CULTNATURE

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ABSTRACT: CULTNATURE is a project to transform uncultivated and wasteland from old mining and industries in Biomass-Park areas, which are development axis in sustainable cities and regions. This project is developing the idea of the international architectural exhibition "Emscher Park" under consideration of the "Energiewende" and an ecological modernization of the industrialized society. Further CULTNATURE line up the idea of the IBA Emscher Park on a new economic basis and is connecting it with new economic perspectives
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1 INITIAL POSITION

Disused mining and military areas as soon as old industry areas are often transformed in uncultivated or waste land which is in short and medium terms unattractive for a new economic use. The disusing of mining or the retreat of Military bases concerns many regions. This caused negative impacts of the economic development of these regions. A less of demand for industrial- and industrial real estates causes a non-using of these areas. Most of these areas cannot be used for residential buildings. All this impacts are responsible for a development of this area to uncultivated- or wasteland in cities and regions.

These problems are to observe in cities where the mining industry where shut down long time ago. For example in Bochum the last active mining closed in the year of 1973. 2011 Bochum has still more than 440 ha wasteland without new functions. Most of them are bigger than 10 ha. Such areas are relevant for the city development on one side, and on the other side they influence the townscape. Areas like this are suitable for the production of biomass.

Bochum has still ca. 900 ha of disused mining areas. More than a third are 40 years after closing the mining without a satisfying using. It has to be noted, that old mining areas can not be reused in a short time after stopping the coal production; there are procedures for safety and cleaning of the area and existing buildings and the rebuilding under control of the states mining agencies. But there is still the fact that more than a third of all mining areas are not used today, and in other cities in the Ruhr-region the situation will not differ. The surveillance made in Bochum in the last years will be make exemplary in cities where the mining will stop until 2018. This is expected because the cities in the Zone of Emscher and Lippe are having less of economical dynamic than the cities in the Hellweg-Zone. For these cities it is important to link CULTNATURE with strategies that can sustainable advance the quality of the locations. The concept of CULTNATURE is a solution for the discussed problems, which linked two known ideas. The first idea takes parts the motivation of the IBA- Emscher Park to develop wasteland to a park landscape. The ambition is an intra-urban advance of living- and location quality. These city-parks can be connected to a regional park landscape through the Ruhr-Region. The second idea is an economic use of wasteland and other uncultivated land to produce biomass for Energy. This solution can be realized without public funds because these biomass parks are cost-effective. They will have a positive impact on the townscape, City development and Quality of location.

Figure 1: An example of a biomass-park, which adds typical elements of park-landscapes with a production of energy-crops and the social approach of recreation areas. [1]

In consideration of these circumstances it is obvious to link both ideas together. That means, that for the composition of these park landscapes crops are used that will have a positive aesthetic appeal and can be used economically worthwhile.

The main idea of CULTNATURE is the transformation from wasteland to agro industrial used park landscapes.

2 SUSTAINABLE AND INTEGRATED CITY-DEVELOPMENT

With the transformation into Bio-Park landscapes wasteland of unused mining areas shall be used for a sustainable city development in old mining regions. CULTNATURE is orientated on the Concept of sustainability of the Brundlandt-Commission and the UNO-study from 1983 "World commission for environment and development". In the 1987 published study „Our Common Future" the commission defines a sustainable development as a development that considerate the requirements and needs of the todays Generation without endangering the possibilities of following generations to consider their own requirements and the choosing of their lifestyle. Transferred on city development this means; a sustainable city is a city that does not affect todays and future development of other cities and regions with their resource use.

The Concept of Sustainability is often concentrated on ecology. This conducts a systematically underestimation of social and economic challenges at the realization of sustainability.

Many experiences in the past ant the today's activities for Climate Change show that Sustainability is not accepted politically and social, if Sustainability stands against a economical development. Sustainability

will be not achievable if the ability of the economic is endangered to produce a social broad accepted dimension of prosperity. At least this is guilty for the industrialized countries und their affected production- and economical culture. The ability to produce a broad accepted prosperity is direct influenced by the social suggestion of the prosperity, also the amount and the distribution of this prosperity.

