

SNOWMAN NETWORK

Knowledge for sustainable soils



Rejuvenate 2



Rejuvenate 2

- Partners
- Background – state of the art – R1
- Aims of Rejuvenate 2
- Work plan
- Time table
- Expected results and content of the deliverables
- Budget, resources
- Risks of the project



Rejuvenate 2 partners

- Swedish Geotechnical Institute, SGI
 - r3, UK
 - Dechema, Germany
- Bioclear, Netherlands
- Hasselt University, Belgium
- ICMPRR, Romania

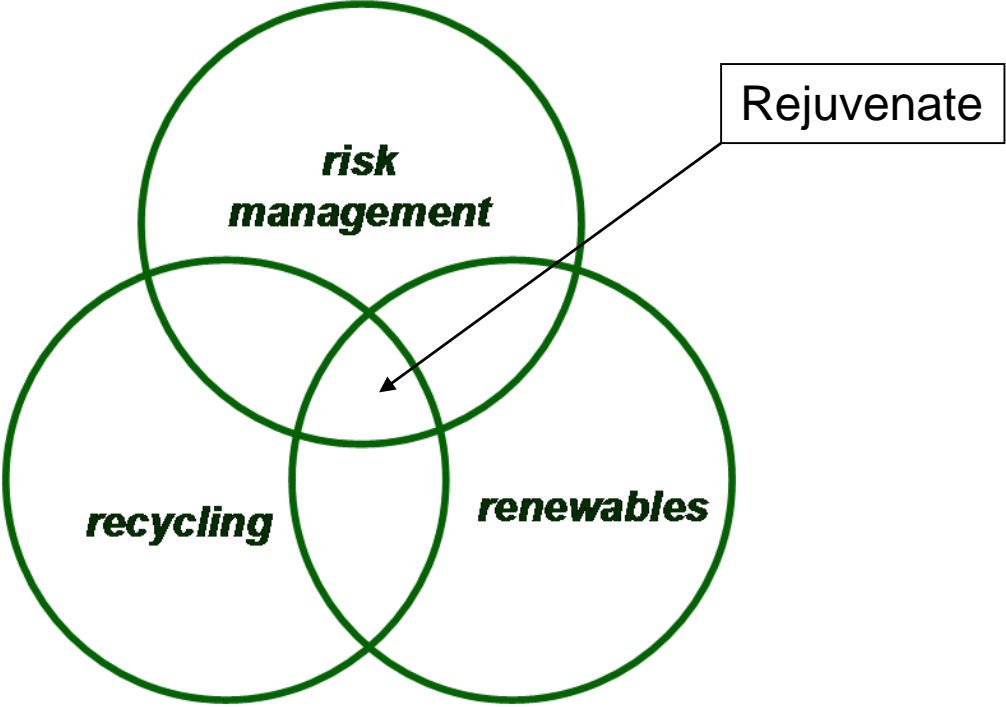
Background – state of the art - Rejuvenate (R1)

- Snowman 1 project
- A desk study
- Carried out by r³ (UK), Dechema (Germany), SGI (Sweden) and Bioclear (NL).
- The goal was to highlight the potential opportunity for using marginal land for producing biomass.





Hypothesis: Sustainability synergy





R1 showed that:

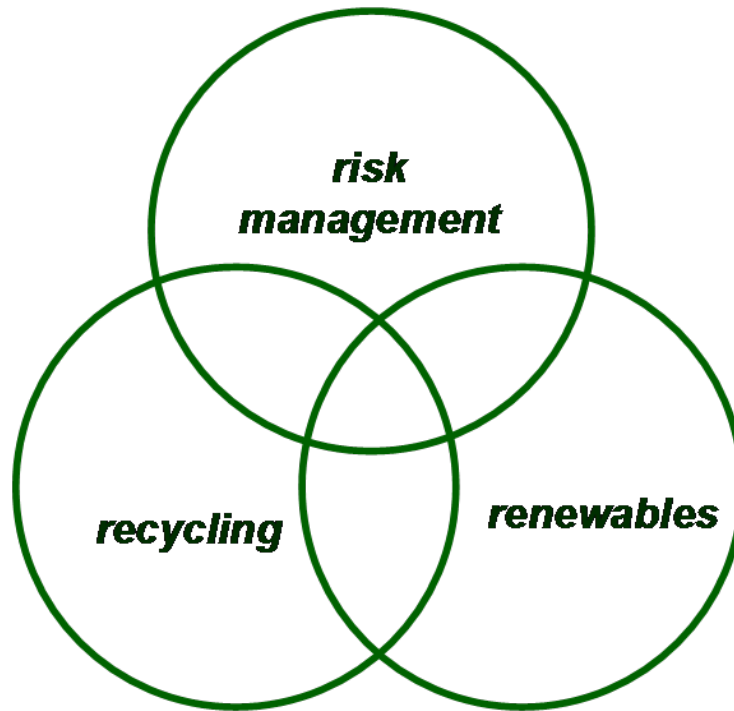
- Marginal land is present in Germany, Sweden and the UK as well as more widely across Europe.
- The use of marginal land may offer sustainable advantages in regions where it is present in significant amounts and cannot be readily used for food production or built development.
- There are significant amounts of organic waste that could be used for soil improvement and as a fertilizer substitute (depend on contaminant level)



