JPI

a healthy diet for a healthy life

IMPLEMENTATION PLAN 2019-2021

Joint Programming Initiative
"A Healthy Diet for a Healthy Life"

Table of Content

Abbreviations

CSA	Coordination and Support Action
DASH-IN	Data Sharing in Nutrition
DEDIPAC KH	Determinants of Diet and Physical Activity Knowledge Hub
DG	Directorate General
DG RTD	Directorate General for Research and Innovation
DG SANTE	Directorate General for Health and Food Safety
EC	European Commission
EFSA	European Food Safety Authority
EIT Food	European Institute of Innovation and Technology of Food
ENPADASI	European Nutrition Phenotype Assessment and Data Sharing Initiative
ERA	European Research Area
ESFRI	European Strategy Forum on Research Infrastructures
ETP	European Technology Platform
FACCE-JPI	Joint Programming Initiative on Agriculture, Food Security and Climate Change
FAIR	Findable, accessible, interoperable and reusable
FAO	Food and Agriculture Organization of the United Nations
FP9	Ninth EC framework programme “Horizon Europe”
FSAI	Food Safety Authority Ireland
H2020	Eighth EC framework programme “Horizon 2020”
JFA	Joint Funding Actions (“Calls”)
JPI	Joint Programming Initiative
JPI HDHL	Joint Programming Initiative “a Healthy Diet for a Healthy Life”
JPI MYBL	Joint Programming Initiative “More Years, Better Lives — The Potential and Challenges of Demographic Change”
JPI OCEANS	Joint Programming Initiative “Healthy and Productive Seas and Oceans”

NGO	Non-governmental organisation
R&I	Research and Innovation
RI	Research Infrastructure
SCAR	Standing Committee of Agricultural Research
SDG	Sustainable Development Goals
SME	Small- and medium-sized enterprise
SRA	Strategic Research Agenda
TRL	Technology Readiness Level
UN	United Nations
USDA NIFA	United States Department of Agriculture - National Institute of Food and Agriculture
WHO	World Health Organisation

Introduction

The strategic goal of the Joint Programming Initiative "A Healthy Diet for a Healthy Life" (JPI HDHL) is to change dietary patterns based on developments in food-, nutritional-, social- and health sciences and to develop evidence-based recommendations and innovative product formats that will — together with concomitant changes in physical activity — have a major impact on improving public health, increasing the quality of life and prolonging productive life of the citizens.
The vision of the JPI HDHL is that **by 2030 all citizens will have the motivation, ability and opportunity to consume a healthy diet from a variety of foods, have healthy levels of physical activity and that the incidence of diet related disease will have decreased significantly.**
The global dimension of JPI HDHL is strengthened through the connection with global political commitments like the Sustainable Development Goals (SDG) set by the United Nations (UN) and *"Rome Declaration on Nutrition"* set by the World Health Organisation (WHO) and the Food and Agriculture Organization of the UN (FAO) and by working in collaboration with research funders globally to tackle this global societal challenge.

1.1 The journey so far

In its 10 years existence the JPI HDHL has grown to an established network of countries that collaborate together to increase the impact of Research and Innovation (R&I) investments towards solutions for the growing burden of diet related chronic diseases. Figure 1 shows an overview on the kev achievement of IPI HDHL until now.

Figure 1: Key achievements and activities of JPI HDHL up to now

1.1.1 JPI HDHL member states

JPI HDHL has enlarged to an initiative which currently connects 26 countries comprising EU member states as well as associated countries with Canada and New Zealand being active members within the JPI HDHL. The country representatives come together three times per year in their function as the Management Board of the JPI HDHL. Twenty-three of the 26 countries involved in JPI HDHL have participated in at least one Joint Funding Action (JFA) and 14 in three or more funding activities.

1.1.2 Joint Funding Actions

Under the umbrella of the previous two Implementation Plans, JPI HDHL has implemented 12 JFAs; three more are currently in process. The results of eleven JFAs are four Knowledge Hubs and 39 research projects involving more than 200 research institutes in Europe and beyond *(see Annex I)* with a total budget of over 80 million Euro. At this date, the research activities resulting from the first JFAs of JPI HDHL have come to an end and provide a first example of the output and outcomes of these investments. Great progress has been made in improving assessment of food choice drivers, of objective food intake measures and of assessing the health effects of foods. A concrete example of a JPI HDHL investment is the Determinants of Diet and Physical Activity Knowledge Hub (DEDIPAC KH), bringing together a multidisciplinary consortium of over 300 scientists from 68 research centres from many different disciplines in 13 countries across Europe and working towards improving methods and insights regarding the *"causes of the causes"* of chronic disease. Concrete results are an overview of the quality of measurement methods for diet, physical activity, and sedentary behaviours summarised in an online toolbox; overviews of the scientific state of the art in the determinants of dietary, physical activity and sedentary behaviours; a toolbox to assist in the development, implementation and evaluation of interventions and policies and the first steps towards cross-European surveillance with a detailed roadmap.

1.1.3 Spreading the message & the road towards more impact

The work and achievements of the JPI HDHL are of great interest for the society and various other stakeholders. In addition to the transnational funding activities, JPI HDHL has invested resources in defining relevant interdisciplinary R&I policy and practice, data sharing and data stewardship, and science dialogues. All of these are explored through desk studies, strategic papers and during workshops and conferences *(see figure 2)*. JPI HDHL furthermore has developed a communication strategy that includes a website with regular news updates and newsletter. The website for instance has over 95.000 visitors from many different countries.

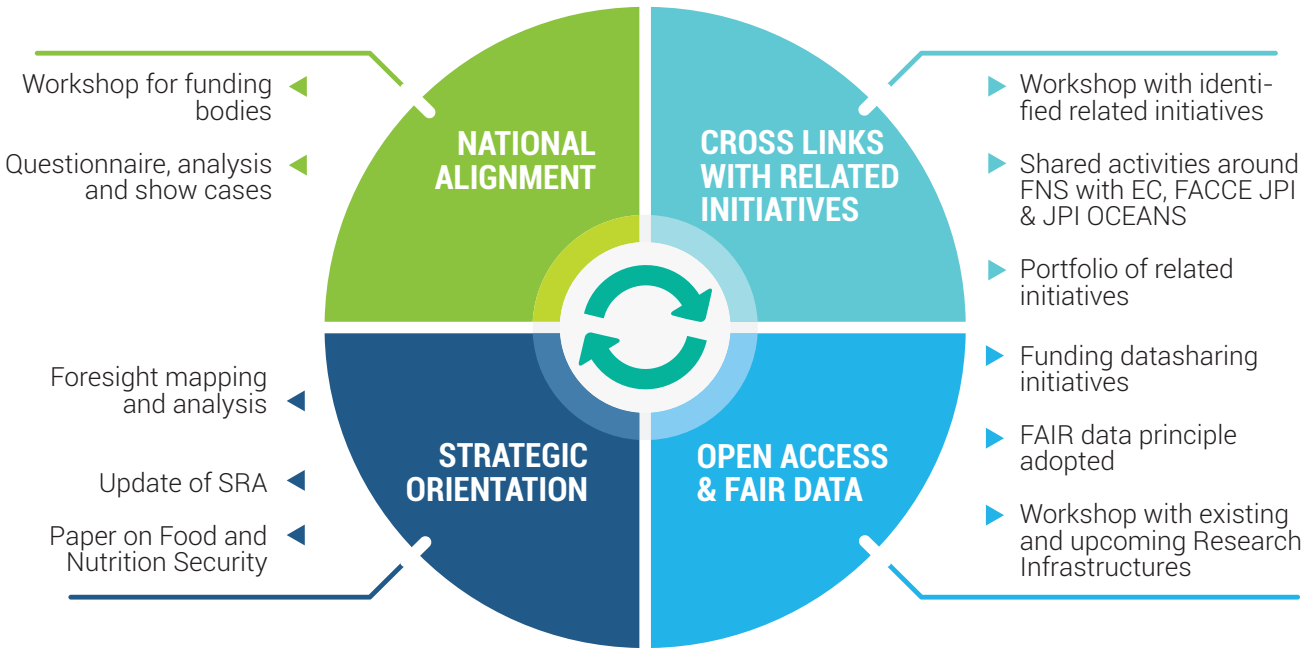


Figure 2: Overview on JPI HDHL's non-funding activities

1.1.4 Structuring the landscape

For JPI HDHL it is crucial to play a role in structuring and connecting key players and initiatives that can contribute to more impact of R&I investments on the societal challenge that we address. The R&I landscape of food, nutrition and health is complex, amongst others due to:

- the various research and policy fields that have to contribute to the knowledge needed — positioned both in the agricultural and health domains;
- the various sectors needed to implement research outcomes: small- and medium-sized enterprises (SMEs), multinationals in the food and drink industry, retail as well as governments;
- the characteristics of the European Research Landscape (regional, national and EU research programmes).

JPI HDHL has undertaken various mapping exercises, interacts with related initiatives and key players via presentations, consultation, advice and participation in boards/stakeholder meetings and bilateral meetings. These meetings serve to create a mutual understanding of priorities and avoid overlap, and to seek opportunities for synergies like joint investments.

1.2 The journey ahead

The JPI HDHL has published its update of the Strategic Research Agenda (SRA) in parallel of this current Implementation Plan 2019-2021 and the development of both documents has been closely aligned due to the strong interconnection between the two key documents. The principle objective of the updated SRA is to attain greater integration of research within the realm of the JPI HDHL to strengthen and improve the impact of research conducted within the European Research Area (ERA), in collaboration with our international colleagues. Whilst the overarching principles of the previous agenda remain, the research pillar model has been revised in order to follow the objective of greater integration.

In this light, JPI HDHL aims to focus its role more towards connecting with different initiatives at the national, European and international level to stimulate networking and to synthesize research for policy making. In order to realize this ambition, activities should be performed in close collaboration with policy makers, (health) professionals and other end users of food, nutrition & health research investments.

With regards to the new framework programme “Horizon Europe” of the European Commission (EC), JPI HDHL will prioritise instruments and activities that are unique for JPIs and add value on top of or next to investments of the framework programme (like network activities in connection with major calls from the framework programme). This will require commitment and dedication of all involved partners, recourse to a number of different national, European and international sources as well as more strategic use and innovation in the JPI HDHL set of tools and activities.

