

NOVANIMAL

Innovations for a future-oriented consumption and animal production

NOVANIMAL: PROBLEMS, OBJECTIVES, METHODS, RESULTS,
AND SUGGESTIONS

BRIEF OVERVIEW AND GUIDE TO RESULTS

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Preface

In the NRP 69 project NOVANIMAL, under the lead of the Zurich University of Applied Sciences **ZHAW**, seven research partners were involved: **Agroscope** (Federal Agricultural Research); Berne University of Applied Sciences **BFH**; Center for Corporate Responsibility and Sustainability **CCRS**, Zurich University; Epidemiology, Biostatistics and Prevention Institute **EBPI**, Zurich University; University of Applied Sciences and Arts Northwestern Switzerland **FHNW**; Research Institute of Organic Agriculture **FiBL** and **ZHAW**. The research partners worked on many work packages, each with its specific questions, objectives, methods, and results. Practice partners were: SV Switzerland; Facility Management ZHAW; Berufsfachschule Baden BBB; Belvoirpark Hotelfachschule, Zurich. This document provides a brief overview and a guide to the results in keywords. The addressees of the innovation ideas, drivers, constraints and suggestions, are decision makers and actors

- within the food supply chains: agriculture, food processing and provision industry and gastronomy
- in politics and administration
- in the fields of media and education
- in the civil society, in their irreplaceable function as promoters and initiators of social and economic innovation processes
- and of course: our practice partners

Two lists conclude this overview: the first with selected key references and NOVANIMAL publications, the second with the contact persons for specific questions. Specific references can be found in the final scientific report (version 02).

The authors, Priska Baur and Jürg Minsch, are responsible for the content of this document.

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1 INTRODUCTION

The aim of the research project 'NOVANIMAL Innovations for a future-oriented consumption and animal production' is to search for innovations in Swiss food systems that have a potentially large positive impact on the environment and possibly also on public health. Therefore, the project focuses on both animal food products and out-of-home consumption and catering. Animal food products are important because the increase in global production and consumption thereof poses challenges for the environment and natural resources. Furthermore, out-of-home consumption is important because gastronomy has a strong influence on diet. The corresponding data for Switzerland illustrate the significance of animal products and of out-of-home catering: in Switzerland, the per capita supply of meat is approximately twice the global average, and dairy products four times as much, including estimated foreign purchases. Out-of-home catering accounts for 50% of meat and dairy consumption in Switzerland and 40% of average household expenses for food and beverages.

1.1 PROBLEMS

High annual use of meat and dairy per capita in Switzerland

(FAO, 2018; CH: estimated shopping abroad included)

- Meat: CH ca. 80 kg – World ca. 40 kg
- Dairy: CH ca. 340 kg – World ca. 90 kg

High livestock in Switzerland with harmful emissions

- Water, air and climate (nitrate, phosphate, ammoniac, methane, ...)
- Ecosystems and biodiversity (nitrogen, ...)

Swiss food cultures center around meat and dairy products

- Low consumption of fruit, vegetables, pulses, nuts, etc.
- No attractive offer of plant based meals in gastronomy

1.2 OBJECTIVES

Finding innovations that contribute to

- An animal production adapted to local ecosystem boundaries
- An efficient use of energy, water and raw materials in food processing
- A lower use and consumption of meat and dairy in gastronomy

Identifying constraints hindering innovations in

- Agriculture
- Food processing
- Gastronomy

Developing approaches to promote resource-lighter eating habits

- That are more plant based
- With more creativity and variety on our dinner plates

1.3 METHODS

NOVANIMAL builds on the 'Bedürfnisfeld' (needs field) approach, an action-oriented, inter- and transdisciplinary sustainability research framework (Minsch & Mogalle, 1998; Mogalle, 2000). The 'Bedürfnisfeld' nutrition is conceived as an innovation system. The main target groups are professionals and those who are strategically responsible in gastronomy and in associated education, in the food processing industry and in agriculture. Within this approach, a large variety of methods have been used. Important is the NOVANIMAL communication and dissemination strategy: From the very first we have invested in communication and dissemination, to make the project and the research process transparent. Methods used:

Field experiment in two university canteens during 12 weeks

- Transdisciplinary approach: with the caterer SV Schweiz and Facility Management ZHAW
- Datasets: 26'340 sold meals; choice patterns of 1'552 canteen visitors

Quantitative surveys

- Written survey during field-experiment: usable data of 1'176 students/staff
- Online survey of chefs, restaurant/hotel owners, managers: 905 respondents
- Integrating questions in 2 GastroSuisse online surveys: 834 & 1'883 respondents

Qualitative surveys (interviews)

- 26 canteen guests (prestudy quantitative survey during field-experiment)
- 20 chefs, restaurant/hotel owners, managers: fully transcribed protocols
- 6 vocational teachers (chefs & hospitality specialists): fully transcribed protocols
- 6 classes with 79 apprentices (chefs & hospitality specialists): fully transcribed protocols
- 19 senior experts from nutrition relevant policy fields: protocols

Additional socio-economic methods

- Exploring trends, drivers and constraints in the need-field nutrition
- Full cost analyses of milk production, suckler cows, beef, pork, egg
- 3 online meal choice experiments with 1054, 923, 151 respondents
- Qualitative document analysis of teaching materials of chefs/hospitality specialists
- Qualitative document analysis of 27 essays written by apprentices (chefs, hospitality specialists)
- Historical analysis of the development of agricultural production, food processing industries, eating habits and food related policies over the last two centuries
- Experimental dialogue on innovations with professionals from the supply chains

In-depth literature reviews

- Meal choice and meal offering
- Public health and meat / dairy consumption

Life cycle assessment

- Animal production: beef, veal, milk, pork, broiler, eggs
- Processed foods: milk, cheese, butter, beef
- Gastronomy: 93 meals in field experiment

Nutrition balance assessment (93 meals in field experiment)

- EBP-model ('Ernährungsphysiologische Balancepunkte')
- Plate-model ('Tellermodell')

Modelling

- Excel-based farm model to simulate animal production in 8 CH zones with different local ecosystem boundaries
- Swiss Beef and Dairy Production and consumption system dynamics model¹

Transparent research & communication & dissemination

- NOVANIMAL website: www.novanimal.ch
- 12 NOVANIMAL cartoons by Sylvia Vananderoye (www.vananderoye-cartoons.ch)
- NOVANIMAL fact sheets, reports and working papers

¹ The system dynamics model is not yet (status: July 2019) suitable for depicting and reflecting NOVANIMAL-relevant animal production and food consumption as originally planned. Therefore, relevant scenarios could not be simulated.

2 RESULTS: INNOVATION IDEAS

In this overview, we present a selection of results, focusing on innovation ideas and barriers to implementation. It was the aim to develop and propose innovations with synergies between environment, health (systemic health risks included) and animal protection. We distinguish between innovations addressing agriculture, food processing and out-of-home consumption. In this section, we list not all but a selection of innovation ideas. Many of them address out-of-home consumption because a moderate animal products consumption is considered as the most effective strategy to less environmentally polluting and healthier eating habits.

For all innovation ideas cf. www.novanimal.ch.

2.1 DEFINITION OF INNOVATION

In NOVANIMAL, an innovation is defined as

- a change compared to current practice,
- along and/or around food supply chains,
- which is consciously carried out by actors and
- where an improvement in environmental, health and/or animal ethical aspects can be expected.

(Note: innovation \neq invention)

2.2 INNOVATIONS ADDRESSING AGRICULTURE AND FOOD PROCESSING

22 innovations addressing agriculture

Goal: Resource-efficient milk and meat production adapted to the local ecosystem boundaries, enabling the regeneration of soil, water and biodiversity.

Innovations, e.g.