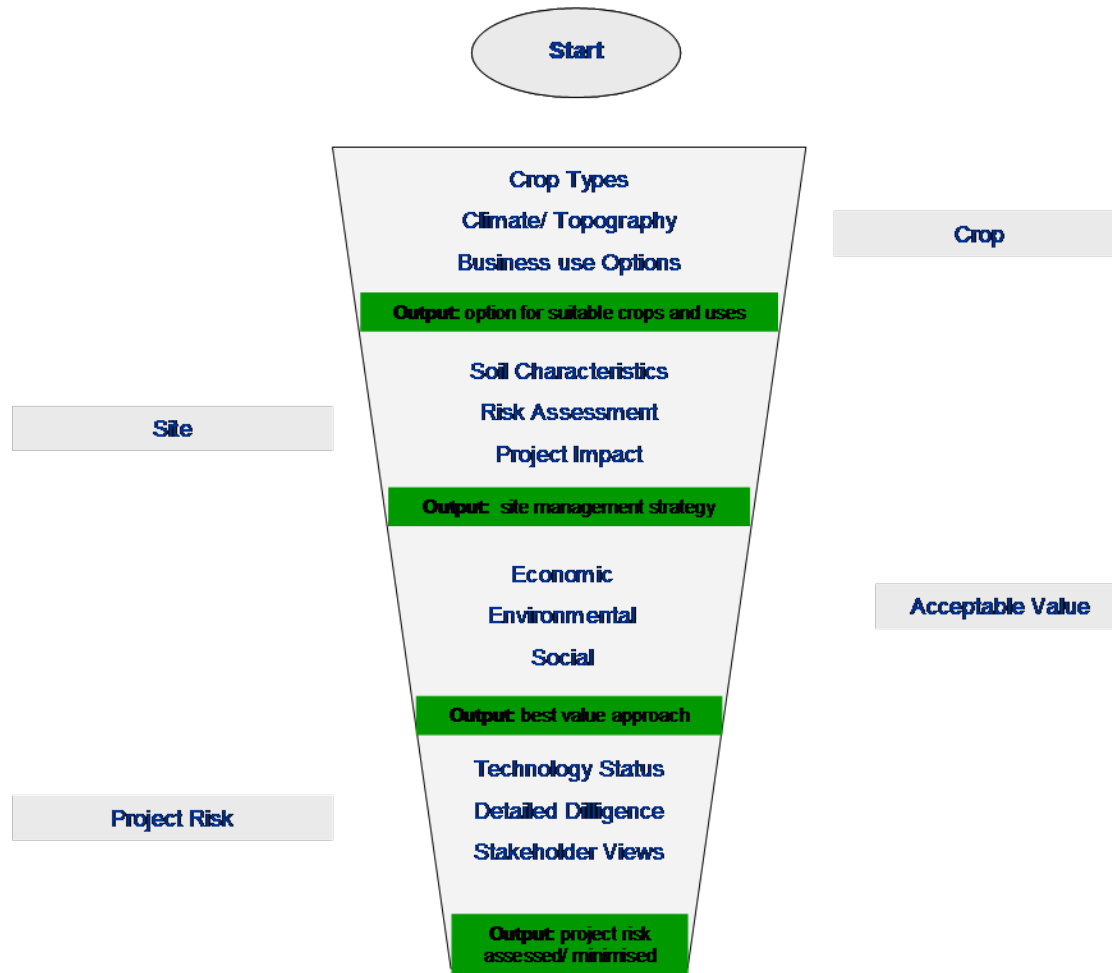
R1 showed that (contd):

- There is an increasing demand for biomass production (for energy, fuel and feedstock)
- This demand is placing pressure on agricultural land
- The use of marginal land for biomass may, in part, offset such pressure
 - More sustainable than biomass on agricultural land?

In principle: Sustainability synergy



Development of a decision making framework (decision support tool, DST)



1 Crop suitability

- This stage primarily considers from a range of possible biomass crops which crops are able to grow in a region and find a market in a region.
- It also considers site topography at this stage for convenience. This stage provides a biomass crop shortlist.
- Each subsequent stage is likely to reduce the length of this list as a more refined solution is found.





2 Site suitability

- Considers:
 - a) site conditions and soil management for possible biomass crops (including need for compost / soil improvement)
 - b) risk management for the site, taking into account soil management and crop cultivation
 - c) environmental impact assessment of crop production, site management and conversion might be.
- A site may be suitable already for some crops or can be made suitable by soil / risk management interventions.
- If an on site conversion facility is being considered then the suitability of the site for this facility must also be considered and any necessary interventions (for example infrastructure) considered.