1.3 Measuring our success

Monitoring and evaluating of JPI HDHL activities is highly important to measure the success, concrete outcomes and impact of the JPI HDHL and to allow for continuous improvement and development of this initiative. Therefore, these activities are an integral part of the work plan of the current Coordination and Support Action (JPI HDHL CSA 2.0) to

The evaluation activities continuously performed by JPI HDHL include:

- Monitoring and evaluation of the processes and general performance of JPI HDHL
  → Report on the third and fourth Process evaluation of JPI HDHL (CSA Deliverable D6.1, D6.4)
- Evaluation of the activities of JPI HDHL related to funding
  → Report on the evaluation of JPI HDHL funding activities (CSA Deliverable D6.2)

- Monitoring and evaluation the activities of JPI HDHL not related to funding
  → Report on the evaluation on the progress of the alignment activities (CSA Deliverable D6.3)
- Overall evaluation of the impact of JPI HDHL
  → Report on the evaluation of the impact of JPI HDHL (CSA Deliverable D6.5)

These tailored activities focus on different aspects that are also included in this Implementation Plan and will result in publically available reports. The evaluations encompass quantitative as well as qualitative measures making use of a wide range of different Key Performance Indicators, reflecting the intermediate and long-term aims of the JPI HDHL. To ensure objective results, part of the evaluation activities will be performed by an external evaluator. With these measures we ensure a results-based management by linking the past, current and future activities of the JPI HDHL. The results of the evaluations will allow the fine-tuning, refining and planning of new activities for the following Implementation Plan to reach the expectations of all stakeholders and fulfill the JPI HDHL objectives.

Alignment

"Strengthening existing and building new partnerships"

A crucial element of the Joint Programming process is the alignment of national and European research programmes and strategies with the SRA, in order to achieve an integrated European Research Area in the thematic area of food, nutrition, health and physical activity. JPIs play an important role in achieving alignment by bringing together program owners, funding bodies, policy makers and researchers from both national and European level. With 26 participating countries involved, JPI HDHL is one of the biggest in the JPI arena and even more countries have expressed interest in joining the JPI HDHL. A significant amount of research activities on nutrition and health is taking place within these countries.
Alignment of these activities will increase the impact of the individual efforts of the involved countries to meet the global societal challenge of the JPI HDHL. The ultimate goal of alignment activities is a broad implementation of the SRA of JPI HDHL.

2.1 International Alignment

JPI HDHL's ambition is to establish **sustainable collaborations** with countries all over the world that can meaningfully engage in, contribute to and capture the benefits from participation in the JPI HDHL. International outreach is key to achieve the critical mass to tackle the societal challenge. The collaboration principle of JPI HDHL can be summarised by a **general openness and flexibility towards countries outside the European Union**: every country is welcome to observe, to apply for membership and to suggest individual activities. JPI HDHL is regularly invited to speak at international conferences and bilateral meetings to share information about the JPI and discuss strategic issues. However, the expansion to non-EU countries is not an end in itself but **true commitment and participation** of these countries in JPI HDHL is expected.

2.1.1 What has been done so far?

A "JPI HDHL Strategy and Action Plan for Flexible and Efficient Collaboration with Third Countries" *(see "Strategy and action plan international collaboration")* has been developed by the JPI HDHL secretariat to work toward successful engagement of countries outside Europe in a sustainable setting. In bilateral meetings and workshops with selected pilot countries meaningful ways for collaboration and barriers as well as perceived benefits for collaboration with JPI HDHL have been discussed and identified, feeding into the optimisation of the strategy for international collaboration.

The implementation of the Strategy and Action Plan is ongoing. As a result of the data-based analysis presented, Australia was chosen as a first pilot country, followed by Singapore. Next to this **JPI HDHL aims at leveraging existing relationships and membership of international forums,** such as the Heads of International Research Organisations and the Global Alliance for Chronic Disease and the E-Asia network. Other opportunities will include exploring potential alignment and involvement of the newly established **International Bioeconomy Forum** (newly established by the EC Directorate General for Research and Innovation, DG RTD) covering agricultural research aiming at sharing knowledge on policy, strategies and actions.

Examples of bilateral interaction/collaboration that took place are:

- The Health Research Council in New Zealand organized and coordinated a mission for the JPI HDHL to connect with **Australia**. The mission included a series of bilateral meetings with key research groups/universities, national funding bodies as well as with the ministries of health. Furthermore a workshop brought together heterogeneous perspectives including the view of non-governmental organisations (NGOs), science, health professionals and the funders/governments. Just before the end of 2018 a mission to a second country in the Asia-Pacific region (**Singapore**) has been organised.
- To further strengthen the collaboration with **Canada** a workshop was held in 2016 in conjunction with the Canadian Nutrition Society annual meeting, and it was co-sponsored by

the Canadian Institutes of Health Research, the Institute of Nutrition, Metabolism and Diabetes and the International Institute of Life Sciences North America, entitled "Global partnerships in food and nutrition to align research agendas and improve public health". This workshop featured JPI HDHL, and speakers included the Chair of the Management Board for JPI HDHL, along with the Vice-Chair of the Scientific Advisory Board[1].

- JPI HDHL representatives met with **United States** governmental bodies, in particular the United States Department of Agriculture - National Institute of Food and Agriculture (USDA NIFA) and the National Institutes of Health. To date, JPI HDHL had a couple of bilateral meetings with the USDA NIFA; and a representative of the United States Department of Agriculture and NIFA participated in a JPI HDHL workshop defining the topic for the next call on the topic of Intestinal Microbiome.

2.1.2 Aims of current Implementation Plan

During the period 2019-2021 JPI HDHL aims to:

- Further deepen existing collaboration through platforms/bilateral dialogues such as e-ASIA Joint Research Program, the International Bioeconomy Forum and the Global Alliance of Chronic Diseases;
- To have established cooperation with at least three new countries or international platforms on either the JPI HDHL governing level or at the level of joint actions or non-funding activities;
- Refine the JPI HDHL international collaboration strategy based on the pilot with one or two countries in the Asia-pacific region, one country in the Latin-American/Caribbean region and further learning of collaboration and interaction with countries outside the Europe.

2.1.3 Approach and instruments to reach these aims

To achieve the above mentioned aims JPI HDHL will work on the following aspects:

Connection with SDGs – and other global political commitments

For the JPI HDHL member states it is highly relevant to highlight the alignment of the JPI HDHL SRA and Implementation Plan with relevant **international commitments and objectives**.

For example, three of the seventeen **Sustainable Development Goals** directly refer to the societal challenge of diet, nutrition and health:

Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Goal 3: Ensure healthy lives and promote well-being for all at all ages

Goal 12: Ensure sustainable consumption and production patterns

Furthermore many others SDGs link with food, nutrition and health. In parallel with the establishment of the SDG, FAO and WHO worked towards the Rome Declaration on Nutrition and Framework for Action, which was first endorsed by 170 countries at the Second International Conference on Nutrition (Rome 19-21 November 2014) and followed by the adoption of the UN General Assembly via a resolution proclaiming the UN Decade of Action on Nutrition from 2016 to 2025. In the period 2019-2021 JPI HDHL will explicitly make the connection towards these commitments in its activities.

Show cases

One way to attract new countries or other international collaborators is the performance of **case studies** documenting the added value of membership and participation in the JPI HDHL, e.g. the

1) Ma DWL, Hentges E, Makarchuk MJ, et al. Key attributes of global partnerships in food and nutrition to align research agendas and improve public health. *Applied Physiology, Metabolism and Nutrition* (accepted for publication).

added value of international science collaborations, using a project such as FOODBALL[2] as an example.

Utilising existing opportunities for international alignment
Next to JPI HDHL membership there are opportunities for both researchers and research institutions to connect with JPI HDHL via applications, if own funding is available. Up to now, 14 research groups have used this opportunity and JPI HDHL is eager to increase this rate. Better communication to both funders as well as the applicants about this possibility could result in a higher use of this opportunity.

Pilot interactions with non EU countries
Further testing of the JPI HDHL international strategy via pilot interactions with at least one country in Asia-pacific region and one country in the Latin-American/Caribbean region. Furthermore countries that are active in other JPIs could be approached.

2.2 European Alignment

JPI HDHL can be strategically positioned to bridge the gap between research and policy and to act as a platform for national or international organisations or institutes that consider research funding activities in the area of nutrition and health. Highlighting complementarities and better interaction with other EU and international initiatives, as well as the EC, will strengthen the role of the JPI HDHL as a strategic hub while supporting JPI widening beyond its current membership.

2.2.1 What has been done so far?

JPI HDHL has been the main driver behind pulling together the **Fit4Food2030[3] consortium**, which has the objective to support the EC to further develop and implement the Food2030 policy framework working towards a food system approach. Besides experts in Responsible R&I this consortium exists of key players in research programming on a European level (public, private and public-private) in one or more areas of the food system.

An overview of European research projects funded within the scope of JPI HDHL has been published as well as an *interactive tool* which shows various players within the European Research Area of food, nutrition and health.

JPI HDHL has regular exchanges with key players on the (R&I) policy level such as the **Standing Committee of Agricultural Research (SCAR)** and the **High Level Group of Nutrition and Physical Activity, DG RTD and DG SANTE (Directorate General for Health and Food Safety)**. Furthermore, JPI HDHL presents about its own objectives at meetings and events of identified initiatives, provides input to strategic documents of other initiatives on a regular basis and holds seats in various advisory boards. JPI HDHL also actively invites these initiatives for relevant events and identifies possible synergies/collaborative efforts for the identified (non-)funding activities.

2.2.2 Aims of current Implementation Plan

During the period 2019-2021 JPI HDHL aims to:

- Deliver a work plan to collaborate with EC Directorate Generals (DGs) in a way that adds value for both the JPI as well as the strategic goals of the DGs;
- Increase the collaboration with stakeholders that can support in strengthening the policy-science interface — in particular the knowledge transfer of research output of JPI HDHL funded research;
- To select a couple of key partners that fit with the identified (funding) priorities of this Implementation Plan and to establish a concrete collaboration with these partners.

2) The Food Biomarker Alliance (FOODBALL) is one of the projects that received funding in the third JFA of the JPI HDHL "*Biomarkers in Nutrition and Health*". The consortium comprises 20 research organizations from nine European countries and Canada and New Zealand.

3) FIT4FOOD2030 is a 'Coordination and Support Action' funded by the European Union's Horizon 2020 research and innovation programme to supports the development and implementation of the European Commission's FOOD 2030 policy framework.

