a tree is 3 m. Impregnated poles are used for support of rows, and bamboo sticks as support for single trees. Pipes for drip irrigation/fertilisation are usually established in new planted fields. Weeds between rows are regularly cut.</p>
Fertilisation:	<p>Before planting, liming and fertilisation is planned according to chemical soil analysis. Animal manure, preferably composted, is recommended before an old field is replanted. In years of production, animal manure or dried poultry manure is applied in early spring; typically 100-200 g of manure per tree = 200-300 kg/ha. In orchards equipped for liquid fertilisation, N and K is applied from medium May to end of July. Cuts of grass and weeds between rows is mulched and supplies some (late) fertilisation. At flowering and/or after harvest, leaves are fertilised with B, Mn, Zn and/or Mg to strengthen subsequent flowers and buds. S and Cu, which are often lacking in organically managed orchards, are applied as fungicides Thiovit (S) and Nordox (Cu).</p>
Crop protection:	<p>Early spring: Nordox (Cu), 1 kg/ha Vegetable oil + soap, 30 + 5 l/ha Against apple scab: Thiovit Jet + Nordox WG 3 kg + 150 g/ha, applied one or more times until flowering. After flowering Thiovit 3 kg/ha before rain Against apple fruit moth: Vegetable oil + soap 20 kg + 3 kg/ha Against aphids and other insects: Pyretrum (Natria), ca 0.5 l/ha After harvest: 1 kg Nordox/ha against scab etc., possibly mixed with leaf fertilisers (B, Mn, Zn, Mg) 0,5-1 l/ha. In 2017, 6 applications of sulphur and copper By August 9, 2018, 1 application of copper and 3 of sulphur this season Software RimPro used to forecast risk of apple scab infection.</p>
Plastics:	<p>Woven plastic has been tried as a ground cover to reduce weeds but is not recommended anymore because of problems with pests such as ants, mice and water vole (<i>Arvicola amphibious</i>).</p>
Peat:	<p>If young trees are received in pots, the growing media includes peat.</p>

Yields and harvest method:	Apples are picked by hand and sorted into class I and industrial purpose (juice) in the orchard. Packed in 300 kg containers of wood or plastic and transferred to local storage/sorting facilities. Yield levels typically 1600-20000 kg/ha and year for Red Aroma; less for Discovery. Modern, dense planting systems may produce 30000-40000 kg/ha and year.
Machinery	Establishment of new orchards is a massive work effort. In producing fields, the annual operations require about: Application of fertiliser 10 t/ha Pruning ca 30 t/ha Application of pesticides 5 t/ha per application Cutting of grass between rows 5 t/ha (tractor) Irrigation 30 t/ha, harvesting 30 t/ha
Alternatives/comments:	Only private gardeners with no commercial production for sale do not use inputs described above. A significant challenge for Norwegian organic fruit production is that a combined chemical with S and Cu is not certified for use in Norway any longer due to restricted market (the producer does not want to apply for approval in Norway because of the restricted market). Later years, significant challenges have come with insects, such as aphids, stink bugs and codling moth (<i>Cydia pomonella</i>). A national software, RimPro provides efficient warnings against scab (<i>Venturia inaequalis</i>) and recommendations for application of S and Cu. Green manures are generally not well synchronized with the nutrient demands of a fruit crop.

2.7 Poland's Annex I-Tables

Note on the data collection through an online questionnaire and personal communication

The template of the questionnaire was adopted to a simpler online questionnaire (in a google format) with understandable questions, and quick and easy to select answers and fill in the information (when necessary) for the selected crops. The online questionnaire was distributed to organic farming experts after contacting them by phone and to organic farmers. The online questionnaire was sent to the organic farmers who grow organically strawberry, potato, tomato and cucumber:

- strawberry: https://docs.google.com/forms/d/e/1FAIpQLSdexR-dydmuB8r4S3UfX6iVI_8Mc2QFbVZaUngJXdujF9SHA/viewform
- potato: https://docs.google.com/forms/d/e/1FAIpQLSfL0JAEoMILlJB_INpnsEuhb5SV0BjG_OfGfbpYR0ZNgl6tFg/viewform
- tomato: <https://docs.google.com/forms/d/e/1FAIpQLSdIVX6gR8Ez1ZIVS-QRz7sWiq9h3vFECOGlLLF4h7KCcHI-yw/viewform>
- cucumber: <https://docs.google.com/forms/d/e/1FAIpQLSdXxz6lulUV23-thotti2vbbMvRG6uN-63PvSCNAP6HHPe7OQ/viewform>

In addition, we contacted the Agricultural and Food Quality Inspection and selected control bodies and used their data base of organic farmers for distributing the online questionnaire. Prior to sending the questionnaire we were advised to make the questionnaire anonymous.

The tables below contain summarized output from the online questionnaire as well as from the phone/personal communications with the organic farming experts.

Name and position/title/function of the person filling in: Based on the anonymous questionnaire output and personal communication with organic farming experts.	
Region to which the information applies: Silesia region, Poland	
<i>Crop</i>	<i>Strawberries</i>
Propagation material	The most popular variety is Polka, other common varieties are Vibrant, Honeoye, Senga and also Salut and Diamente.
Cultivation system	In most cases strawberry is grown in ground systems. Soil is not exchanged (or there is no information that is otherwise). Often crop rotation is applied with alfalfa, clover, lupine, mustard.
Fertilisation	In most cases fertilization is applied before and early spring or after the growing period is completed. The most typical fertilizers are: compost from a conventional farm or manure. The quantity of fertilizers applied to soil differs significantly. On average, it is estimated that 10-25 t of compost is applied per ha, whereas about 30-35 t of manure is applied per ha. As for mineral fertilizers,

	some organic farms use calcium fertilizers (e.g. dolomite, CaO), potassium fertilizers (potassium sulfate). The most typical is CaO (on average 8 kg/ha).
Crop protection	It is typical to use straw as a natural mulching. The quantity of straw differs, 4-5 t of straw is applied per 1 ha to form a 3-5 cm cover. Using natural mulching is affordable. However, in few cases, black plastic foil (polyethylene) is used for protection from weeds. Also, in more advanced organic farming different types of fiber cloth is used (e.g. Pegas Agro with 19g/m ² for early season and 23 g/m ² for protecting the plants from low temperatures for autumn-winter season). No information on using copper or mineral oils.
Plastics	Plastics are used in growing as soil mulching materials for protection from weeds, e.g. black LDPE foil. Many experts pointed out that using plastic mulch (polyethylene foil) is an alternative to crop protection products. However, there is a problem with removal and recycling of these plastic mulches. There is no information on using biodegradable materials.
Peat:	From the obtained information both from the experts and the farmers peat is not used in organic growing of strawberry.
Yields and harvest method:	No information available.
Machinery:	Plough and a plant machine combined with spreading plastic mulch.
Machinery	
Irrigation	Typical irrigation systems include drip irrigation and sprinkler irrigation. No data on the amount of water used per growing season.
Alternatives/comments:	No information available.