3 Value

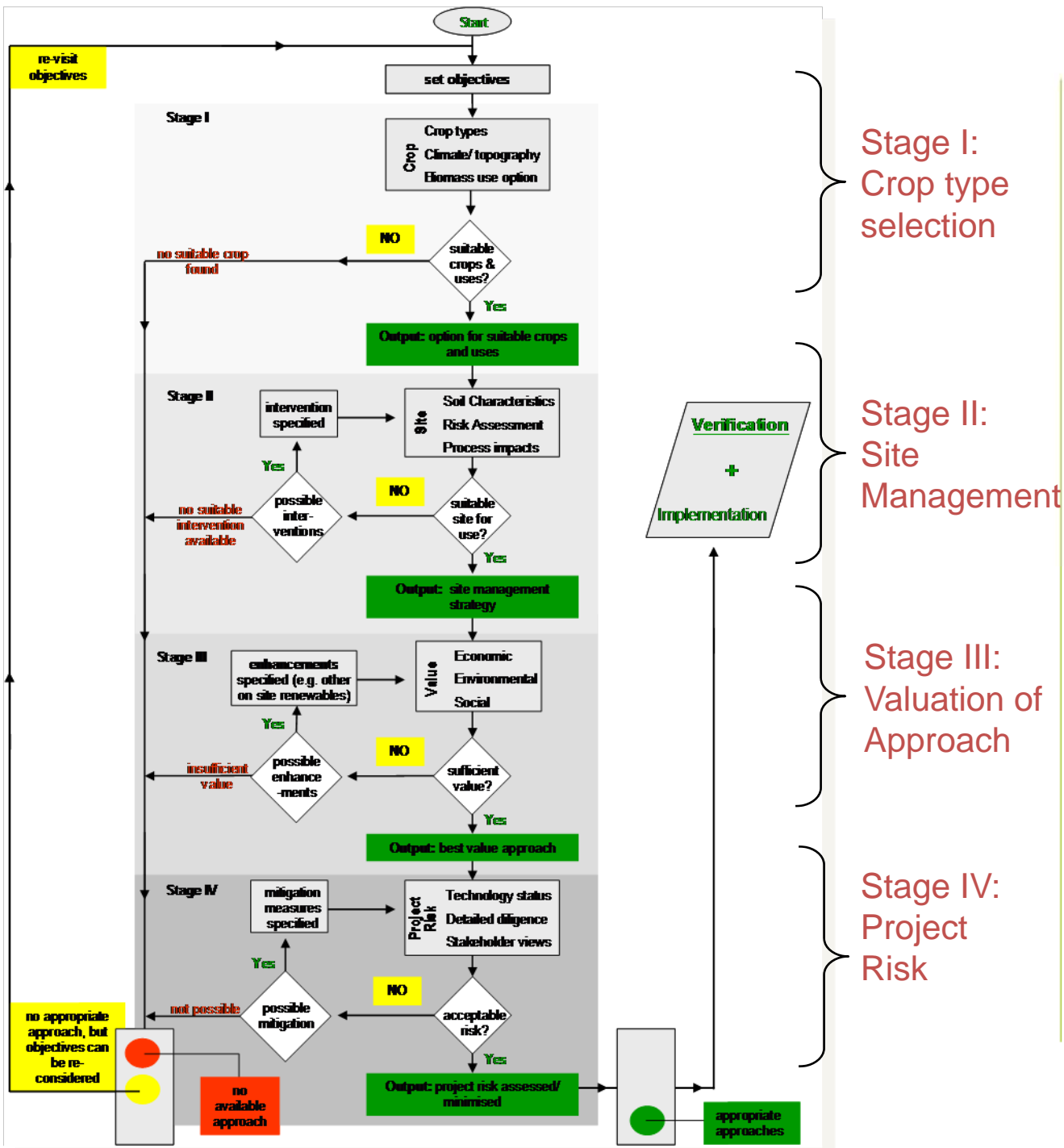
- Considers
 - the direct cost benefit equation as to whether the benefits of using a site for biomass are worth the investment needed
 - the wider sustainability of the project (environmental impact assessment, social impact assessment etc)
- It may be appropriate to include other measures to increase overall project value, e.g. integrating other forms of renewable energy production with the site re-use; or combining biomass use with the re-use of agricultural residues.

4 Project Risk

- Once a firm project concept has been elaborated whose value is attractive to its developers, the project planning needs to ensure as far as possible its viability before any major investment takes place, considering:
 - technology status
 - detailed diligence (e.g. of financial partners and project partners)
 - the broad stakeholder consensus (although early involvement should have taken place)



Decision Support Tool Structure



Stage I:
Crop type
selection

Stage II:
Site
Management

Stage III:
Valuation of
Approach

Stage IV:
Project
Risk

Verification
+
Implementation

re-visit
objectives

no appropriate
approach, but
objectives can
be re-
considered

no
available
approach

appropriate
approaches



Stage 1: The identification of crop and use opportunities

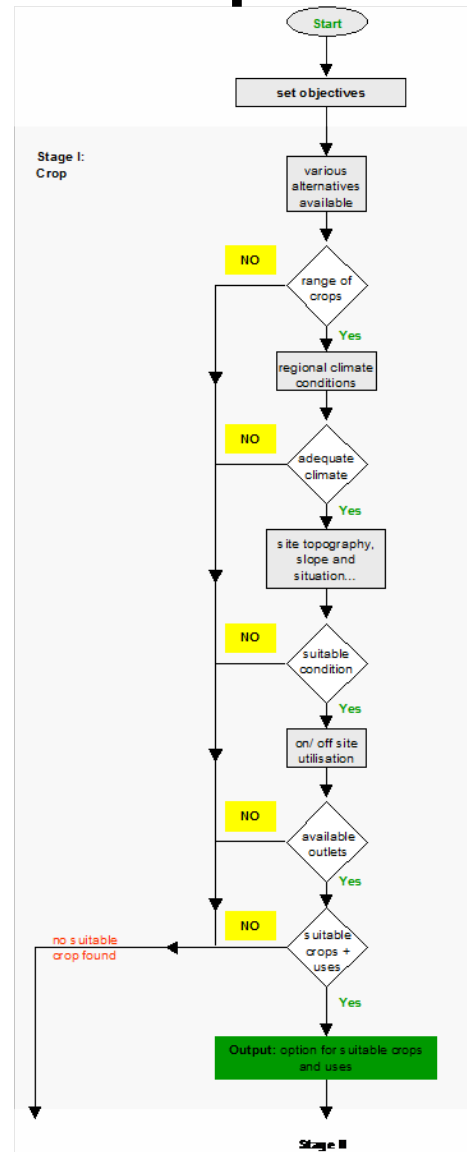
- Project objectives and constraints in overview (e.g. off site use of biomass)
- Range of crops that could meet overall project objectives
- Suited to the climate, topography, slope conditions
- Available opportunities for biomass use