The Climate Change shows clearly, that the industrial affected structure of production and consumption is not sustainable in any way; further it endangered the natural basics existential. The CO_2-Emission or the use of nuclear power does not only cause this, above all it is the consumption of natural resources behind the planetary boundaries. This is from the ecological side not acceptable any more and therefore politically insupportable. These behave causes conflicts about the distribution of resources and of ecological costs and risks. The Consumption of natural resources is the central problem of the ecological sustainability, may be it is the only existing adjusting instrument to achieve sustainability.

How experiences with the attendance of sustainability are showing, any effective programs are failing on the question of prosperity. That means, that sustainability is just achievable if she is linked with prosperity. And the only way seems to be Resource efficiency. With a drastic increase of resource efficiency about a factor 10 in the next two or three decades it may be possible that industrialized countries can hold their prosperity and developing and emerging countries close the gap to the industrialized countries without increase the resource consumption and the GHG-Emissions.

With this background CULTNATURE is setting the ecological focus on resource efficiency, with the combination of energy efficiency and the IBA Emscher Park Motivation of Live Quality. Live Quality has its own value, because a less of live quality is a bottleneck for the economic development in the Ruhr-Region.

This is reasonable in the dependency of local quality in Germany in manpower of high-qualified labors. And this supply is determined by live quality.

CULTNATURE changes the priorities in social and economic views. As it is seen now, the IBA Emscher Park did not focus enough on the economic dimension of the transition. This review is outgoing from today Problems and Problem understanding which are quite different to the situation during the IBA Emscher Park.

CULTNATURE gives a view of different possibilities and solutions to realize the above-mentioned concept of sustainability. On the level of city planning and development these possibilities are particularly the transformation of wasteland to bioenergy parks as an instrument

1. For the development to a green city, particularly a city, which generate an important part of their energy demand from Biomass. These cities are using wasteland for creating development axis for a sustainable city development.
2. For the creation of attractive town scape while wasteland and uncultivated land will be transformed to aesthetic places that are attractive for leisure and sport activities.
3. For a local attractively against trends; the development of industrial wasteland to industrial real estates.
4. For the employment trend for people with a lower qualification and less of chances on the employment markets.
5. For the development of a city culture with a balance of interests with the discussion of creation und Use of wasteland and uncultivated land.

On the level of Quartier development CULTNATURE gives opportunities in the use as an instrument for:

1. The advancement of Living- and working areas in Quartiers, which are affected from the retrogression of the mining industry, throw the transition of wasteland.
2. The activation of this quartiers via participation of inhabitants in planning, creation and use of wastelands.
3. The regional advancement of Life chances with Job creation and options for qualification. This is important for young and less qualified workers.

These conflict potentials are lead directly to the second main idea of CULTNATURE, the idea of a integrated city development. This idea is propagated as a main item of city development in the Charta of Leipzig from 2007. The Leipzig-Charta is building in the Aalborg-Charta that was declared in 1994. In Germany, the Initiative “National City Development Policy”, the Institution “Deutscher Städtetag” and the German City- and Community band implement the Leipzig- Charta.

Integrated City development in the meaning of the Leipzig-Charta includes a participation of all involved stakeholder in the process of city development. Disadvantaged Quartiers shall get more in the center of political activities. Also with the instrument of participation different positions shall be balanced.

The special focus for disadvantaged quartiers is to settle the unequal chances of involvement. The results of this approach should be a higher quality of city planning and development, more Life quality, the protection of urban framework and at least a sustainable development.

3 PROJECT DEVELOPMENTLAYOUT

CULTNATURES Concept for Sustainability gives some guide lines to continue the project:

1. First aim of CULTNATURE is to transform wasteland to biomass parks as much as possible. These parks must be productive in a middle and long term. These parks content further landscape elements, free and commercial leisure supply, Living areas, and industrial real estates. This aim must be included in all planning and development of wastelands from the beginning. Economical activities must be ecological and social sustainable.
2. Wastelands, with no option for a industrial use in a middle and long term should developed with a high leisure value for defined target groups, so that Life quality and the environment of the region is increasing.
3. All wasteland should be planned in a way, that, while

keeping landscape architectural quality criteria and functional necessities, the best possible yields from energy crops are reachable. Biomass will be an important renewable energy source, but other options like Photovoltaic or wind energy can also be used, if it is economically reasonable. Areas:

A central item of a CULTNATURE area is the link between an economically meaningful biomass-production with an ambitious landscape architecture. Wasteland and other uncultivated land in cities are transforming into places that are aesthetic and attractive for leisure and also industrial use. With areas like that townscapes can be created more attractive. The areas are an instrument to develop green cities with a own energy production side and green developing axes. They will increase the value of Life and the work- and living areas of disadvantaged quartiers and regions.