Name and position/title/function of the person filling in: Based on the anonymous questionnaire output and personal communication with organic farming experts.	
Region to which the information applies:	
<i>Crop</i>	<i>Potato</i>
Propagation material	The most typical varieties of potato grown organically include: Bartek, Bila, Vineta.
Cultivation system	Ground cultivation system. Potatoes are grown in narrow-row and wide-row technology. Crop rotation every 4-5 years, the most common rotation crops include winter wheat, triticale.

Fertilisation	Fertilization of potato is mostly done with organic fertilizers such as cow manure, poultry manure mixed with compost. The application of manure is 20-30 t/ha, poultry manure mixed with compost is 5,0-7,5 t/ha. In addition, mineral fertilizers are also used (e.g. urea).
Crop protection	Potatoes are protected by substances enlisted as those which can be applied in organic farming. The experts pointed out that in potato cultivation copper fungicides are used. These include copper sulfate, copper oxychloride, copper hydroxide. For Colorado potato beetle (<i>Leptinotarsa decemlineata</i>) one of the plant substances is the extract from <i>Chrysanthemum Cinerariifolium</i> . It is available commercially (Polish name – “Pyretryna naturalna”) and the recommended application is 0.5 kg/ha. Other natural insecticides include paraffinic oils, potassium salts and grey soap but they are less frequently used.
Plastics	No plastics are used in growing potato.
Peat:	Peat is not used in growing potato.
Yields and harvest method:	The average yield is about 10-15 t/ha.
Machinery	Ploughing, harrowing, earthing, ridging are applied in potato cultivation. Potato planting and harvesting machines, potato sprayer.
Irrigation	It is estimated that the water used per growing season for potato accounts for 200-400 mm, depending on the type of variety, soil properties and temperature during growing season.
Alternatives/comments:	Some alternatives include plant extracts from nettle or tansy (<i>Tanacetum vulgare</i>). Also, an alternative way to using substances for crop protection is selection of potato varieties that are resistant to diseases.

Name and position/title/function of the person filling in: Based on the anonymous questionnaire output and personal communication with organic farming experts.	
Region to which the information applies:	
<i>Crop</i>	<i>Tomato</i>
Propagation material	Tomymaromacho washington, Atut F1, Merkury F1, Gracja F1, Julia F1
Cultivation system	Tomato is predominantly grown in tunnels. For example, one of the largest organic tomato producers grows tomato in soil on the area of 600 m ² . The tunnels are

	covered with multi-seasonal foil with the high tot 3 m. Crop rotation include tomato, then gherkin – after each crop legumes.
Fertilisation	In tomato cultivation the following fertilization is used: manure, composted legume residues, macerated nettle. Other fertilizers include: potassium sulfate, potassium phosphate, florovit, microelements. The plants are treated with fertilizers in the dose of 30 L/m ² . Fertilization is done in spring and autumn.
Crop protection	Common crop protection methods include: biological methods, plant extracts and application of natural mulching e.g. with straw. In addition, fiber cloth is used to protect the plants and facilitate the growth.
Plastics	During tomato growing plastic materials are used in the form of tunnel foil, strings, etc.
Peat:	Peat is not used in tomato cultivation.
Yields and harvest method: What is a typical yield level that qualifies for sale? (kg/ha)	For tunnel cultivation of tomato, the typical yield is about 5-6 kg/m ² . This is also typical for sale.
Machinery: Machinery List operations performed in the field and estimated time consumption pr. operation	Mostly manual work.
Irrigation	Typical irrigation for tomato grown under tunnels (drip irrigation).
Alternatives/comments:	Alternatives for crop protection include different plant extracts obtained on-site.

Name and position/title/function of the person filling in: Based on the anonymous questionnaire output and personal communication with organic farming experts.	
Region to which the information applies:	
<i>Crop</i>	<i>Cucumber</i>
Propagation material	Cezar F1, Ares, Kronos F1, Cyryl F1, Alibi F1
Cultivation system	Cucumber is grown both in ground and tunnel systems. Crop rotation: after 3 years mainly after tomato and potato.

	Tunnel system uses plastic foil for about 4 seasons, the height about 190 cm.
Fertilisation	<p>Fertilizers used in cultivation of cucumber are of natural origin, e.g. green fertilizers (lupine, lucerne, etc.). Also, manure is used. Mineral fertilizers such as phosphorus, calcium and magnesium.</p> <p>The application of fertilizers is usually done prior to cultivation (autumn) Manure is spread on the land and then mixed with soil.</p> <p>Typical doses of fertilizers in tunnel systems:</p> <ul style="list-style-type: none"> - prior to seeding 0.08 t /ha P₂O₅, 0.1 t/ha N, i 0.19 t/ha K₂ O. - after harvesting 20 m³/ha
Crop protection	In protection of cucumber usually biological methods are used. Commonly, the crop protection is done with natural plant extracts (e.g. garlic) obtained on-site. Also, some growers use commercially available bioproducts.
Plastics	Plastic is used as a foil for tunnels. Also, fiber cloth or black foil can be used to protect the crops from e.g. weeds.
Peat:	Peat can be used in tunnel system. It is mixed with straw and/or manure.
Yields and harvest method:	The typical yield of cucumber in tunnel system is about 12-16 kg/m ² whereas in ground system it is about 16-17 t/ha.
Machinery	<p>In ground systems: seeding machine, spraying machine, irrigation.</p> <p>In tunnel systems: fertigation devises with application system.</p>
Irrigation	On average the amount of water is 350-400 mm in order to maintain 70-80% of moisture content.
Alternatives/comments:	No additional information.

