Tools and Approaches to Strengthen River Basin Organisations in SADC

The 2Tool – Beyond the TWO analysis

Marius Claassen






TWO – “old school”

Categories: Sources / Factors: Development	a) New Water	b) Efficient use of water	c) Other sources in basins that are not closed
1. Hydropower and power trading	Location of reservoirs in high-altitudes to minimise evaporative losses	Siting of multipurpose dams for e.g. hydropower and irrigation in optimal locations	*Additional electricity generation through hydropower schemes and power pooling*
2. Primary production	Re-use of treated wastewater for irrigation Interbasin water transfer schemes	*Green Water use to increase agricultural outputs Increase efficency in irrigation*	Investment in bioenergy crops Introducing aqua culture
3. Urban growth and industrial development	*Strengthen institutional management for water allocation to more high value use*	Maximising economic returns per unit of water in industry	Recharge of groundwater
4. Environment and ecosystem services	Use of “green credit schemes” through e.g. water purification in wetlands	Optimising economic returns from developing fisheries and tourism sector	Allocate water to restore ecosystems
5. Others (every basin is unique and other opportunites may exist)	*Desalinate water for high value use*	Drought-proofing through improved land management	Flood protection

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Transboundary Waters Opportunity Analysis (TWO)

"2Tool"

2Tool version 1.04
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Author: M Claassen

Application decription: Result from case study workshop
Geographic extent: Orange-Senqu
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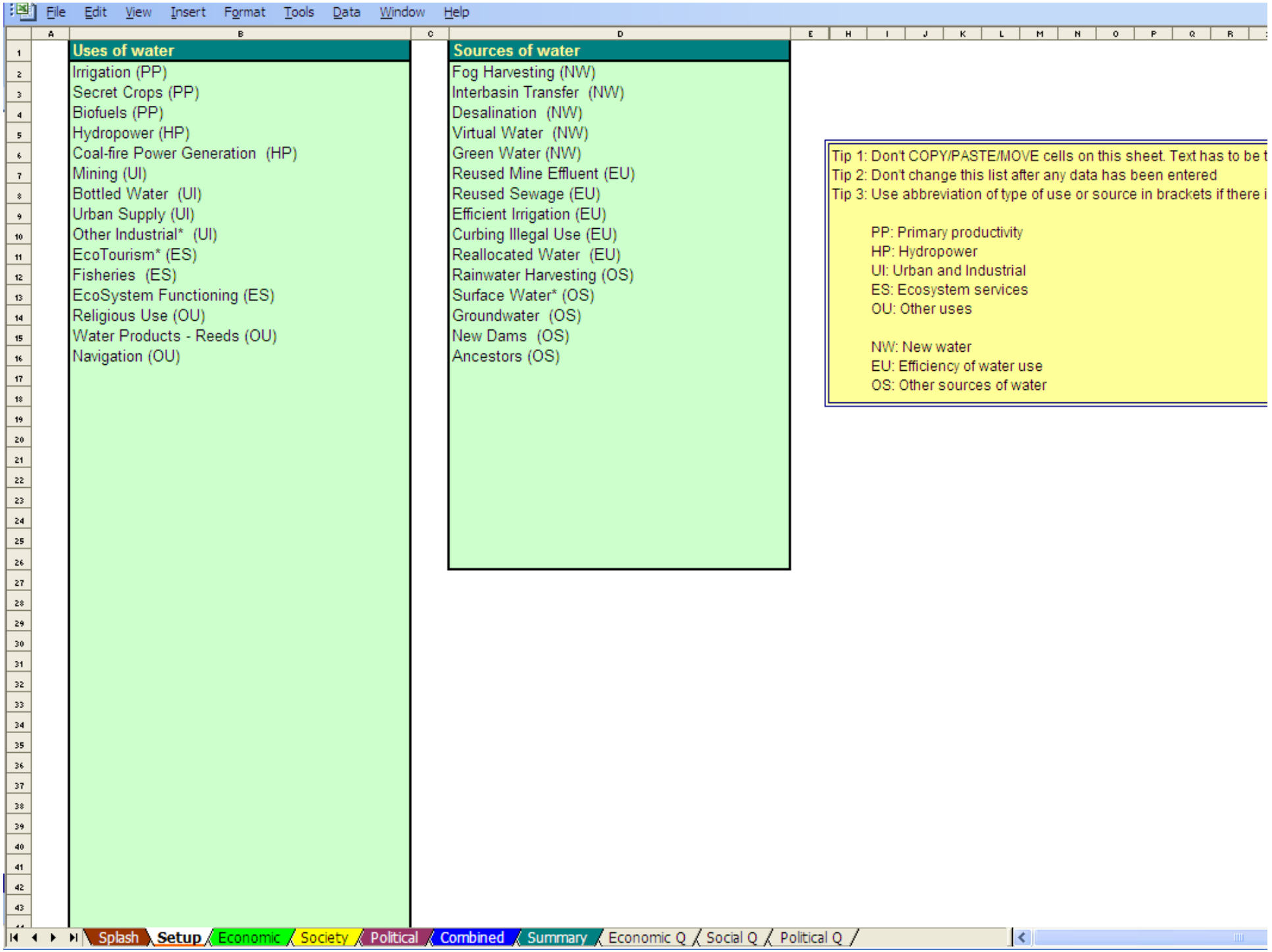
Other:

Acknowledgements: D Phillips, I Jacobs, K Nortje, J Granit

Splash | Setup | Economic | Society | Political | Combined | Summary | Economic Q | Social Q | Political Q


File Edit View Insert Format Tools Data Window Help
Uses of water
Irrigation (PP)
Secret Crops (PP)
Biofuels (PP)
Hydropower (HP)
Coal-fire Power Generation (HP)
Mining (UI)
Bottled Water (UI)
Urban Supply (UI)
Other Industrial* (UI)
EcoTourism* (ES)
Fisheries (ES)
EcoSystem Functioning (ES)
Religious Use (OU)
Water Products - Reeds (OU)
Navigation (OU)
Sources of water
Fog Harvesting (NW)
Interbasin Transfer (NW)
Desalination (NW)
Virtual Water (NW)
Green Water (NW)
Reused Mine Effluent (EU)
Reused Sewage (EU)
Efficient Irrigation (EU)
Curbing Illegal Use (EU)
Reallocated Water (EU)
Rainwater Harvesting (OS)
Surface Water* (OS)
Groundwater (OS)
New Dams (OS)
Ancestors (OS)
Tip 1: Don't COPY/PASTE/MOVE cells on this sheet. Text has to be t
Tip 2: Don't change this list after any data has been entered
Tip 3: Use abbreviation of type of use or source in brackets if there i
PP: Primary productivity
HP: Hydropower
UI: Urban and Industrial
ES: Ecosystem services
OU: Other uses
NW: New water
EU: Efficiency of water use
OS: Other sources of water
Splash Setup Economic Society Political Combined Summary Economic Q Social Q Political Q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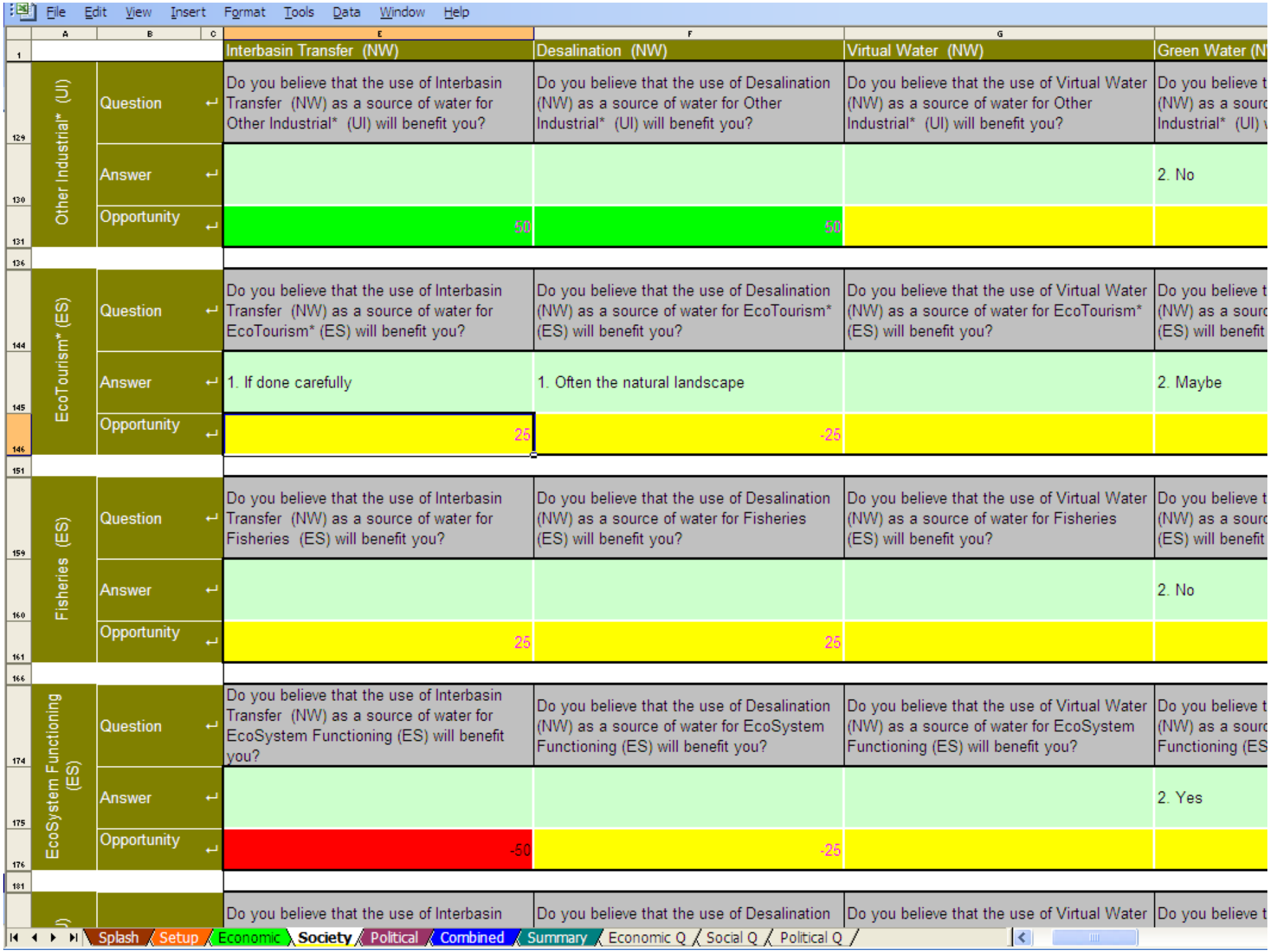