Output: short list of crops that fit local conditions and have an outlet

25 %

Completion of overall procedure



Which kind of crop shall be considered? Reason for preferences in objectives?

What are the dominating local climate conditions?

Which kind of biomass conversion shall be considered? E.g. On/ Off Site? Reason for preferences in objectives?

Research gaps identified in R1:

- Crop
 - There is need to better understand the fate of contaminants that might be taken up by biomass produced on marginal land
 - There is a need for elaboration of strategies for risk management regarding the transmission of contaminants to harvestable fractions of biomass
- Site
 - URGENT need to support large scale demonstration work
 - Implementation (move from academic to practical)



Research gaps identified in R1 (contd):

Value

- The long term impacts (soil quality, water quality, biodiversity, environmental impacts on regional to global scale)
- Biofeedstock opportunities would be interesting to consider

Project risk

- Confidence building activities e.g. networking and other activities to developing more holistic approaches to the regulation and permitting of projects facilitating the use of biomass from marginal land
- Where case study projects are taking place the performance regarding environmental, economic and social goals should be monitored to present “good example” and as to better understand causes of poor performance where it occurs.



Research gaps identified in R1 (contd):

Over all

- The decision making approach developed by R1 should be “tested” against
 - real demonstration project activities
 - its wider applicability in Europe (especially countries with large areas of marginal land)
- Useful with demonstration projects in various parts of Europe to take into account different regional, economic and technological aspects and to test the decision making framework from R1





Rejuvenate 1 reports:

- Guidance Report, which describes
 - The sustainable development opportunity
 - Available land banks, biomass and organic matter opportunities in DE, S and UK
 - Elaborates the decision making framework
 - Comprehensive supporting information for the decision stages (Including tables, technical annexes and > 300 supporting references and links)
- Accompanying worked example
- Two reports looking at case studies in Sweden (LCA & Carbon balance, “Swedish context”)
- Available from: <http://www.snowman-era.net>

Aims of Rejuvenate 2 (R2)

- Fill in research gaps found in R1
- Apply DST to real sites
- Validate and optimise the decision making framework
- Provide detailed case studies for the reuse of contaminated land for biofuel crop production
- Extend the scope of the DST to a broader European context by applying and validating it in three new jurisdictions (Belgium (desk study) and Romania).