2.2.3 Approach and instruments to reach these aims

To achieve the above mentioned aims JPI HDHL will work on the following aspects:

Collaboration between JPI HDHL and the EC

In relation to the **EU Framework Program**, it is important to recognize that the work of the JPI HDHL is complementary to the EC, and that the vision and activities of the JPI HDHL need to reflect this complementarity. A unique aspect of the concept of the Joint Programming Initiative is the continuity of the collaboration needed to deliver the knowledge and innovation contributing towards solutions for the challenges that our societies are facing. The JPI HDHL for example has the ability to build on outputs/outcomes from joint activities. Relevant policy briefs and EC strategies that JPI HDHL could connect with include Food2030, the Common Agricultural Policy White Paper that stresses the importance of research and relates to Food2030, and the statement on the Bioeconomy Strategy. In addition, there are several health-related strategies that relate to the core strengths of the JPI HDHL and are important to connect with like the Platform for Action on Diet, Physical Activity and Health, the Strategy for Europe on Nutrition, Overweight and Obesity-related Health Issues or the Action Plan on Childhood Obesity. A very concrete action that could both benefit the connection with the EC as well as the visibility on the higher political level of the member states is the organisation of and participation at workshops and events in connection with the official EU presidency agenda *(see also chapter 2.3.3)*.

Increased stakeholder collaboration

Starting from the collaboration as a partner in the CSA Fit4Food2030 and therefore the connection to **Food2030** the JPI should further expand their links and connections with other relevant European initiatives *(see also chapter 4)*. For an efficient implementation of this European collaboration strategy the creation of synergies through collaboration is the key exercise. **The existing collaboration with the JPI on Agriculture, Food Security and Climate Change (FACCE-JPI) and "Healthy and Productive Seas and Oceans" (JPI OCEANS)** will be expanded further (e.g. JFAs together with FACCE and OCEANS, *see chapter 3.1.3*).

Establishing new partnerships

Apart from these already existing collaborations, the JPI HDHL will investigate new opportunities to move forward by connecting to other relevant initiatives based on the mapping exercise in relation to the resources available within the JPI HDHL. The possibilities for concrete **collaborations with other related JPIs** (at least in particular areas with shared interest) will be further explored, e.g. malnutrition topic might connect with JPI *"More years, better lives"* (JPI MYBL) or research on the impact of the built environment of physical activity behaviour connects with the JPI *"Urban Europe"*. This might offer new opportunities for shared activities like joint calls or on overarching themes like assessment of scientific quality or data sharing.

2.3 National Alignment

National alignment is the strategic approach taken by member states to modify their national programs, priorities or activities as a consequence of the adoption of joint research priorities in the context of Joint Programming, with a view to implement changes to improve the efficiency of investment in research at the level of member states and the European Research Area.

2.3.1 What has been done so far?

The societal challenge that JPI HDHL is facing is strongly related to the Food2030 Research and Innovation Policy Framework, presented by the EC in 2016 as well as high-level political commitments such as the UN SDGs which explicitly mentions the importance of R&I to achieve the SDGs. These types of commitments are a strong foundation for the national political commitment required to bring JPI HDHL to the next level. However, a mapping exercise carried out by both the SCAR Working Group of Food Systems and the Independent Expert Group Food2030 shows that the topics food, nutrition and health are under-addressed within the food system.

JPI HDHL has performed a small research exercise itself on existing national R&I investments and/or programmes on national alignment amongst its member states which showed some baseline results on national alignment and provides input to further strengthen national alignment. Various communication models and tools have been developed and the resulting alignment *toolbox* is available on the website.

Furthermore, the previous Implementation Plan supported national meetings focussing on a policy-science exchange on the national level as well as workshops on how to improve the overall quality of research in food, nutrition and health. Some JPI HDHL member states have established national mirror groups. These consist of people from ministries, funding organizations and other relevant parties in the field of health policy and research that discuss the national research priorities and positions with regards to the JPI HDHL on a regular basis.

In addition, through Fit4Food2030 JPI HDHL is engaged in a concept called 'policy labs' which looks into innovative processes to improve the impact of R&I investments on the national level. The scope of these labs includes the whole food system.

2.3.2 Aims of current Implementation Plan

During the period 2019-2021 JPI HDHL aims to:

- Provide evidence to enhance and improve the position of food, nutrition and health research within national R&I programmes or strategies and integrate this in the impact evaluation of JPI HDHL;
- Improve the political buy-in by increasing the number of relevant regional and national R&I key players engaged with JPI HDHL and better aligning the national R&I policies;
- Increase the number of funders in the JFAs of JPI HDHL by increasing the visibility of JPI HDHL on a national level and putting more emphasis on national gain of engagement with JPI HDHL.

2.3.3 Approach and instruments to reach these aims

To achieve the above mentioned aims JPI HDHL will work on the following aspects:

Organisation of JPI HDHL events during EU presidencies

The nutrition and health topics should be positioned on the agenda of those countries that will have the EU presidency in the coming years. **Romania** holds the presidency in the first half of 2019 and is involved in Fit4Food2030 as a policy lab, where they plan to focus on the obesity challenge. A Food Policy Lab event is to be organised during the presidency back-to-back to an EC Conference under the

umbrella of the Agriculture4Life Conference in Bucharest to connect important additional national and international stakeholders from other areas outside the agrifood chain, such as the health and environment sector. This will provide a first opportunity to further increase the visibility of the JPI HDHL and raise interest in countries that are not yet involved.

During the Finnish Presidency of the Council of the European Union in the second half of 2019, **Finland** is planning to focus on health and economics related topics. Food systems, healthy nutrition and the burden of non-communicable diseases are core themes for growth and competitiveness, making them an integral part of economics. JPI HDHL will keep up with the progress and integrate activities when useful.
The respective management board members will check the opportunities how JPI HDHL can be represented at or integrated into suitable presidency activities. The clear connection with global political goals such as the SDGs should be highlighted during these events.

Policy Labs & broader inclusion of national/regional key players

For an improved national alignment it is important to share the experience and lessons learned from the Fit4Food2030 policy and city labs and to explore how these could be used for the JPI HDHL context. This could include mapping and connecting with more R&I investments within the country for example foundations, regional governments as well as research institutes — very much depending on the national R&I landscape.

Political buy-in

The representatives of the Management Board of JPI HDHL should make sure that JPI HDHL is connected with the national R&I policy and key players. The update of the SRA has proved to be a good discussion starter for countries. National consultations have been organized in 11 member states, with different ministries, various funders, and representatives from the national research community and coordinators from JPI HDHL projects. National workshops, establishment of national networks or permanently constituted **National Mirror Groups** can also be used to align the JPI with national universities and the research community and to incorporate the SRA and/or certain research topics in national or regional research strategies. Both sides will benefit from these dialogues. On the one hand the academic priorities will be lifted to a higher level by incorporating them in the JPI HDHL research agenda; on the other hand the JPI HDHL research priorities will be directly communicated to the relevant communities.

More emphasis on national gain of engagement with JPI HDHL

To improve national alignment **more funders should engage in JPI HDHL**, in particular by providing budget for the foreseen JFAs. Joint funders' workshops could lead to additional contacts with other funders. In particular in the field of nutrition and health it seems to be challenging to achieve strong national alignment since there are so many different stakeholders and ministries involved, e.g. nutrition research plans could be developed without involving all relevant ministries or the respective research community. To facilitate the dialogue with funders and policy makers and to demonstrate the added value of the JPI HDHL to national representatives it is important to refer to concrete outcomes of the JPI HDHL and its funded research projects as well as highlighting how the JPI HDHL connects to important (international) related initiatives. Furthermore a clearer link between national and JPI HDHL activities could and should for which the national overview of relevant national R&I programmes and foreseen call for proposals could be a first basis.

Toolbox with practical materials

To support national conversations, the JPI HDHL has developed a *toolbox with practical materials* for different audiences to support countries to increase national alignment. The animated video of the JPI has been published on the JPI website and the use of the video and related materials will be monitored and evaluated. Additional materials (e.g. flyer, factsheets and/or presentations) will be developed as needed. Further, best practice examples from member states will be added to underline how they can best be used as a discussion starter in a national context.

2.4 Broader engagement and involvement of member states

JPI HDHL currently comprises 26 countries including three observers (Cyprus, Estonia and Slovenia), which are EU member states and associated countries like Canada and New Zealand. In order to reach its vision the JPI HDHL strongly depends on the engagement and contributions of its member states. Therefore it is of great importance to take certain actions to increase the engagement among the member states and organizations in general and new member states (see chapter 2.1.3) as well as observer countries in particular.

2.4.1 What has been done so far?

The initial period as **a new member** in a JPI can be challenging and time-consuming. The JPI HDHL acts in a complex context and with a number of diverse engagements and different activities. Since most activities are implemented in complex processes it takes time to understand before being able to fully participate and actively contribute. The discussions on the Management Board meetings can be difficult to follow as a new member (or observer) and many items require pre-knowledge and good insight regarding the issue and context. The supporting material sent out before a meeting is quite extensive and challenging to navigate through especially for new members. The presentation of the agenda has already been improved by adding specified leading questions for Management Board members on each agenda item to guide and facilitate the preparation for the meeting.

The challenges for observer countries can be similar to the challenges experienced by new members. Thus, the complexity of the JPI structure and processes might be an obstacle for **observer countries** to become full members of the JPI.

2.4.2 Aims of current Implementation Plan

During the period 2019-2021 JPI HDHL aims to:

- Reach a broader engagement of the already participating member states, e.g. to encourage the current members with an observer status to become full member and actively engage in the JPI HDHL funding and non-funding activities;
- Attract new members and provide them with all necessary guidance and materials to understand the structure and processes within the JPI HDHL allowing an active contribution of these new member states;
- Facilitate the planning for members in general regarding funding that should be available, time frame and (human as well as financial) resources for a better engagement from its member states.

2.4.3 Approach and instruments to reach these aims

To achieve the above mentioned aims JPI HDHL will work on the following aspects:

Development of a start-package with guiding materials

There is a lot of important and extensive information available (on the web) but it is perceived as cumbersome to get a good overview of upcoming activities. To facilitate and accelerate the learning curve and the process of involvement of new members **guiding materials as a start-package** with practical know-how and comprehensive overviews of different activities will be developed. Such material including infographics would also be usable for all Management Board members in their communication and dialog on a national level *(see chapter 2.3.3)*. Further, it is important to have a rough estimate how many resources need to be dedicated for the learning period and the get-to-know process when entering the JPI HDHL as well as the resources (man power, time, money) that are necessary for the day-to-day management and processes later on.

Establishment of a buddy system

A buddy system will be established to introduce and accompany new member states. An assigned buddy will help in guiding new members in the JPI HDHL nomenclature, activities and processes and make them more familiar with the JPI HDHL structures and will also serve to connect members within the Management Board and thereby strengthen the collaboration. To have a dedicated person/organization as a first guiding partner, in addition to the JPI HDHL secretariat, will facilitate the inclusion into the group. The assigned buddy can for example help to prepare the supporting documents for the Management Board Meetings and also assist during the meeting. In addition to the buddy system, guiding materials how to run a call secretariat will be developed. For this purpose, templates for call implementations will be made available.