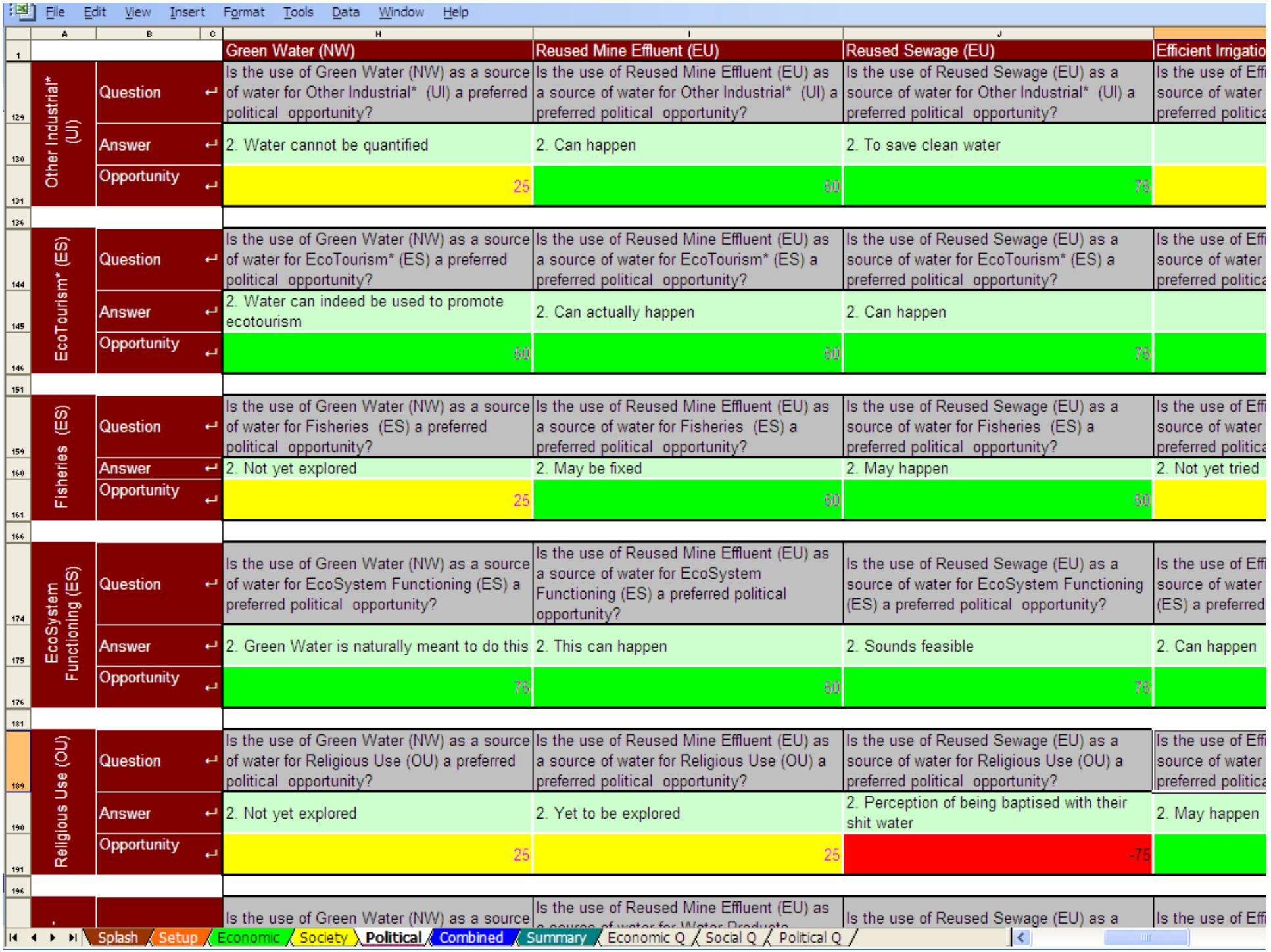
Fog Harvesting (NW)
Interbasin Transfer (NW)
Desalination (NW)
Virtual Water (I
Irrigation (PP)
Question
Does the use of Fog Harvesting (NW) as a source of water for Irrigation (PP) represent a sustainable economic development opportunity?
Does the use of Interbasin Transfer (NW) as a source of water for Irrigation (PP) represent a sustainable economic development opportunity?
Does the use of Desalination (NW) as a source of water for Irrigation (PP) represent a sustainable economic development opportunity?
Does the use of source of water a sustainable ec opportunity?
Answer
1. Takes pressure off other water sources
2. Only if economic
1. Too expensive water
2. Only to improve water quality
1. Change in Vir irrigation deman
3. Questions no Water Concept
Opportunity
0
38
-42
Secret Crops (PP)
Question
Does the use of Fog Harvesting (NW) as a source of water for Secret Crops (PP) represent a sustainable economic development opportunity?
Does the use of Interbasin Transfer (NW) as a source of water for Secret Crops (PP) represent a sustainable economic development opportunity?
Does the use of Desalination (NW) as a source of water for Secret Crops (PP) represent a sustainable economic development opportunity?
Does the use of source of water represent a sust development op
Answer
