

LUMASS

Land Use Management Support System

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LANDCARE RESEARCH
MANAAKI WHENUA

Sustainable Landscape Management

How does the system work?

How does it react to management?

Spatially explicit system dynamics modelling

- System understanding
- Impact assessment

What do we do?

Where do we do it?

Optimal spatial resource/land-use allocation

- Land-use development scenarios
- Limits testing
- Resource-use efficiency



LUMASS - Key features

➤ Multi-objective spatial optimisation framework

- Science integration from different domains to support spatial planning
- Integration of stake holder preferences
- Optimal spatial resource allocation
- Identifying trade-offs between conflicting objectives
- Flexible specification of objectives and constraints
- Scale independent

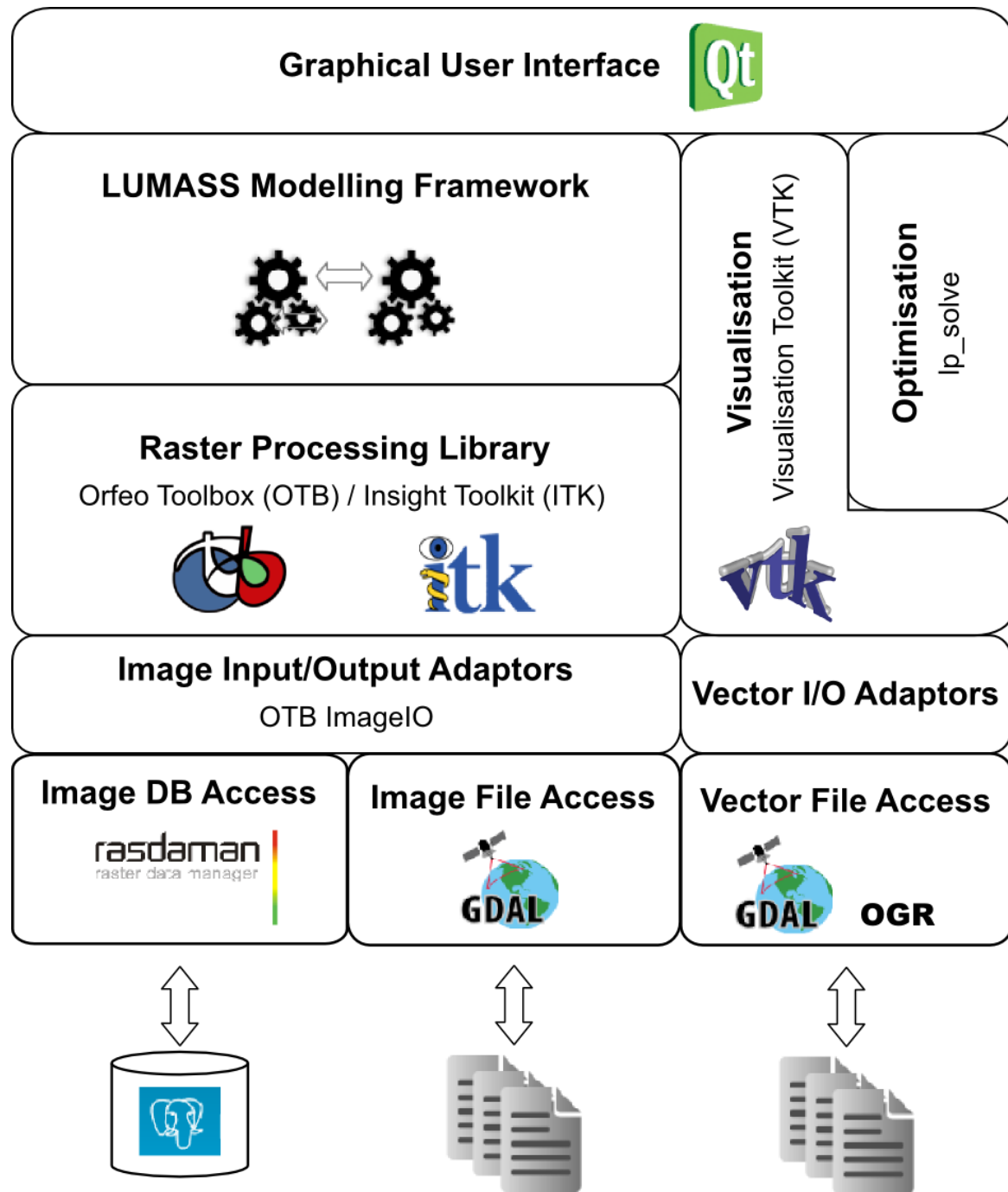
➤ Spatially explicit system dynamics modelling framework

- Model development for non-programmers
- Model integration across domains
- Component-based modelling (Lego brick principle); re-use of components
- Support for big data and multi-temporal modelling
- (Immediate result publication via OGC web services (WCS))

