Joint models (Eco-scheme simulation tool, FARMDYN, AGMEMOD)

The Dutch eco-scheme: an eco-points-system with performance-based farmer remuneration

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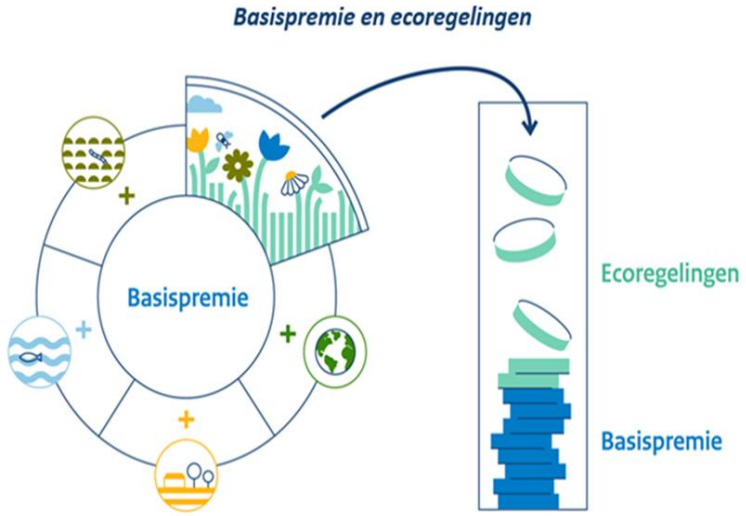
THE ECO-SCHEME: WHAT SHOULD IT DO…?

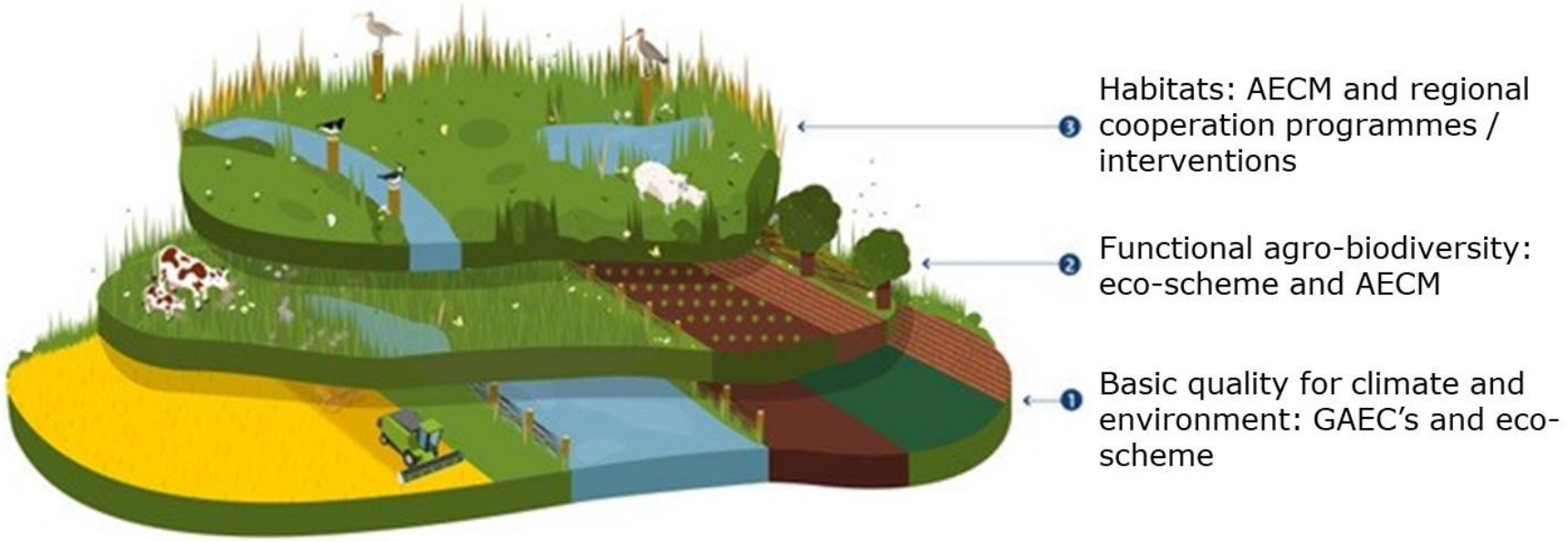
- A rating system, developed by the government, supported by farmers and other stakeholders.
- To support transition towards more sustainable agriculture with a focus on nature inclusive farming.
- The goal is to strengthen the sustainability performance of farmers, in a:
  - National rating system with five objectives and regional differentiation;
  - broadly accessible by farmers (the platoon);
  - activities go beyond conditionality AND good agricultural practices.
- Working with the rating system should be easy and flexible for farmers.
- The rating system gives insight in a farm(er)'s sustainability profile and could improve farmers' market award.
- The measures in a rating system should be easy to monitor.