2. Illegal water use for illegal crops
2. Unlikely
3. Questions no Water Concept
Opportunity
0
-17
-25
Biofuels (PP)
Question
Does the use of Fog Harvesting (NW) as a source of water for Biofuels (PP) represent a sustainable economic development opportunity?
Does the use of Interbasin Transfer (NW) as a source of water for Biofuels (PP) represent a sustainable economic development opportunity?
Does the use of Desalination (NW) as a source of water for Biofuels (PP) represent a sustainable economic development opportunity?
Does the use of source of water sustainable eco opportunity?
Answer
2. Possibly
1. Too expensive water
2. Unlikely
1. Change in Vir irrigation deman
3. Questions no Water Concept
Opportunity
0
0
-33
Hydropower (HP)
Question
Does the use of Fog Harvesting (NW) as a source of water for Hydropower (HP) represent a sustainable economic development opportunity?
Does the use of Interbasin Transfer (NW) as a source of water for Hydropower (HP) represent a sustainable economic development opportunity?
Does the use of Desalination (NW) as a source of water for Hydropower (HP) represent a sustainable economic development opportunity?
Does the use of source of water represent a sust development op
Answer
2. Ditto
3. Questions no Water Concept
Opportunity
Splash Setup Economic Society Political Combined Summary Economic Q Social Q Political Q


