The potential of food forests in the Dutch temperate climate

Voedselbossen Zuidoost-Nederland

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Personal introduction

- 4th year students from HAS University of applied science
- International Food & Agribusiness
- Horticulture and Business Management
- Bedrijfskunde en Agribusiness

- Voedselbossen Zuidoost-Nederland

Main findings

- A food forest shows a positive rentability
- Attention on the sales side is essential
- Diversification can bring a food forest additonal benefit
- Labor demand and supply need to be considered

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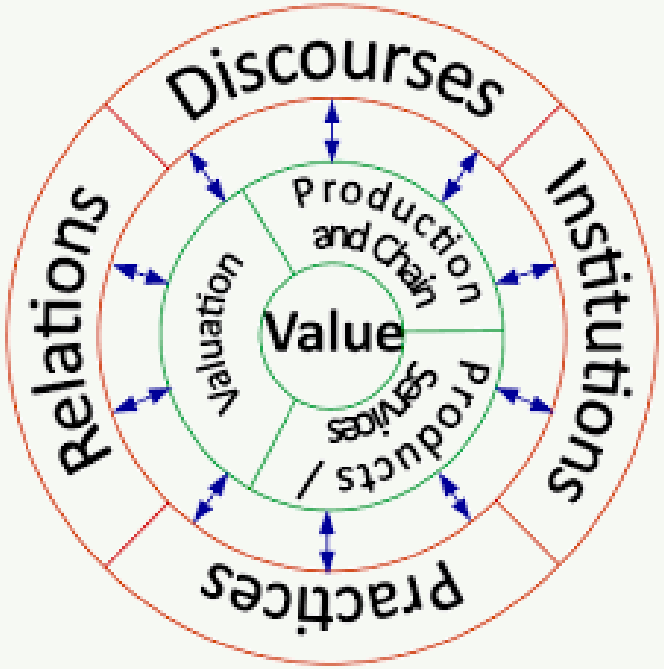
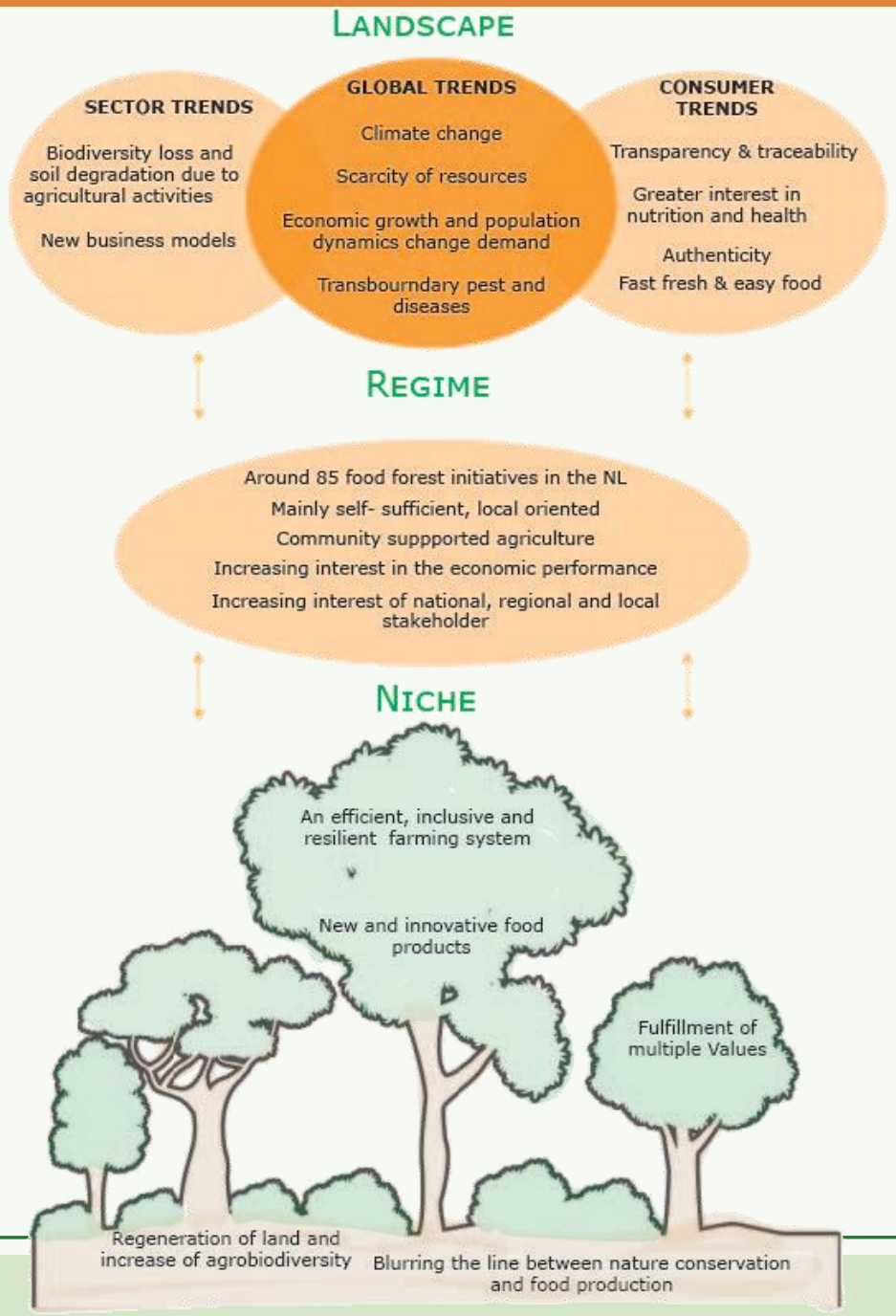
Introduction to the research

Main research Question:

What could be a successful business case for a temperate climate Food Forest in the Netherlands?