Compiled and structured overview on upcoming activities

The provision of a compiled overview of the activities (parallel to all funding activities) in the upcoming year, their timing and the time frame of different activities and related processes will support the planning on national level. Since there are a lot of different topics and activities considered in parallel a **compiled and structured overview** with brief information on the activities for the time ahead will assist the national planning and prioritization processes.

Joint Actions

"Aspiring research leadership"

The JPI HDHL wishes to contribute to the area of nutrition, food and health as well as to the completion of the European Research Area. To achieve these goals JPI HDHL has implemented several JFAs based on the principle of variable geometry. The principle of variable geometry means that countries or organisations decide on a call-by-call basis whether they will participate in a JFA and how much they will contribute to the JFA. This results in different compositions of the involved countries and different amounts of funding between the JFAs. The JFAs encompass funding of transnational research projects, knowledge hubs and networks or other funding measures *(see infobox)*.

To extend the impact of the research in this field it is crucial to connect these JFAs and add additional value to them. This comprises the involvement of industry partners during the research projects or for the translation of research results into innovative products where feasible. Furthermore, it is important to enable researchers within the JPI HDHL to make use of adequate research infrastructures. This will help to further improve the impact of research investments to deliver towards JPI HDHL's vision by increasing circulation and reuse of scientific data.

Infobox: Funding instruments used within the JPI HDHL

Classic calls

Joint transnational calls are competitive procedures whereby proposed projects are selected and cooperatively funded by partners within JPI HDHL. They form one of the standard instruments for implementing aspects of the JPI HDHL Strategic Research Agenda. Before publishing the joint call the funding partners develop a joint vision on the call topic, specify an earmarked budget and agree on the criteria for eligible projects, call procedures and timeline.

In case of a one-step procedure full proposals are submitted. After a peer review process involving external and independent experts the funding decision is taken by the participating funders. In case of a two-step procedure a pre-proposal submission is required. The pre-proposals are evaluated by external experts. Depending on the outcome a subgroup of the applicants will be invited to submit full proposals. The full proposals will then be reviewed as described above. Optional, a rebuttal step can be included, where anonymous referee reports are sent to the applicants who are given the opportunity to respond to the reports by means of a brief, written rebuttal before the final evaluation meeting.

Some of the JPI's classic calls were implemented as ERA-NET Cofund actions under Horizon 2020. This instrument supports jointly funding trans-national research projects with a financial contribution by the European Commission.

Examples within JPI HDHL: NutriCog – Nutrition and Cognitive Function (2016-2019, one-step procedure, non-cofunded), HDHL-INTIMIC – Interrelation of the Intestinal Microbiome, Diet and Health (2018-2021, two-step procedure, cofunded), Nutrition & the Epigenome (one-step procedure with rebuttal stage, 2019-2022)

Knowledge Hubs/Networks

Knowledge hubs are networks consisting of selected research groups within a defined area of research. They bring together excellent interdisciplinary research groups to optimize research outcomes by facilitating the exchange of information among the actors, creating critical mass, pool already existing knowledge and data to conduct joint research. Scientists of the participating countries who wish to become a member of the Knowledge Hub submit an Expression of Interest form (EoI). Based on these submitted EoIs the most promising participants will be selected either in

an national or international competitive evaluation with the involvement of external experts following agreed criteria with the aim to create a well-balanced network of members providing all the expertise required to reach the defined goals. After a networking meeting of the selected research groups, the consortium of the invited scientists develop one network proposal which will undergo an independent evaluation process without competing proposals as in traditional calls. The result of the evaluation is a recommendation for funding, a recommendation for funding with some revision or a recommendation to reject the proposal (or some parts of it like particular work packages).

Examples within JPI HDHL: DEDIPAC KH – Determinants on Diet and Physical Activity Knowledge Hub (2013-2016), MaNuEl – Malnutrition in the Elderly (2016-2018), PEN – Policy Evaluation Network (2019-2022)

'Lighter' funding instruments

Apart from these two major funding instruments there are also so-called 'lighter' funding instruments with usually smaller budgets with the main objective of capacity building and knowledge sharing. These funding measures include but are not limited to the development and financing of training courses, research exchanges/mobility programmes, graduate schools, internships, summer schools, paper awards, working groups or top up-funding for already running projects.
Examples within JPI HDHL and ERA-Nets: Working groups on diet related diseases (2017-2019), Stipends for Cajal course on Developmental Neurobiology and Pathologies, Excellent Paper in Neuroscience award (both in ERA-Net NEURON), ERA-NET Sumforest Summer School for Young Researchers, OECD International Conference Sponsorship - Individual Travel Bursary Fellowship Awards

3.1 Key research topics for funding activities

One of the major efforts of the JPI HDHL is the funding of transnational competitive calls for proposals, knowledge hubs and other instruments in the three areas defined in the SRA of JPI HDHL. With the update of the SRA the interconnectivity between the traditionally distinct research areas has been stressed as one of the strategic objectives of JPI HDHL. Based on the research challenges identified in the SRA the intended new JFAs are presented below.

Apart from the two major funding instruments used in the JPI HDHL there is an emerging interest within the Management Board to also invest in so-called 'lighter' funding instruments with smaller budgets that are also able to have an impact on the European Research Area in this field. To achieve the best possible outcome of these measures it needs to be closely tailored to the respective research challenge and the relevant scientific community. This will ensure a critical mass of participating funders to justify the implementation efforts of these 'lighter' funding instruments.

For the intended new Joint Actions it is crucial that, they are connected to the existing Joint Actions, where relevant. Furthermore, a mix of funding instruments will be promoted to enable the most efficient use of available resources in the JPI HDHL member states *(see infobox)*.

3.1.1 What has been done so far?

Up to now, JPI HDHL has launched 15 JFAs with 3 JFAs still being in progress. This resulted in four Knowledge Hubs and 45 research projects involving more than 200 research institutes in Europe and beyond *(see Annex I)*.

Since the first wave of JFAs has now finished their research activities, the JPI HDHL carefully evaluates which JFAs are promising to build up on (e.g. JFA "Policy Evaluation Network" following from Thematic Area 3 of the DEDIPAC Knowledge Hub or JFA "Knowledge Platform on Food, Diet, Intestinal Microbiomics and Human Health" connecting previously funded JPI HDHL projects in this research area).

The JPI HDHL perceives its role in building the starting point for transnational collaborations and to

encourage the participating research consortia or newly build knowledge hubs to continue the collaboration by own means by applying to other external (e.g. EC funded) calls and programmes.

3.1.2 Aims of current Implementation Plan

During the period 2019-2021 JPI HDHL aims to implement up to six JFAs. The intended calls will have different foci which will include:

- INVEST — into competitive research projects in areas with a need for greater funding efforts;
- CONNECT — in research areas that are already well covered in specific partner countries, but need more coordination and collaboration between JPI countries and/or between different (research) disciplines networking activities will be initiated;
- SUPPORT — capacity building and career development in emerging research areas where early career scientist can benefit from transnational collaboration.

3.1.3 Approach and instruments to reach these aims

The diversity of funding activities during the last years reflects that the JPI HDHL is not only able to implement 'classic' competitive calls with several parallel research consortia being funded (INVEST). Another unique feature of the JPI is the establishment and funding of transnational and multidisciplinary research networks like knowledge hubs or platforms (CONNECT). For the runtime of this Implementation Plan it is also foreseen to explore the possibilities to implement some 'lighter' funding instruments, e.g. summer schools, prices, training, top up funding, exchanges and internships (SUPPORT).

The following intended call topics have been agreed by the Management Board for the period of 2019-2021:

2019

METADIS — Impact of Diet, Food Components and Food Processing on Body Weight Regulation and Overweight Related Metabolic Diseases *including elements to specifically support early career scientists (implemented through HDHL-INTIMIC)*

Background

It is well recognised that the overconsumption of energy-dense food combined with an inactive lifestyle are important causes for overweight, obesity and other metabolic alterations increasing the risk for several chronic diseases such as diabetes and cardiovascular diseases. However, the exact mechanisms are still not well understood and also vary on an individual level. Body weight regulation is controlled by various biological processes, which are influenced by dietary composition and related to the consumption of specific food components. In addition, also the macronutrient composition of diet as well as other food characteristics such as bioactive components, energy density, taste, aroma, texture, etc. affect appetite and/or metabolic regulation at biological and psychological level and in consequence influence risk factors for overweight-related metabolic diseases.

Aim of the call

The aim of this call is to support transnational, collaborative research projects that address important research questions regarding the effects of food (components) or diets and/or food processing on overweight and related metabolic diseases.

Proposals should focus on one or both of the following topics:

1. Identification of food (components) or diets that affect appetite and/or satiety, body weight regulation and/or risk factors for the development of overweight related metabolic diseases as well as the underlying mechanisms. This includes the understanding of individual responses to food components or diet.

2. The effect of food processing and/or storage conditions on food components, and the mechanisms by which this will influence appetite and/or satiety, body weight regulation and/or risk factors for the development of overweight related metabolic diseases. This can include studying how to modify the amount of these food components during food processing without affecting consumer acceptance.

An additional objective is to support Early Career Scientists in the area of food, nutrition and health with designated training activities that need to be included in the proposals as well as workshop organized by JPI HDHL for Early Career Scientists to support their career development after the projects have started.

Expected impact

The expected long-term impact of this call is to prevent or delay the onset of metabolic diseases by gaining a better understanding on the relation between food, diet and metabolic diseases. Identification of the food factors that influence health and characterization of the underlying mechanisms will contribute to reach this aim. In addition, the identification of food processing conditions with beneficial effects will enable the industry to produce healthier high-quality foods that will slow down the prevalence of metabolic diseases.

This call also aims to promote transnational collaboration, which is necessary for establishing multidisciplinary and complementary consortia that will allow the development of ambitious research projects that meet the needs identified by the JPI HDHL. Moreover, the coordination of the transnational research networks will also contribute to important research related activities such as harmonisation of protocols, establishment and sharing of data and guidelines or/and sharing of research facilities and capacities. This call will contribute to the establishment of such research networks.

Promoting and supporting the interchange of ECSs between different partners within a consortium, as well as training activities dedicated to ECSs, will contribute to build capacities and to enable ECSs to tackle the challenges of JPI HDHL in the coming years.

