

# FAT – FARM ASSESSMENT TOOLKIT: Profiling farms and farmers

*A scientific toolkit to monitor & evaluate farm performance*

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# Rationale

- Widespread, untapped farm potential: scope for resource efficiency/sustainability
- M&E is critical to focus investment– to guide targeted intervention/management
- Sustainable yield increases required, given economic & climate change concerns
- Need quality info on land potential, resources, production, infrastructure, risks, limitations
- To focus investment and management – need good information – FAT
- Using the FAT in the PLAS evaluation ( $\pm$  2000 farms), sharpened ARC's farm evaluation skills



# FAT - essence

- Analysis farm and farmer potential and performance to shape management
- Using a targeted survey shaped by survey science expertise complemented by farm-based agro-ecological maps [digitised national database]
- FAT establishes land potential, ideal commodities & potential production – based on national commodity standards (livestock, horticulture, crops) updated annually
- Determines potential, limitations & risks
- Provides recommendations on training, management focus & investment



# Data collection process

Profiling tool developed over last decade with local & international survey science expertise that captures essential enterprise particulars:

- 1) Assets available
- 2) Inputs and labour used
- 3) Farm infrastructure/equipment
- 4) Production/productivity
- 5) Markets accessed
- 6) Income generated
- 7) Technology & support utilisation