2.8 Spain's Annex I-Tables

Name and position/title/function of the person filling in: Freelance Organic Agriculture Advisor	
Region to which the information applies: Andalusia	
<i>Crop</i>	Tomato
Propagation material	The same cultivars than conventional. There are many of them. Flavour and resistance to virus are requested.
Cultivation system	Crop rotation is mandatory. Common rotations: tomato-cucurbitaceous-bean (or other legume). Also long-cycle tomato (August-May) plus legume or zucchini. Seeds come from transnational seed companies. Local cultivars are not common. Organic seeds are not easily available (availability below 10% of demand), normally non-treated seeds are used. Seeds go to a commercial nursery then seedlings produced. Plantation material in the greenhouses are always seedlings from the nursery. The typical greenhouse structure is 'raspa y amagado' type (i.e. polyethylene plastichouse).
Fertilisation:	Most of the soils are mulched with sand. 80% growers use exclusively liquid fertilisers. 20% introduce plant debris and/or manure before planting. All greenhouses are irrigated every day. 10% of growers apply biosolarisation with transparent polyethylene cover.
Crop protection:	Copper: 4-5 applications for long cycles and 2 applications for short cycles. After pruning. Diversity of products: Increasing the presence of complexed Cu 5.5%. Sulphur: Powder formulation: 4 applications (first 4 weeks) at 25 kg/ha/week. After 5 th week, bi-weekly applications by pulverisation. Not used from nov to feb. Main target: <i>Aculops lycopersici</i> . Mineral oils: Paraffinic oil (54%). Used sporadically in winter. Not compatible with sulphur.
Plastics:	Transparent polyethylene for biosolarisation or solarisation (50% growers). Strings to tie and wind the plants. Clips for supporting strings. Thermal sheet. Double roof (15% of growers). Mulching (15% of growers)
Peat:	Peat is used only in the nurseries.
Yields and harvest method:	

Machinery: Machinery	Phyosanitary treatments: 6 h/week/ha
Irrigation	Between 2,000-5,000 m ³ /ha cycle
Alternatives/comments:	Substitutions of sulphur: Maltodextrin. Copper substitution: Plant extracts, <i>Bacillus subtilis</i> , <i>Trichoderma</i> spp., Potassium bicarbonate, Laminarin. Biodegradable strings are getting more and more common, but still less than 2%. Some growers produce vermicompost as a feasible alternative to peats for nurseries.

Name and position/title/function of the person filling in: Technical advisor of BioProcam.	
Region to which the information applies: Andalusia	
<i>Crop</i>	Tomato
Propagation material	The same cultivars than conventional. There are many of them.
Cultivation system	Crop rotation is mandatory. Common rotations: tomato-cucurbitaceous-bean (or other legume). Seeds come from transnational seed companies. Local cultivars are not common. Organic seeds are not easily available, normally non-treated seeds are used. Seeds go to a commercial nursery then seedlings produced. Plantation material in the greenhouses are always seedlings from the nursery. The typical greenhouse structure is 'raspa y amagado' type (i.e. polyethylene plastichouse).
Fertilisation:	Most of the soils are mulched with sand. Every 3-4 years sand is fully removed and manure buried. Each year organic matter is added by means of pellets through plantation rows. In August starts the tomato crop until March-April. Then melon or watermelon are cultivated, and in May beans are sown. Fertilizers: <ul style="list-style-type: none"> • Potassium sulfate): K₂O 52%. • Magnesium sulfate • Solorganic Plus: N 1,31% y K₂O 4,15%. All greenhouses are fertigated every day. Plant debris are buried together with Brassica debris as biofumigant in Summer, in rows.
Crop protection:	Copper: 7 applications from end September to April. Formulation: Complexed Cu 5.5%. Sulphur: 6 applications. 80% S richness

	Mineral oils: Not used.
Plastics:	Transparent polyethylene for biosolarisation. Strings to train the plants. Clips for supporting strings. Thermal sheet. Double roof.
Peat:	Peat is used only in the nurseries.
Yields and harvest method:	
Machinery:	Irrigation: 5 h/month/ha
Machinery	Phytosanitary treatments: 6 h/week/ha
Irrigation	About 3,000 m ³ /ha cycle (August-March) Average 0.40 kWh/m ³ /month
Alternatives/comments:	Substitutions of sulphur: plant extracts. Copper substitution is harder. Biodegradable strings are getting more and more common. Biosolarisation is increasing its presence in the area.

Name: ADV Ponent (Lleida-Catalonia)	
<i>Crop</i>	Olive
Propagation material	Arbequina
Cultivation system	Irrigated lands Very intensive: training in «palmeta» 1.25-1.5 between trees and 3.5-4 m between rows (+ 1000 trees/ha) Training trees based on canes or wires Intensive: trees in tall vase of 8 x 4 m, 7 x 7 m (200 to 400 trees/ha) Non irrigated arable land/dryland Different densities, but -in general- 100 trees/ha. In vase.
Fertilisation:	Composted manure at 6 000-8 000 kg/ha during winter time. Potassium can be applied (K salts) Magnesium sulphate in case of shortcomings. Iron chelates Granulates rich in Organic N (punctual cases) The dosage would depend on the kind of plantation, the uptake for production and the shortcomings according to leaf and soil analysis.
Crop protection:	Sulphur: 10-12 kg/ha spring (against fungi)

	Copper: 2 kg oxychlorur 50%/ha before blooming (against fungi) Kaolin: 25-30 kg/ha maturation of the fruit (olive fruit fly) Spintor cebo: 1L/ha (against olive fruit fly) Bacillus thuringensis: 0.5-1 kg/ha (Lepidoptera larvae).
Plastics:	No
Peat:	No
Yields and harvest method:	Very intensive: 8 000-10.000 kg/ha. Harvesting and special machinery Intensive: 5000-7000 kg/ha. Shakers. Traditional: very variable, depending on the year and rainfall 2000 kg/ha Manual harvesting or manual shakers.
Machinery: Machinery	Strimmer («picadora») Strimmers under the line, between adjacent trees Disc harrow (very intensive) Manual pruning Machinery for spreading manure or fertilizers Sprayer (treatment phytosanitary)
Irrigation	Irrigation plantations: Intensives: about 7500 m ³ /ha Very intensives: about 12 000 m ³ /ha
Alternatives/comments:	No. But often happens that such inputs are not applied each year. Or the dosage is reduced.

