



**LABORATORY OF WATER AND WASTEWATER TECHNOLOGY
DEPARTMENT OF FOOD TECHNOLOGY
SCHOOL OF FOOD TECHNOLOGY AND NUTRITION**

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**TECHNOLOGICAL
EDUCATIONAL
INSTITUTE OF
THESSALONIKI**



**Short term seminar:
Implementation of C2C issues in agriculture**

Alexander Technological Educational Institution of Thessaloniki

17/4/2013

9.00-9.30	Registration
9.30-10.00	Welcome-short presentation
10.00-13.00	The C2C concept: Why, What and How!
13.00-13.30	Coffee break
13.30-14.00	Functions of plant production: Structure of production process
14.00-14.30	Propagation material
14.30-15.30	Soil management
15.30-16.00	Lunch break
16.00-16.45	Plant nutrition - Fertilization
16.45-17.00	Close of the first day

18/04/2013

9.00-9.30	Irrigation
9.30-10.00	Plant protection
10.00-10.30	Harvest and Post-harvest handling
10.30-11.00	Equipment and Energy management
11.00-11.30	Coffee break
11.30-12.00	Waste management
12.00-12.30	Environment-Biodiversity
12.30-13.00	Health, safety and training of personnel
13.00-14.00	Presentation of the C2C game
14.00-14.30	Lunch Break
14.30-16.00	C2C game
16.00-17.00	Discussion-Conclusions

Activities report form

Activities: Training of Agricultural Scientists in C2C concept: the agronomist approach.

Date: 17-18/04/2013

Place: TEITHE

Activities (description of workshops, lectures, work etc.)

Training workshops using interactive presentation of Cradle to Cradle concept. The program includes detailed approach of C2C tailored on the specific needs of the activity. For plant production the individual functions of farming have been presented and analysed. After every aspect of plant production there was a conversation between the participants. In the opinion exchange and brainstorming there was an effort to find the weaknesses of currently applied practice and there were suggestions in terms of approaching C2C concept.

The program contained:

Day 1

- Presentation of C2C concept
- Circular economy
- Activity analysis and step by step approach

Day 2

- Activity analysis and step by step approach
- Simply Cycle Game (presentation and play)
- Open discussion – Suggestion for future work

Results (contacts, action plans, documents etc.)

All participants were introduced to a new perspective. The trainers' effort was focused on presenting the fact that there are no such things as "waste" but there are only procedures to be upgraded and useful products to turn bi-products into.

Conventional industry following the linear economy has a starting point or an input, and a finishing point or an output where products are produced as well as waste is produced also.

Following the individual functions of agriculture there were suggestions for the improvement of procedures and materials used in terms of increasing the sustainability and succeeding upgrade at the end of the production chain.

Related document: **Agronomy suggestions report**.

Learning outcomes (what input has been delivered for your organisation and for yourself)

The agriculture scientists training session made it clear to the trainers that there is already a lot of scepticism among farmers and agronomists about the practices currently applied in primary production. There is a clear picture that the cost of materials, the handling cost, the waste management and its cost are factors that contribute to the degradation of environment and the weakening of the sector. Considering the current economic crisis situation there is little hope for practising competitive farming and future recovery if we follow the same model.

Cradle to cradle approach of farming is a new hopeful dynamic approach which lets the player the advantage of selecting the best possible way of handling production processes and materials used.

The stakeholders of primary production are ready to change practice of agriculture and C2C has a good potential to be successful if it is applied in big scale projects and if industry adopts it and proceeds to the appropriate modifications especially in the inputs and other supplies form.

Agreements (what have all parties present agreed upon)

All recognize that currently applied practice is no longer sustainable and linear economy should be abandoned giving place to circular procedures.

All partners agree that something should soon be done in terms of redesigning the individual activities in farms in order to protect environment and achieve a dignified farmer income.

All of the trained scientists have agreed on collaboration for future pilot projects for practical implementation of C2C in commercial scale production farms.

All of them are ready to contribute each from his/her own expertise for the improvement of specific methods, procedures and materials.