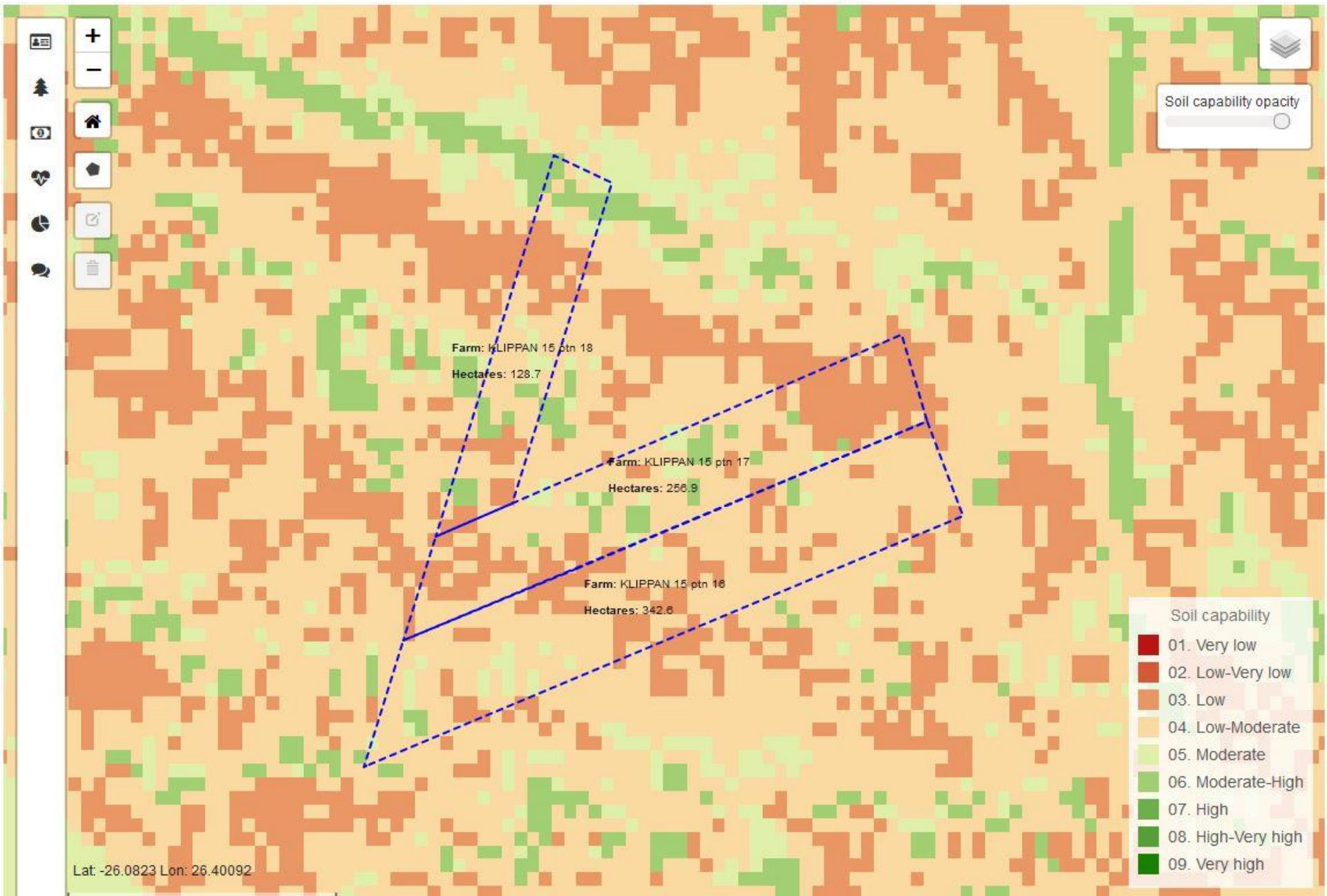


# Toolkit basics

- Survey + National Agro-ecological Database [ARC/DALRDD]
- Scientific panel of experts (specialists in livestock, crop & horticulture) evaluate **survey data** in view of natural resources of the farm (**agroecological maps**)
- Trans-disciplinary expert panel scores all aspects to ensure objective evaluation
- Commodity standards updated annually with commodity organisations: typical yields, costs, prices (low, medium, high levels)
- Enterprises include intensive/extensive livestock, irrigation based horticulture (fruit, vegetables) dryland crops and pastures



# Example of agroecological map: soil capacity



# Commodity standards –extract

Column1	Commodity	Level	Minimum No/Area (Ha)	Annual offtake	Price /unit	Costs %	Revenue	Potential net income
		Low	250 x 0.5	125	R6 500,00	0,35	R 812 500,000	R 528 125,000
Extensive Livestock	Beef	Fair	10 bulls,250 cows [offtake - X 0.60] 50 heifers replacement	150	R7 000,00	0,35	R 1 050 000,000	R 682 500,000
		High	250 x 0.7	175	R7 500,00	0,35	R 1 312 500,000	R 853 125,000
		Low	500 x 0.8	400	R1 000,00	0,35	R 400 000,000	R 260 000,000
	Sheep	Fair	20 rams, 500 ewes [x 1 = offtake – NB – twins]	500	R1 200,00	0,35	R 600 000,000	R 390 000,000
		High	500 x 1.5	750	R1 500,00	0,35	R 1 125 000,000	R 731 250,000
		Low	3kg offtake	1820	R125,00	0,35	R 227 500,000	R 147 875,000
	Wool	Fair	20 rams, 500 ewes [x3.5kg = offtake]	1820	R170,00	0,35	R 309 400,000	R 201 110,000
		High	4kg offtake	1820	R215,00	0,35	R 391 300,000	R 254 345,000
				3	R250,00	0,35	R 750,000	
	Angoras		1000 ewes [delivering mohair - kg]	4	R300,00	0,40	R 1 200,000	R 720,000
				5	R550,00	0,45	R 2 750,000	R 1 512,500
			selling 350 kids		R850,00	0,40		
		Low	offtake 1.0	300	R1 650,00	0,20	R 495 000,000	R 396 000,000
	Goats	Fair	15 bucks, 300 does [offtake = x1.2]	360	R1 750,00	0,20	R 630 000,000	R 504 000,000
		High	offtake 1.4	420	R1 850,00	0,20	R 777 000,000	R 621 600,000

# Expert panel evaluation - Step 1:

- Farm location,
- Farm name & size
- Land use/Enterprises
- Nearest town
- Investment
- Provides context, focus

<b>SECTION 1: DESCRIPTION OF THE PROJECT</b>	
<b>Table 1 Project Details</b>	
<b>Province</b>	<b>Mpumalanga</b>
<b>District</b>	<b>Gert Sibande</b>
<b>Project Name</b>	<b>Sterkfontein</b>
<b>Project number</b>	<b>MP65</b>
<b>Size (Ha)</b>	<b>838,2418</b>
<b>Arable land area (Ha)</b>	<b>200</b>
<b>Grazing land area (Ha)</b>	<b>550</b>
<b>Irrigable area (Ha)</b>	<b>0</b>
<b>Intensive farming infrastructure (Ha)</b>	<b>0</b>
<b>Price paid</b>	<b>R5 071 861,61</b>
<b>Date</b>	<b>2000/09/25</b>
<b>Recap Amount</b>	<b>R0,00</b>
<b>Date</b>	<b>-</b>
<b>When occupied</b>	<b>2009</b>
<b>Purpose for acquisition?</b>	<b>commercial farm</b>
<b>How long on farm (Years)</b>	<b>8</b>
<b>Number of residents/dependents</b>	<b>Two families</b>
<b>Nearest town</b>	
<b>Beneficiary status – full time/part time</b>	<b>Fulltime</b>
<b>Experience: (years in farming)</b>	<b>40</b>
<b>Sex</b>	<b>Male</b>
<b>Age</b>	<b>48</b>
<b>Education</b>	<b>Secondary</b>
<b>Water availability</b>	<b>Yes</b>
<b>Water rights</b>	<b>To be investigated</b>