Potential of a food forest in the NL



To which trends does a food forest respond ?

What is the current role of Food Forests in the Dutch agri- food system?

Which niches does a Food Forest fulfill?

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Possibilities for a food forest in the NL

Pawpaw Quadrant

Rentability, regular and speciality products,

Nashi- pear Quadrant

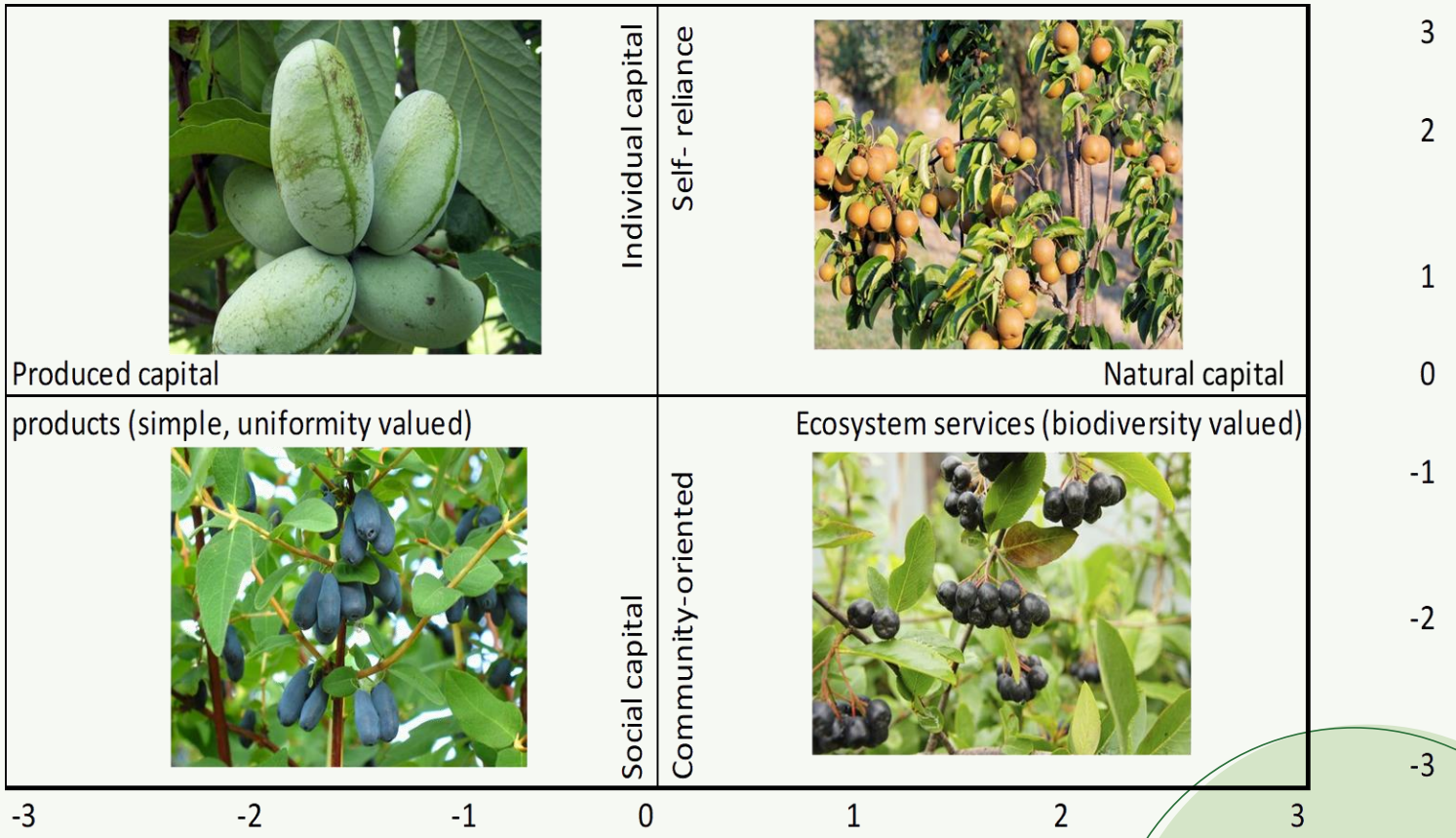
Consultancy& research, restoration of ecosystem services