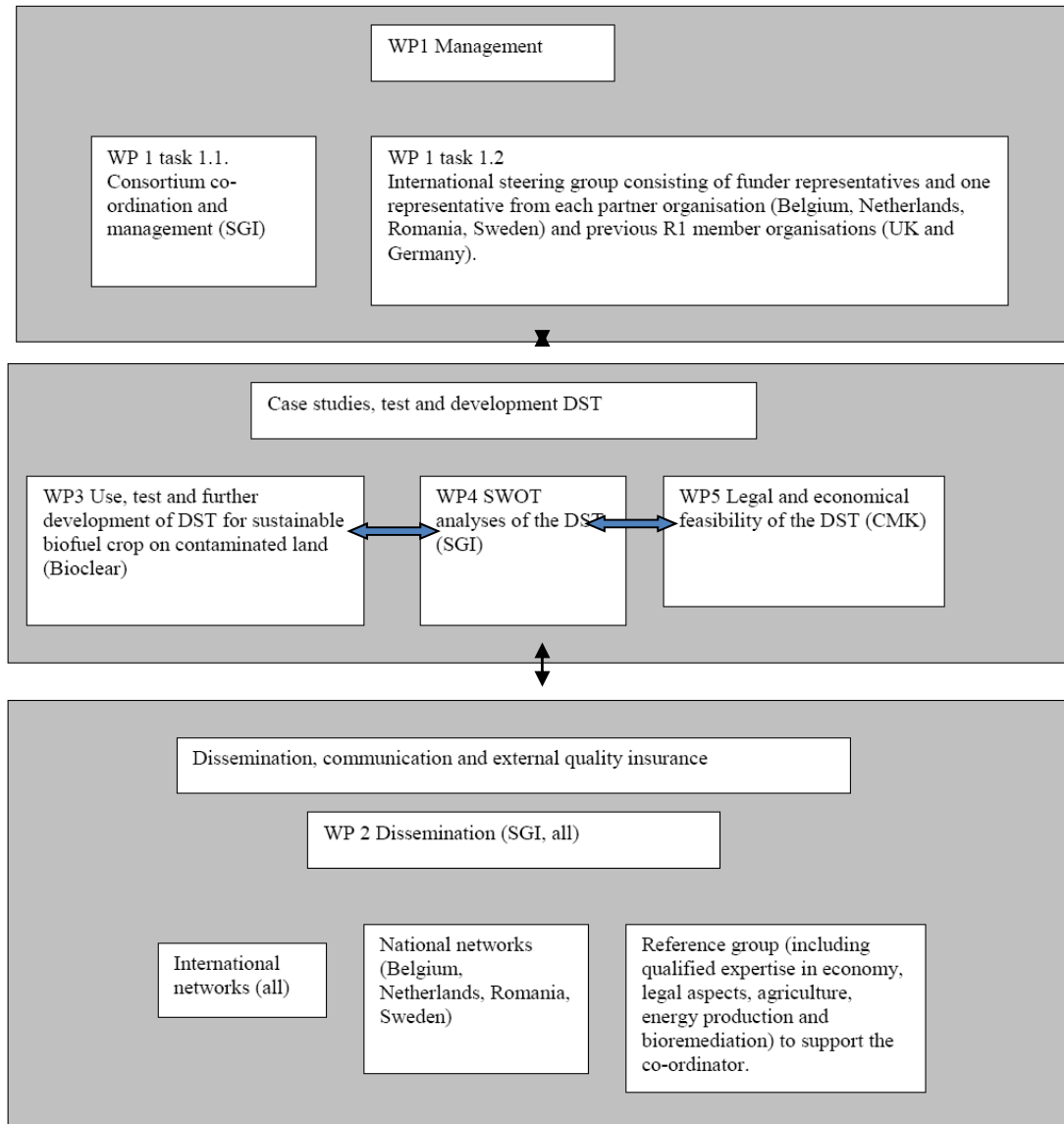


Specific objectives of R2

1. Establish three full scale case studies in the participating countries (Sweden 1, Romania 2 and additional desk study Belgium).
2. Provide a mechanism for other countries and third party funders to add further case studies to the project over its three year life span.
3. Validate the decision support approach based on *Strength, Weakness, Opportunity and Threat* (SWOT) analysis, with regard to i) crop and site management and ii) biomass use and delivery of value to stakeholders.
4. Perform ecological, environmental, legal and economical assessment of the crop based systems for sustainable risk based land management (RBLM), including the full chain of choice of fields to biomass use.
5. Identify ongoing research, developments and experience of implementation agendas for the re-use of contaminated land for biofuels.



Rejuvenate 2 (R2) organisation structure



Workplan





SGI

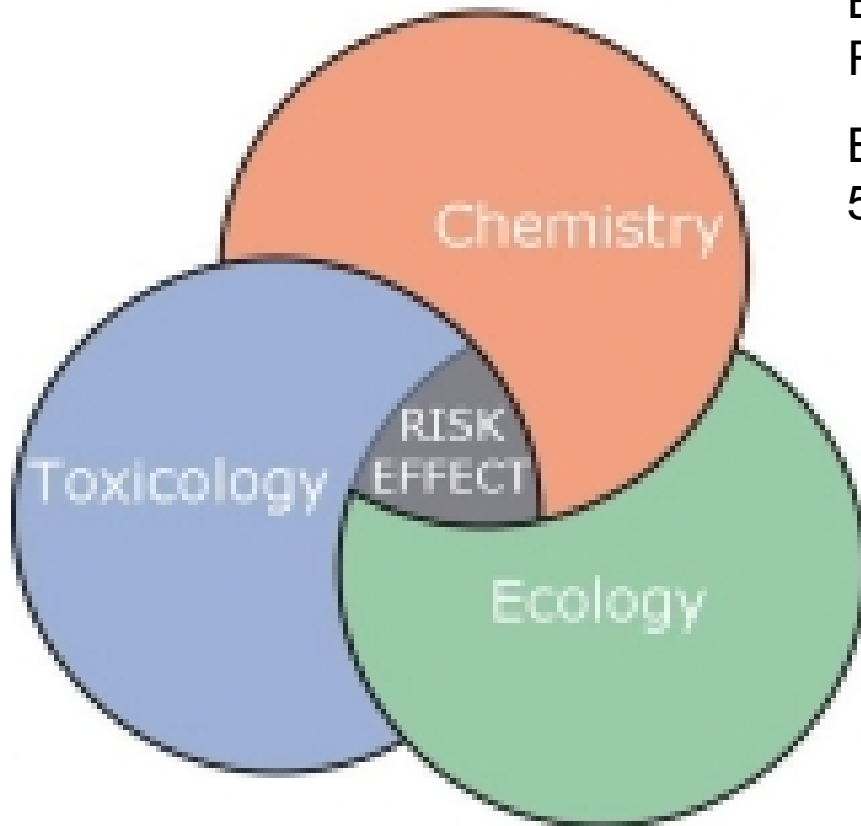
- WP 1 – co-ordinate: project + steering group (SG)
(SG repr. partner, R1 repr., funder repr.)
- WP2 – co-ordinate: dissemination
- WP3 – “responsible for” Swedish site/pilot
- WP4 - co-ordinate: SWOT analyses of DST including EIA
- WP5 – communication WP4 and provide information from Swedish site, praxis and legislation