Institution: technician from the Organic Farming Service- (Valencia Government) growers and advisor on organic citriculture).	
<i>Crop</i>	<i>Citrus</i>
Propagation material	Under the rootstock <i>Citranger carrizo</i> : variety Clemenules
Cultivation system	No crop rotation (trees). Monoculture.
Fertilisation:	<ul style="list-style-type: none"> - Organic: 10 000 kg/ha sheep manure (winter and spring time). External input. - Organic matter addition of spontaneous flora, with cuts (equivalent to 5000 kg manure). - Unwanted addition because of irrigation water pollution with nitrates (70 FU/ha) from March to november, included (depending on rainfall) - Foliar fertilization: Goemar (algae) - Manganese sulphate: 40 FU/ha (commercial product: Epsomita) - Iron chelates 1.5 FU/ha (commercial product: Sequestrene)
Crop protection:	<ul style="list-style-type: none"> - Paraffin oil: 80 L/ha - Azaderactina (Alig): 3 L/ha

Plastics:	It is frequent to use it in new plantations, but not in all cases.
Peat:	Not used
Yields and harvest method:	20 000 kg/ha
Machinery: Machinery	Strimmer: 12 h/ha and year Crusher: 3 h/ha and year Sprayer: 9 h/ha and year.
Irrigation	7000 m ³
Alternatives/comments:	

Name: growers and advisor on organic citriculture	
<i>Crop</i>	<i>Citrus</i>
Propagation material	The grown varieties are the same as the conventional crop. The most frequent variety is Clemenules, but other mandarine cultures are Hernandina, Oronul. Regarding oranges, important ones are: Navel-late, Nàvel chislett, Nàvel lane-late, Sanguines. Sometimes there are small fields with avocado, pomegranate, kaki, kumquat.
Cultivation system	No exchange. The used soil is the original one. No protected crops. Always outside. No rotation (tree culture)
Fertilisation:	Main fertilizer is sheep manure, but also cow (bou) or horse manures. The dosage: 20 t/ha. There are also punctual application of commercial liquid organic matter using 100-200 L/ha. Normally 2 foliar nutrition treatments (algae) are applied.
Crop protection:	Crop protection consists in a single treatment with paraffin oil (once a year). At the end of winter time a treatment with copper.
Plastics:	In the implementation of new cultures, geotextiles have been used with different results.
Peat:	Never
Yields and harvest method:	The yield is very different depending on the year, since the organic farming implies that, after a season with good yields, next year could be bad. But there are varieties like Hernandina that are quite masting ones. An average yield in organic Citrus is 15 000 kg/ha. Harvest is always manual.
Machinery	Rototiller: 8 h/ha Strimmer with tractor and crusher: 6 h/ha Foliar treatment (with turbo) 6 h/ha

	Manure with shovel: 12 h/ha
Irrigation	Surface irrigation
Alternatives/comments:	<p>The alternative to paraffin oils are: Control of red spidermite: Diatomea soil Control of red scale: mating disruption. Control of whitefly: potassim soap There are some alternative for fungi control but the use of cupper is very punctual (only one treatment/season) and right now the commercial products have low Cu content (14%).</p>

Name and position/title/function of the person filling in: Agronomist/Advisor citric crops.	
Region to which the information applies: Andalusia	
<i>Crop</i>	Citrus
Propagation material	Seedlings not from organic nurseries. Two years after planting start certification eco.
Cultivation system	Open field, original soil, 100% drip irrigation. Harvest: On September (early Citrus), on July (late productions).
Fertilisation:	Fertigation very important. <ul style="list-style-type: none"> - Algae-based products (60 L/ha/week) via drippers, since pre-flowering until harvest. - Organicum (14-1-1) (15 l/ha/week) - Fertiliza complex (2-0-10) (5 l/ha/week): product to induce maturation. - Fox 20 (Organic phosphorus): 10 (l/ha/week) for two weeks while flowering. - Calcium sulphate. No composting, no biofumigation.
Crop protection:	Copper: Sporadically, Up to two applications of Copper hydroxyde (1.5 kg Cu/ha/year) Sulphur: Not applied. Mineral oils: Summer applications (below 25 l/ha/year active ingredient).
Plastics:	Two uses: <ul style="list-style-type: none"> - In nurseries for covering the grafting junction. - In West Andalusia, some growers mulch with micro-perforated plastic.
Peat:	Not used
Yields and harvest method:	40,000-60,000 kg/ha
Machinery: Machinery	Pruning Tillage: twice per year Treatments with atomizer
Irrigation	6,000 m ³ /ha/year
Alternatives/comments:	To copper: <i>Bacillus subtilis</i> , <i>Equisetum arvense</i> extracts.

Name and position/title/function of the person filling in:	
Region to which the information applies: Andalusia	
<i>Crop</i>	Olive
Propagation material	Seedlings not from organic nurseries.
Cultivation system	Dryland crop.
Fertilisation:	Fertilisation depending on the results of foliar analyses.
Crop protection:	Copper: Not applied to soil.

	Sulphur: Not applied to soil. Mineral oils: Not applied to soil.
Plastics:	Boxes, plastic for soil (to avoid water runoff).
Peat:	Not used
Yields and harvest method:	2000-2500 kg/ha
Machinery: Machinery	Weed chopping Harvest (nov-feb) Treatment against olive fruit fly Foliar fertilizers treatments
Irrigation	Dryland
Alternatives/comments:	To reduce plastic use: Avoid boxes, i. e., moving harvest directly into trailers.

Name and position/title/function of the person filling in: Advisor/Las Parras C.B.	
Region to which the information applies: Andalusia	
<i>Crop</i>	Olive
Propagation material	Seedlings from organic nurseries.
Cultivation system	Dryland crop.
Fertilisation:	Fertilisation depending on the results of foliar analyses.
Crop protection:	Copper: 3-4 treatments depending on foliar analyses. Sulphur: Not applied. Mineral oils: Not applied.
Plastics:	Plastic for soil (to avoid water runoff).
Peat:	Not used
Yields and harvest method:	5000 kg/ha
Machinery: Machinery	Weed chopping Harvest (nov-feb) Treatment against olive fruit fly Foliar fertilizers treatments Pruning
Irrigation	Dryland
Alternatives/comments:	

Name: ADV Ponent (Lleida-Catalonia)	
<i>Crop</i>	Olive
Propagation material	Arbequina
Cultivation system	Irrigated lands Very intensive: training in «palmeta» 1.25-1.5 between trees and 3.5-4 m between rows (+ 1000 trees/ha) Training trees based on canes or wires