File Edit View Insert Format Tools Data Window Help
Interbasin Transfer (NW)
Desalination (NW)
Virtual Water (NW)
Green Water (N
Other Industrial* (UI)
Question
Do you believe that the use of Interbasin Transfer (NW) as a source of water for Other Industrial* (UI) will benefit you?
Do you believe that the use of Desalination (NW) as a source of water for Other Industrial* (UI) will benefit you?
Do you believe that the use of Virtual Water (NW) as a source of water for Other Industrial* (UI) will benefit you?
Do you believe t (NW) as a sourc Industrial* (UI)
Answer
2. No
Opportunity
50
50
EcoTourism* (ES)
Question
Do you believe that the use of Interbasin Transfer (NW) as a source of water for EcoTourism* (ES) will benefit you?
Do you believe that the use of Desalination (NW) as a source of water for EcoTourism* (ES) will benefit you?
Do you believe that the use of Virtual Water (NW) as a source of water for EcoTourism* (ES) will benefit you?
Do you believe t (NW) as a sourc (ES) will benefit
Answer
1. If done carefully
1. Often the natural landscape
2. Maybe
Opportunity
25
-25
Fisheries (ES)
Question
Do you believe that the use of Interbasin Transfer (NW) as a source of water for Fisheries (ES) will benefit you?
Do you believe that the use of Desalination (NW) as a source of water for Fisheries (ES) will benefit you?
Do you believe that the use of Virtual Water (NW) as a source of water for Fisheries (ES) will benefit you?
Do you believe t (NW) as a sourc (ES) will benefit
Answer
2. No
Opportunity
25
25
EcoSystem Functioning (ES)
Question
Do you believe that the use of Interbasin Transfer (NW) as a source of water for EcoSystem Functioning (ES) will benefit you?
Do you believe that the use of Desalination (NW) as a source of water for EcoSystem Functioning (ES) will benefit you?
Do you believe that the use of Virtual Water (NW) as a source of water for EcoSystem Functioning (ES) will benefit you?
Do you believe t (NW) as a sourc Functioning (ES
Answer
2. Yes
Opportunity
-50
-25
Do you believe that the use of Interbasin
Do you believe that the use of Desalination
Do you believe that the use of Virtual Water
Do you believe t
Splash Setup Economic Society Political Combined Summary Economic Q Social Q Political Q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Green Water (NW)
Reused Mine Effluent (EU)
Reused Sewage (EU)
Efficient Irrigatio
Other Industrial* (UI)
Question
Is the use of Green Water (NW) as a source of water for Other Industrial* (UI) a preferred political opportunity?
Is the use of Reused Mine Effluent (EU) as a source of water for Other Industrial* (UI) a preferred political opportunity?
Is the use of Reused Sewage (EU) as a source of water for Other Industrial* (UI) a preferred political opportunity?
Is the use of Effi source of water preferred politica
Answer
2. Water cannot be quantified
2. Can happen
2. To save clean water
Opportunity
25
50
75
EcoTourism* (ES)
Question
Is the use of Green Water (NW) as a source of water for EcoTourism* (ES) a preferred political opportunity?
Is the use of Reused Mine Effluent (EU) as a source of water for EcoTourism* (ES) a preferred political opportunity?
Is the use of Reused Sewage (EU) as a source of water for EcoTourism* (ES) a preferred political opportunity?
Is the use of Effi source of water preferred politica
Answer
2. Water can indeed be used to promote ecotourism
2. Can actually happen
2. Can happen
Opportunity
50
50
75
Fisheries (ES)
Question
Is the use of Green Water (NW) as a source of water for Fisheries (ES) a preferred political opportunity?
Is the use of Reused Mine Effluent (EU) as a source of water for Fisheries (ES) a preferred political opportunity?
Is the use of Reused Sewage (EU) as a source of water for Fisheries (ES) a preferred political opportunity?
Is the use of Effi source of water preferred politica
Answer
2. Not yet explored
2. May be fixed
2. May happen
2. Not yet tried
Opportunity
25
50
50
EcoSystem Functioning (ES)
Question
Is the use of Green Water (NW) as a source of water for EcoSystem Functioning (ES) a preferred political opportunity?
Is the use of Reused Mine Effluent (EU) as a source of water for EcoSystem Functioning (ES) a preferred political opportunity?
Is the use of Reused Sewage (EU) as a source of water for EcoSystem Functioning (ES) a preferred political opportunity?
Is the use of Effi source of water (ES) a preferred
Answer
2. Green Water is naturally meant to do this
2. This can happen
2. Sounds feasible
2. Can happen
Opportunity
75
50
75
Religious Use (OU)
Question
Is the use of Green Water (NW) as a source of water for Religious Use (OU) a preferred political opportunity?
Is the use of Reused Mine Effluent (EU) as a source of water for Religious Use (OU) a preferred political opportunity?
Is the use of Reused Sewage (EU) as a source of water for Religious Use (OU) a preferred political opportunity?
Is the use of Effi source of water preferred politica
Answer
2. Not yet explored
2. Yet to be explored
2. Perception of being baptised with their shit water
2. May happen
Opportunity
25
25
-75
Is the use of Green Water (NW) as a source
Is the use of Reused Mine Effluent (EU) as
Is the use of Reused Sewage (EU) as a
Is the use of Effi
Splash Setup Economic Society Political Combined Summary Economic Q Social Q Political Q