Bioclear

- WP 1 – participate in steering group
- WP2 – contribute to dissemination
- WP3 – co- ordinate: including eco-toxicological assessments of sites and the harvested crops
- WP4 - providing information from WP3 to SWOT analyses

WP 3: management, crop selection ecological risk assessment



Bioclear In rejuvenate II:
Risk effect

Budget from funder
50.000 euro



ICPMRR

- WP 1 – participate in steering group
- WP2 – contribute to dissemination
- WP3 – responsible for Romanian sites/pilots
- WP4 - providing information from WP3 to SWOT analyses
- WP5 –provide information from Romanian site, praxis and legislation

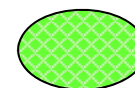


POSSIBLE SITES FOR CASE-STUDIES IN ROMANIA



Significant contaminated lands with heavy metals (Cu, Pb, Zn, Cd)

- 1- Copsa Mica, Sibiu county
- 2- Zlatna, Hunedoara county
- 3 Baia Mare, Maramures county
- 4- Valea Calugareasca, Prahova county



Affected-contaminated areas with radionuclide, by uranium mining activity

- A – Bihor area, Stei zone
- B – Banat area, Ciudanovita zone
- C – Suceava area, Crucea zone





Hasselt University

- WP 1 – participate in steering group
- WP2 – contribute to dissemination (see project Gantt chart)
- WP3 – use information for WP5 from Romanian and Swedish sites
- WP4 - provide information from WP5 to SWOT analyses
- WP5 – co-ordinate: Legal and economic feasibility of the DST

Planned work

- Legal
 - EU and national overview
 - Recommendations
- Economic
 - Local and regional economic impact
 - Cost-benefit analysis → involves two stakeholders: farmers and investors in installations to valorise the biomass

Main deliverable:

legal and economic assessment → month 12

Time frame

Hasselt University received funding for only 1 year



SWOT analysis (WP4, SGI in cooperation with all partners)

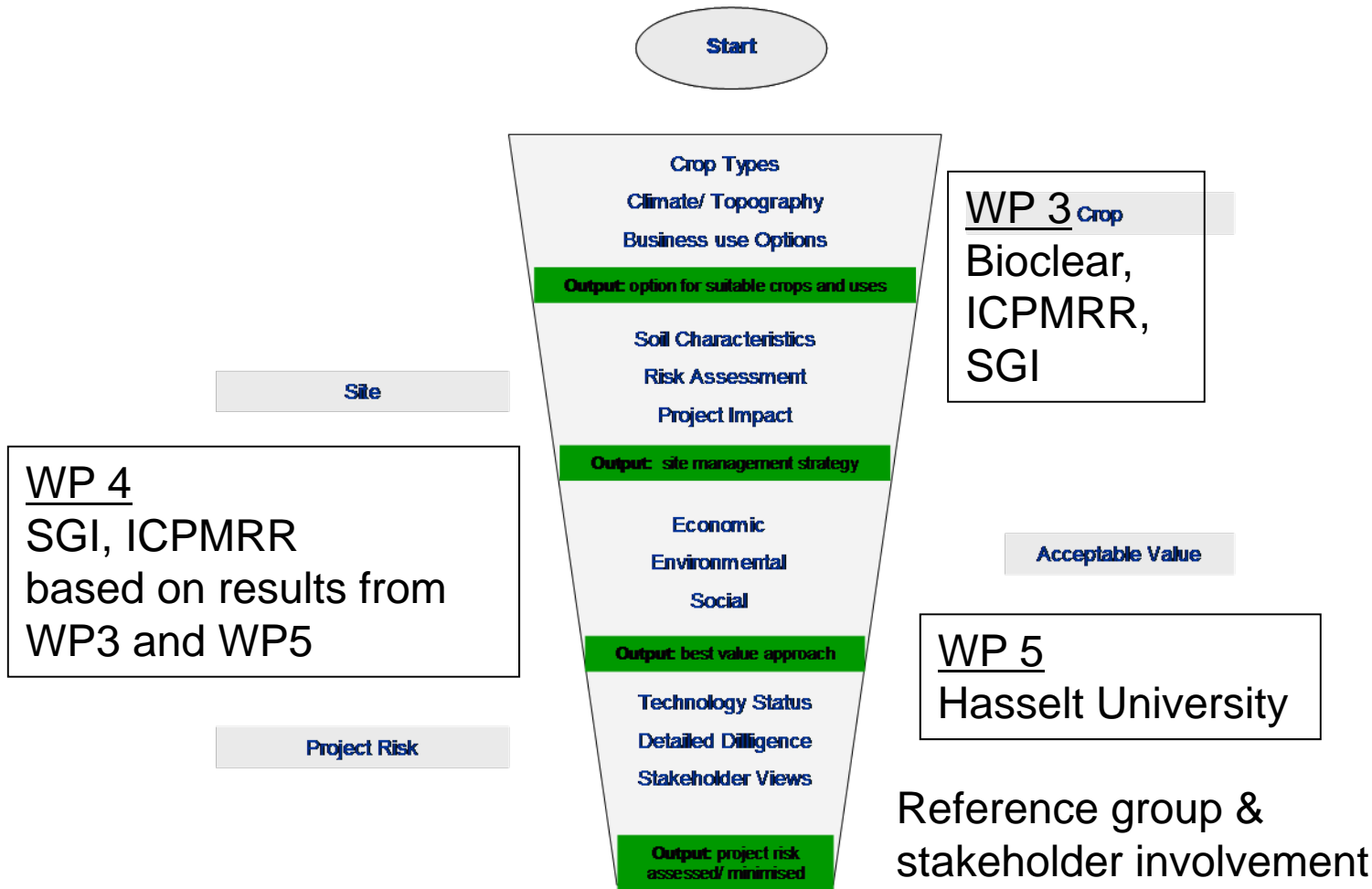


The SWOT analysis be based on the results of legal and economical feasibility under WP5 and the real outcome of two (or three) established full scale case studies. The fate and value of the crop will be followed throughout the life cycle.