Participating countries and agencies

Eleven countries and thirteen funding agencies are participating in the METADIS call:

Belgium (FRS-FNRS), Czech Republic (MEYS), France (ANR), Germany (BMBF represented by DLR and BMEL represented by BLE), Israel (MOST), Italy (MIPAFFT and ISS), Latvia (IZM), The Netherlands (ZonMw), Norway (RCN), Spain (ISCIII) and Sweden (FORMAS).

Food & Nutrition Security Knowledge Hub *(joint call with FACCE and OCEANS, implemented through ERA-HDHL)*

Background

Providing Food and Nutrition Security (FNS) in a changing world is an urgent objective due to the increasingly interconnected challenges of natural resource scarcity, climate change, and population growth, which affect food systems in Europe and globally. Research and innovation in food systems play a key role in addressing several of the sustainability goals set by the UN. The EC aims to tackle FNS with research and innovation policies designed to future-proof food systems through a systemic approach referred to as FOOD2030 strategy. The objective of FOOD2030 is to contribute to the

transformation of European food systems so as to make them 'future-proof', i.e. sufficient, sustainable, resilient, responsible, diverse, competitive and inclusive.

Ensuring food and nutrition security is a complex issue, requiring an integrated food systems perspective. FACCE-JPI, JPI HDHL and JPI OCEANS cover the necessary scientific fields to ensure integrated research across the whole food system, and therefore have the opportunity to create a bigger impact towards tackling societal challenges related to food and nutrition security.

Aim of the call

The overall aim of the Knowledge Hub on Food and Nutrition Security is to foster transnational and multidisciplinary collaboration and networking in order to accelerate, further characterize and to manage the impact of climate change on nutritional make-up of food, and to propose adaptive strategies/measures to ensure food and nutrition security.

For this, participating funding agencies will bring together research groups from various disciplines to form an international consortium that will design and implement the Knowledge Hub. The network will carry out joint multidisciplinary activities aiming at integrating complementary expertise, knowledge, facilities and databases in relevant areas on Food and Nutrition Security. The activities of the network should address current cross-cutting challenges in the field and may focus on:

- Standardisation and harmonisation
- Data handling, knowledge and data sharing
- Addressing knowledge gaps

Specifically, the knowledge hub should identify knowledge gaps and key challenges and possible adaptive measures improvements and new research across at least two of the following themes — ensuring to include the societal challenges of the three JPIs:

- Enhancement of the nutritional composition and bioavailability of nutrients in food by bio-fortification via crop breeding, agronomic improvement and marine interventions
- Improved management of marine and land resources towards increased resilience, sustainability and nutritional quality, and when possible mitigation of GHG emissions
- Dietary diversification by plant, insect and marine sources
- Changing the practices of actors in the food system to improve diets

Expected impact

The following actions will contribute to developing the knowledge base needed to realise guidelines for producing and consuming food that include resilience, sustainability and nutritional aspects.

Additionally, it will provide:

- A roadmap for future research needs
- Targeted policy briefs that provide holistic advice on food systems
- Exchange between R&I and industry how to work towards new and adapted food products that are both economically viable and healthy and sustainable.

Specific outcomes of the Knowledge Hub will deliver impact to the three main stakeholder groups:

- Producers (in a broad sense) - Work providing knowledge and know-how on which practices will increase resilience, sustainability and nutritional quality of food.
- Agri and food industry (post-"farmgate") - Work with industry to increase diversity in feed and food sources to provide greater nutritional qualities and contribute to resilient production systems by exploring food products that are both ethically and economically viable.

- Consumers - Work with citizens to promote a dialogue to increase awareness of healthy and sustainable diets taking into account nutritional quality, food safety, production methods, sensory aspects, ethical and environmental issues.

Participating countries and agencies

Ten countries and the respective funding agencies are participating in the FNS KH call:

Belgium (FWO), Czech Republic (MEYS), France (INRA), Germany (BMEL represented by BLE), Ireland (DAFM), Italy (MIPAFFT), Latvia (IZM), Norway (RCN), Portugal (FCT) and Spain (AEI).

2020

Area 1 *(with overlap to Area 3)*: **Prevention of unhealthy weight gain and obesity during early life and other critical life events throughout the lifespan**

Background

Overweight and obesity are associated with a range of chronic diseases, including cardiovascular disease, type 2 diabetes and certain cancers. The rising prevalence of childhood obesity is of particular concern due to the serious adverse psychological, social and health consequences of obesity in childhood and implications for future adult life. Similar to the body mass index, dietary and physical activity habits track strongly from youth to adolescence to adulthood. Therefore, it is important to establish healthy behaviours early in the lifespan to prevent overweight and obesity. Determinants of healthy behaviours, and targeted prevention strategies to address these determinants, differ across the life span, depending on levels of an individual's independence and autonomy, cognitive function, motivation, socio-economic status and competing life commitments. Thus, unhealthy weight gain prevention strategies targeted to different phases across the life span are urgently needed. In addition, critical transition periods and life events (such as pregnancy, the diagnosis of a chronic disease, or retirement) provide opportunities for interventions to change health-related behaviour and reduce overweight and obesity.

Aim of the call

Novel prevention strategies to prevent or reduce overweight and obesity, adjusted to defined target populations based on certain life stages, should be developed, implemented and evaluated.
This call focuses on crucial phases throughout the lifespan such as transition periods (from pregnancy to birth/infancy, pre-school to school age, adolescence to early adulthood) or critical life events (moving out from home, marriage, diagnosis of a chronic disease, retirement etc.).
Strategies should take a broad and comprehensive approach to determinants and prevention of obesity, including individual and environmental factors. Demonstration of implementation and impact resulting from prevention strategies is critical and strategies should incorporate policy based obesity prevention interventions.

Expected impact

Effective intervention strategies, particularly those targeting children and young people as well as those tailored for subjects in other critical life periods have the potential to significantly reduce the obesity burden and the risk of co-morbidities. Progress in the implementation of policy-based obesity prevention strategies, and identification of the ideal mode of delivery of strategies, can produce significant tangible health benefits and prevention of chronic illness.

Area 2 (with overlap to Area 3)*:*
Development of targeted nutrition for prevention and treatment of undernutrition in elderly

Background

Undernutrition, defined as a state resulting from lack of intake or uptake of nutrition that leads to altered body composition (decreased fat free mass) and body cell mass leading to diminished physical and mental function and impaired clinical outcomes from disease, is a common problem mainly in elderly. The risk of disease and health benefits of diets vary significantly between groups and individuals within populations and in this respect, individual variations in nutrition response need more attention. Research is therefore needed that provides a better and deeper understanding of how food is metabolized in the body and how nutrients are made available for absorption. Protein supply is important in all stages of life, and in relation to undernutrition in elderly, and other target groups with a risk to develop underweight/undernutrition, a reduced intake and bioavailability of proteins and micronutrients puts these individuals at increased risk of diseases. Thus, there is a need for a targeted nutrition approach, which is a tool to overcome the challenge of undernutrition in elderly. New tailored food ingredients and foods designed to overcome undernutrition and diet related malfunctions (e.g. sarcopenia, other chronical diseases) can be part of the solution. The way in which these have to be processed and how they interact with human metabolism require research.

Aim of the call

This topic should aim to understand the relationship of undernutrition with the balance between nutrition, lifestyle and physical exercise on the metabolism of nutrients, but also on the bioavailability and the application of (new and known) food ingredients. It should also aim to identify new sources and processes to find new ingredients with this purpose, taking into account sensory acceptance of the elderly, affordability, and safety. The development, evaluation and application of new protein ingredients with high biological value (balanced amino acid score) and very high bioavailability and digestibility is required. This may be achieved by tailored combinations of different animal and plant derived protein ingredients. They can be highly concentrated and/or pre-treated for better digestibility and bioavailability by separation technologies, hydrolysis, fermentation or others. The processed ingredients should be optimized in functionality and taste to enable a wide range of food applications to design highly acceptable meals. These novel ingredients or food products need to be examined in the context of clinical trials either alone or in combination with other interventions (e.g. exercise) and explore whether its efficacy is similar in different disease states.

Expected impact

The impact of targeted nutrition based on new designed foods and lifestyle advice as part of the treatment of patients with undernutrition should have considerable impact, in terms of greatly improved health outcomes mainly in respect of elderly. The learnings could also bring benefits to other specific target groups (nutrition for pregnancy, lactation, people with metabolic malfunctions or sports nutrition). Such developments also can lead to enhanced competitiveness of the pan-European agro-food industry based on new innovative food developments including SMEs to enter ew and profitable market segments in the area of personalized nutrition.

2021

Area 3 *(with overlap to Area 2)*: ***Addressing adverse effects of foods by modifications in food processing and studying underlying mechanisms***

Background

Food intolerance and allergies are becoming increasingly common. This is suggested to be due to changes in the living environment, including food offering. As modern diets are increasingly composed of processed foods, it is important to understand the role of various food ingredients as well as processing methods on nutritional value, support of development of the immune system and allergic reactions in sensitive subjects. The links between food processing and formulations and the adverse effects of foods are poorly understood and need more investigation.

Aim of the call

This topic addresses the role of food processing in potential causes and solutions of the rise of food intolerances and allergies in society, as well as understanding mechanisms and the causal pathways that link food properties to intolerances and allergies in children or adults.

This could include research on

- potential relationships between food processing methods and food allergies/intolerance, especially with respect to protein foods and new protein sources;
- whether and how different food processing methods, different degrees of food processing or the use of refined ingredients, can modulate the immune function and tolerance to allergies;
- whether and how food formulation and certain additives play a role in development of allergies and intolerances;
- strategies to avoid or reduce such adverse effects such as development of alternative processing procedures or novel food additives;
- studying the link between chronic inflammation, food allergy, food intolerance and/or gluten sensitivity and the possible mechanism(s).

The topic calls for strong collaboration between food technologists, nutrition scientists, immunologists and health scientists to identify needs for improvement and to assess the impact and potential mechanisms of developed new processing methods or ingredients in vitro, in human intervention studies, and in birth cohorts.

Expected impact

Successful reformulation or adoption of production processes of certain foods may enable building a more robust immune system or the removal of allergens, both making these foods to be more supportive to good health. Knowledge in this area could lead to improved prevention of food intolerance and food allergies. This may contribute to a reduction in the incidence of at least some forms of food intolerance and allergies and could thus reduce the public health burden and consumer concerns.