Contribution (description of own contribution to the activities)

The trainers have attempted to transfer the knowledge, inspire the attendants and give them the appropriate initiatives and triggers so that the training would be more interactive and the trainees would contribute the best of themselves in terms of knowledge and enthusiasm. This was done by using digestible examples and by asking questions such as:

- "If you were the managing director of that factory what would you do to improve?"
- "If you were a minister of agriculture what would be your directive concerning?"

All their reactions and contribution to work was concentrated, processed and is recorded in **Agromony suggestions report**

Remarks

It is obvious that the agriculture world is more mature and receptive than ever for a dramatic change in both procedures and materials currently used in farming. The linear economy is driving to a dead-end in terms of economic viability, environment and quality of life.

Also except of political, economic and individual decisions there is a big gap to be narrowed in terms of scientific contribution to technical solutions that have to be provided.

Name: Athanasios Roubos, Ilias Kalfas

Organisation TEITHE

Place Thessaloniki

Date 11/05/2013

Signature

Agronomy suggestions report

This report contains the suggestions that have been made by the C2C training attendees concerning the cradle to cradle implementation, problems and perspectives.

Propagation material

Seeds and seedlings are usually contained in plastic bags and carton boxes. Plastic bags could be replaced with new biopolymers materials while carton boxes could be replaced by recycled carton.

The chemical pigments used for the labeling of those packages could be replaced by other pigments that are C2C accepted.

All upper materials could be multi-use and there should be a cost return upon returning them to the seed or seedling selling company.

In any case they should be appropriate for entering the biological cycle.

Soil management

Soil should be managed that way so that compaction and corrosion would not exist.

Also there should be measures for increasing soil quality both in terms of mechanical structure and in organic matter contained (biological cycle).

Plant nutrition - Fertilization

Fertilization should be managed in such way that the nutrients are not washed out by water in deeper soil depths where roots cannot reach them. Therefore there should be formulations of fertilizers that are constant in soil and remain in colloids for more time.

Nutrients should come from renewable sources such as plant remains and not by mining activities. This way the biological cycle could technically be implemented. In combination with technical cycle there can be an adequate plant nutrition practice.

Fertilizers are usually contained in plastic bags or plastic bottles when are liquid. These packaging materials could be replaced by biopolymers which would be multi use or bio-degradable.

The chemical pigments used for the labeling of those packages could be replaced by other pigments that are C2C accepted.

Irrigation

Water is one of the most critical resources for production. The way of reclaim, storing and application is very important for the environment. There should be more quantities of sweet water appropriate for agricultural use deposited in surface reservoirs, strict water use management plans and of course implementation of water saving irrigation methods such as underground irrigation or drip systems.

Plant protection

Chemicals used for the plant protection can be in many cases replaced by naturally occurring substances (as copper, sulphur, plant toxins etc), which can provide equal or even better results than chemical insecticides and fungicides.

Pesticides are usually contained in plastic bottles or bags or plastic. These packaging materials could be replaced by biopolymers which would be multi use or bio-degradable. Also when appropriate paper packaging materials could be used. The empty packaging could be returned to the company or incorporated into the biological cycle.

The chemical pigments used for the labeling of those packages could be replaced by other pigments that are C2C accepted.

Harvest and Post-harvest handling

Harvest could be done in such way that the waste would be minimized. All of the existing waste could be used for production of other alternative products than the destined ones. Only remains that have no practical use would return to the biological cycle.

Harvest boxes should be multi-use and they should be made of materials that will not be waste after end of life, but they can still be incorporated into technical cycle and produce the same or other products. Bio-polymers should be preferred instead of plastic or other materials.

Again the harvest containers should be returned to the company they were originally bought from.

Equipment and Energy management

All equipment should be well maintained. Service of machinery can reduce emissions and waste produced. Machine oil, spare parts and also consumables such as filters should be recycled in technical cycle.