The concept of CULTNATURE is basically applicable for all industrial waste- and uncultivated land, and military conversion land in urban regions. The layout of your paper should have exactly the same format as this master document.

Figure 2: Industrial Wasteland in Dortmund [2]

4 BIOMASS

Since a few years there is still a debate of the sense of using Biomass as an energy source. To bring the debate on a point: The production of Bioenergy is only with the use of organic waste and biomass from residues ecologically worthwile. Otherwise Biomass males from the ecological point of view less of sense. This point is represented by the German National Academy of Sciences Leopoldina in her study; "Bioenergy: Chances and Limits", published in 2012. The academy advises a development of all renewable energy sources except Biomass. This message was spread fast by the media.

The study of the academia just discussed biomass from agricultural production sides. Biomass out of urban wasteland was not included in their considerations. Thus, CULTNATURE approach is still an option for a sustainable biomass use. Urban Biomass can still be an important energy source within the combination for a sustainable urban land use planning. The energetic potential of these areas are neglect in the study, but also in the socially and politically discussions of the last years. Scientists have to think beyond one's own nose and look for alternatives in the discussion about Food versus Fuel. All the more, while Biomass still has an important part in a renewable energy system, special as a source for heat/cooling and the electricity supply with "storable" energy.

CULTNATURE is an option, where all the negative positions against biomass not apply. The approach of CULTNATURE is to use areas for the production of biomass that are uncultivated or wasteland without any other using options. These areas are not suitable for any kind of food production. Some of these areas where the mining industry march on rural areas with agricultural use, can bring back into the agricultural system to produce biomass without taken arable land out of food production.

CULTNATURE brings options for the production of bioenergy, which are ecologically and economically sensible.

The Biomass production is in the concept of CULTNATURE not the main item it is just an instrument. The aim is to value up wasteland into architectonic, functional, ecological and economical productive landscapes. The production and conversion of biomass should finance the transformation and guarantee the full coverage of follow-up costs. Follow-up Costs are generated by the preservation of the parks. Further the biomass production is a form of Catalyzer for the settlement of small and medium industrial real estates and other productive activities. At least the biomass production for bioenergy is a contribution of city to resource efficiency and a major step in the direction of "urban Mining".

After all, the dictum for the production of Biomass at CULTNATURE areas is to search for the economically best form of Biomass production in Line with the restrictions that are given by the targets of city development. Like mentioned above short rotation plantations and agricultural areas that are used for energy crops can be implemented in Park-Landscapes. This creates options to benefit with high-energy yields from the park areas keeping landscape architectural and town planning quality in mind.

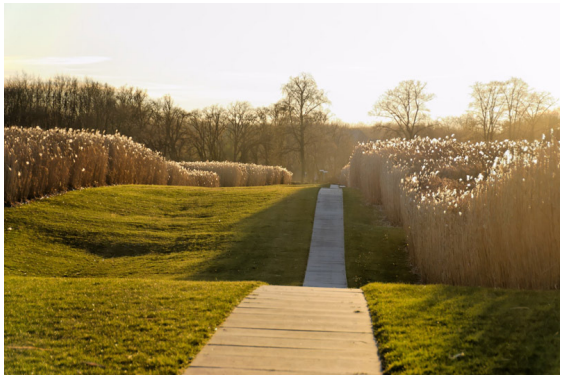

Figure 3: Project New Gardens of Schloss Dyck using Miscanthus as an landscape architectural element, (http://www.stiftung-schloss-dyck.de) planed and realised by Stephan Lenzen, RMP Landschaftsarchitekten (http://www.rmp-landschaftsarchitekten.de) [3].