Area 1 *(with overlap to Area 2)*: ***Standardized measurement/monitoring and biomarkers: food intake, physical activity and health***

Background

It is well recognized there are major discrepancies between self-reported and device-based instruments when assessing diet and physical activity (incl. sedentary behavior). The same holds true when comparing self-reported intake of nutrients and/or foods with specific biomarkers. This affects the credibility of the research field, e.g. by affecting results of observational studies on diet, physical activity and disease occurrence. Further, the amount of data on physical activity that can be collected in large samples over extended periods of time (so-called big data) raises new scientific and societal challenges. With objective measurements, the quality of nutrition and lifestyle research will be increased and better recommendations and guidelines regarding diet and physical activity will be made.

Aim of the call

- to develop improved methods for diet and physical activity assessment using new technologies, incl unobtrusive data, food purchases etc, with the aim to help promote a healthier lifestyle;
- to (further) valid develop biomarkers for food intake (eating patterns and/or diet composition);
- to standardize commercially available device-based methods for objective assessment of physical activity (and sedentary behavior);
- to develop platforms to aggregate such data, and to develop techniques for analyzing large amounts of such data in diverse populations with special attention to combinations and integration of measurements of diet, physical activity (and sedentary behaviour);
- to identify challenges regarding data privacy and ethical issues specific to diet and physical activity (and sedentary behavior).

Expected impact

These resulting tools and data will allow comparisons between different populations, identify specific at-risk groups to target in interventions, and when sufficiently implemented in research increase the validity of dietary and physical activity recommendations and guidelines.

3.2 Industry collaboration

The translation of research results to foster innovation and smart specialisation is vital to deliver the vision of JPI HDHL and to ensure the industrial competitiveness of all countries in Europe. New regulatory requirements and changing framework conditions as well as non-regulatory barriers, the consequences of globalisation and financial crises are major challenges for companies. SMEs will be especially vulnerable to these challenges due to their limited resources. Within the scope of JPI HDHL these aspects should be further discussed and analysed. Engagement with industry (any size of companies) to identify the particular innovation hurdles is one starting point. The aim of the JPI HDHL in this regard is to provide a platform for exchange and discussion with the relevant internal and external stakeholders. It is of particular importance to consider the respective needs of academia and industry and to define conditions for collaboration which take into account their particular needs.

3.2.1 What has been done so far?

There are already a number of industry partners involved in the current Joint Actions. In total, 21 industry partners (reaching from SMEs to global enterprises) are involved in JPI HDHL funded projects. To further enhance collaboration with industry in the JPI HDHL and to discuss and analyse existing hurdles for collaboration a few workshops have taken place to bring together representatives from industry (both small and large companies), scientists, other organisations and experts from different areas as foreseen in the CSA 2.0.

The main outcomes of the workshops were the recognition that trust and good communication among the collaborating partners (academia & industry) and stakeholders are essential conditions for fruitful collaboration. The modalities of the collaboration differ at a pre-competitive vs. competitive stage. Regulatory bodies play an important role when it comes to innovation. It is vital that they are well informed about developments in industry and academia to fulfil their tasks. Therefore, a tri-lateral collaboration of industry, academia and regulatory bodies at an early stage is in the interest of all parties and should be facilitated while maintaining the neutral role of the regulatory bodies and the risk assessing organisations.

3.2.2 Aims of current Implementation Plan

During the period 2019-2021 JPI HDHL aims to:

- Provide guidance on industry & academia collaboration with recommendations about what issues should be taken into account when academia and industry collaborate in JPI HDHL projects including best practices and examples;
- Facilitate the mutual understanding between industry, academia and regulatory bodies to improve the collaboration between the three domains, overcome innovation hurdles and thus to achieve more impact of research investments within the JPI HDHL;
- Develop funding measures or other activities which are suitable to meet the needs of both, academia and industry to support the development of top talents and increase the impact of research in the area of food, nutrition and health.

3.2.3 Approach and instruments to reach these aims

To achieve the above mentioned aims JPI HDHL will work on the following aspects:

JPI HDHL guideline for industry & academia collaboration

Based on the outcome of the workshops the JPI HDHL guideline for industry & academia collaboration will be drafted based on already existing documents like the 'Principles of research conduct' by the European Technology Platform (ETP) 'Food for Life' and adapted to the context of JPI HDHL.

Joint workshop with industry representatives and regulatory bodies

The translation of research results into innovation and smart specialisation is vital to work towards a healthy, competitive and sustainable food system. However, the incorporation of innovative approaches and technologies into new products is currently lagging within the food sector. One of the reasons for this seems to be gaps in technological as well as regulatory skills and competences. Innovation from a scientific and technical perspective should always be paralleled by regulatory considerations. To better connect knowledge needs between scientists, industry and national and European food safety regulation, JPI HDHL is organizing a joint workshop with the European Institute of Innovation and Technology of Food (EIT Food), the European Food Safety Authority (EFSA), and the Food Safety Authority Ireland (FSAI) to discuss the current status of the landscape at the JPI HDHL Conference 2019 and to facilitate the exchange of views and mutual understanding of the different involved bodies and stakeholders.

Towards a joint training activity

The goal of the JPI HDHL is to enable (young) researchers that in order to increase the impact of their research it can be important to collaborate with partners outside of academia, in particular industry. The possibility to implement a joint education activity with a focus on training of (early career) scientists on important requirements for collaboration with/by industry (e.g. intellectual property rights, market demands, entrepreneurship) will be explored. To achieve the best possible impact, JPI HDHL aims to join forces with EIT Food to establish the required industry contacts and to creating synergies between these two initiatives. Collaborations with other relevant initiatives representing additional areas of the food and drink industry (e.g. Food Nexus) will be explored.

3.3 Research infrastructure

The JPI HDHL has recognized that an open and sustainable European data infrastructure and stimulation of the circulation and reuse of scientific data are vital to further improve the impact of research investments and that there is a need for a Research Infrastructure (RI) in the field of nutrition and health research (see also *Strategic Research Agenda*). RIs are the backbone of a research domain and crucial to more efficient investments (*see infobox*). RIs are making state-of-the art equipment and resources available to new generations of researchers and companies, thereby furthering novel developments in science, technology and business. While the agricultural and health care sector have (advanced) RIs in place, it has been acknowledged by European Strategy Forum on Research Infrastructures (ESFRI) that to study the relationship between food, nutrition and health such an infrastructure is lacking.

RIs are costly to establish and also costly to maintain. The establishment of a RI is not JPI HDHL's responsibility and also not its member states given mandate. However, JPI HDHL can possibly offer support to existing initiatives in defining research needs and framework conditions. JPI HDHL also can encourage its member states to explore further if there is the need for a new transnational RI or if already existing RIs can take up aspects of a food, nutrition and health RI.

Infobox: Research Infrastructures

According to EU definition Research Infrastructures (RIs) are facilities, resources and services that are used by the science community to conduct research and foster innovation. They enable data collection, management, processing, analysing and archiving and can include major scientific equipment (or sets of instruments), skilled personnel engaged in services, competence development and outreach, knowledge-based resources such as collections, archives or scientific data and e-infrastructures (e.g. data/computing systems and communication networks). Such RIs can be single-sited (a single resource at a single location), distributed (a network of distributed resources), or

virtual (the service is provided electronically).
(Source: *Research infrastructures EU*)

3.3.1 What has been done so far?

As one supportive activity in the field of food, nutrition and health the JPI HDHL has set up the transnational Knowledge Hub **"The European Nutrition Phenotype Assessment and Data Sharing Initiative" (ENPADASI)** running from December 2014 until June 2017. The main objective of ENPADASI was to develop an open access platform for all nutritional mechanistic, interventional and epidemiological studies including a multitude of phenotypic outcomes that will facilitate combined analyses in the future. ENPADASI has developed templates for data collection and integrated 85 interventional studies, 23 observational studies and has made 28 studies open access. These studies have been integrated via the web-based Data Sharing in Nutrition (DASH-IN) structure. It allows connectivity between distributed databases containing structured records of nutritional studies. There is no limit to study design and DASH-IN is compliant with the latest data-safety legislation and compatible with the FAIR (findable, accessible, interoperable and reusable) data principle. This pilot data fusion analysis showed that integrative analyses are possible and these data can be reused for new research questions. Further, ENPADASI has made a full overview of the ethical, privacy and IP issues related to data sharing.

Following up ENAPDASI's results JPI HDHL organised a **workshop on data sharing and data stewardship** in February 2017 to explore the needs and gaps of the field as well as to identify the next steps that JPI HDHL should take to further stimulate open science and improve the circulation and reuse of scientific data in the field of nutrition and health. One of the outcomes was that the use and implementation of the products developed by ENPADASI could be a starting point to further enhance their development. It was concluded that harmonisation and standardisation of data is an important next step to stimulate data sharing and open science. The funding of a pilot study where the research question will be answered with a meta-dataset from existing data could show the added value of data sharing.

To further improve the impact of research investments the Management Board of the JPI HDHL adopted the **FAIR data principles** and agreed that all new funded research by the JPI HDHL should apply these principles. With the adoption of the FAIR data principles the JPI HDHL contributes to an open and sustainable European Data Infrastructure and stimulates the circulation and reuse of scientific data. In addition the JPI HDHL contributes to the vision of Commissioner Moedas for EU research and innovation policy: Open Innovation, Open Science and Open to the World. A pilot study on the implementation of the FAIR data principles in a JFA is currently carried out in the "Nutrition and the Epigenome" call. The aim of this pilot study is to evaluate and improve the implementation of a data management strategy in projects and is divided in an application and a monitoring phase with regular requests to update the project's data management strategy and subsequent evaluations.

3.3.2 Aims of current Implementation Plan

During the period 2019-2021 JPI HDHL aims to:

- Identify which achievements or novel demands in the fields of nutrition, food science and related health sciences are crucial for a potential research infrastructure and how to engage with and build on RIs that are already existing or currently in development;
- Provide support to tackle the identified gaps and needs for the concerned interdisciplinary research community to move towards the standardisation of methodology and terminology in the different scientific disciplines connected to the Nutrition & Health Challenge;
- Stimulate open science and access to and re-use of data of the JPI HDHL funded projects by the implementation of the FAIR data principles and by aligning with the Go Fair Initiative.

3.3.3 Approach and instruments to reach these aims

To achieve the above mentioned aims JPI HDHL will work on the following aspects:

Continuation of the dialogue with important RI stakeholders

The JPI HDHL will continue and facilitate the dialogue with the involved stakeholders from other RIs by promoting itself as a user and articulating the specific needs and expectations of the research community in the field of nutrition, food and health for such an infrastructure. Therefore, a mapping and **first concept formulating the demand of the needed components** for such a RI will be carried out in close collaboration with the project leaders of JPI HDHL funded projects as well as representatives from METROFOOD-RI[6] and FNH-RI[7] that are already in the process of developing and RI in the field of food, nutrition & health. This enables JPI HDHL to proactively articulate needs and gaps for a research infrastructure in the field of nutrition and health and support researchers to make use of existing infrastructures to answer relevant nutrition research questions where possible. This concept will include long term goals and short term solutions for already running projects as well as how to deal with budgetary and legal issues.