# Expert panel evaluation – step 2:

GIS-based data, used with satellite imagery (google earth)

Panel scores soil, topography, climate, water availability & degradation, for objective NR score; simple, but extensive data behind calculation

## Section 2: Natural Resources Assessment

Table 2: Natural Resources (including weights to factor in land use mix/ratio)

Natural Resource	Area (Ha)	Weight (Area/Total Area)	Capability	Score (1, 2, 3) (Weight x Condition x Capability)
Soil Capability for cultivation Non irrigable land	200	1	2	2
Soil Capability for Irrigation - Irragable Land		0		0
Rangeland Capability		0		0
Area Suitable for Intensive infrastructure based agriculture		0		0
Total productive area	200			
Total score out of 3				2
Climate Capability				3
Rainfall & temperature				750, 23
Topography				2
Water available				2
Degradation				0
Total (Score out of 12)				9

# Stepwise expert panel evaluation – step 3:

Select suitable commodities, based on natural resources & expert panel views

Panel considers alternatives if current commodities are not sustainable/optimal

Assessment of an Illustrative High Potential Mixed Farm ( $\pm$  4000ha):

Commodity	Detail	Optimal number or Area (Ha)	Annual offtake	Price /unit	% Production costs	Potential Net income
Livestock	Beef	520	364 calves	R6 500	0.35	R1 537 900
	Sheep	1732	1732 lamb	R1 600	0.35	R1 801 280
Field crops	Maize (irrigate)	100	10t/ha	R2 600	0.85	R390 000
	Soya	100	4t/ha	R5 000	0.80	R400 000
	Planted pasture	150	12t/ha			Used on farm
Fruits	Nectarines	10	25t/ha	R11 500	0.75	R718 750
Vegetables	Potato (irrigate)	100	5000kg/ha	R3.50	0.85	R262 500
Potential annual gross income (return on investment)						R5 110 430
Viable – (good (3) fair (2) poor (1))						3



# Stepwise expert panel evaluation - step 4:

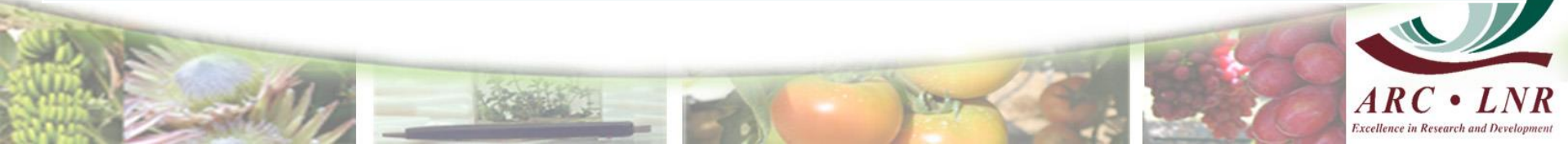
Establish farm's productivity, given selected commodities

Calculate potential net income & current net farm income (survey)

Commodity guidelines considers area, offtake, value, typical input/costs

Current performance of an illustrative mixed farm:

Commodity	Detail	Actual # or Area (Ha)	Composition (Male<Female<Young)	Reproduction % / Yield	Production cost (%)	# Sold	Price/unit	Income obtained
Livestock	Beef	250	7, 173, 70	40%	0.35	55	7500	R268 125
	Goats	3000	300, 2221, 479	33%	0.2	1568	800	R1 003 520
Field crops	Maize	300ha		3t/ha	0.7	900t	2 600	R702 000
Vegetables	Tomatoes	2ha		10 000kg	0.7	20t	R6/kg	R36 000
Actual Net income obtained								R2 009 645
Current productivity (good (3) fair (2) poor (1))								3



# Stepwise panel evaluation – step 5:

Calculate return on investment ratio (ROI) on potential & actual productivity – provides a sense of the value of investment

Comparing ROI with repo rate indicates opportunity cost of farm investment, in contrast with investment in financial markets, scored accordingly as low, medium or high.