Suggested measurable parameters are:

- *Cultivation costs (site results)*
 - *Amount harvested (site results)*
 - *Products or other use of harvest (site results)*
 - *Income of the raw material from customer (site results)*
 - *Environmental risk assessment including:*
 - *ecological performance (WP3/site results)*
 - *classical life cycle aspects such as emission, use of resources such as virgin materials and water, energy, land use (WP4)*
 - *carbon footprint (WP4)*
 - *Stake holder perspectives (Swedish reference group/interviews/questionnaire) (WP4)*
-
- The SWOT analyses will serve as a learning loop to improve the DST.
 - Knowledge gaps will be identified after each SWOT analysis and the DST will be updated.

Application of DST



Experience from R1 and Quality assurance

- Steering group
- Dechema(Germany R1) and r3 (UK R1) in project through SGI
 - Participate and head steering group meetings
 - Assist in handover of Phase 1 DST to new team
 - Peer review pilot study plans, SWOT analyses, Legal and economic feasibility
 - Linkage to European networks – NICOLE, Common Forum, “SuRF’s”, DG ENV CIS expert group, ETPs: SusChem
 - Peer review reports, guide, papers
 - Support liaison with US EPA
 - Peer review for web pages
 - Review EU context of DST Guide
 - Support final workshop organisation (Frankfurt)
- Swedish reference group with researcher, experts and stakeholders





Time plan - Mile stones – dates and content:

- Hand over R1 visits Dechema and r3 (March 2010)
- Choice of site, crop and potential product/s (April 2010)
- Site preparations (start spring 2010)
- Pre cultivation soil sampling (spring/summer 2010)
- Planting (spring/autumn 2010)
- Harvest – depend on crop
- Production of energy/fuel - depend on crop and product
- Sampling and analyses of vegetation and soil (depend on crop)
- Ecological risk assessment pre and post planting
- Assembling site/pilot information for WP4 and WP5 (continous from feb. 2010-2012)
- Swot analysis including environmental impact assessment (plan start March 2010)
- Economical and legislative assessment (finalised month 12)
- Updated DST (finalised month 36)
- Guide for DST and RBLM (finalised month 36)
- -

Expected results and content of the deliverables



Deliverables (D)	
No. of D	Title
1	Progress report 18 month
2	Final report – jan 2013
3	Managed sites in Romania and Sweden
4	Robust DST for sustainable RBLM with focus on marginal contaminated land for biofuel production (iterative process). Final version month 36.
5	Guide for sustainable RBLM with focus on marginal contaminated land for biofuel production (iterative process). Final version month 36.
6	Legal, economic and ethical assessment month 12
7	Final workshop in Frankfurt month 36
8	Web based continuous project dissemination
9	Open conference contributions (national and European) several
10	Manuscript for peer review article year 3

(Use as many lines as necessary)