Honeyberry Quadrant

Recreation, connecting producer and consumer,

Aronia Quadrant

Community building, care for the less fortunate in society



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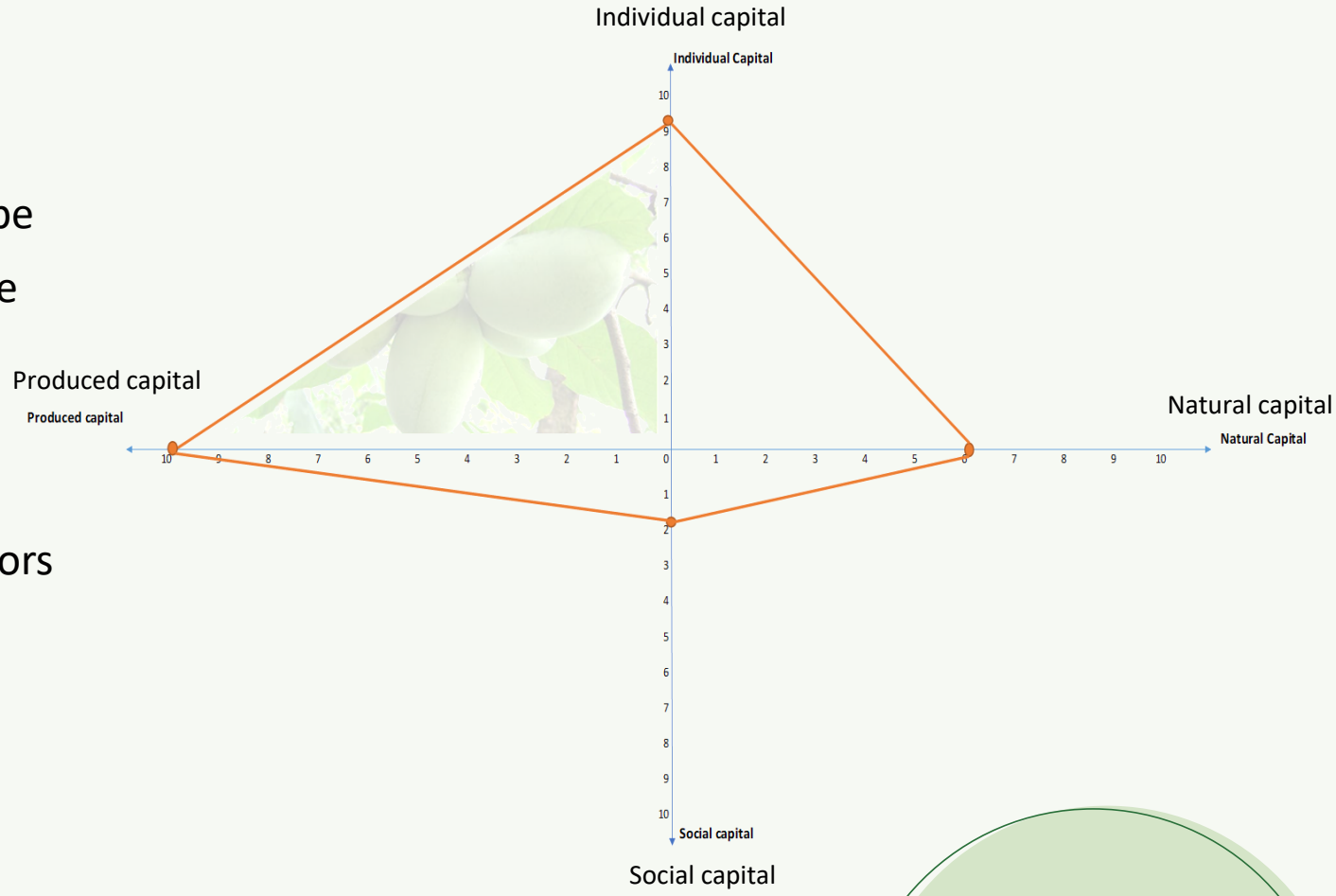
Case study Schijndel

- Value proposition
- restoring biodiversity in the agricultural landscape
- Proof of economic viability & provide a showcase
- Simplified food forest (12 main species), GOB involvement

- Short chain; Vitam, local restaurants, oil processors

Proccesing opportunities & services



Case study Schijndel - Valuation

Product	Layer	kg/plant	No. Plant	kg/ha/jr	Price per Kilo
Chestnuts	Canopy	25.00	11.00	275.00	2.58
Walnuts	Canopy	50.00	10.00	500.00	4.29
Apples	Sub-canopy	27.00	52.00	1404.00	1.29
Plumbs	Sub-canopy	5.72	48.00	272.00	3.43
Chokechery	Shrubs	5.87	96.00	554.40	0.86
Autumn olives	Shrubs	6.43	60.00	381.67	4.29
Hazelnuts	Shrubs	7.89	57.00	449.45	2.58
Elderberries	Shrubs	5.44	54.00	285.12	5.15
Currants	Shrubs	1.15	518.00	544.56	4.29
Rhubarb	Herbaceous	1.17	512.00	598.15	2.58
Ramson	Herbaceous	0.02	7500.00	183.30	4.29
Edible flowers	Herbaceous	0.30	1350.00	405.00	5.15
Kiwiberries	Vine	15.83	73.00	1155.83	3.43