Return of below 5% is considered poor, between 5 and 9.9% fair, and above 10% good

## REPORT 4: Return on Investment

Table 4: Return on Investment

<b>Investment in farm (purchase price + recap)</b>	<b>R2 889 562,00</b>		
<b>Potential production</b>	<b>R648 000,00</b>	<b>% potential annual return on Investment</b>	<b>22,4</b>
<b>Actual production</b>	<b>R527 550,00</b>	<b>% actual annual return on Investment</b>	<b>18,3</b>
		<b>Prime Lending RATE %</b>	<b>10,25</b>
<b>THIS PROJECT HAS A</b>		<b>GOOD</b>	<b>RETURN ON INVESTMENT</b>
Lease option 1 - 1% of purchase price: R28 895.62 p.a. or R2408 per month			
Lease option 2 - 5% of potential net income: R32 400 p.a. or R2 700 per month			

# Stepwise evaluation – step 6:

Establish infrastructure score using a compound index (quality & quantity of 5 types)

Inventory audit, survey, satellite imagery & panel insights used - score of below 15 considered poor, 15 to 24 fair and above 24, good.

An Example of Farm Infrastructure Scoring, Using 5 types and 2 criteria:

Asset Type	Condition (Based on inventory)	Sufficiency (based on farm needs)
Staff housing	2	1
Production infrastructure (immovable assets (e.g., sheds)	3	2
Fencing	3	2
Water equipment,	3	3
Production equipment (e.g., tractors, scales)	3	2
Total		24
Sufficient and suitable infrastructure		FAIR



# Stepwise evaluation – step 7:

Beneficiary skills assessed using a compound index of four criteria

Consider scores obtained in steps 2, 4 & 6 & survey to establish farmer' capacity

A score to 4 is considered poor; 5 to 8 fair and above 8 is deemed good

An example of a farmer skills evaluation:

Skill indicators	Score
Productivity achieved	2
Farm condition - is infrastructure maintained, e.g., fencing, buildings, equipment	3
Sustainability - is farm sustainable managed (erosion, degradation, overstocking, nutrient Mining)	2
Support utilization - is support used effectively (Mentor, Partner, Extension, Link to Coop)	2
Total score (12)	9
This Beneficiary's capability is:	GOOD



# Stepwise evaluation – step 8:

Identify & score inherent limitations to sustainable production

Identify & score external risks in the area

Based on survey, inventory, imagery, NR information & geographic context

## SECTION 6: LIMITATIONS AND RISKS

Table 6a: Risks

Risk	Severity score
Erosion	3
Bush encroachment	
Invasive plants	
Pests & diseases	
Security	3
Fire	
Floods	
Water availability	
<b>Total score</b>	<b>6</b>

This Project has a risk rating of

**MEDIUM**

Table 6b: Limitations

Type	Severity score
Water(rights)	3
Age/succession	1
Infrastructure	2
Support (extension service / mentorship)	3
Access to finance	3
Skills/expertise	3
Degraded	3
<b>TOTAL LIMITATION SCORE</b>	<b>18</b>