Dissemination –

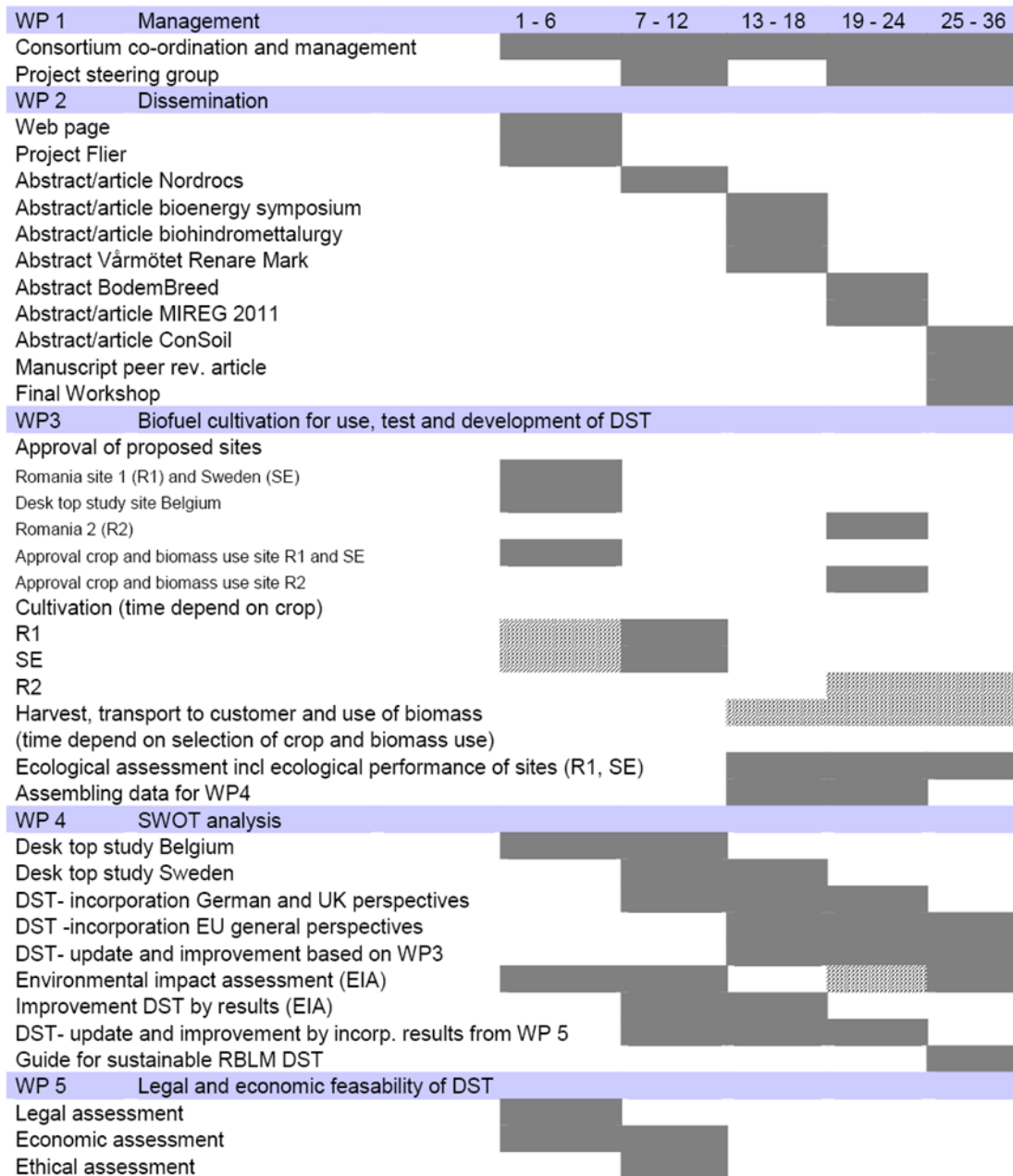
- Promotion of R2 through presentations at national and international conferences
- Flier and press releases in Sweden by the start and end of the project
- National/international articles (popular scientific and peer review)
- Web based information about the project (SGI)
- Progress report (18 month) and final report



- **Common meetings – dates and content**
 - Hand over R1 to R2 – March 2010
 - Pilots selections and plans – 24-25 March 2010
 - Plan SWOT and WP5 plans – 24 -25 March 2010
 - Swedish reference group meeting March/April 2010
 - Steering Group meeting 1 - September 2010
 - Follow up meetings per WP physical/video/telephone
 - ...



Project Gantt chart





Budget

Applied for

TABLE 1	SGI (SEK)	Bioclear (€)	INCDMRR (LEU)	CMK (€)
WP1	498000	34781	94970	
WP2	407724	7431	72311	
WP3	480438	27765	317097	
WP4	670192	0	2187	
WP5	13154	0	2187	64900(including overhead)
Total € (incl. overhead)	241 843	69 977	116 920	64 900

Bioclear funded € 50 000 full project (3 year)

Hasselt University funded one year (1st)



Risks

- The use, test and improvements of the DST does not cover all EU countries, however, this is compensated for by the wide contextual variety within the project (Belgium, Germany, Netherlands, Romania, Sweden, UK)
- Swot analysis – Risks occur due to major differences in regulatory approach and economic circumstances between EU countries (the DST was, however, developed in a broad context already in Rejuvenate, several countries involved in R2)



Risks (contd).

- Limited budget from funder for ***Risk effect*** studies (Bioclear - 50.000 euro), i.e. limited funding for chemical, eco-toxicological analysis:
 - Limited results of eco-toxicological assessment
 - Limited ability to fill gap regarding fate of contaminants

Goal find to related projects, try to find additional funding in Sweden, Romania, EU ...?)

- Can not find nearby similar but cleaner conditions
 - Can not interpret ecology test results



Risks (contd).

- Hasselt University only funded 1 year. Results of WP5 can only be based on preliminary results and not on the real results
- Not achieved final expected site management due to short project time

R2 Dissemination



Dissemination

Conferences/seminars

- Presentations of R1->R2 (2009) Green remediation (P. Bardos et al.) and Risk management seminar Göteborg
- Abstracts sent to Consoil, Nordrocs, EGU: R1-> R2 study
- Hints given to “Spring meeting of the network clean soil Sweden”
- Abstracts will be sent through the course of the project to Nordrocs, relevant Bioenergy conferences, ConSoil and other relevant conferences and workshops as they appear
- Final conference R2
(Frankfurt or preferentially linked to larger event)



Dissemination

- Web based information about the project (SGI) (Initiate February 2010)
- Flier and press releases in Sweden (first - February 2010)
- Steering group including R2 org., funder repr., Dechema, r3
- Swedish reference group - once/twice per year (First meeting March/April 2010)
- Linkage to European networks – NICOLE, Common Forum, “SuRF’s”, DG ENV CIS expert group, ETPs: SusChem
- Support liaison with US EPA



Dissemination

- National/international articles (popular scientific and peer review)
 - Manuscript R1-R2
 - Final results R2
- Progress report (18 month)
- Final report
- ...