GREEN ARCHITECTURE OF THE CAP: FARMERS WORKING ON A BIODIVERSE RURAL ENVIRONMENT

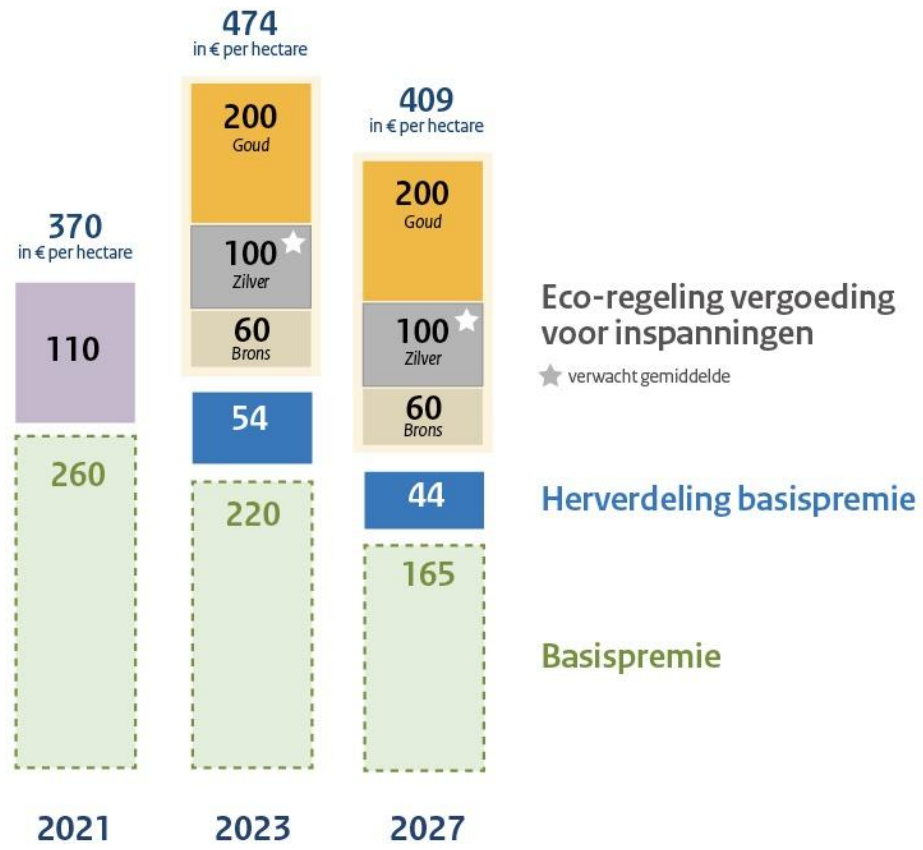
TOOLS 4 CAP

Different levels of area-related interventions



DUTCH ECO-SCHEME

CAP reform 23-27 included a re-allocation of (decoupled) direct payments



- 1st pillar payments: per hectare agricultural land, now including landscape features (e.g. ditches & hedgerows)
- Three levels of payment in eco- scheme (“medals”)
- 2024-2027 Redistribution from BIS to AECM
- Original budget in 2023: 152 million euro, while 202 million euro requested
- 35,000 farmers applied out of 50,000 farmers.

A core e Du e

Activities farmers can choose from (menu)

Five objectives

Impact scores

		Climate	Soil&Air	Water	Landscape	Biodiversity
Main crops						
	Resting crop	4	4	4	2	2
	Nitrogen fixatin crops (legumes)	3	2	0	1	1
	Perrenial arable crop	4	4	4	1	1
	Permanent grassland (no plouging)	4	4	3	1	1
	Species rich grassland	2	4	1	3	1
	Paluda culture	3	0	0	1	2
	Harverst root crop before 1 September	2	2	4	1	1
	Harverst root crop before 1 November	0	3	0	0	0
	Gras/clover	4	4	0	1	1
	Strip cropping	0	2	2	2	2
	Fibre crops	4	4	4	2	3
Plant cover						
	Inter cropping catch crop	2	1	1	1	1
	Extended cover crop	2	3	3	1	1
Cultivation						
	Natural pest control	0	1	4	1	2
Dairy cattle						
	Extended grazing 1	2	3	0	2	1
	Extended grazing 2	3	4	0	2	2
Non productive						
	Landscape features: Low woody structures	4	2	0	40	60
	Landscape features: High woody structures	4	2	0	40	60
	Green fallow	2	4	0	10	40
	Species rich bufferstrip on arable field or permanent crop	2	4	4	30	60
	Species rich bufferstrip on grassland	0	0	3	30	60
Sustsainable farm						
	Organic farming	4	4	2	1	2

Farmers choose from a menu (22 eco activities) and receive a performance related payment per hectare.

Eco activities contribute to several of five objectives.

Illustration of activity-objective impact-matrix (points per hectare)

How does the Dutch point system work…?