Limitation requiring intervention are rated

**HIGH**

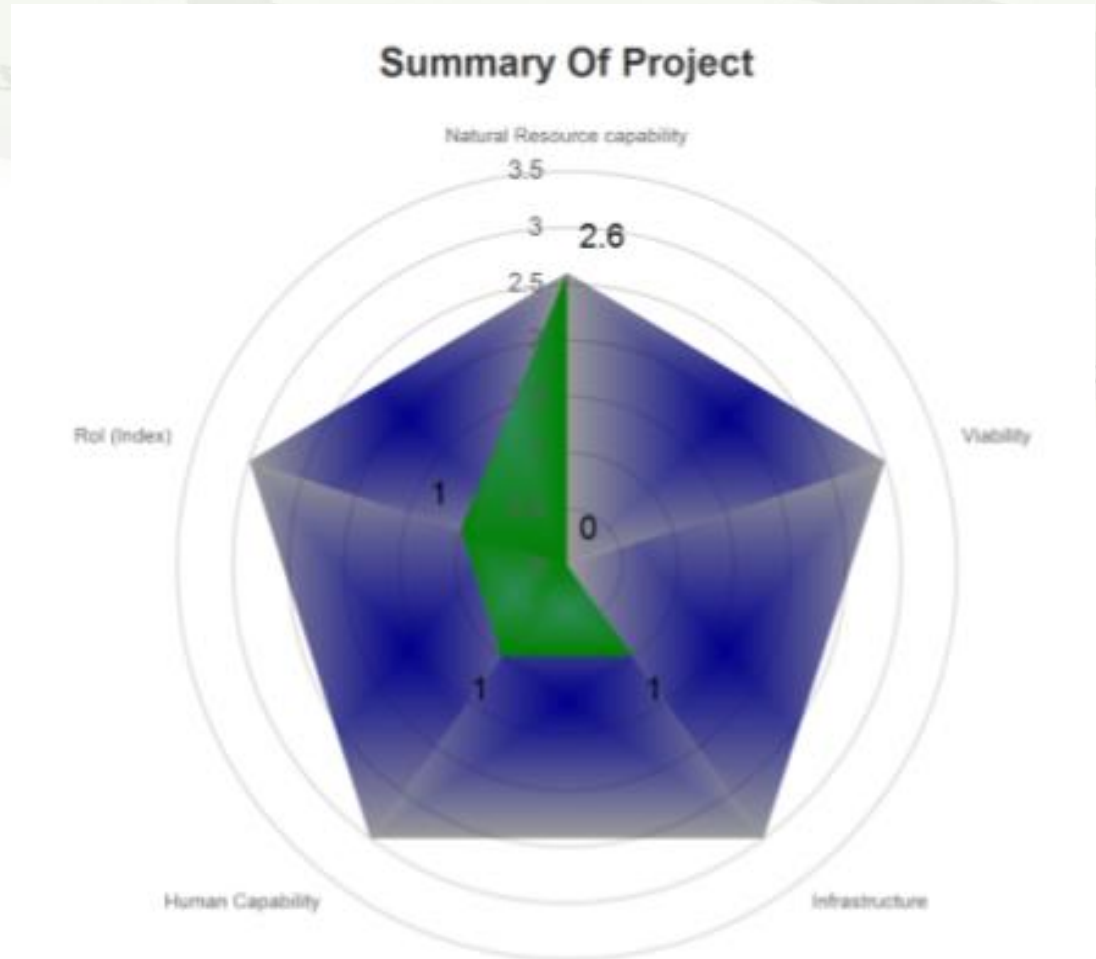
# Stepwise evaluation – step 9:

‘Spider graph’ scores farm according to 5 aspects

Comparing potential & actual performance

Summarise assessment

Visual distillation





# Stepwise evaluation step 10:

Provide a set of recommendations, based on panel process and collective, holistic systemic farm view

Formulate priority management interventions, and remedial action if required

Priorities in terms of infrastructural development

Priorities in terms of farmer development



# Digitised toolkit

Meeting | Microsoft Teams x | BL Business Day x | Farm Assessment Toolkit x +

Not secure | 155.240.219.10/PLAS-Toolkit-App/dev\_source/index.php

The ARC Farm Assessment Toolkit aartjan@arc.agric.za

Farm Assessment Toolkit

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*Scientific & Holistic Farm Analysis & Evaluation*

**START SURVEY**

NEW SURVEY

CONTINUE SURVEY

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# Conclusions

- Toolkit developed thru iterative, transdisciplinary process
- Scoring based on spatial data, collective interpretation – ensuring objectivity
- Considers farm potential; performance; infrastructure, risks & limitations
- Aligned to industry productivity standards – at low, fair, high levels
- Visual, easy to interpret; sequential analysis facilitates decision-making
- Delivers farm level insight in management dynamics as basis for recommendations
- Scientifically sound output guides enterprise development, support & policy
- Requires data collection – which required investment
- An expert system – requires scientific team



# Suggested approach to stakeholders:

- Identify a farm that requires evaluation
- ARC provides survey template for collection of data
- ARC team can visits farm with representative to verify information
- Expert panel evaluates farm, with, if requested, staff from farm & deliver a report
- On the basis of this farm evaluation, decide whether you wants to contract ARC to evaluate more farms
- If agreeable, contract is negotiated on specifics, timeframe



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Thank you