Energy can be of renewable sources. Bio-diesel, photovoltaic panels, wind turbines and other biofuels such as pellets can be utilized in production procedure. This way a farm can cover part or all of its needs and also sell energy surplus making thus extra income.

Waste management

Empty containers of pesticides and fertilizers should be handled following a general waste management plan. Management plan should have provisions for solid, liquid and air waste. There should be plans for the avoidance of waste creation. However in any case there should be recycling and when appropriate up-cycling of all waste.

Environment-Biodiversity

Environment is a general term that contains agricultural, cultural and human environment. All of them should be protected.

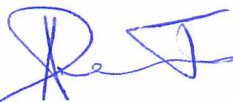
At areas that are not cultivated there should be natural vegetation which serves as refuge for beneficial organisms. Natural habitats promote biodiversity.

Health, safety and training of personnel

In implementation of C2C there are factors that should be taken under account such as health and safety of personnel. All selected actions and alterations of procedures and materials used should assure that there is no hazard involved for the safety and health of personnel and consumers.

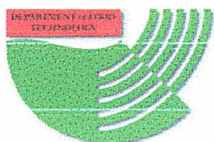
Also training is the tool for the successful involvement of stakeholders in such big scale improvements of procedures and materials. Training courses should be organized and provided to the personnel for a successful implementation.

Prof. Athanasios Roubos



Dr. Ilias Kalfas





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**Short term seminar:
Implementation of C2C issues in food industrial processes**

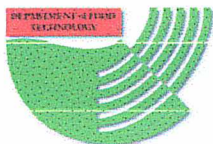
Conference Center of Sindos

Monday April 1st

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|--------------------------|---|
| 9.00-9.30 | Registration |
| 9.30-9.45 | Welcome-short presentation by the Greek partner |
| 9.45-10.00 | R. Bolsius: The C2C concept: Why, What and How! |
| 10.00-10.45 | K. Webster: The implementation of circular economy issues in the food processing plants |
| 10.45-11.15 Coffee break | |
| 11.15-11.45 | E. Karagiannidis: Best available technologies in food industries |
| 11.45-12.15 | A. Hatziandreou: A zero waste process for olive mill plants |
| 12.15-12.45 | A. Karagiannidis: Sustainable logistics chains in the agri-business - The GREEN AGRICHAINS EU project |
| 12.45-13.15 | T. Panoras: Reclamation and reuse potential of wastewaters |
| 13.15-13.45 | Discussion-End of 1 st session |
| 13.45-14.40 | Close of the first day |

Tuesday April 2nd

- | | |
|--------------------------|--|
| 9.00 -9.30 | I. Kalfas: Presentation of the C2C game |
| 9.30-11.00 | C2C game (all) |
| 11.00-11.30 Coffee break | |
| 11.30-15.00 | Visit in an olive mill plant-Potential for C2C issues implementation in the plant-light launch |
| 15.00-15.30 | Discussion-Conclusions |



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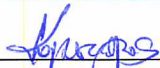
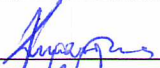


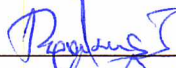

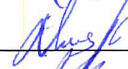
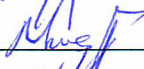

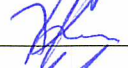

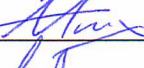


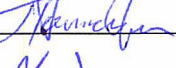
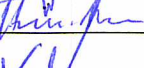

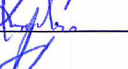


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Short term seminar: Implementation of C2C
Seminar Attendance Form

Place: TEITHE

NAME	DATE: 17/4/2013	DATE: 18/4/2013
GIANNIS KARASTERGIOS		
DIMITRA KOKA		
GIANNIS PEROULAKIS		
NIKOS GKOUTZIOMITROS		
KOKKALIS CHRISTOS		
ALEXANDROS ALEXANDRAKIS		
MARIA LAZARIDOY		
ASTERIOS PAPAIOANNOU		
PARASKEYI KARTSANA		
KONSTANTINA SKOTINIOTI		

Trainer(s):

ATHANASIOS ROUBOS

ILIAS KALFAS