- Assume a farmer has 50 hectares of land
  - of which 30 hectares are permanent pasture
  - 10 hectares are temporary grassland
  - 6 hectares are cultivated with maize
  - 2 hectares are wooded banks
  - 2 hectares are cultivated with alfalfa

- See calculation of points and payment rate/ha in Table

Dutch point system properties

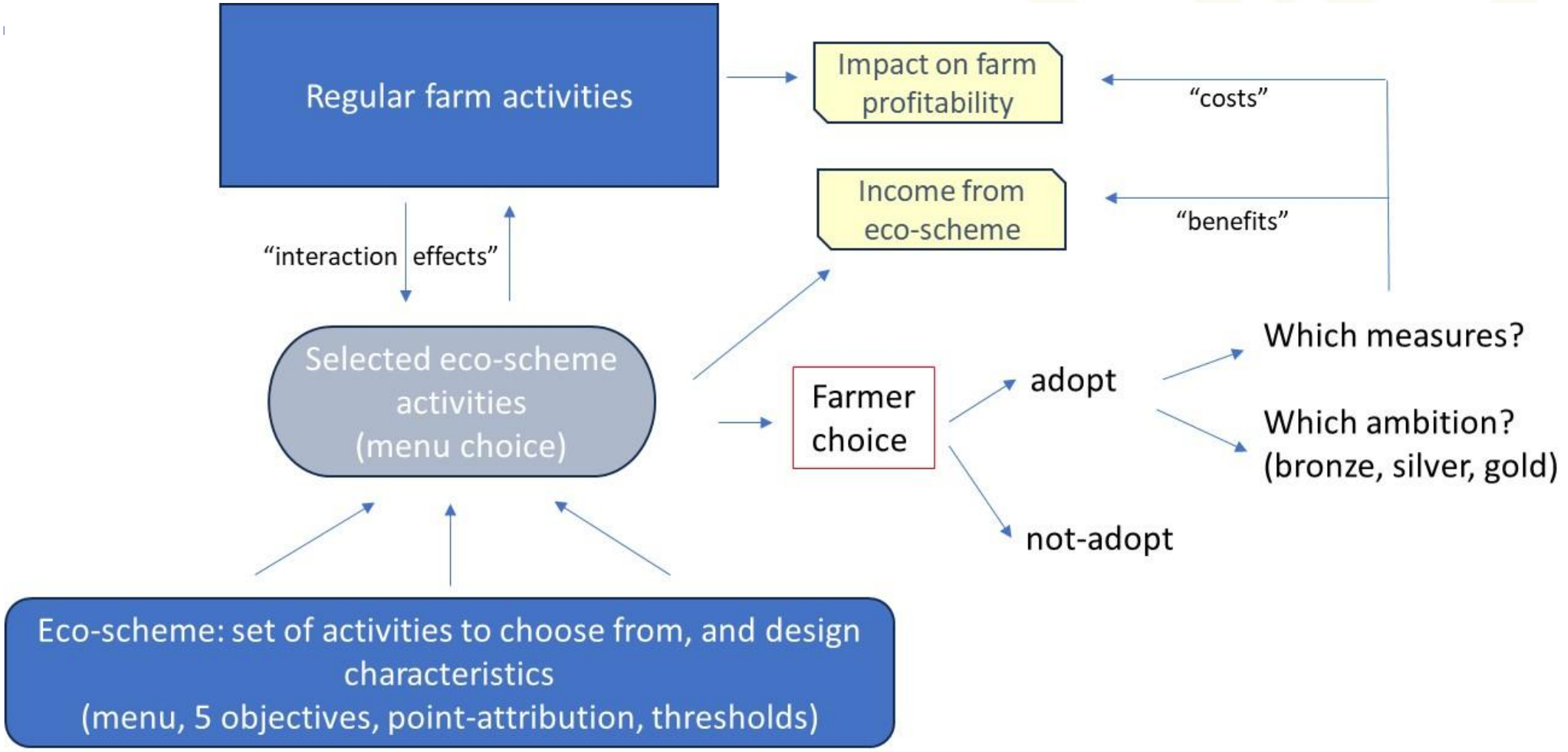
- A farmer should contribute to 5 different objectives;
- Selected activities generate points (see matrix in previous slide);
- Threshold values should be satisfied;
- A counting of both point value and monetary value (renumeration of activity);
- The financial threshold values for bronze, silver and gold for a 50-hectare farm are €3,000 (=60x50), €5,000 (=100x50) and €10,000 (=200x50).

Eco-scheme	Acreage (ha)	Cimate (1,5 p/ha)	Soil/Air (0,75 p/ha)	Water (0,75 p/ha)	Landscape (0,5 p/ha)	Biodiversity (1,0 p/ha)	Value (€/ha)	Amount (€ x ha)
Permanent pasture	30	(4p/ha) 120	120	90	30	30	€ 91	€ 2.730
Extended grazing	40	80	120	0	80	40	€ 43	€ 1.720
Nitrogen -fixing crops	2	6	4	0	2	2	€ 1.995	€ 3.990
Total number of points&amount		206	224	90	112	72		€ 8.440
Minumum threshold	225	(=50*1.5) 75	37,5	37,5	25	50		
Threshold reached?		Yes	Yes	Yes	Yes	Yes		(=silver)