Calculated crops in food forest Schijndel

Micro economical Result per hectare			*Year 20*
Turnovers			
Food products	€ 15,794.49		100%
		€ 15,794.49	
Related costs			
Inspection	€ 280.00		2%
Maintenance	€ 400.00		3%
Harvest	€ 7,200.00		46%
Organisation & logistics	€ 1,600.00		10%
		€ 9,480.00	60%
Bussiness Balance		*€ 6,314.49*	40%

Business balance per hectare

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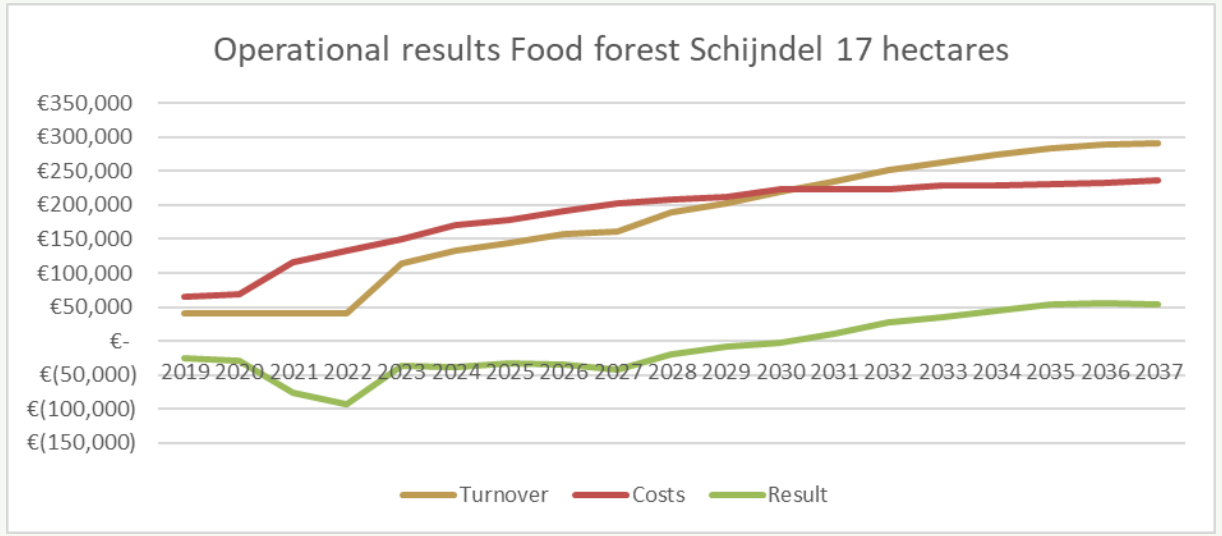
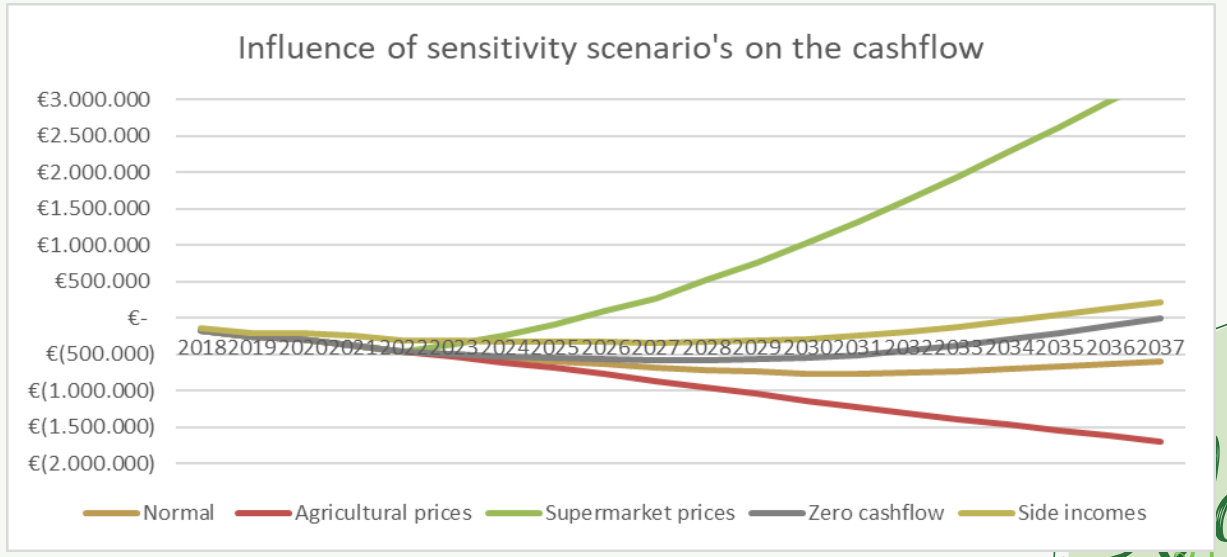
Case study Schijndel - Valuation

Analysis:

- Cash flow negative
- Tenancy
- Long return on investment
- Influence on cashflow