	<p>Intensive: trees in tall vase of 8 x 4 m, 7 x 7 m (200 to 400 trees/ha)</p> <p>Non irrigated arable land/dryland</p> <p>Different densities, but -in general- 100 trees/ha. In vase.</p>
Fertilisation:	<p>Composted manure at 6 000-8 000 kg/ha during winter time.</p> <p>Potassium can be applied (K salts)</p> <p>Magnesium sulphate in case of shortcomings.</p> <p>Iron chelates</p> <p>Granulates rich in Organic N (punctual cases)</p> <p>The dosage would depend on the kind of plantation, the uptake for production and the shortcomings according to leaf and soil analysis.</p>
Crop protection:	<p>Sulphur: 10-12 kg/ha spring (against fungi)</p> <p>Copper: 2 kg oxychlorur 50%/ha before blooming (against fungi)</p> <p>Kaolin: 25-30 kg/ha maturation of the fruit (olive fruit fly)</p> <p>Spintor cebo: 1L/ha (against olive fruit fly)</p> <p>Bacillus thuringensis: 0.5-1 kg/ha (Lepidoptera larvae).</p>
Plastics:	No
Peat:	No
Yields and harvest method:	<p>Very intensive: 8 000-10.000 kg/ha. Harvesting and special machinery</p> <p>Intensive: 5000-7000 kg/ha. Shakers.</p> <p>Traditional: very variable, depending on the year and rainfall 2000 kg/ha</p> <p>Manual harvesting or manual shakers.</p>
Machinery: Machinery	<p>Strimmer («picadora»)</p> <p>Strimmers under the line, between adjacent trees</p> <p>Disc harrow (very intensive)</p> <p>Manual pruning</p> <p>Machinery for spreading manure or fertilizers</p> <p>Sprayer (treatment phytosanitary)</p>
Irrigation	<p>Irrigation plantations:</p> <p>Intensives: about 7500 m³/ha</p> <p>Very intensives: about 12 000 m³/ha</p>
Alternatives/comments:	No. But often happens that such inputs are not applied each year. Or the dosage is reduced.

2.9 Turkey's Annex I-Tables

Name and position/title/function of the person filling in:	
Region to which the information applies: IZMIR Province	
<i>Crop</i>	<i>Citrus-</i>
Propagation material	<i>Satsuma mandarin</i>
Cultivation system	-
Fertilisation:	On farm Compost hip (artificial plants+cow manure) 40 tonnes /ha Before the season: Fertilization with composted plant artificials and animal (cow) manure(on-farm).
Crop protection:	Insect problems: mineral oil 600-1500 ml/100L water b) Pheromone traps with deltmethrin c) 0,24gr/l Spinosad CB (1 Liter insecticide + 10 Liters water as partial branch application) 120-130 ml water-bioinsecticide mixture per tree. Sulphur: for acar, spider mite problems (%80 sulphur wp 600 g/100L water) Ectomyeloid ceratoniae: 32000 IU/mg Bacillus thuringiensis berliner var kurstaki WP: 100GR/100 liter water Flower thrips: Spinosad 480 g/L 30ml/100L water Phoma spp. Phytophthora spp.: Copper sulphate, bordeaux mixture (as pure copper 6kg/hectare/year max limit)
Plastics:	There is no plastic mulching
Peat:	No
Yields and harvest method	Harvest method is usually collecting fruits by hand 20-30 tonnes/ha
Machinery:	Disk harrow Sub soil Rotavator tiller 2 timea annually
Irrigation	Drip Irrigation 4 times/ a week in summer season -4 hours/day – 40lt /1000m2
Alternatives/comments:	-

Name and position/title/function of the person filling in:	
Region to which the information applies: Turkey	
<i>Crop</i>	<i>Olive</i>
Propagation material	Gemlik, Ayvalik, Memecik, Domat, Kilis Yaglik (In general age: ≥20 year)

	-Implant on wild type-
Cultivation system	No crop rotation in olive orchards.
Fertilisation:	%80 Olive Orchard : No fertilization (slope %20-25) %20 slightly slope Composted animal manure Autumn season: 2-3 kg per tree
Crop protection:	<i>NO (%80) (SLOPE LAND)</i> <i>Olive fruit fly (Bactrocera oleae, Dacus oleae):</i> a) By using traps consist of di-ammonium phosphate in plastic bottles. b) Pheromone traps c) 0,24gr/l Spinosad CB (1 Liter insecticide + 10 Liters water as partial branch application) Prays olea Azadirachtin 0,3 gr/l as 500 ml/100Liter water Olive leaf spot, pea cock: Cupper sulphate, bordeaux mixture(For 1St. spraying: 1500grams [Coppersulphate equivalent to %20-25 metallic copper] + 750 grams quicklime/100Liter water. 2nd. Spraying: 1000 grams [Coppersulphate equivalent to %20-25 metallic copper] +500 grams quicklime ***3th spraying will be done in 2019. In Turkey after 2018 farmers will make 3 fungicide application for <i>Spilocaea oleaginae</i> . Autumnx1 +Spring x2
Plastics:	There is no plastic mulching.
Peat:	No Apart from OF production During Sappling production, rooting stage peat is required or else sheep manure+soil+perlite is an another option . By the way at this moment there is no any commercial sampling organically certified grower in the country.
Yields and harvest method	Harvest method is usually collecting fruits by hand and mechanical way (by using harrow) Variability is high as 20-150 kg per tree
Machinery:	Soil cultivation: plough, harrow
Irrigation	No (%80) It depends on the soil characteristics, land sloping characteristics, and annual climate. (average 600-800 mm per year) need in long summer season. Olive yield mainly depending on irrigation possibility rather than fertilization in most cases.
Alternatives/comments:	-