- Animal stocking density adapted to local ecosystem boundaries
- «Feed no food-strategy» in cattle feeding
- Regional nutrient cycles in pigs and poultry

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Adapting animal stocking density to local ecosystem boundaries means a significant decrease of cattle, pig and poultry in Switzerland (preliminary results):

- Cattle: minus 30-40%; milk: minus 40-50%; beef: minus 30-40%
- Pig: minus 45-60%; pig meat: minus 50-70%
- Poultry: minus > 80%; eggs: minus 80%; chicken: minus > 90%

18 innovations addressing food processing

Goal: Efficient use of energy, water and raw materials in the processing of milk, meat and vegetable substitutes.

Innovations, e.g.

- Energy: fossil fuels are replaced by renewable energy sources
- Food losses: making use of by-products in animal production
- Water: recirculation of washing water

There is a significant potential to reduce natural resource use and environmental pollution in food processing, e.g. global warming potential. However: ecological benefits are moderate compared to those feasible in production and consumption.

2.3 INNOVATIONS ADDRESSING OUT-OF-HOME CONSUMPTION

The objectives of innovations addressing out-of-home consumption are a lower use and consumption of meat and dairy and a higher consumption of fruit, vegetables, pulses, nuts, etc. in gastronomy. This shall be reached by a more plant based meal offer together with more (plant based) creativity and variety on dinner plates. The plant based meal offer is operationalized by the number and share of vegetarian and vegan meals (veg²). The rationale behind is that veg²-meals are a simple and robust strategy, that leads to less environmentally polluting and healthier eating habits. It is distinguished between innovations addressing

- Meal offer
- Enterprises in catering industry
- Vocational education and training

20 (+8) innovations addressing meal offer

Goal: Guests eat more vegetable products and fewer animal food products than today – by choice and with delight.

Innovation ideas, e.g.

- **Qualitative offer:** delicious, varied and creative vegetarian and vegan (veg²) dishes; not only meat substitutes but also authentic veg² dishes
- **Quantitative offer:** increase number and percentage of veg² dishes; hot & cold buffet with mainly veg² components
- **Menu labelling:** not advertise as veg²; appetizing creative meal descriptions; declare veg² dishes discreetly and objectively/factually, together with other ingredients
- **Positioning at meal counter:** no special veg² menu line; offer veg² on all menu lines
- **Positioning on the menu:** no separate compartments for meat, fish and veg² dishes; distribution of veg² dishes throughout the menu
- **Use synergies:** combine veg² dishes with lactose-/gluten-free; offer of veg² dishes for members of different cultures, religions, values
- **«Less is more»:** less meat dishes on the menu; remove/reduce «invisible» animal foods from recipes; «from nose to tail»; meat not in the center, but as a «spice»; animal food from animal-appropriate breeding and husbandry (this is differentiated into 8 innovation ideas cf. Baur & Egeler, 2019)

The field experiment demonstrated the effect of some of these innovations. For example: Meat menus were chosen less frequently. For women, the proportion of meat menus fell from 39% to 28%, for men from 65% to 50% - without negative effects on customer satisfaction and operating results. In order for these innovations to become „good gastronomic practice“, combined even with increasing customer satisfaction and corresponding operating results, flanking innovations are needed in the catering industry and in education and training.

13 innovations addressing enterprises in catering industry

Goal: Improving the range of attractive veg² dishes (to facilitate the more frequent choice of vegetable products for guests).

Innovation ideas:

- **New specializations:** promote and recruit veg² cuisine specialists; encourage specialists for «less is more» meat cuisine
- **New needs, new audience:** veg² cuisine not for vegetarians/vegans, but for flexitarians; address new target groups: children, adolescents, female guests, international business people and tourists

- **Diversity and creativity:** pick up employee knowledge; traditional/origin cuisine as inspiration; «cook in residence»; competitions; invest in training
- **Technical prerequisites:** invest in infrastructure and equipment for veg² cuisine: prepare, store, arrange, present
- **Supplier relationships:** ingredients and pre-products for veg² cuisine: use and optimize existing supply chains; build up new supply networks

21 innovations addressing vocational education and training

Goal: Chefs and hospitality specialists are both motivated and competent in cooking and recommending attractive veg² dishes to facilitate the supply of attractive, plant-based meals.