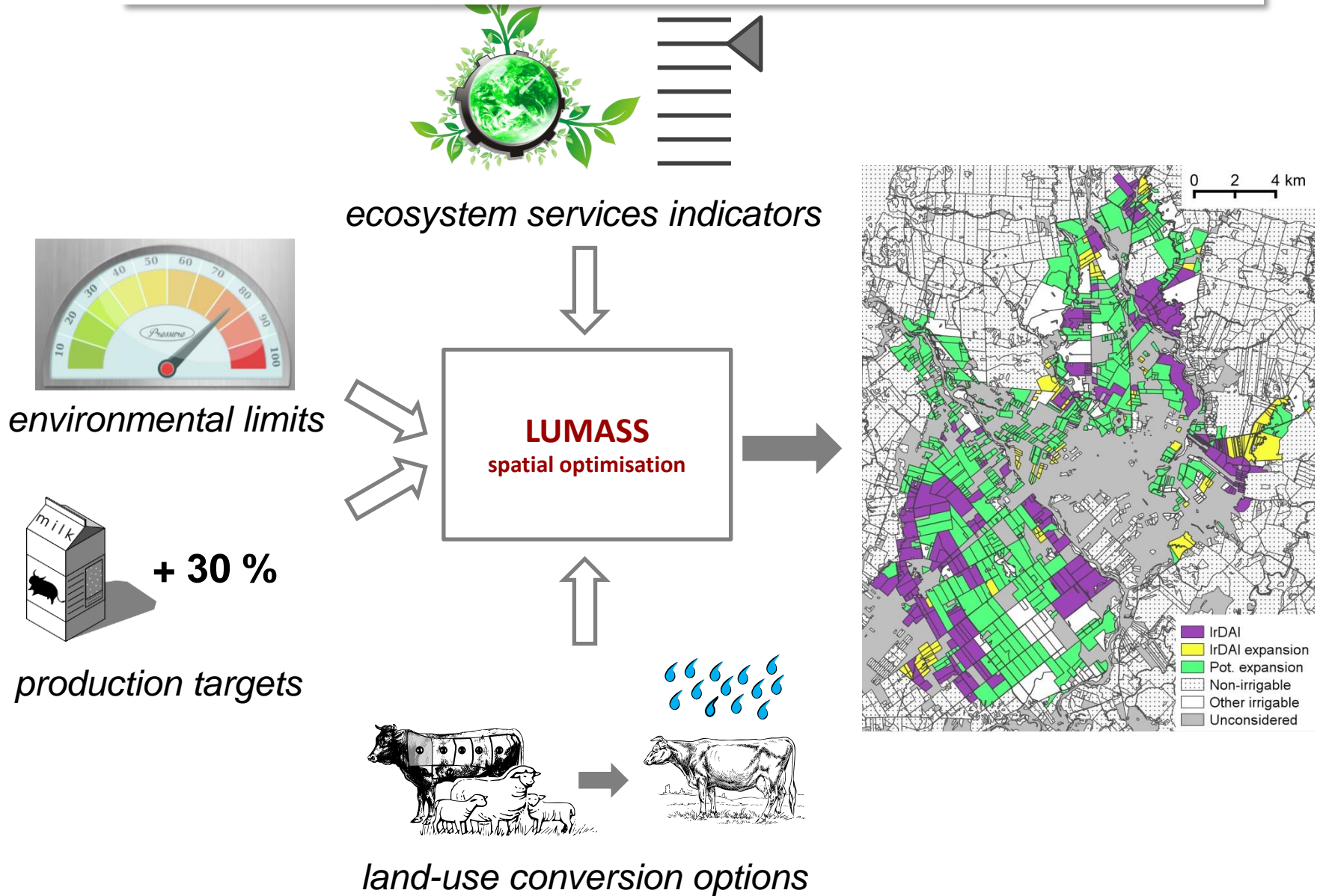
➤ Free and open source

- No license fees
- Transparent
- Extensible

Architecture



Multi-Objective Spatial Optimisation Framework



➤ Exploring Limits

➤ Identifying trade-offs

➤ Discovering Potentials

Spatially Explicit System Dynamics Modelling Framework

Object Analysis M

Enter ComponentName or UserID

Layers Components

Map Layers

lenz_lv_2

ELEVATION

Value Field ELEVATION

Descr Field ELEVATION

Legend Type NM_LEGEND_RA

Colour Ramp NM_RAMP_ALTI

Upper 1822

Lower 1

> Upper

1822

1

< Lower

Table Objects

lenz_layers

Model Components

CastImage

CostDistanceBuffer

DataBuffer

DataBufferReference

ExternalExec

ExtractBand

FocalDistanceWeight

ImageReader

ImageSorter

ImageWriter

MapAlgebra

MapKernelScript2

ParameterTable

RandomImage

ResampleImage

Attributes & Properties

Layer Attributes

	Attributes (0)	Value
1	rowidx	0
2	Histogram	125...
3	LVL_2	
4	HECTARES	0
5	ELEVATION	0
6	ANNUAL_TEMP	0
7	MIN_TEMP	0
8	ANNUAL_SOLR...	0
9	WINTER_SOLRAD	0
10	OCT_VPD	0
11	WAT_BAL_RATIO	0
12	WATER_DEFICIT	0

Component Properties

Property	Value
ComponentN...	AggrCor
UserID	WeedUn
Description	WeedUn
TimeLevel	23
Inputs	{}
IterationStep	1
NumIterations	1
NumIteration...	{}
Sub compone...	{{AggrCo

lenz_layers

	Name	Transform	NiRange	SiRange	
1	mat	img / 10.0	17.1	20.1	J:/alex
2	tmin	img / 10.0	15.1	16.5	J:/alex
3	mas	img / 10.0	1.9	4	/homi

0 of 16 records selected Clear Selection Swap Selection Selected Records Only

Weed Allocation

Weed Allocation

C, N, P calc

C, N, P WeedLeaves

Map Location: X: 2027598.13497 Y: 6514335.45181 Pixel(11, 84, 0) = 0 | LPRPixel(360, 2740, 0)