Support the research community to use existing elements of RIs

The establishment of a research infrastructure for nutrition and health research data is beyond the remit of JPI HDHL, though at the same time of key importance to deliver towards the vision of the initiative. Thus, JPI HDHL will benefit from further development of a RI in the field of food, nutrition & health and promote its funded research consortia as potential users. To facilitate the establishment of an RI in this field, JPI HDHL will support its funded researchers when using existing elements of RIs as for example DASH-IN implemented by ENPADASI (e.g. by granting budget for usage fees of RIs).

Pilot activity to demonstrate added value of data re-use

To demonstrate the added value of a well-functioning RI, JPI HDHL is aiming to set up a small case study as a first pilot activity to re-use data sets generated in different studies to answer relevant nutrition research questions that cannot be explored by single studies. Examples could be a JFA to exploit (intake or effect) biomarkers across multiple studies to investigate e.g. inter-individual variations, microbial functionality, 'unhealthy' food intakes, or malnutrition markers.

Finalisation of FAIR data guideline and related templates for data management

JPI HDHL was one of the first JPI's that decided that future funded calls would have to adhere to the FAIR Data Principles, but implementing these principles in all member states is challenging since the status of national adoption differs and the necessary interdisciplinary infrastructures suitable for all relevant disciplines are not always there yet. To support the funded research projects with implementing FAIR data principles, the results of the pilot study on implementation of FAIR data principles during the application phase and continuation during the project runtime will be evaluated. Afterwards the final FAIR data guideline and the related templates for data management to be used in upcoming JFAs will be adopted.

6) The Infrastructure for promoting Metrology in Food and Nutrition (METROFOOD-RI) is a new distributed Research Infrastructure aimed to promote scientific excellence in the field of food quality and safety. In 2018, METROFOOD-RI has been selected by ESFRI as one of the six new projects for the strategic potential and impact for strengthening European research.

7) The FNH-RI aims to develop a European platform for data, tools and services for research in food, nutrition and health. Wageningen University & Research is forming the European PROSPECT consortium that prepares the submission of FNH-RI to the 2020 ESFRI roadmap for Food and Health.

Exploitation, dissemination and stakeholder involvement

"Achieving higher impact of our collective efforts"

A general goal of JPI HDHL is to increase the impact of JPI HDHL investments towards the societal challenge addressed. This means that the knowledge obtained from the funded research projects needs to be processed further to higher technology readiness levels and/or more applied science *(see figure 3)*. For this reason, a core principle of the JPI HDHL is to facilitate coordination between policy makers within the countries involved with a view to support collaboration between scientists and other stakeholders to generate new scientific knowledge, share existing knowledge and expertise, and bring together important datasets in the areas of food, nutrition and health. Furthermore, knowledge needs from JPI HDHL's stakeholders will also feed into the research programming and funding strategy. The outcomes of the Joint Actions of JPI HDHL will create a strong knowledge base for policy within the JPI HDHL countries, the EU and beyond. Therefore, efficient communication and dissemination of the research outcomes to all relevant stakeholders is most crucial for success.

The societal challenge of JPI HDHL involves a wide variety of stakeholders, this includes representatives of NGOs, (public) healthcare professionals, consumers, industry, research and development, education institutes and policy (European & national, R&I and thematic). To ensure that the investments of JPI HDHL can be translated into real health improvements, JPI HDHL works towards an integrated multi-sectoral approach, embracing education, health care, agriculture, environment, food and drink industry, transport, advertising and commerce as well as end-users and consumers. This is essential to position food, nutrition and related public health policy and evidence from research sufficiently high on the political agenda to create substantial impact.

4.1 What has been done so far?

The JPI HDHL has the skills, capacity, and critical mass through its substantial research funders' networks, the research community supported through JPI HDHL JFAs and its strategic partnerships with a broad range of key stakeholders to become an important strategic platform with a critical role in this area of research. To this end, the JPI HDHL cooperates with key stakeholders regularly through its Scientific and Stakeholder Advisory Boards to connect with experts from the involved scientific disciplines as well as important representatives from policy, industry, health professionals, and consumer organisations. While the Scientific Advisory Board consist of 15 well-known scientific experts providing advice in all scientifically and technologically relevant issues, the Stakeholder Advisory Board connects JPI HDHL with policy, industry, health professionals as well as consumer organisations.

In addition to the regular exchanges with these two closely related advisory boards there are a substantial amount of international initiatives on European and global level that — partly — relate to the scope and objectives of JPI HDHL. To structure the landscape of JPI HDHL's stakeholder community a mapping of related stakeholder and initiatives has been undertaken. Over 100 initiatives that are active on a European or global level in the field of food, nutrition and physical activity have been identified and included in this interactive *stakeholder framework*.

To support the exchange and collaboration with this broad range of stakeholders, the JPI HDHL is using a variety of **communication tools** with the **web domain** *www.healthydietforhealthylife.eu* as the key communication channel. This unique web platform integrates different components, such as:

- public website, including a mobile application functionality;
- restricted area for the JPI HDHL members and advisory bodies (intranet);
- Meta Data Base (MDB) platform to collect and share information from and with users;
- Electronic Submission System as a portal for applications of international funding activities.

One important additional measure to communicate and disseminate the research results of the funded research projects inside the JPI HDHL and also to relevant external stakeholders are the

midterm and final symposia of funded projects. In 2017 the first joint midterm symposium of the *JFAs ENPADASI, Nutrition and Cognitive Function, Intestinal Microbiomics, Food Processing for Health and Malnutrition in the Elderly* took place. The midterm symposium of the ERA-HDHL Cofund *Biomarkers for Nutrition and Health* followed in 2018. These symposia have proven to provide excellent opportunities for networking and information exchange between the JPI HDHL funded research consortia and relevant stakeholders.

4.2 Aims of current Implementation Plan

During the period 2019-2021 JPI HDHL aims to:

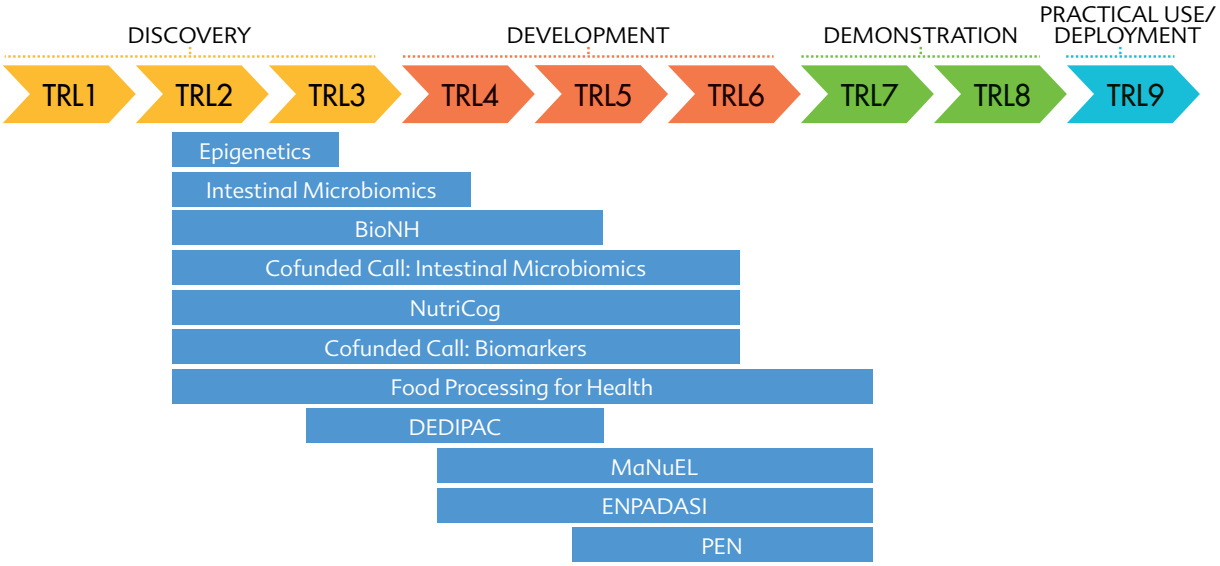
- Facilitate the transfer from research results obtained within JPI HDHL funded projects into practice, i.e. support the translation of research into innovative products with the support of the (food) industry as well as the translation of research into policies and procedures;
- Improve and strengthen its visibility and effectively disseminate its activities and outputs amongst stakeholders and to actively engage key stakeholders in dissemination activities;
- Provide targeted communication of important activities and development in the JPI HDHL funded projects tailored to the needs of the different related audiences and target groups;
- Move towards a more intensified and strategic stakeholder engagement in JPI HDHL to facilitate coordination between policy makers and the scientific community with a special focus on the involvement of yet underrepresented (public health, societal science) or salient groups (consumers).

4.3 Approach and instruments to reach these aims

To achieve the above mentioned aims JPI HDHL will work on the following aspects:

Increase the impact of project results

It is an important goal of JPI HDHL to fund research that results in tangible outcomes and societal impact. To increase the impact of the research results and new knowledge obtained within JPI HDHL funded projects it is crucial to exploit and transfer research results into practice. Up to now JPI HDHL has funded several research projects in lower technology readiness levels (*TRL, see figure 3*).



	TRL level	Technology Readiness Level Definition
Discovery	TRL1	Basic research: Basic principles observed
	TRL2	Applied research: Initial practical applications are identified
	TRL3	Proof of concept established: Applied research advances and early stage development begins
Development	TRL4	Lab Testing/validation: Design, development and lab testing of components/processes
	TRL5	Validation in relevant environment
	TRL6	Prototype system verified: System/process prototype deminstration in operational environment
Demonstration	TRL7	Pilot system demonstrated: System/process prototype demonstration in operational environment
	TRL8	System incorporated in commercial design: Actual system/process completed and qualified through test and demonstration (pre-commercial demonstration)
Practical use/ Deployment	TRL9	System proven and ready for full implementation

Figure 3: Technology Readiness Level of JPI HDHL Joint Funding Actions (JFAs)

In the future, JPI HDHL will also work towards funding activities with a stronger focus on applied science and the transfer of research results into innovative or optimized foods and products as well as policies, recommendations and other applications, involving industry and other relevant stakeholders (*see chapter 3.2*). In general, there will be a stronger focus on the exploitation strategies and potential impact of all JPI HDHL funded research projects during the application phase, the project runtime as well as the evaluation to achieve the best possible impact for the society.