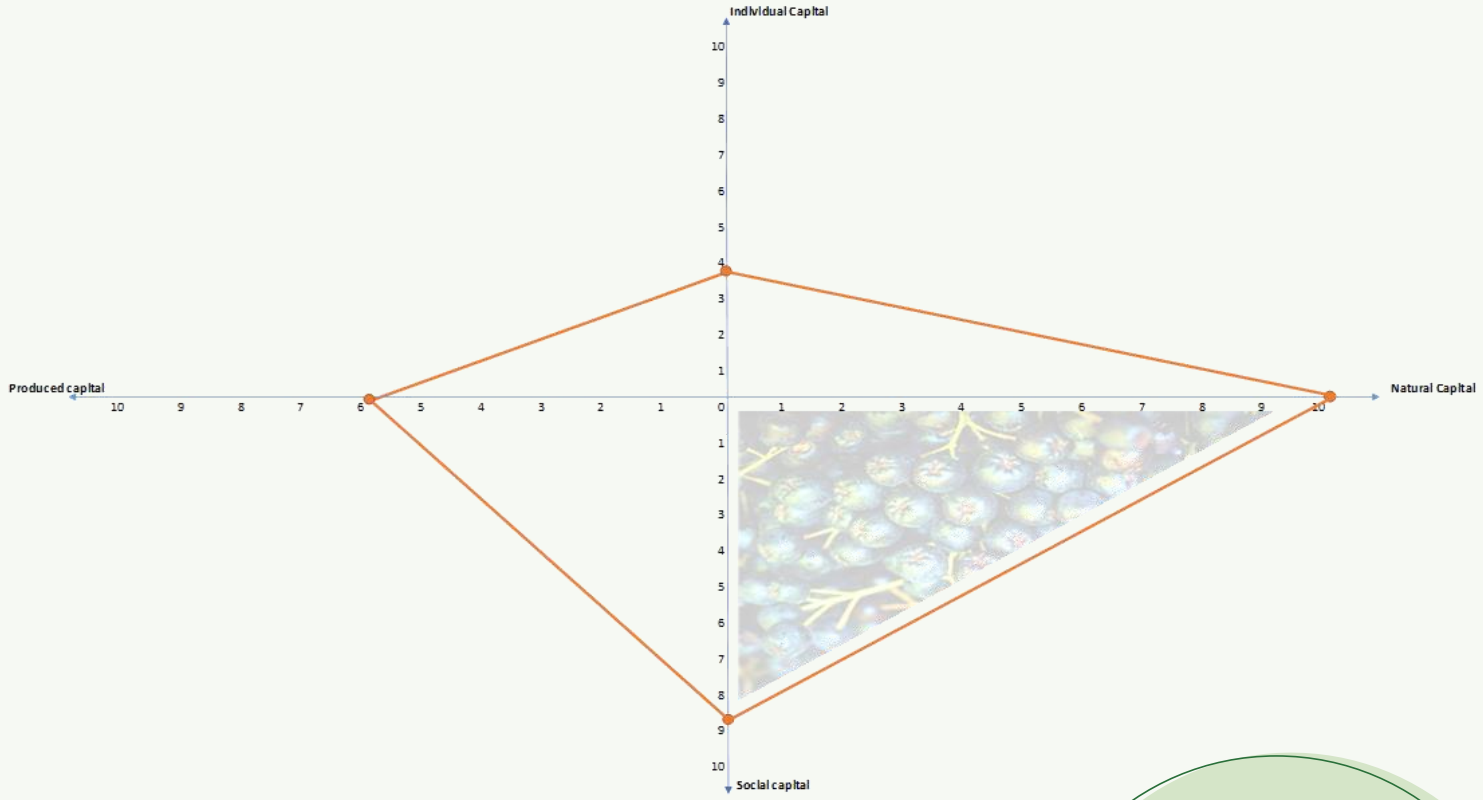




Case study Phien

Value proposition:

- possibility to produce food using a food forest, to provide an alternative lifestyle for families and the community (self sustainability, social happiness, basic needs op people, nature)
- Self-sufficiency
- Conscious use of resources
- Restoration of ecosystem services