Name and position/title/function of the person filling in:	
Region to which the information applies: Aegean (Izmir-Odemis is the most convenient place for potato cultivation, Middle Anatolia (Niğde, Nevsehir, Konya, Amasya, etc.)	
<i>Crop</i>	<i>Potato</i>
Propagation material	Marabel and Granola (Family farms use their own potato reproduction material)
Cultivation system	Depends on variety in winter (February-June) and summer (August-November seasons in Izmir Odemis Crop rotation is being done with vegetables like melon, watermelon, and cereals corn
Fertilisation:	On farm Compost hip (artificial plants+cow manure) 40 tonnes /ha Before the season: Fertilization with composted plant artificials and animal (cow) manure(on-farm). Vermicompost usage have been improving from commercial national market (in some years)(10 tonnes/ha) Commercial K fertilizer organically certified (50 kg/1000m2)some years- After planting: Compost tea application(spray)(1-2 times)(50lt/1000m2-%0.5 N)
Crop protection:	Insect problems: Leptinotarsa decemlineata: a) 480gr/l Spinosad sc (10 ml/100Lt) b) Azadirachtin 10g/Lt (250 ml/100Lt) Sulphur: for acar, spider mite problems (%80 sulphur wp 600 g/100L water) (Rhizoctonia solani) a) %1,5 1x10 ⁸ kob / ml min. Pseudomonas fluorescens strain CEDRIKS Biyologij Fungicide 500 ml/100 kg seed treatment b) %0,3 Bacillus subtilis GB03 race 1,2x10 ⁷ cfu/gram COMPANION 500 ml/100 kg seed treatment
Plastics:	There is no plastic mulching.
Peat:	No
Yields and harvest method	10-35 tonnes/ ha
Machinery:	Soil cultivation: plough, harrow, tiller
Irrigation	Modern irrigation system (under soil 40 cm depth)
Alternatives/comments:	Soil quality is high in terms of OM and texture is loamy.

Name and position/title/function of the person filling in:	
Region to which the information applies: Aegean, Marmara, Middle Anatolia	
<i>Crop</i>	<i>STRAWBERRY</i>

Propagation material	Camarosa, Fern, Fortuna, Sweetcherry, Sweet Charlie* *Commercial strawberry Producers prefer this variety and have been growing it for 20 years and reproduce their own seedlings..
Cultivation system	Farmers changing the cultivation area every 1 or 2 year. They are usually making solarisation. In Turkey, under the plastic tunnel cultivation is widespread. <u>Description of plastic tunnels:</u> 2-2,50 meter height and 6-7 meters weight. Percentage of plastic tunnel systems:%50 Percentage of open field systems:%50 (Usually second year of cultivation, farmers take back the plastic tunnel system over the strawberry field.
Fertilisation:	Autum and spring Before planting the seedlings: Fertilization with vetch and manure. After planting: Compost tea
Crop protection:	<u>Tetranicus spp:</u> %80 Sulphur – 400 gr/100Liter water. Spinosad 480 gr/L dosage: 20 ml/1000square meter <u>Aphids:</u> <u>Snails:</u> Collecting with hand For root rots (<i>Fusarium sp</i> , <i>Rhizoctonia solani</i> , <i>Macrophomina sp.</i>): <i>Trichoderma harzianum</i> by dipping the cuttings or seedlings before planting. <u>Grey mould (<i>Botrytis cinerea</i>):</u> Seranade SC ® (1000 mili liter/1000 square meters) <u>Powdery mildew (<i>Podosphaera aphanis</i>):</u> Sulphur %80 micronize. 300gr/100Liter water. Weeds: Collecting, solarisation, soil mulching
Plastics:	Yes, totally plastic mulching have been using except one from Ankara. He is using straw instead of plastic mulch but in vvery small scale growing area (500 m ²).
Peat:	No
Yields and harvest method	Harvest method is usually collecting fruits by hand 30-40 tonnes /ha
Machinery:	2 times sub-soil+ 2 times rotary tiller
Irrigation	Drip Irrigation (2 lt/h, 17 lt 4 times per week)
Alternatives/comments:	-

Name and position/title/function of the person filling in:					
Region to which the information applies: Aegean					
<i>Crop</i>		<i>Tomato</i>	<i>Pepper</i>		<i>Eggplant</i>
Propagation material	Open Field	Standard Open Pollunated Landraces (56, SC2121) Determinate Type	Standard Open Pollunated Landraces		Standard Open Pollunated Landraces

			(Çarliston, Dolmalık, İnce Kıl)	(Topan, Aydın Karası)
	Greenhouse (Only one greenhouse certified organically in the country since 1995)	Hybrid Pepper (National varieties) (Bred from landraces of TR) Indeterminate type	Hybrid Pepper (National varieties) (Bred from landraces of TR)	Amadeo F1 Topan (Open pollinated landrace)
Cultivation system		Rotation system is using their own field and greenhouses. Growing period open field: April-September In greenhouse: Winter time		
Fertilisation:		All season 2-3 times in a year in open field and greenhouse Mostly on farm composting Before the season: Fertilization with vetch+barley mixture as green manure and animal manure (20-30 tonnes/ha) Before planting the transplants : Compost 20 tonnes /ha Fertilization with composted plant artificials and animal (cow) manure and Vermicompost usage have been improving. After planting: Compost tea application (spray+irrigation) (4 times in early stage)		
Crop protection: Describe the type and quantities of crop protection products in amounts per application and unit land area, with special reference to copper, mineral oils and sulfur		<p><i>Sulphur: for powdery mildew</i> <i>Trichoderma harzianum: for soil born fungal diseases and Botrytic cinerea on fruits.</i> Tuta absoluta :</p> <p>a)35000 DBM/mg Bacillus thuringiensis var. aizawai strain ABTS-1857 WG: as 150gr /100 l water for greenhouse b)32000 IU/mg Bacillus thuringiensis berliner var kurstaki100 gr/100L water for field conditions. c)480 g/l Spinosad LASER 25 ml / 100 L water for greenhouse d)10 g/l Azadirachtin SUHULET 10 EC 500 ml/100 l water (larvae)</p> <p>Greenhouse NESIDIOCONTROL 500,Nesidiocoris tenuis (Miridae):(Bemisia tabaci, Trialeurodes vaporariorum), (Tetranychus spp.), (Tuta absoluta) 0,5-1,5 beneficial insect/1 square meter</p>		
Plastics:		No		
Peat:		No.		
Yields and harvest method:		Harvest method is collecting fruits by hand Tomato: 40 tonnes/ha open field, 35-75 tonnes / ha in greenhouse Pepper: 15-25 tonnes/ha open field, 35-60 tonnes / ha in greenhouse		

	Eggplant: 35-40 tonnes/ha open field, 30-35 tonnes / ha in greenhouse
Machinery:	Disk harrow Sub soil Rotavator tiller 2 times a year in autumn and spring times
Irrigation	Drip Irrigation Variability very high.
Alternatives/comments:	-

2.10 UK's Annex I-Tables

For UK, information was not compiled in crop tables. Instead, the largest organic growers' association, Soil Association (SA) interviewed several growers, and analysed the permissions to use restricted inputs that were given in one year. The information provided by SA is following.