Note:The system is regionally differentiated

DECISION-MAKING FARMER

Reward for effort and performance



TOOLS4CAP MODELING CASE STUDY

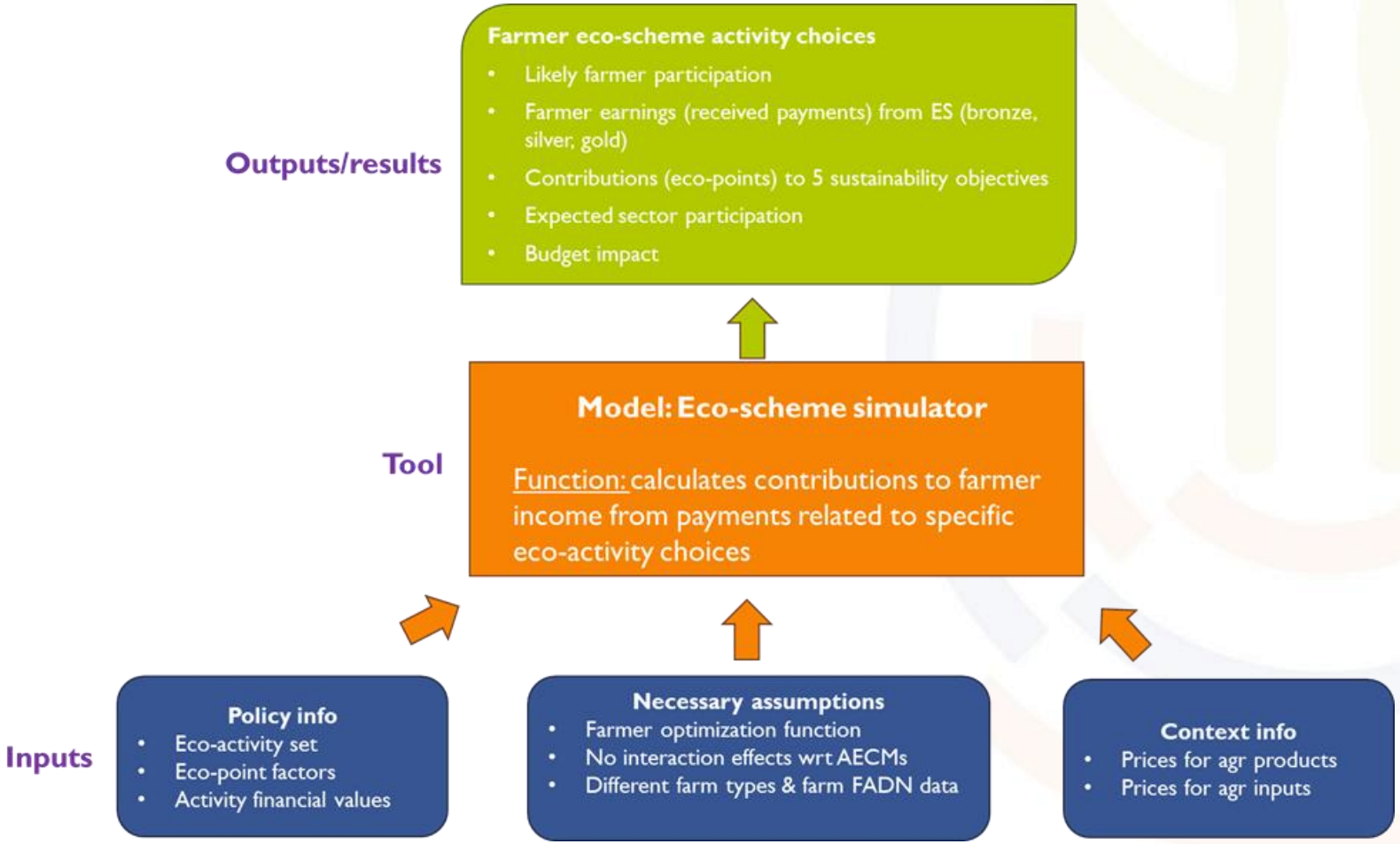
- Previous study financed by LVVN to recalibrate the eco-scheme – rationale:
  - To adjust the eco-scheme so that the observed adoption rate will be more in line with the available budget.
  - Ministry wants to see if the scheme can be designed so that most of the rewards end up with those farmers who also work the most sustainably
- Research questions TOOLS4CAP:
  - At what level should the point requirements for the medal colours bronze, silver and gold be set to make the most effective use of the available budget?
  - What should be the percentage distribution of points across the five goals (= disk of five) in the two regions, to best address the challenges there?

MODELLING ECO-SCHEME SYSTEM

- Core parameters of the Dutch eco-scheme system necessarily to be included in a modelling approach:
  - Points assigned to the five goals
  - Point requirements per goal
  - Valuation of activities
  - Classification system payments
- **However, optimal planned eco-scheme is farm dependent (e.g. structure, type)**
- Steps:
  - Eco-scheme simulator: to calculate the hectare payments of the set of eco-scheme activities
  - FARMDYN: farm optimization in whole farm context including the set of eco-scheme activities
  - AGMEMOD: projected input and output prices (in EU and world market context) as input for FARMDYN