Phiens' role and the current status

High biodiversity – year-round production and including housing

Diversity in species

- 177 different species
- Low quantities, specialty products

Variety	layer	product	kg/plant	No. Plants per Ha.
fagopyrum dibotrys	herbaceous	seeds		15
Alnus cordata	canopy	Wood	0	1
Fraxinus excelsior	canopy	Wood	0	1
Alnus incisa 'aurea'	canopy	wood	0	6
Gallus gallus domesticus	lifestock	eggs	30	5
Caragana arborescens	shrub	legume pods	13	20
caragana arborescens 'lorbergii'	shrub	legume; pods	13	2
caragana arborescens ssp.	shrub	legume; pods	13	4
Gallus gallus domesticus	lifestock	meat	1.5	1
Malus domestica mid-stem	sub-canopy	apple	27	6
Malus domestic highstem	sub-canopy	apple	150	4
malus domestica low-stem	shrub	apple	15	10
Prunus armeniaca	shrub	apricot	30	4
eleagnus umbellata	shrub	autumn olives	7.5	2
sorbus domestica	sub-canopy	berries	20	1
crataegus	sub-canopy	berries	0	0
vaccinium macrocarpum	groundcover	blueberries	4	5
rubus fruticosus	shrub	brambles	4	5
aronia melanocarpa	shrub	chokecherry	7.5	
ribes rubrum	shrub	currents	1.4	4
ficus carica	sub-canopy	figs	15	6
Cornus sanguinea	shrub	fruit	3	30
diospyrus kaki 'Dunaj'	sub-canopy	fruits	60	2
diospyrus lotus	sub-canopy	fruits	120	1
sorbus 'titan'	sub-canopy	fruits	20	1
pyrus pyrifolia	sub-canopy	fruits	14.55	5
Sambucus nigra	shrub	fruits	6	50
Amelanchier lamarckii	shrub	fruits	0.5	60
Viburnum opulus	shrub	fruits	6.8333333	30
Prunus spinosa	shrub	fruits		60
hippophae rhamnoides	shrub	fruits	5	20
Cornus mas	shrub	fruits	3	50
ribes nidigrolaria	shrub	fruits	5	1
eleagnus angustifolia	shrub	fruits	7	20
aronia prunifolia 'Hugin'	shrub	fruits	7.5	3
rubus occidentalis	shrub	fruits	2	5
vaccinium macrocarpon 'pilgrim'	groundcover	fruits	0.2	25
Prunus avium	canopy (wind barrier)	fruits	5	30
akebia quintata	vine	fruits	20	5
Gunnera manicata	herbaceous	fruits (possibly)		1
lycium barbatum	shrub	Goji berry	8	5
Ribes grossularia uva-crispa	shrub	gooseberries	4	1
Eleagnus multiflora	shrub	Goumi berries	7.5	3
eleagnus multiflora ssp.	shrub	goumi fruit	7.5	12
vitis vinifera	vine	grapes	15	10
Rosa canina	shrub	hips	2	50
lonicera ceerulea	shrub	honeyberry	3	4
Actinidia arguta	vine	kiwi berries	22.5	10

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Case study Phien - valuation

	total need	total supplied	sum (adjusted diet)
bread/grains/oats/rice	**227.76702**	**0**	227.76702
Dairy	**0**	**0**	0
cheese	**0**	**0**	0
starches, potatoes	**302.6**	**312.5**	-9.9
vegetables	**284.8**	**287.08**	-2.28
fish, meat, eggs or legumes	**124.6**	**489.5**	-364.9
nuts	**32.04**	**611**	-578.96
lipids	**42.008**	**0**	42.008
fruits	**772.62146**	**5889.116667**	-5116.495207

Self-sufficiency capability

- Labor supply by the family

Micro economical Result			*Year 20*
Turnovers			
Own use food	€ 9,061.15		60%
Food sales	€ 6,117.78		40%
		€ 15,178.93	100%
Related costs			
Inspection	€ 3,360.00		22%
Maintenance	€ 1,000.00		7%
Annuals	€ 6,240.00		41%
Chickens	€ 240.00		2%
Harvest	€ 6,240.00		41%
Organisation & logistics	€ 1,600.00		11%
Phien (10%)	€ -		0%
		€ 18,680.00	123%
Bussiness Balance		*€ -3,501.07*	-23%