Restricted input/Product	crop	Permission Details (incl. Ingredient/Brand Name of	Contentious input A
Cuprokylt and codacide		Cuprokylt + codacide on potatoes against blight @ 5kg/ha	Copper
Copper Cuprokylt		Request to use Copper (Cuprokylt) to treat potato blight using 4 applications at the rate of 0.8kg (3.2kg/per ha) has been approved	Copper
Laws bespoke		200l 5-0-10 cu zn mn feed and 80l 6-0-7 + mn , cu, zn b Laws bespoke fertiliser on potatoes and beetroot respectively	Copper
Cuprokylt		Request to use Cuprokylt on 15/20 varieties of potato to treat blight in (1.44ha).	Copper
Copper oxychloride		<ul style="list-style-type: none"> • until end of 2018 • on (0.156ha) • at the following threshold levels: A maximum of 3 sprays of 3kg copper oxychloride (in 200-300L water) per spray per hectare. 	Copper
Cuprokylt		Cooper (Cuprokylt) on potatoes against blight	Copper
Sylvinite, Laws Potash Plus, Laws High N, Laws Foliar N, Manganese, Copper, Zinc and boron		Sylvinite, Laws Potash Plus, Laws High N, Laws Foliar N, Manganese, Copper, Zinc and Boron on carrots, onions and potatoes	Copper
Copper		Copper against potato blight WITH CAVEAT that it can only be used if the EAMU comes through...	Copper
Cuprokylt		Cuprokylt on potatoes against blight	Copper
Copper oxychloride		Copper oxychloride - against canker on apples and pears	Copper
Manganese and copper		Manganese and copper applications to winter wheat and barley crop	Copper
Boron, Manganese, Copper		Your request to use Boron, Manganese & Copper on Beetroot & Spring onions (shown as deficient) has been approved	Copper

Restricted input/Product	crop	Permission Details (incl. Ingredient/Brand Name of	Contentious input A
Copper oxychloride		Copper Oxychloride on apples and pears, prophylactically as a fungicide.	Copper
Copper oxychloride		Copper oxychloride for treating canker on apple and pears	Copper
Laws High N, Na, S, Mn, B, Zn, Cu		Laws High N, Na, S, Mn, B, Zn, Cu on potato, onion and parsnip	Copper
Sulphate		Sulphate of potash on grass fields	Sulphur
Sulphur		sulphur on leeks and broccoli	Sulphur
Microthiol		Microthiol special on borragge crop at 5kg/ha.	Sulphur
Zynergy Omex		1x application of Zynergy Omex (Zn Zinc + Sulphur S03 + Copper Cu) @ 0.7kg/ha, on 2 parcels of Vining Peas – (4.49ha) & 11 acre, (4.57ha).	Sulphur, Copper
NuGro		NuGro 8-7-7 <ul style="list-style-type: none"> • during July and August 2018 • only applied to propagating module plants before planting. • 2 litres/acre every 14 days NuGro 6-2-4 & 7-2-2 <ul style="list-style-type: none"> • during July and August 2018 • 2 litres/acre every 14 days 	Sulphur
Bittersaltz & Omex		Request to use: Bittersaltz - Mg Sulphate Bittersaltz @ 5.5kg/ha Boron @ 0.2kg/ha Zynergy Omex (Zn Zinc + Sulfur S03 + Copper Cu) @ 0.7kg/ha On 2 parcels:	Sulphur, Copper
Microthiol (sulphur)		Requested to use Microthiol Special (Sulphur) at 10kg per ha on Onions	Sulphur
Sulphur		Sulphur against mildew on tomatoes	Sulphur
Sulphur		Sulphur on carrots, parsnips, beans, barley, oats and onions against fungal disease - plan for 2018	Sulphur
Manganese sulphate and kumuls DF sulphur		Manganese sulphate and Kumulus DF (sulphur) on spring barley and spring oats	Sulphur
Microthiol (sulphur)	special	Microthiol special (sulphur) on hops against powdery mildew	Sulphur
Sulphur		Sulphur on apple and pear trees against mildew	Sulphur

Restricted input/Product	crop	Permission Details (incl. Ingredient/Brand Name of	Contentious input A
PatentKali		PatentKali 250kg/ha on carrot, onion, onion set, potato	Sulphur
Yaravita (manganese sulphate)	Mantrac	Yaravita Mantrac DF (manganese sulphate) on carrots/onions/onion sets/potatoes	Sulphur
PatentKali		Patentkali at 250kg/ha on carrot, onion, onion set and potato	Sulphur
Manganese sulphate		Manganese sulphate, Boron, Sulphur, Magnesium sulphate on carrots, leeks and broccoli.	Sulphur
PatentKali		request for Patent Kali has been approved: <ul style="list-style-type: none"> •For use between May-August 2018 •For use on - (- 2.68 ha) <li style="padding-left: 20px;">- (- 4.93 ha) - For use up to 250g/ha 	Sulphur
SoP		SoP	Sulphur
Microthial Special		Microthial Special <ul style="list-style-type: none"> • until 31st December 2018. • on Spring Oats, Spring Barley, Winter Wheat, Winter Barley and Spring Beans (for treatment of mildew and sulphur deficiency) • at the following threshold levels: as detailed in your submitted management plan 	Sulphur
Manganese sulphate		Your request to use Ilex manganese (Manganese sulphate) has been approved: Subject to: 1) 1ml / m2 applied as 2.5 L in 30m3 tank and irrigated to 5000m2 2) Glasshouse mixed salad and veg	Sulphur
Sulphur		Sulphur For use against scab and mildew in apple trees	Sulphur
Sulphur		Sulphur•On apples•Against mildew•When there is a risk of mildew	Sulphur
Potassium carbonate	hydrogen	Potassium hydrogen carbonate <ul style="list-style-type: none"> •On apples •Against mildew •When mildew is seen on new growth, alternating with sulphur 	Sulphur
Sulphur		Sulphur	Sulphur
PatentKali		Patent Kali (sulphate of potash)	Sulphur