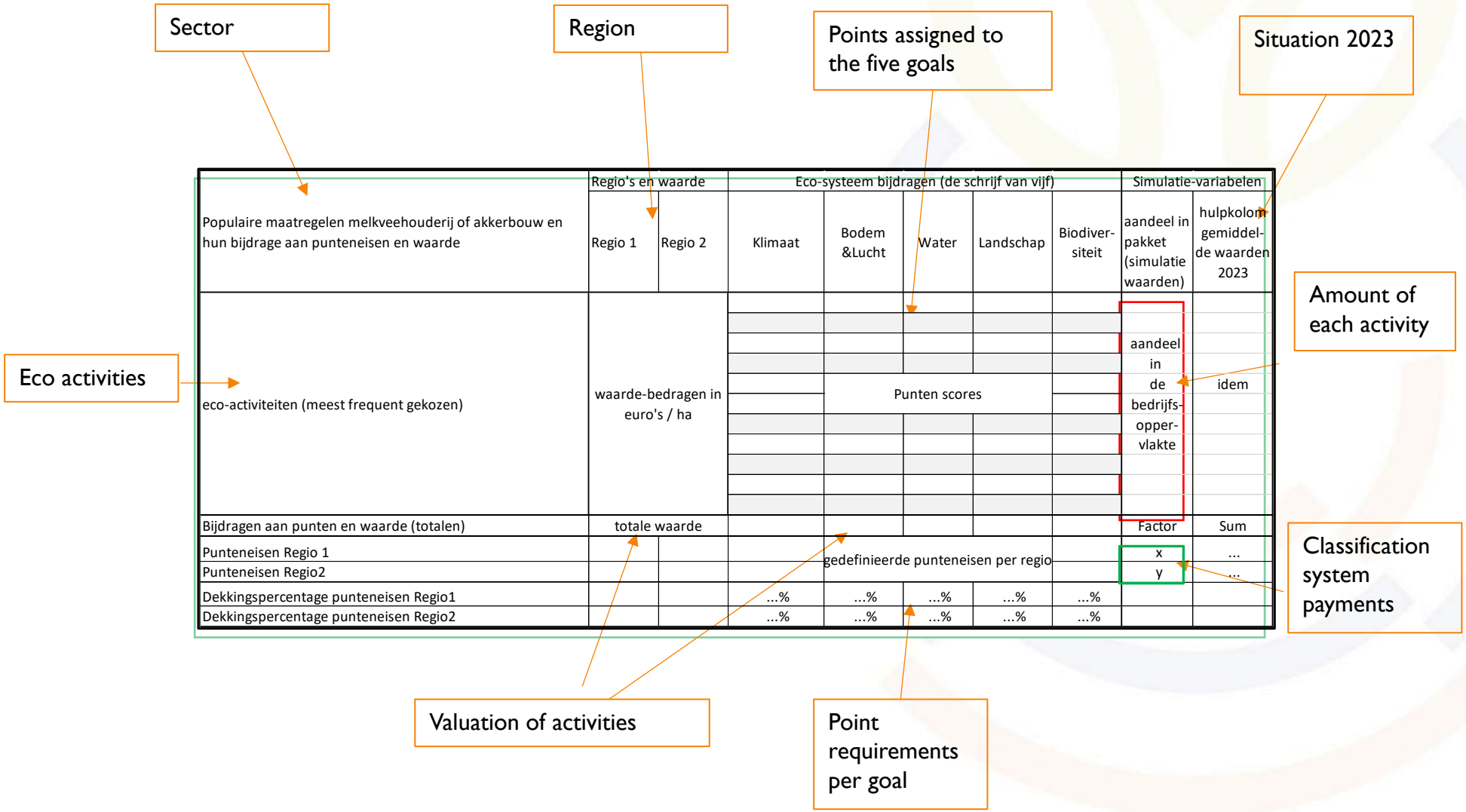
TOOLS4CAP MODELING CASE STUDY

Eco-scheme simulator: estimating the effects of different options for the design and the hectare payments of the planned eco-schemes on the expected uptake and the required budget.