Business balance per hectare

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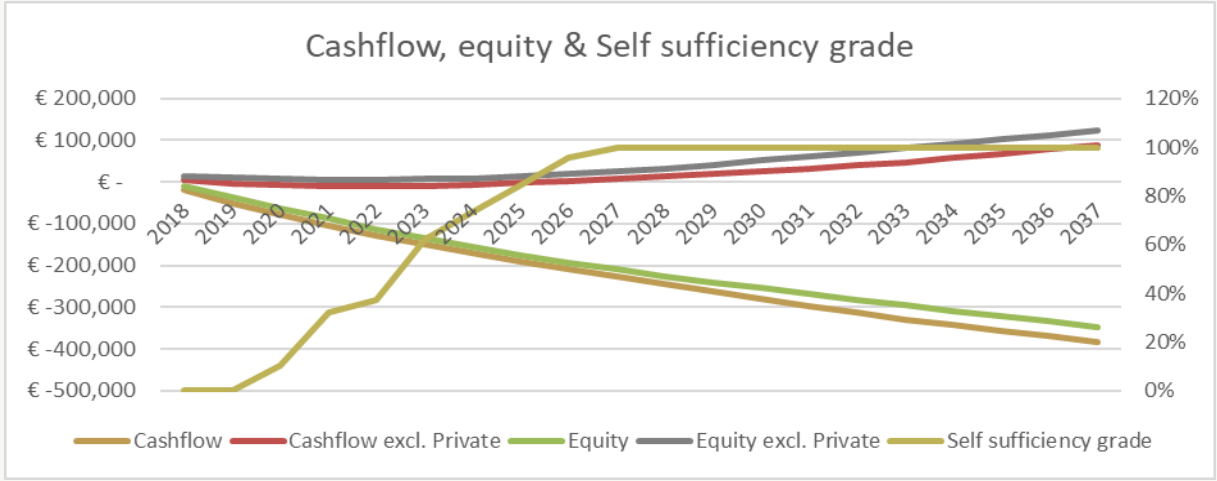
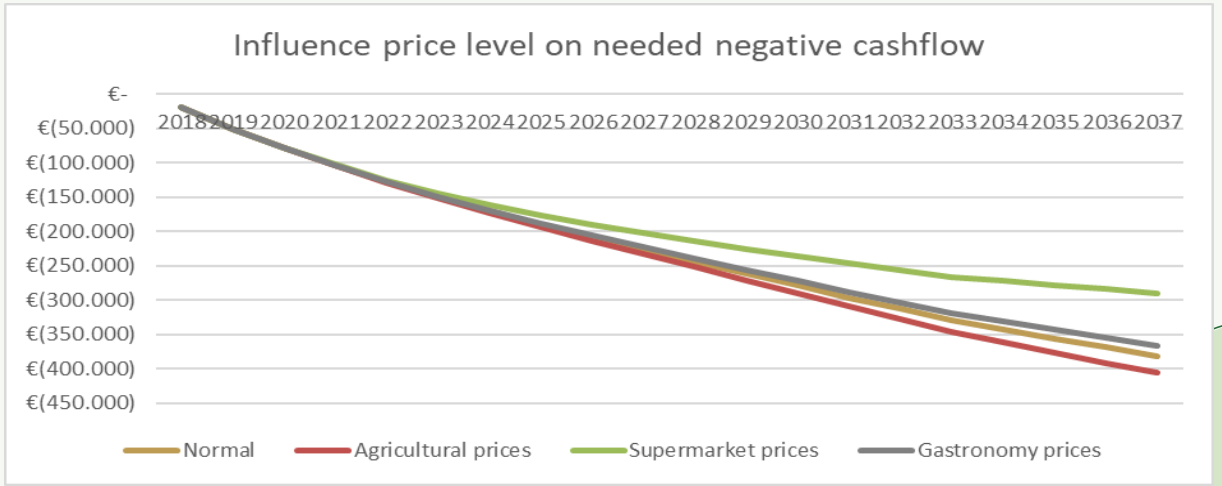
Case study Phien - valuation

- Housing & general living costs included
- Side-income should be maintained
- Small scale
- Higher margin through farm shop

- sensitivity for price level and higher labor need (external)





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Nuance

- A food forest shows a positive rentability
- Attention on the sales side is essential

Crop	Rentability/Ha/year
Food forest	€6300
Potatoes	€3885
Strawberries	€2723
Maize	€908

- Stability after 20 years, significant negative cashflow in 0-20

Price level	Return on investment (years)
Agricultural price (KWIN, 63%)	40+
Wholesale price (100%)	20
Supermarket price (226%)	7

- Wholesale price: 20 years,

Common agriculture: 1 year

- fluctuation supply and quantity
- Communication of added value

- Sensitivity analysis

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Nuance

- Diversification can bring a food forest benefit (focus on other capitals)
- Labor demand and supply need to be considered




- Opportunities to diversify
  - Social (workshops, tours)
  - Natural (carbon farming, ecosystem services)
- Labor need 544 vs 7.7
  - Stability & intensity
  - Lack of data