Innovation ideas:

- **Basic skills vocational education:** more space in theory and practice for veg² cuisine; minimum requirements for training restaurants, with regard to veg² offer; sensitization of trainers in training restaurants
- **Background knowledge in basic education:** relations between food production and the environment; animal husbandry, protection and welfare; diversity of eating cultures and international nutrition trends
- **Educational plans and teaching materials:** more veg² recipes; more knowledge concerning food production and the environment, animal husbandry etc.; final apprenticeship examination: include a veg² dish in qualification proceedings
- **Specialization in vocational education and training:** teachers specializing in veg² cuisine; new apprenticeship: veg² chef; higher professional examination: veg² 'head chef'
- **Upgrading education:** from 3- to 4-year apprenticeship; additional veg² module; additional sustainability module; joint inter-company courses; exchange programs

3 RESULTS: DRIVERS OF INNOVATIONS

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Several megatrends and specific drivers promote innovations.

Megatrends relevant to nutrition

- **Seven trends motivating a moderate animal products consumption:** gender shift; health; knowledge based society; neo-ecology & smart new green; security; silver society & millenials; urbanization
- **Four trends promoting resource-efficient production & processing:** globalization; global scarcity of natural resources; neo-ecology & smart new green; urbanization

Specific drivers

- **Agriculture & food processing:** economic opportunities arising from changing eating habits and food demand; technological development; competition; increasing resource prices; resource scarcities; scarcities of animal feed (cereals; protein feed, e.g. soy)
- **Consumption, gastronomy and vocational education:** economic opportunities arising from changing eating habits and attracting a new clientele, in particular woman; emergence of a global society; competition; chef's professional ambitions

4 RESULTS: CONSTRAINTS TO IMPLEMENTING INNOVATIONS

Overall important constraints are ‚habits & routines‘ and ‚satisficing behavior‘: Actual behavior is maintained, even if it’s unhealthy or not economic, etc. Habits & routines and satisficing behavior are powerful barriers that should not be underestimated. But there are also more specific constraints hindering innovations: In this section, we distinguish between constraints in agriculture and food processing and, in consumption, gastronomy and education.

4.1 CONSTRAINTS IN AGRICULTURE AND FOOD PROCESSING

Constraints in agriculture

- Swiss agriculture is specialized in animal production
- Self-perception and communicated image of farmers
- Reducing animal production contradicts Swiss agricultural policy:
 - Maintaining agricultural production on current level (23‘300 TJ)
 - Maintaining «self-sufficiency», which is for animal food products 100% (gross calorie production, excluding imports of animal feedingstuffs)
 - Manifold measures and subsidies promoting milk and meat production

Constraints in food processing

- Investing in cleantech in food processing does not pay off because
 - Subsidized prices (e.g. water, energy, waste)
 - ‘Polluter pays principle’ not realized
- Efficiency gaps are not seen or are perceived as ‘minor problems’
- Small-scale production and processing structures
- Large variety of products in small quantities

4.2 CONSTRAINTS IN CONSUMPTION, GASTRONOMY AND VOCATIONAL EDUCATION

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In this section, we further distinguish between 'soft' sociocultural and psychological and 'hard' economic constraints.