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Wt
Desalination (NW)
Virtual Water (NW)
Green Water (NW)
Reused Mine E
Irrigation (PP)
Does the use of Desalination (NW) for Irrigation (PP) represent a development opportunity
Does the use of Virtual Water (NW) for Irrigation (PP) represent a development opportunity
Does the use of Green Water (NW) for Irrigation (PP) represent a development opportunity
Does the use o for Irrigation (PP opportunity
Economic 1 -42 33 50
Social 1 25 0 0
Political 1 0 50 0
Combined -6 28 17
Secret Crops (PP)
Does the use of Desalination (NW) for Secret Crops (PP) represent a development opportunity
Does the use of Virtual Water (NW) for Secret Crops (PP) represent a development opportunity
Does the use of Green Water (NW) for Secret Crops (PP) represent a development opportunity
Does the use o for Secret Crop development op
Economic 1 -25 8 13
Social 1 25 0 0
Political 1 -50 -50 0
Combined -17 -14 4
Biofuels (PP)
Does the use of Desalination (NW) for Biofuels (PP) represent a development opportunity
Does the use of Virtual Water (NW) for Biofuels (PP) represent a development opportunity
Does the use of Green Water (NW) for Biofuels (PP) represent a development opportunity
Does the use o for Biofuels (PP opportunity
Economic 1 -33 25 38
Social 1 50 0 0
Political 1 0 50 75
Combined 6 25 38
Hydropower (HP)
Does the use of Desalination (NW) for Hydropower (HP) represent a development opportunity
Does the use of Virtual Water (NW) for Hydropower (HP) represent a development opportunity
Does the use of Green Water (NW) for Hydropower (HP) represent a development opportunity
Does the use o for Hydropower development op
Economic 1 -33 33 0
Social 1 0 0 25
Political 1 0 50 0
Combined -11 28 8
Coal-fire Power Generation (HP)
Does the use of Desalination (NW) for Coal-fire Power Generation (HP) represent a development opportunity
Does the use of Virtual Water (NW) for Coal-fire Power Generation (HP) represent a development opportunity
Does the use of Green Water (NW) for Coal-fire Power Generation (HP) represent a development opportunity
Does the use o for Coal-fire Pov represent a dev
Economic 1 33 33 0
Social 1 -50 0 25
Political 1 0 50 0
Combined -6 28 8
Does the use of Desalination (NW) for Mining (UI) represent a development
Does the use of Virtual Water (NW) for Mining (UI) represent a development
Does the use of Green Water (NW) for Mining (UI) represent a development
Does the use o for Mining (UI)
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	A	D	E	F	G	H	I	J	K	L	M	N
1		Interbasin Transfer (NW)	Desalination (NW)	Virtual Water (NW)	Green Water (NW)	Reused Mine Effluent (EU)	Reused Sewage (EU)	Efficient Irrigation (EU)	Curbing Illegal Use (EU)	Reallocated Water (EU)	Rainwater Harvesting (OS)	Surface Water* (C
2	Irrigation (PP)	17	8	0	0	8	13	25	8	17	17	
3		44	-6	28	17	33	71	92	50	19	47	
5	Secret Crops (PP)	3	-17	-14	4	13	46	63	17	3	19	
7	Biofuels (PP)	33	6	25	38	33	54	75	50	-8	44	
9	Hydropower (HP)	61	-11	28	8	17	4	13	25	14	17	
11	Coal-fire Power Generation	42	-6	28	8	42	17	25	38	18	3	
13	Mining (UI)	44	31	11	8	63	46	29	54	35	19	
15	Bottled Water (UI)	-8	8	3	17	17	-21	29	29	11	28	
17	Urban Supply (UI)	81	39	28	25	21	-4	33	71	57	33	
19	Other Industrial* (UI)	83	39	19	17	58	63	21	46	50	28	
21	EcoTourism* (ES)	17	-11	17	25	25	29	46	54	54	19	
23	Fisheries (ES)	14	0	17	8	13	17	21	54	18	28	
25	EcoSystem Functioning (ES)	-22	-22	28	46	8	17	54	75	57	44	
27	Religious Use (OU)	-39	-22	8	17	17	-13	25	24	22	19	
29	Water Products - Reeds (OU)	-22	-25	17	33	21	38	58	54	22	39	
31	Navigation (OU)	17	-8	8	0	-4	0	0	21	7	13	
33	0	0	0	0	0	0	0	0	0	0	0	
35	0	0	0	0	0	0	0	0	0	0	0	
37	0	0	0	0	0	0	0	0	0	0	0	
39	0	0	0	0	0	0	0	0	0	0	0	
41	0	0	0	0	0	0	0	0	0	0	0	
43	0	0	0	0	0	0	0	0	0	0	0	
45	0	0	0	0	0	0	0	0	0	0	0	
47	0	0	0	0	0	0	0	0	0	0	0	
49	0	0	0	0	0	0	0	0	0	0	0	
51	0	0	0	0	0	0	0	0	0	0	0	
53	0	0	0	0	0	0	0	0	0	0	0	
55	0	0	0	0	0	0	0	0	0	0	0	
57	0	0	0	0	0	0	0	0	0	0	0	
59	0	0	0	0	0	0	0	0	0	0	0	
61	0	0	0	0	0	0	0	0	0	0	0	
63	0	0	0	0	0	0	0	0	0	0	0	
65	0	0	0	0	0	0	0	0	0	0	0	
67	0	0	0	0	0	0	0	0	0	0	0	
69	0	0	0	0	0	0	0	0	0	0	0	
71	0	0	0	0	0	0	0	0	0	0	0	
73	0	0	0	0	0	0	0	0	0	0	0	
75	0	0	0	0	0	0	0	0	0	0	0	
77	0	0	0	0	0	0	0	0	0	0	0	
79	0	0	0	0	0	0	0	0	0	0	0	
81	0	0	0	0	0	0	0	0	0	0	0	