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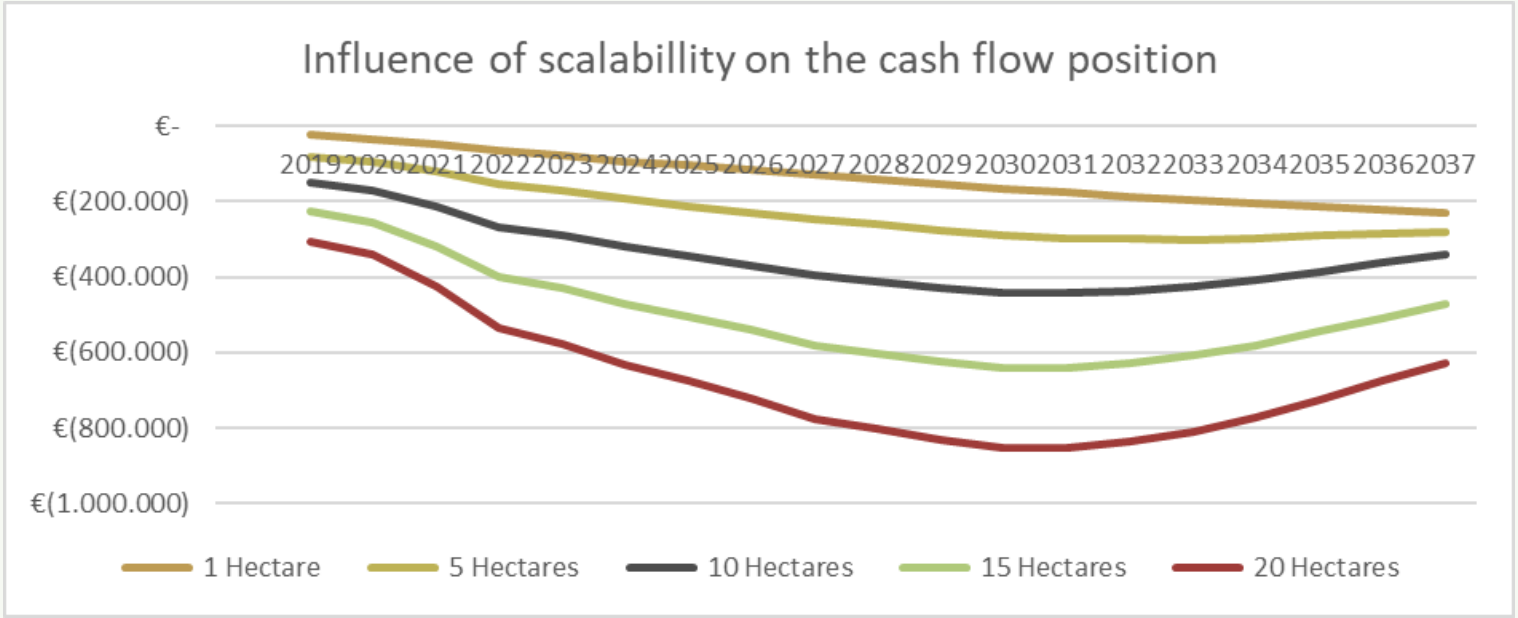
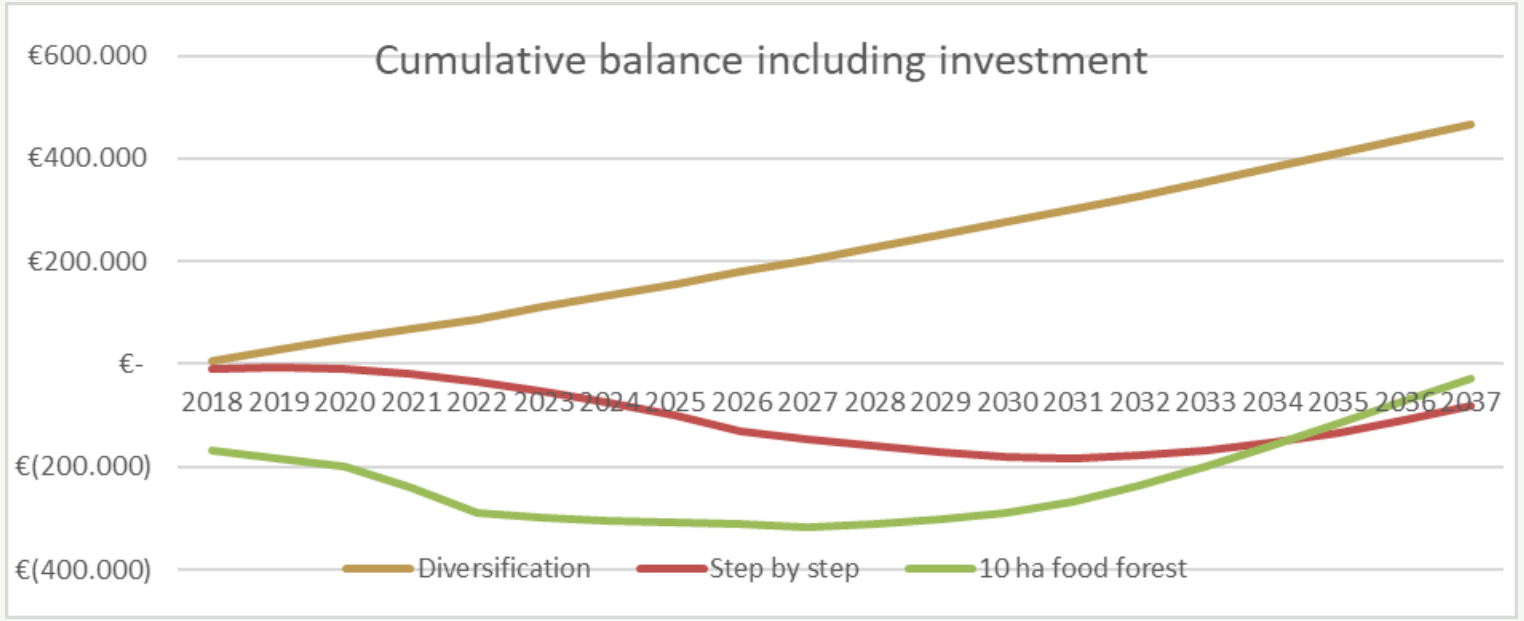
Recommendations applicability - scalability

- Spreading company costs
- Labor & mechanization
- Risk management



Recommendations applicability - scenarios

- Four scenarios
  - Simplified agroforestry system
- Managing risks
  - Stable income
  - Needed cashflow
  - Environmental influences



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Recommendations applicability - conclusion

- **Main research Question:**

What could be a successful business case for a temperate climate Food Forest in the Netherlands?

Recommendations applicability - recommendations

- Main recommendations
  - Influence of price
  - Using of short chain
  - Leadin design (simplified vs. Diversified)

- Further research:
  - Worth added value of food forest
  - Payments on natural capital
  - Social and individual capital

Recommendations applicability - Discussion

- Discussion
  - Uncertainty of return on investment
  - Technical drawbacks of the system
  - Uncertainties related to the market
  - Devaluation of land

Closing epilogue

Questions & discussion