Sociocultural and psychological constraints

- The 4 Ns: meat is 'natural', 'normal', 'necessary' and 'nice'
- Meat is perceived as the most valuable item on the plate
- 'Regional' products are preferred; in Switzerland, 'regional' means meat and dairy
- Positive image of animal husbandry and animal 'welfare' in Switzerland
- Meat is the rule, vegetarian the exception and vegan a disturbance
- Veg² is cooked and marketed for minority of guests with veg² lifestyles
- Kitchen hierarchy: meat chef is highest
- 'male chefs cook for male guests'
- Norms and beliefs concerning a balanced diet: each day and each meal balanced

Economic constraints

- Expectation, that veg² dishes should cost less
- Veg² cuisine is more demanding and time consuming
- Lack of skills and knowledge to prepare attractive veg² dishes
- Well-established supply chains for meat and dairy (lock-in-effect)
- Promotional meat predominates ('Aktionsfleisch')

5 SUGGESTIONS TO DECISION MAKERS

Suggestions address decision makers in politics, in economy (agriculture, food processing industries, gastronomy), in vocational education, in the Swiss society for nutrition, in research, and in media and civil society.

5.1 POLITICS

Federal Council, Federal Administration and Parliament, and other public authorities

- **Conflicting policies:** There are fundamental conflicts between goals of agricultural and other policies, such as: environmental policies (protection of soil, water, climate, biodiversity), health policy, animal protection, and foreign trade and economic policy. A decline in the consumption of meat and dairy products would mitigate conflicts between agricultural and other policies.
- **Misleading incentives by agricultural policy:** Examples of conflicting policies are incentives that promote meat and milk production by price support (implementing tariff and non-tariff barriers to trade) or direct payments tied to minimal livestock density. Or policies that promote meat and milk consumption, e.g. through subsidizing advertising campaigns for Swiss milk and meat. The abolition of such policies should be discussed.
- **Declining consumption as a challenge for the supply chains:** However, a decline in the consumption of animal food products is a challenge for the players in the corresponding supply chains. This issue should be addressed, analyzed and tackled farsightedly. It should be discussed, how agriculture, food industries, and gastronomy eventually could be supported to adapt to lower domestic demand for meat and dairy.
- **Dialogue must be learned and practiced:** To tackle conflicting policy goals and economic challenges for agriculture, industries and retailers concerned, a true dialogue is necessary. However, the ability to engage in dialogue is weakly developed in politics and society. We propose to initiate a dialogue between all relevant stakeholders (incl. young generation and civil society) in the 'Bedürfnisfeld' nutrition.

5.2 ECONOMY ALONG THE FOOD SUPPLY CHAIN

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Farmers

Swiss farmers should discuss if they want to follow the global mainstream (e.g. investing in poultry, investing in single-purpose cattle) or if they rather should produce within local ecosystem boundaries for (global) niche markets where they could be economically competitive (unique selling proposition).

- **Farming within local ecosystem boundaries:** This means to redirect investments and production considering ecological and economic chances and restrictions typical for Switzerland. This would lead to, first, reducing production quantities; second, specializing in grassland fed milk and beef production with robust dual-purpose breeds (on a lower production level than today); third, respecting strict ecological production standards (clearly higher than today). A challenge to agricultural education.
- **No doubtful investments in animal production:** A paradigmatic example of an economically and ecologically doubtful investment is poultry. In Switzerland, poultry production doubled since 2000. In the short term, production is profitable. But poultry production in Switzerland is ecologically (not respecting nutrient cycles) and economically (internationally not competitive) not sustainable. Also, production in large herds is associated with increased epidemiological and zoonose risks and antibiotics use. Further, it is not resilient to delivery crises ('animal material' and fodder imported). Moreover, poultry breed is dominated by a few global players. Finally, from an ethological perspective, it is doubtful if hybrid breeds (crossbreeds) respect animal-appropriate breeding and husbandry.

Food companies: from processors to retailers

- **Responsibility of powerful companies:** In Switzerland, Coop and Migros are the largest meat processors, traders, importers and sellers. Their business strategy is aimed at maintaining or even increasing per capita animal product consumption. From an environmental and a health perspective powerful companies could assume more responsibility.
- **Natural resource use:** The potential to reduce natural resource use and food waste and to increase resource-efficiency could be more exploited.