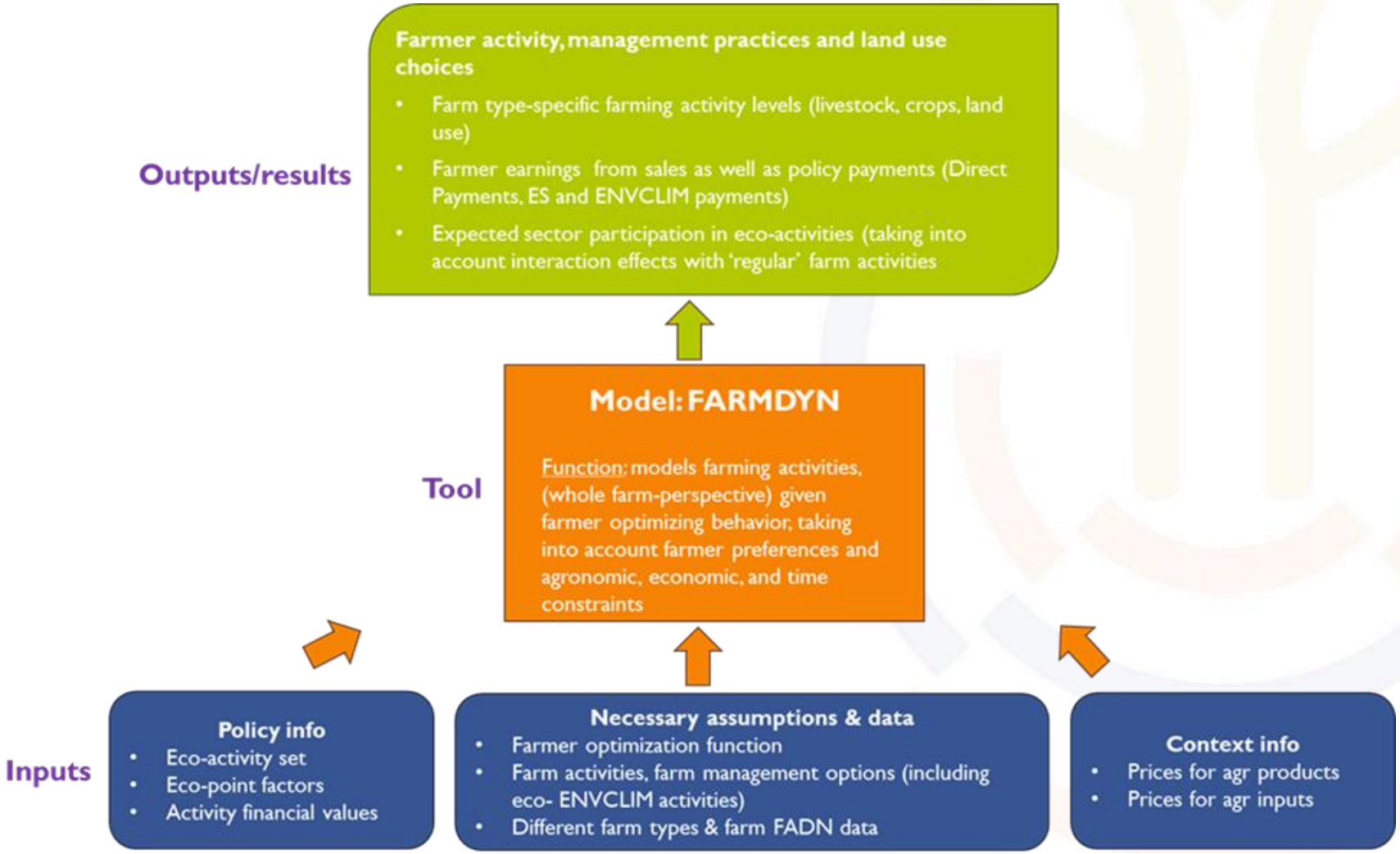
ECO-SCHEME SIMULATOR STRUCTURE

Spreadsheet farm-level simulation



TOOLS4CAP MODELING CASE STUDY

FARMDYN: calculating the contributions to farmer income from payments and adoption of eco-activities, taking into account the whole farm-context