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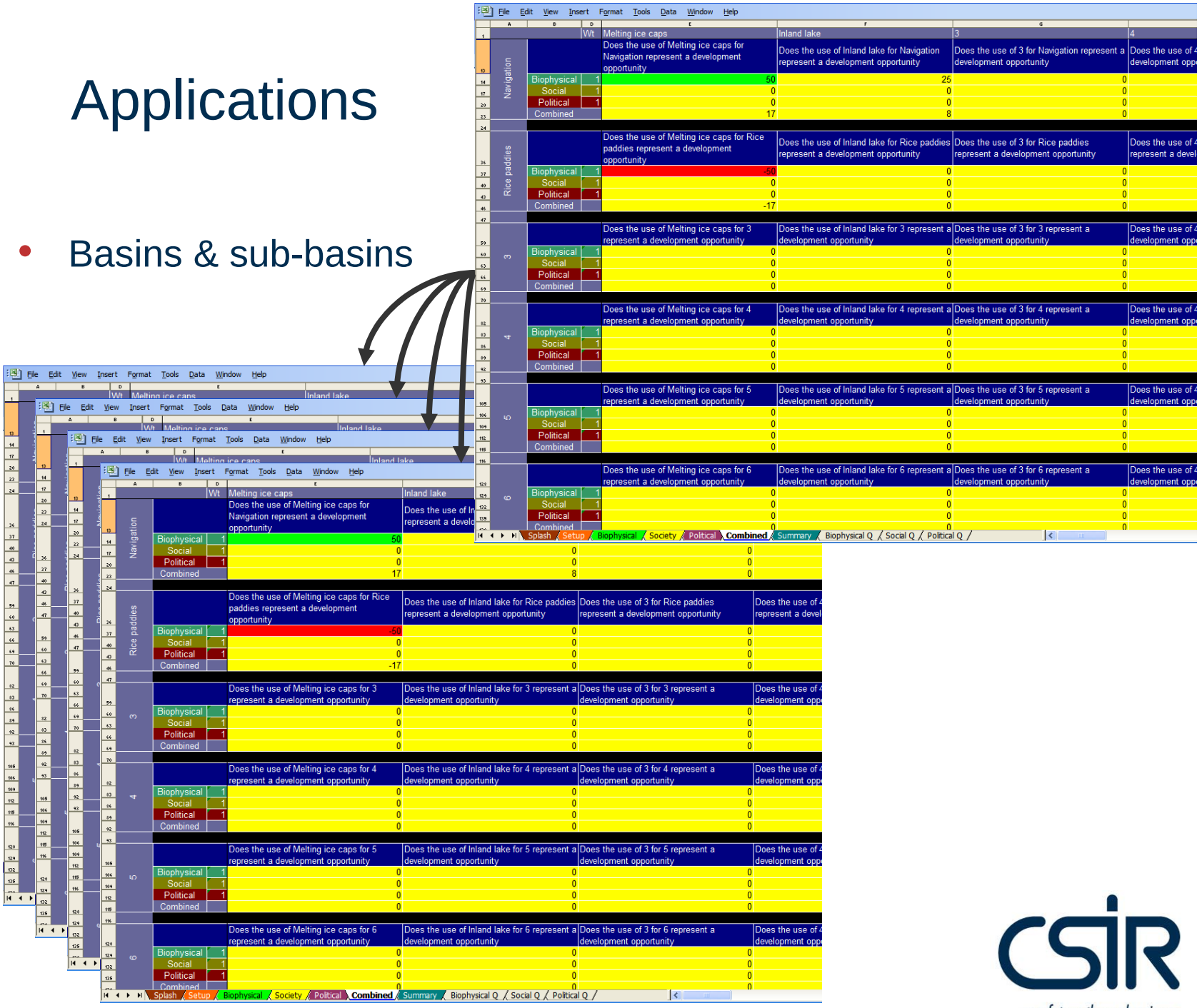
Applications