Restricted input/Product	crop	Permission Details (incl. Ingredient/Brand Name of	Contentious input A
SOP		SOP on fields: Between 60 to 180 kg of product depending on field	Sulphur
Manganese sulphate, Boron, Sulphur		Manganese sulphate, magnesium sulphate, boron, sulphur on carrots	Sulphur
Sulphur		Sulphur on apples and pears for powdery mildew	Sulphur
Sulphate		Sulphate of potash for four fields with index of 0	Sulphur
Law bespoke		Law Fertilisers bespoke mixes on carrots in (9.3ha) and (5.7ha) The 1110 kg will be used over 3 applications as follows: 625 kg/ha BASE SALT MIX: 80K, 170 NaO, 2B, 60 SO3 500 kg/ha BED MIX: 9-0-9+Mn,S,B 10 kg/ha PLACEMENT MIX (with drill): N-P+	Sulphur
Sulphate		Sulphate of potash	Sulphur
Tracer (Spinosad)		Your request to use Tracer (Spinosad) has been approved. For use against Thrips on the following crops: - Tarragon - Mint - Basil - Chives	Spinosad
Tracer (Spinosad)		Tracer (spinosad) on plums for plum fruit moth - 2 applications	Spinosad
Tracer (Spinosad)		Tracer (spinosad) on leaf salads against Silver-Y caterpillars	Spinosad
Tracer		Tracer on spring onions	Spinosad
Tracer		Tracer (spinosad) on plums and gages against plum moth	Spinosad
Spinosad		Spinosad to treat for ermine moth in apples	Spinosad
Spinosad		Spinosad on apple and pears in fields 9, 11 & 33 against moth and sawfly	Spinosad
Spinosad		Spinosad (conserve) on basil, mint, tarragon and chives	Spinosad
Spinosad		Request to use Spinosad on Cauliflower to combat Cabbage Root Fly	Spinosad
Spinosad		Conserve (spinosad) on tomatoes against leaf miner	Spinosad
Tracer (Spinosad)		Tracer (spinosad) on apples	Spinosad

Restricted input/Product	crop	Permission Details (incl. Ingredient/Brand Name of	Contentious input A
Tracer (spinosad)		Tracer (spinosad) to treat against apple sawfly	Spinosad
Spinosad - tracer		Permission for Spinosad - Tracer	Spinosad
Spinosad		Spinosad against tortrix moth on apples and pears	Spinosad
Spinosad		Spinosad (Conserve)	Spinosad
Spinosad		Permission to use Spinosad on Rapsberries - Spinosad (Tracer)	Spinosad
Spinosad		Permission to use one application of Spinosad - Spinosad (Tracer)	Spinosad
Omex 'saltex'		Omex 'Saltex' (mined salt source) on 7ha fodder beet - 2 applications of 500l/ha	Sodium chloride
Potassium bicarbonate, Ferric Phosphate, pyrethrins, sulphur, PHC, Laws High N		2018 input and pest control management plan. P&D: potassium bicarb, ferric phosphate, natural pyrethrins, sulphur Restricted inputs: PHC liquid, Laws High N, Boron foliar feeds, Pharm organics Allowed without approval: Zenith, Biolife Pro A and S Rejected: Copper	Pyrethrin, Sulphur
Spruzit		Spruzit on brassicas	Pyrethrin
Pyrethrum		Pyrethrum on kale against aphids.	Pyrethrin
Tracer and Pyrethrum		Tracer and Pyrethrum to following fields:	Pyrethrin
Pyrethrum		Pyrthrum 5EC on leaf salads again Silver-Y	Pyrethrin
Spruzit (pyrethrum)		Spruzit (pyrethrum) on leaf salads against Silver-Y	Pyrethrin
Pyrethrum		Pyrethrum to all purple sprouting broccoli crop against aphid	Pyrethrin
Pyrethrum		pyrethrum to control aphids on broccoli	Pyrethrin
Pyrethrum		Pyrethrum on kale against aphids	Pyrethrin
Pyrethrum		Pyrethrum 5EC against plum aphid	Pyrethrin
Spruzit		Spruzit (natural pyrethrum) - on aphids at first sighting, 3l/ha on carrots.	Pyrethrin
Pyrethrum		Pyrethrum on salad brassicas	Pyrethrin
Pyrethrum		Request to use Pyrthrum 5 EC on Asparagus crop to treat Asparagus Beetle.	Pyrethrin
Pyrethrum		Pyrethrum for tortix moth on roses	Pyrethrin
Potassium		Potassium soft soap for aphids on roses	Pyrethrin
Pyrethrum 5EC		Pyrethrum 5EC (natural pyrethrins + piperonyl butoxide synergist)	Pyrethrin
Pyrethrum		Pyrethrum 5EC	Pyrethrin

Restricted input/Product	crop	Permission Details (incl. Ingredient/Brand Name of	Contentious input A
Pyrethrum		Pyrethrum against pear midge on pear trees	Pyrethrin
Pyrethrum		Pyrethrum 5EC For use against rosy apple aphid and apple sawfly	Pyrethrin
Pyrethrum		Pyrethrum •On apple and plum orchards •Against blossom weevil •When 4-6 insect found per tree	Pyrethrin
Pyrethrum (spruzit)		Pyrethrum (spruzit)	Pyrethrin
Pyrethrum		Pyrethrum for weevils	Pyrethrin
Pyrethrum		Pyrethrum 5EC	Pyrethrin
Pyrethrum		Permission to use pyrethrum 5EC against whitefly on kale - Pyrethrum 5EC	Pyrethrin
Calcium chloride		Calcium chloride (Yaravita StopIt) •On dessert and culinary apples •To aid fruit set •According to agronomist recommendations	Calcium chloride
		Leeks are suffering from Thrips infestation, verbal permission given by BK.	
Basic Slag		Request to use Basic Slag on selected fields:	
Sawfly		Soft soap against sawfly larvae on gooseberries	
PHC 9-2-2		PHC 9-2-2 on spinach and lettuce	
Organic Natural 2.0		Organic Natural 2.0	
		on Kale Crop when 4 slugs have been caught per trap	
Amino A, Calcium chloride, manganese		Nutrient inputs: Amino A, calcium chloride, manganese,	
Vita Protect		Vita Protect	
Basic Slag		permission to use basic slag - basic slag	
Melcourt Sylvamix		Requested to use Melcourt Sylvamix as a propagating material.	
Dunns Natural 3		Dunns Natural 3 (granular P and K)	
Better Grass Xtra		Better Grass Xtra on fields 4, 5, 14, 15, 16, 17 & 20.	
Basic Slag		Permission to use basic slag - basic slag	