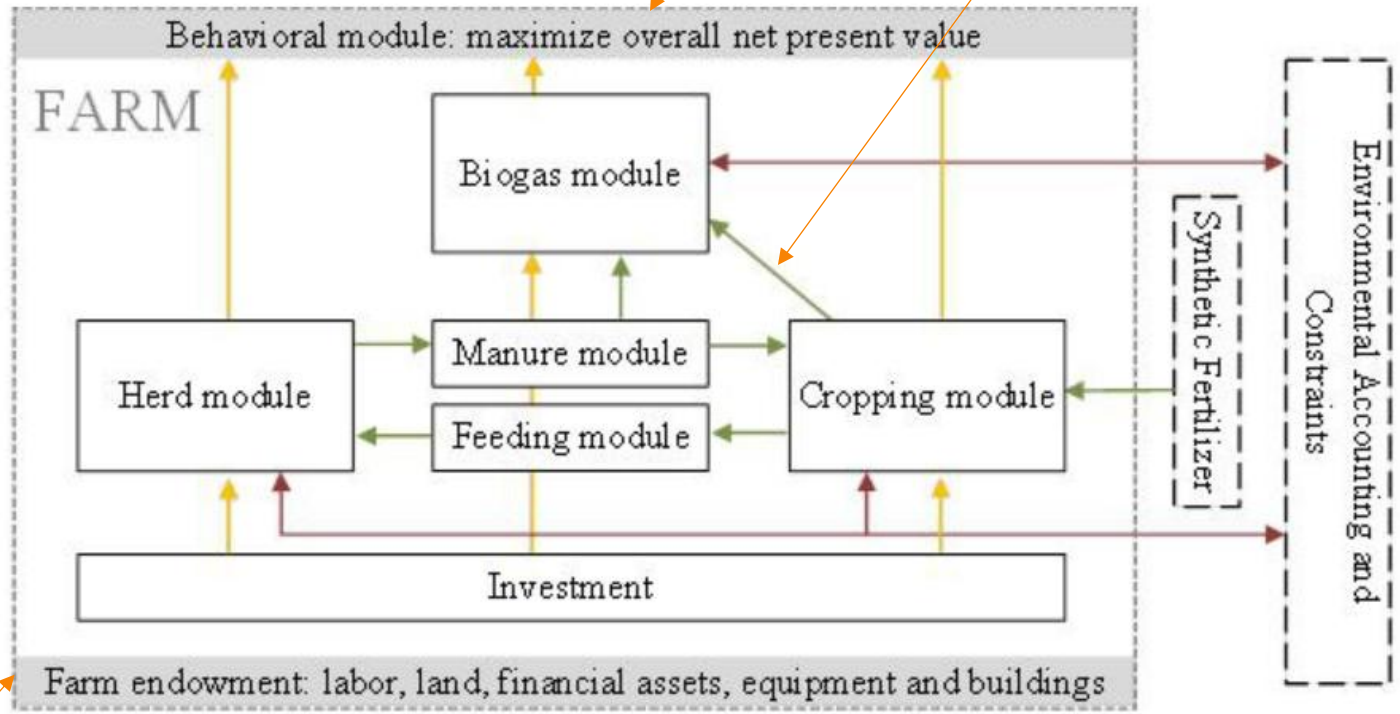
FARMDYN STRUCTURE

Farm-level optimisation

Objective function

Linkages between modules to account of interaction effects

Different models to determine technical and economic outputs

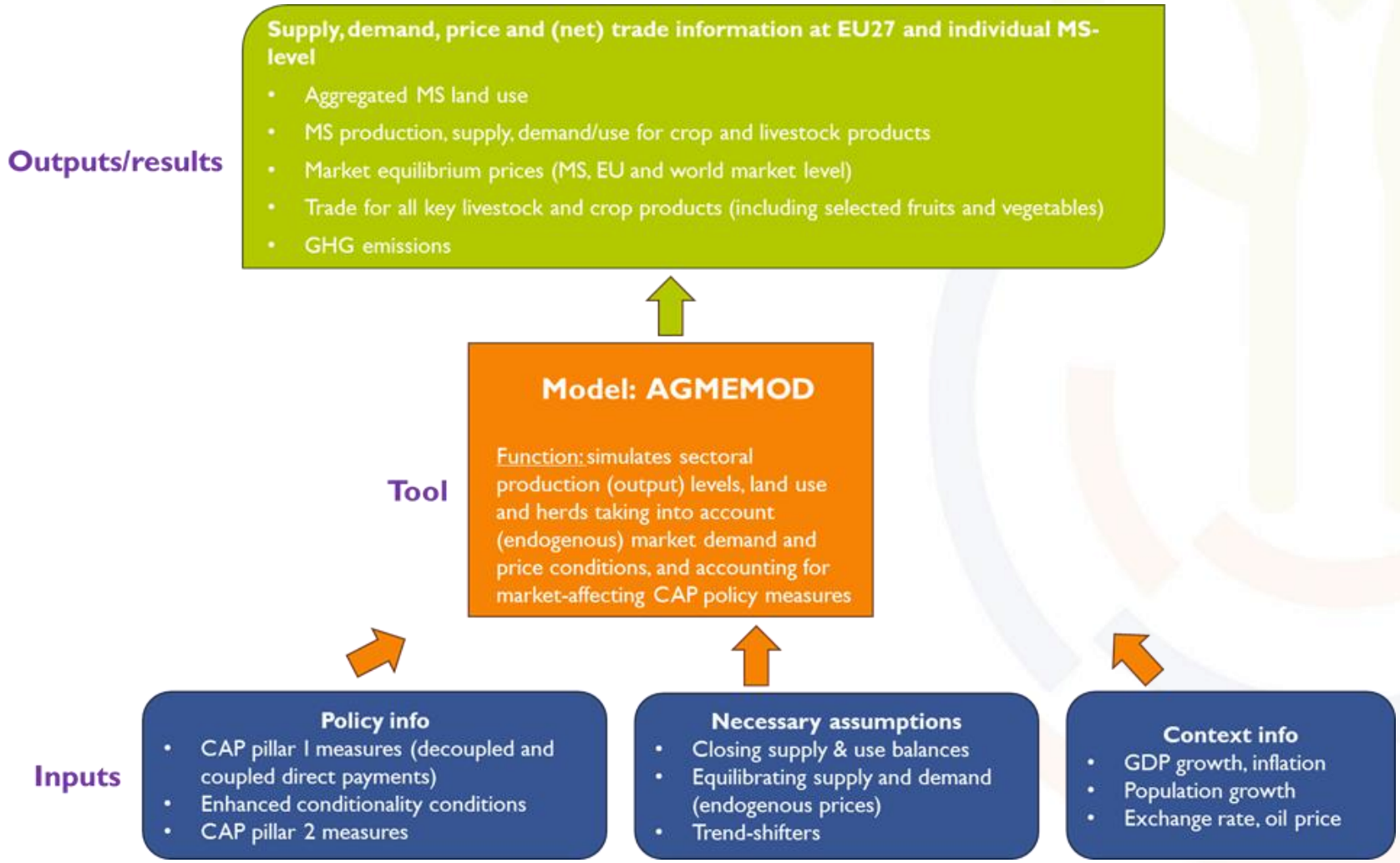


Constraints

Technical and economic inputs

TOOLS4CAP MODELING CASE STUDY

AGMEMOD: calculating production (and output prices)