Gastronomy

- **Veg² offer:** The demand for veg² dishes is greater than perceived by gastronomy (lock-in-effect). However, the offer is quantitatively and qualitatively unsatisfactory. Gastronomy should invest in the veg² cuisine or is at risk of missing the development.
- **No marketing for the niche:** Gastronomy still offers veg² dishes for 'vegetarians' and 'vegans'. This is a fundamental misunderstanding and mistake. Veg² dishes should be cooked for flexitarians and meat-eaters.
- **Win new customers:** Today, gastronomy still cooks for a 'male clientele'. If gastronomy wants to profit from women's increasing purchasing power, the offer must become more creative and more plant-based. Women are more demanding and choosy, they prefer veg² dishes more often than men.
- **Responsibility of large caterers:** While guests make spontaneous and pleasure-related decisions, gastronomy is in a position to make rational strategic decisions about which dishes to offer to guests. In particular large caterers and community gastronomy are 'scout and guide' on the way to more plant-based eating habits.
- **The 'end' of generalists in the cuisine:** The idea that a chef is capable of cooking delicious meat, fish and veg² menus is outdated. More professionalization and specialization is needed. There are chefs specialized in meat cuisine, which includes the competence to cook 'from nose to tail'. And there are chefs who specialize in veg² cuisine.
- **Win new professionals:** The specialization in the cuisine opens up a new professional field for chefs and hospitality specialists. New staff is required who is particularly motivated and competent to cook veg².
- **Role models, inspirations and pioneers:** A more plant-based cuisine can be inspired by a person's own traditions ('grandmas' apple pie'), by eating cultures in other parts of the world, prominent celebrity chefs who are passionate about veg² cuisine and successful pioneers.

Products and supply networks

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- **Products and purchase options:** A greater variety of high quality precursors is needed to prepare attractive veg² dishes. This also means new supply networks.

5.3 VOCATIONAL EDUCATION

- **Apprenticeship for the future:** The prospective chefs need more background knowledge about nutrition. They should learn more about a modern, increasingly plant-based cuisine. Vocational training and teaching materials need to be adapted.
- **New apprenticeship for veg² cuisine:** Improved education is not enough, new specialists are needed in the kitchen. A new apprenticeship for veg² cuisine, including specialized further training opportunities ('head chef') could make a difference.

5.4 NUTRITION GUIDELINES

- **Swiss dietary guidelines SGE-SSN:** Current guidelines are only partially in line with scientific evidence. The potential of an increasingly plant-based diet is not sufficiently recognized or translated into recommendations. We encourage to review and revise guidelines and its communication against the background of new scientific findings, controversies and uncertainties, and considering effective eating habits.

5.5 RESEARCH

- **From agricultural to food systems research:** Today, publicly funded agricultural research in Switzerland is guided by the Federal Administration (Federal Office of Agriculture). This research neglects for instance the interests of consumers, food industry and gastronomy. Conceiving agriculture as **one** subsystem of the entire 'Bedürfnisfeld' nutrition is a prerequisite for the shift from today's agricultural to a more open and independent food systems research. This would contribute to additional relevant outcomes concerning, e.g.: consumer preferences; food security, food safety and other risks (e.g. energy, climate, infrastructures, geopolitics); human and animal health ('one health'); animal protection and environment; economic and social development in the food supply chains and networks.
- **Food systems research means transdisciplinarity:** Applied food systems research needs advanced transdisciplinary competences, in particular when focusing on innovations and behavioral change (habits & routines). This includes: time; an appropriate institutional setting; a supportive environment; sufficient resources; and most important: courage, knowledge and skills to enter a dialogue with practice partners and to communicate results for the broad public with different media. Publications for a scientific audience follow as a second priority.

6 OUTLOOK

The evaluation and analysis of the data is still in progress. Numerous publications are in preparation (cf. references). The project will be continued at ZHAW with concentration on implementation. Working title «NOVANIMAL impact». Focus: Gastronomy & Consumption, and specific questions referring to food supply chains, food policies & ethics.

7 SELECTED KEY REFERENCES AND NOVANIMAL PUBLICATIONS

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