- Basins & sub-basins



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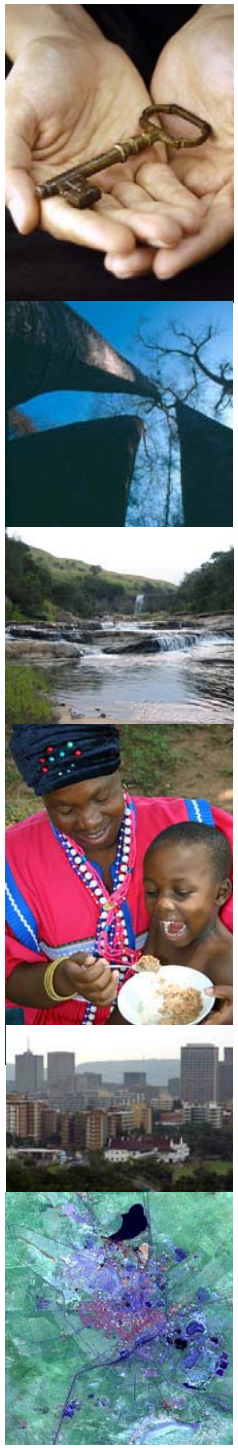

Applications

- Scenarios

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	A	B	C	D	E	
1				Melting ice caps	Inland lake	3
2	Navigation	Question		Does the use of Navigation as a source of water for Melting ice caps represent a sustainable economic development opportunity?	Does the use of Navigation as a source of water for Inland lake represent a sustainable economic development opportunity?	Does water econo
3		Answer				
4		Opportunity				
5		Answer (option 2)				
6		Opportunity (option 2)				
7		Answer (option 3)				
8		Opportunity (option 3)				

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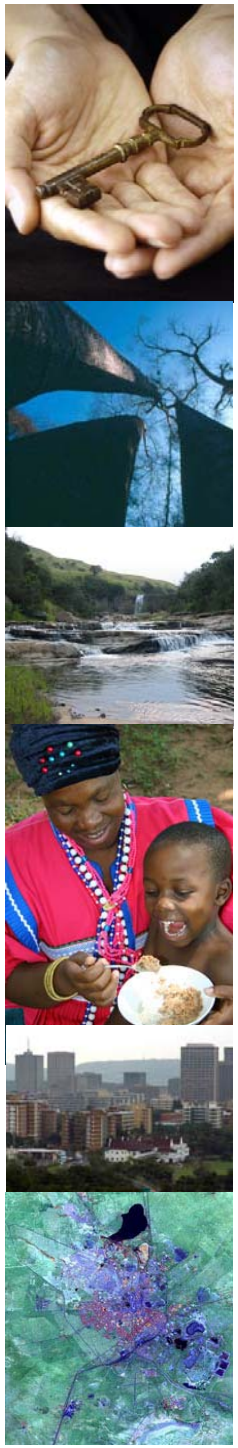

Applications: Select portfolios

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	Melting ice caps	Inland lake	3	4	5	6	7	8
Navigation	43	-73	-67	-92	91	-52	-64	
Rice paddies	63	-85	18	79	4	67	-47	
3	12	-17	83	-29	57	-8	70	
4	-3	74	-45	25	0	97	-74	
5	-95	67	-82	-58	-72	26	-63	
6	-7	-69	-24	-34	29	-36	-50	
7	93	-32	-67	-65	30	-65	22	
8	15	-11	-29	-34	49	-2	-61	
9	-7	24	-85	90	-86	-21	-34	
10	97	-92	-6	-67	13	-55	95	
11	87	92	49	40	23	99	-9	
12	-54	92	44	71	64	90	-70	
13	-54	-73	-5	-66	85	-53	95	
14	-59	-52	29	32	22	-27	-62	
15	-9	-8	40	87	-8	-58	-72	
16	0	17	90	-26	79	-88	88	
17	65	-96	-100	-52	87	45	96	
18	-27	-69	26	-30	83	-70	37	
19	0	-26	-26	-34	56	-9	-35	
20	-14	-57	88	-96	-1	-74	32	
21	-8	-36	-100	22	-87	100	-7	
22	-72	-72	14	-88	47	42	65	
23	-88	-4	-64	5	54	-88	52	
24	-10	-12	9	-37	25	-35	73	
25	-51	2	8	16	8	82	13	
26	-70	38	2	-71	18	7	11	
27	2	-75	41	5	7	78	-67	
28	-50	-43	1	62	-79	-49	-65	
29	46	40	-49	-70	35	-30	-71	
30	-83	-18	26	87	-1	84	69	
31	65	28	-68	-60	47	-96	30	
32	11	-54	48	26	-5	64	-51	
33	15	17	78	22	13	-54	90	
34	74	-22	-15	-69	-75	-29	5	
35	25	-73	-17	79	-80	-97	-46	
36	13	8	-31	12	-59	-90	76	
37	91	-6	15	-78	56	53	-24	
38	0	0	0	0	0	0	0	
39	0	0	0	0	0	0	0	
40	0	0	0	0	0	0	0	
41	0	0	0	0	0	0	0	
42	0	0	0	0	0	0	0	
43	0	0	0	0	0	0	0	

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Thank you


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