# C10A Hungarian pond aquaculture – the software

Implementation case

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### Principles of the Hungarian DSS

- Pond aquaculture: farm-level decision
- The Hungarian DSS was designed to <u>support</u> <u>decision at farm level</u> and not at regulation level
- Focuses on strategic direction of input management under CC
- <u>Helps to identify stock and feed</u>
   <u>management strategies most adaptive to CC</u>
- Only strategic guiding, not a precision tool

→ does not regulate daily managerial intervention!



### Main interface of DSS

#### 👱 Pond/Lake Aquaculture in Hungary







## User defined parameters:

Kosice OUtherod DARASES TOA	select simulation climate scenario RCP4.5 v stocking weight (g) 475 v time frame 2000	Gross yes
Mitek wytegyhaza oSatu Mare Bas	management option carp 3 v natural mortality 26 v get bio. result	Farming technology
Northern Great Plain simulation location	feeding rate /stocking rate feeding rate 1501 v stocking population 150 v gross yield (kg/ha) 583,29 show graph net yield (kg/ha) 433,29 show graph	<ul> <li>Stocking density (kg/ha)</li> <li>10 options</li> </ul>
Rated Action	FCR (kg feed/kg net yield)     3.46       final individual weight (kg)     2.48	<ul> <li>Mortality</li> <li>35% per season</li> </ul>

#### Location, time and scenario

- RCP4.5 / RCP8.5
- present, 2020, 2030, 2050
- 2 simulation locations

#### • Ind. weight of stockers

26% per season

18% per season

- 350g
- 475g
- 600g
- Feeding rate (kg/ha/season)
  - 8 options





## **Biological Outputs**







### Farm-level economic module

- Costs categories → Feed + Stock +
   Labour + Water + Other
- Unit cost of inputs and price of output are user given
- Default values are market avg. (2017)
- Labour requirement (FTE/100ha) is also user given
- 2 main financial indicators are calculated:
  - Per-unit cost (HUF/kg)
  - Net income (HUF/ha)
- Generated graphs visualize cost and income functions

#### economic simulation

Please enter for the economic calculations the following prices / cost.









### **Optimizing mangerial intervention**

#### **Provides optimal combination of**

- Feeding rate
- Stocking density
- Ind. weight of stokers

#### Minimal values for per-unit costs

climate scenario	RCP4.5 V	species	Common carp	targeted fina individual we	al eight(kg)	2				U	Init cos	(Ft/kg)	per sto	cking	popula	ition f	or diffe	ent fe	eding r	ates
select farm location	south_pond $ \sim $	time frame	2030 🔻	tolerance ta	raeted		Optimze		500 T										_	4000/376/350 4000/350/350
management option	carp3 v	natural mortality	18 🔨	final individu	ual weight(%)	10														4000/310/350 4000/450/475
Please enter for the	economic calculati	ons the followir	ng prices / cost.													1				3500/310/350
					L.	abor per 100 ha	5		400				_							3500/270/350
Feed price	44	Prices st	tocking	690						1	1									3500/400/475
Carp 3 sales price		carp1			W	Vater service fee	2													3000/400/4/0
/market price	580	Average	gross	196000																4000/270/350
Cam 2 sales price		salary of v	worker		W	Vater abstraction charg	e 0.5													3000/270/350
/market price	638	Other cost	ts	42000	V	Vater provided free of			300											
Diana da dalar	0.00	(depreciat	tion.rent.repair)	42000	a	bstraction charge	10000		500											
Prices stocking	620				-	S. 1														
carp2	030	Other rev	renues	65000	5	tocking costs of other olvcultured species	20000	1 ×												
resulting 5 best feedir	ng rates /stocking i	rates						Ľ.,	200											
feeding rate		stocking p	population	sto	cking weight (	g)			200											
4000 4000 4000 4000	^	376 350 310 450		A 35 35 35 47	50 50 75	^			100											
3500	$\sim$	310		V 35	ŏ	~														
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FCR (kg feed/kg net y	vield) 3,1816988	show graph	gross yield (	(kg/ha) 1633,19	show graph	Unit cost 388,	727275 show graph													
inal individual weight(	kg) 1,84	show graph	net yield (k	g/ha) 1257,19	show graph	Total cost	654865,49		0+	1	2 3	4	5	6	7	8	9	10	11	
specific water use (m³/kg weight gain)	12,251290	show graph	Calculated	profit 357384,70	show graph	Total revenue	1012250,2						result	numbe	er					



👱 optimize

select simulation

ClimeFish



# Comparing individual growth between locations and RCP scenarios

Compare scenario/location Compare individual growth Optimization portunities 👤 individual weight time frame 2016-25  $\sim$ individual weight in kg show graph north pond individual weight in kg for feeding rates/stocking population combinations individual weight in kg for feeding rates/stocking population combinations 3 feed/stock 3-- 0/110 999 / 190 2.5 2.5 2001 / 270 2500 / 350 - 3000 / 400 2 — 4002 / 450 **RCP 4.5 RCP 8 5** ₽ 1.5· ₽ 1.5 0.5 0.5 0 0 2019.04.01 2019.06.01 2019.08.01 2019. 10. 01. 2019.04.01 2019.06.01 2019.08.01 2019. 10. 01 2019.05.01. 2019.07.01 2019.09.01. 2019, 11, 01, 2019.05.01 2019.07.01. 2019.09.01 2019, 11, 01, day day south pond individual weight in kg for feeding rates/stocking population combinations individual weight in kg for feeding rates/stocking population combinations 3 feed/stock 3 - 0 / 110 — 999 / 190 2.5 2.5 2001 / 270 — 2500 / 350 - 3000 / 400 2 2 **RCP 4.5 RCP 8.5** — 4002 / 450 2 1.5 **₽** 1.5 0.5 0.5 0-0 2019.04.01. 2019.06.01. 2019.08.01 2019. 10. 01. 2019.04.01 2019.06.01 2019.08.01 2019. 10. 01. 2019.05.01. 2019 07 01 2019.09.01. 2019.11.01. 2019 05 01 2019.07.01. 2019.09.01. 2019. 11. 01. day day

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feed/stock

0/110

999 / 190

- 2001 / 270

- 2500 / 350

3000/400

- 4002 / 450

feed/stock

999 / 190

- 0 / 110

2001 / 270

— 2500 / 350

— 4002 / 450

- 3000 / 400

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#### Risk assesment in DSS

👱 riskassesment				-	
Category Water use Fish growth and feeding Biomass losses Pond food web Water use	Climate Change	e Driver Increa	ased air and water temperature, changes in precipitation patterns		
Water quality Potential Im	Risk Score	<b>Risk Rating</b>	Potential Impacts	Risk Score	<b>Risk Rating</b>
Decreased water availability Increase in water prices Increased evaporation losses	2 1 3	Moderate Minor Moderate			





### Thank you for your attention!