The Production and combustion of biomass is not only a financial instrument, it has also a function as a promoter for the development of commercial and other productive activities. Further, the biomass conduces to a third aim of CULTNATURE. CULTNATURE - Biomass contribute resource efficiency of cities and is a step in the

direction of "City Mining". "City Mining" means, that preferably all organic waste and residues are used for material and energetic utilization. Infrastructure and logistics for sampling, separating and storage of this organic mass is a main requirement. CULTNATURE can help to build up these infrastructures.

5 CROPS

Most of the areas of the CULTNATURE project are areas with different grades of soil contamination. This problematic can be handled with three options. The first option is to cover the ground with a new surface soil or, using crops with a deep going root system to use a filling soil. This is the common way to make these areas reusable.

Second option is to leave these areas unused, so natural wild crop systems will discover these areas. Some areas with succession – forests are still existent.

The third variation is not common used for the old mining areas in North-Rhine Westphalia. It is the use of crops for soil rehabilitation. Reasons for the rare use of this methodology are the long lasting period and the reduced feasibilities of these areas. They cannot be used for sport parks, children's playgrounds, other leisure activities and buildings. This possibility is interesting for areas, which has to be used as green corridors from the landscape architectonical- and from the city planning side.

These areas can be integrated as locked agricultural modules in parks, as biomass producing areas or in combination with special events like Nature trails for Soil rehabilitation a.s.o.. Further less and middle contaminated soils can be brought onto these areas for crop-soil rehabilitation. This option is financially attractive because income can be generated which is directly dependent of the grade of contamination.

There a special crops which can be used for this soil rehabilitation with Phytodegradation . Crops assimilate Toxic matters in different ways. Therefore crops with a high assimilation rate and a concentration of these toxic matters in their biomass are particularly suitable for the Phytoextraction. Other convenient crops inactivate toxic matters with chemical processes inside the crop. The gain of these crops is the less of toxic matters Synthesis while the combustion ore digestion process.

With these context it is important that most of the energy crops that are feasible for CULTNATURE will not assimilate toxic matters in high rates. Most of the crops can assimilate inorganic matters like heavy metals over their roots. High toxic matters like polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyl's (PCB) or Dioxins and Furans (PCDD/F) are chemical so high complex that most crops cannot assimilate them complete or just in components. Other crops are able to inactivate some of these toxic matters.

The production of biomass on old mining wasteland or other uncultivated land of industrial estates is not problematic from an ecological and healthy point of view. This includes crops that are spontaneous colonizing themselves like in Succession forests.

Cost models that are basing on agricultural experiences are not useable neither for city recycling areas nor CULTNATURE areas. The production and business models are too different from this way of urban agriculture. So urban agriculture has to develop a new type of agricultural model. It is desirable to develop models for calculating these business models. From the current state of scientific knowledge it is not able to do. Agricultural production lines are not transferable on urban biomass production pathways.

Production models are influenced by a plurality of factors. For urban agricultural special models for every single area have to be calculated.

CULTNATURE can provide a framework to calculate pilot projects in different variations.

These experiences can be first components to create system modules that support a modulated development of production models for urban wastelands.

6 CONCLUSIONS

The ecological impact of CULTNATURE is hard to estimate, special for climate effects in small regions like city quartiers. It is still known, that green corridors have an important function for the climate of urban areas. So CULTNATURE areas will still also have positive effects.

More important are the indirect socio-cultural climate effects. If CULTNATURE establish urban wasteland as new green corridors and urban developing axis a transition in the behavior of urban leisure and mobility can have positive ecological effects. The establishment of more leisure attractiveness in urban areas can cause more leisure activities in the nearer periphery with a reduction of transport performances. The development of CULTNATURE further can bring together Living and working areas.

The production of biomass on urban wasteland has a significant positive ecological effect. The agricultural production of energy crops often causes high environmental pollution causes by over-fertilization, Eutrophication, acidification of soils and a loss of biodiversity. The energetic use of residues and organic waste has positive results in the Eco balance. CULTNATURE will have better results and effects as the conventional production of biomass on agricultural areas. Special the positive impacts on biodiversity will be measurable.

7 REFERENCES

[1] KLA – Kiparlandschaftsarchitekten with friendly permission of S. Günther.
[2] First Report CULTNATURE-Bio-Montan-Park NRW Dez. 2012 IAT Bochum.
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9 LOGO SPACE

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