JPI HDHL events and meetings

The **midterm and final symposia** of funded projects with broad involvement of different stakeholders are important instruments to disseminate information about the results of funded research projects to the relevant target groups. To strengthen their impact these events will be connected with each other and/or broader JPI HDHL meetings, such as the **international JPI HDHL conference**. This will ensure an effective dissemination of results to relevant stakeholders and policy makers, also possibly engaging new funders. Thus, these symposia will be opened from rather internal meetings to (small) scientific congresses or it could even be aimed to integrate JPI HDHL sessions in relevant international congresses.
The international JPI HDHL conference will also provide the platform for capacity building activities as well as partnering and networking sessions for young scientists. In addition, the conference will include workshops to facilitate the **policy-science and stakeholder-science dialogue** by providing a platform for the exchange between policy makers and researchers and provide the researchers of finished projects to formulate the concrete policy implications resulting from their research projects.

Update of communication tools

The available **communication infrastructure** (website, database, intranet) and tools (newsletter, social media) will be improved and specifically tailored to the needs of the different audiences (funders, policy makers, researchers, public). The key effort will be the **relaunch of the updated** *JPI HDHLwebsite* in a mobile- and more user-friendly design as the main external communication tool. The new webpage will also include a new **interactive tool with information about funded projects**. This dynamic infographic will inform on finished and running research projects. Links to the respective websites of the funded projects will be included.

Intensified dissemination of project results

To better involve the funded research groups in dissemination activities, they will be able to actively share their most recent research findings or other important news from the research projects via the JPI HDHL website. In addition, the funded consortia will be encouraged to extend their communication activities and to make sure that the projects are recognised as JPI HDHL funded projects. For this, the communication plans and the communication activities in the projects will be assessed and evaluated more closely. To facilitate this process, new short **instructions for dissemination of funded projects** (1-2 pages) will be drafted and shared with the project coordinators. In addition, there will be **automatic regular alerts** for the project coordinators to share information or tweets about future meetings, new publications or other relevant developments.

Increasing stakeholder engagement

To increase the involvement and the interest in participation of all target stakeholders of the JPI HDHL in an active stakeholder community, JPI HDHL will improve its engagement tools and create suitable structures that are necessary to carry out the specific functions and tasks expected from the stakeholder community. The key stakeholders will not only receive information about JPI HDHL actions and outputs but will also be engaged in actively contributing to the implementation of the JPI HDHL objectives and plans and the realization of its vision. The key instrument will be a **guideline for stakeholders how to get better involved,** in particular in the whole process of implementation of a funding activity (scoping, development of call documents, indicators, monitoring/evaluation). Also specific collaborations with stakeholder advisory board members will be enforced to improve the engagement of a broader stakeholder group for example by organizing a workshop at conferences of the stakeholder board members or by publishing JPI HDHL news in their newsletters.

Roadmap to sustainability

"Leading the JPI HDHL to a sustainable future"

The secretariat of the JPI HDHL is currently financed by the EC with a CSA that is funded through the 8th EC framework programme "Horizon 2020" (H2020). While this Implementation Plan was drafted, the EC funding instruments in the next EU framework programme "Horizon Europe" were not determined yet and therefore it remains unclear whether such funding will be also available under the next framework programme. This means that the JPI HDHL has to secure funding for the secretariat and its main activities which is independent of the funding by the EC.

5.1 What has been done so far?

It is recognised that at the end of the current CSA JPI HDHL 2.0 in early 2021, JPI HDHL will need to be a self-sustainable entity. Therefore, in August 2016, a task force with representatives from BLE Germany (task leader), DLR Germany, ILVO Belgium, BMBWF Austria, ISCIII Spain and CIHR Canada has been established. Different options for JPI HDHL to achieve sustainability, including short- and long-term solutions, possible approaches or solutions from other JPIs in the same situation, have been investigated and analysed taking into account financial, legal, organisational and management structures and processes. The findings were discussed in a workshop held in November 2017 with the JPI HDHL Management Board members and representatives of other JPIs. A final report with recommendations to relevant policy makers was drafted in order to ensure the continued support of the activities of the JPI HDHL. These recommendations have been discussed in the Management Board and based on these discussions, a scenario for the sustainability has been developed by the secretariat.

5.2 Aims of current Implementation Plan

During the period 2019-2021 JPI HDHL aims to:

- Ensure the further development and long-term existence of JPI HDHL as an self-sustainable independent intergovernmental platform, both financially and organisationally with the support of its members and the relevant national policy makers;
- Agree on a solution tailored to the specific purpose and governance of JPI HDHL and to the expectations and needs of its members with a possibility to use the future funding instruments of the EC as potential add-ons to support JPI HDHL funding actions and related activities;
- Connect to the next EC framework programme "Horizon Europe" (FP9) as part of its long-term strategy by creating added value to the framework programme (like network activities in connection with major calls from the framework programme) or next to investments of "Horizon Europe".

5.3 Approach and instruments to reach these aims

To achieve the above mentioned aims JPI HDHL will work on the following aspects:

Development of a sound sustainability proposal

The current proposal for a self-sustainable JPI HDHL recognizes that a membership fee is essential to finance the secretariat and to ensure the continued existence of the JPI. The largest component of the budget is staffing costs to run the secretariat. A combination of membership fees with in-kind contributions for specific tasks (e.g. running a call secretariat) is possible.
To this end, a **mixed model solution** has been recommended by the task force, including the following core aspects:

- the Steering Committee and the secretariat represent the backbone of JPI HDHL,
- its core activities are funded by membership fees and seconded by in-kind contributions,
- EC funding instruments are used to finance additional activities, where applicable.

Transition period

The remaining duration of CSA JPI HDHL 2.0 will be used as a transition period. Towards the end of CSA JPI HDHL 2.0, a Memorandum of Understanding will be developed to clarify the agreement and terms and conditions of the maintenance and sustainability of JPI HDHL. The final decision on sustainability of JPI HDHL is planned to be taken in the Management Board meeting in June 2019 based on the concrete proposal for the future terms of membership in the JPI HDHL. The JPI HDHL aims to run as a self-sustainable entity based on membership fees from early 2021 onwards.

Linkage to "Horizon Europe"

Another aspect to ensure the sustainability of the JPI HDHL is to foster a close connection to "Horizon Europe". Therefore, more knowledge and insight in the FP investments as well as more strategic use and innovation in the JPI HDHL set of tools and activities is required. The JPI HDHL recognizes its unique role by combining the two clusters "Health" and "Food and natural resources" from "Horizon Europe" within their remit. By fostering the interconnectivity of these two important clusters with specific instruments or approaches the JPI HDHL will create an added value for the EC and the European Research Area.

The JPI HDHL will therefore invest in the further development of instruments or approaches that enable a more extensive and effective collaboration on those areas where there is a shared interest for investments and a clear need to combine resources and approaches with the Framework Programme. Since this needs to be done in close collaboration with the EC to ensure that the instruments of the future are fit-for-purpose, the JPI HDHL will seek active contact to relevant EC representatives and decision makers. Better alignment and efficiency will be realised, for example by positioning JPI HDHL in a more official advisory role regarding the Work Programmes of the Framework Programme, by introducing more flexible financial support and/or collaboration instruments between H2020 and JPIs and by building on each other's investments.

Annex 1

Overview of JPI HDHL Joint Funding Actions

RESEARCH AREA	CALL	NUMBER OF FUNDED PROJECTS	ACRONYMS OF FUNDED PROJECTS
1	**DEDIPAC KH (2013):** Determinants of Diet and Physical Activity Knowledge Hub	1 Knowledge Hub	DEDIPAC KH
1	**PEN (2017):** Policy Evaluation Network	1 Knowledge Hub	Effectiveness of existing policies for lifestyle interventions - Policy Evaluation Network (PEN)
2	**BioNH (2014):** Biomarkers for Nutrition and Health	2	FOODBALL MIRDIET
2	**FP4H (2015):** Food Processing for Health	2	LONGLIFE PROHEALTH
2	**Intestinal Microbiomics (2015):**	6	ArylMUNE, DINAMIC, EarlyMicroHealth, EarlyVir, GI-MDH, MaPLE
2	**ERA-HDHL BioNH (2016):** Biomarkers for Nutrition and Health (co-funded call)	12	ALPHABET, BioFN, BioNUGUT CABALA_Diet&health, DERIVE, FAME, FiberTAG, HEALTHMARK, OXYGENATE, SALAMANDER, SALIVAGES, VALID
2	**ERA-HDHL (2019):** Food and Nutrition Security Knowledge Hub	Call in progress	Call in progress

RESEARCH AREA	CALL	NUMBER OF FUNDED PROJECTS	ACRONYMS OF FUNDED PROJECTS
3	**ENPADASI (2014):** European Nutritional Phenotype Assessment and Data Sharing Initiative	1 Knowledge Hub	ENPADASI
3	**NutriCog (2015):** Nutrition and Cognitive Function	5	AMBROSIAC, D-CogPlast, iCASE, MiTyrAge, SELENIUS
3	**MANUEL (2015)** Malnutrition in the Elderly	1 Knowledge Hub	MaNuEL
3	**Working Groups on Diet Related Diseases (2017)**	1	@OBEDIS (Guidelines for Obesity Dietary Interventions Sharing)
3	**HDHL-INTIMIC (2017):** Interrelation of the Intestinal Microbiome, Diet and Health (co-funded call)	11	DiGuMet, DIME, Di-Mi-Liv earlyFOOD, FATMAL, GUTMOM, meaTIc, MEDIMACS, MICRODIET OCTOPUS, TransMic
3	**ERA-HDHL (2018):** Nutrition and the epigenome	6	DIFAMEM, DIMENSION EpiBrain, HEROS, NutriPROGRAM, PREcisE
3	**HDHL-INTIMIC (2018):** Knowledge Platform on Food, Diet, Intestinal Microbiomics and Human Health	1 Knowledge Hub	HDHL-INTIMIC Knowledge Platform
3	**HDHL-INTIMIC (2019):** METADIS - Impact of Diet, Food Components and Food Processing on Body Weight Regulation and Overweight Related Metabolic Diseases	Call in progress	Call in progress

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Editors
Kristina Foterek, Friederike Bathe, Jolien Wenink and Sanne van Geel

Lay-out/Design
Claudia Pica, www.grafica@claudiapica.it

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