AGMEMOD MODEL STRUCTURE

Partial equilibrium model; dynamic (AGricultural MEmber State MODelling)

EU Common Agricultural Policy
EU policy framework (1st, 2nd pillar)
MS NSPs
MS specific national measures

Other exogenous variables
Macroeconomic information (e.g. gdp/cap, deflator, energy price, exchange rate, oil price, ...)
Population growth
Trade policy (e.g. TRQs)
Technological change
Preference shifters

Scenarios

MS Country models

Resources
Land availability and land allocation to crops, set-aside
Herd structure

Yields
Yield/ha, yield/cow, slaughter weights

Domestic demand
Food, feed, bioenergy, other uses

Domestic supply
Crops, animal products

Net exports (incl self-sufficiency)

MS price

Price transmision

AGMEMOD key price

$$\sum_{i=1}^{27} NX_i = \text{EU excess supply}$$

World market price

RoW excess demand

Market clearing

Farm module
14 farm types, 6 size classes
Farm incomes
Adoption of practices

Environmental module
GHG emissions
...

Non-EU countries
Ukraine
Russia
...
Rest of the World (RoW)

PRELIMINARY CONCLUSION MODELING APPROACH

- Eco-scheme simulator / FARMDYN add value for ex-ante and ex-durante analysis
  - Can be jointly used to (re)calibrate the key parameters in the eco-scheme (i.e., analyse impact of changes on payout and demand)
  - By means of FARMDYN specific (group of) farms can be included to study in more detail impact of changes on payout and demand in whole farm context
  - Ideally eco-scheme is a module in FARMDYN, but not yet foreseen (parts explored within TOOLS4CAP)
- AGMEMOD is an added value for ex-ante analysis of longer programs
  - For example, CAP reform 2023-2027 eco-schemes: prices are important drivers of uptake of eco-schemes and thus budget allocation in the planning period

PROS AND CONS OF THE DUTCH ECO-SCHEME

Two points of view: government & farmers

	Government	Farmer
Advantages / strengths	• Performance based (value for public money) • Goal-oriented instead of prescribing means to farmers • Flexible system adaptable over time • Regional finetuning possible	• Reward for effort and performance • Stimulates entrepreneurship • Allows for taking farm(er)-specific situations into account • Linkage with own interest w.r.t. measures in relation to farming system
Disadvantages/ weaknesses	• Participation is unclear ex-ante and so is delivery • Monitoring is more difficult than with Greening in former CAP	• Payments received are no longer 'cost free' (require effort) • System is complicated • Uncertainty regarding adjustments & no long-term contracts

HOW PECULIAR IS THE DUTCH ECO-SCHEME?

- NL has a unique point system, but other MS sometimes have limited ‘menu’-options.
- Eleven Member States target more than 80% of their UAA and 21 above 50%.
- Eco-schemes may benefit hectares (land) as well as livestock (heads).
- NL scheme seems ‘ambitious’ relative to that of several other MSs.

CONCLUDING REMARKS

- The points system, which already has 22 different measures, with minimum thresholds and regional differences, is relatively complex compared to how other member states implement the CAP's eco-scheme.
- The points system is a performance-related reward system for eco-system services in agriculture and as such fits into ‘new delivery model’ of the CAP.
- However, partly due to EU legislation around compensation rules, the system now contains a hybrid form, in which the maximum possible cost-efficiency will not yet be realized (implicit prices for eco-points differ over activities).
- To better achieve least-cost provisioning of ecosystem services, a pure point-based remuneration (instead of effort-based remuneration) should be adopted.
- The activity-objective-impact-matrix is a key component of an effective eco-point scheme. The Dutch system makes this visible, but also opens it up for discussion.
- The observed willingness to participate is high (see first results about farmer/activity participation).
- Fine-tuning needed, we and the farmers are still learning.

THANK YOU

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READING MORE...

- Jongeneel, R. and Gonzalez-Martinez, A. (2023) Implementing the EU eco-scheme in the Netherlands: A results-based points system approach. *EuroChoices*, 22(1), pp. 1-8.

- Runge, T., Latacz-Lohmann, U., Schaller, L., Todorova, K., Daugbjerg, C., Termansen, M., Liira, J., Le Gloux, F., Dupraz, P.,Leppanen, J., Fogarasi, J., Vigh, E. Z., Bradfield, T., Hennessy, T., Targetti, S., Viaggi, D., Berzina, I., Schulp, C., Majewski, E., Bouriaud, L., Baciu, G., Pecurul, M., Prokofieva, I. and Velazquez, F. J. B. (2022). Implementation of eco-schemes in fifteen European Union Member States. *EuroChoices*, 21(3): 19-27.

MONITORING

- Areal Monitoring System (AMS) and a Land Parcel Identification System (LPIS), are two essential subsystems to support the Integrated Administration and Control Systems (IACS). The AMS monitors both conditional activities eligible for CAP subsidies as well as additional activities eligible for eco-scheme subsidies.
- Eco-scheme satellite-based activities monitored include: mixture of grassland with herbals and/or clover; perennial grassland; perennial crops; cover crops; nitrogen fixing crops; fibre crops; and biological pest control.