Plataforma Agrologística 2030

A diagnosis of the potential for public-private partnerships in the Mexican agrologistics sector following the Dutch top sector model, Final Report, 1 July 2021

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Preface

Preface

Wageningen University & Research, Netherlands
The 21st century is characterized by major global challenges that transcend countries and sectors. We are confronted with depleted natural resources of our planet, malnutrition continues to be a global problem, cities are becoming overcrowded and the climate is rapidly changing. With knowledge, education and research of the highest possible standard, Wageningen University & Research aims to tackle global challenges and shape and accelerate the required transitions. We do that together with new and existing partners all over the world, we aim to find answers together.

Wageningen University & Research has been active in Mexico for over 15 years in multiple themes, including agroparks, horticulture, agrologistics and water management. With our contribution we aim to improve the Mexican food system via more efficient production of food products, less food waste, more sustainable logistics and thriving markets. Agrologistics concerns all activities in the supply chain to match product supply from the farm with market demand for those products. It aims at getting the right agri-food product, at the right place, at the right time, according to the right specifications (including quality and sustainability requirements) at the lowest cost. Fulfilling this aim requires collaboration of many actors in the food system.

In the Netherlands we understand the importance of agrologistics, since this is one of the major industries of our economy, and also one of the fastest growing since the nineties.

I welcome the cooperation with the Mexican business community, represented by the National Agrifood Council (CNA), Mexican government institutions (FND and FOCIR) and academia to improve agrologistics in Mexico.

Both countries have much to give and much to learn from each other. This project has strengthened the cooperation between WUR and Mexican partners. We look forward to further expanding and intensifying our cooperation with the aim of increasing sustainability and strengthening the economic position of the agri-food sector in both countries.

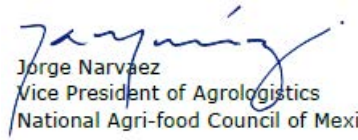
Mr. Prof. Jack van der Vorst
Director Social Science Group
Wageningen University & Research
The Netherlands

National Agri-food Council (*Consejo Nacional Agropecuario CNA*), Mexico
Each year, Mexico loses between 33 and 45% of its agricultural production due to food loss and waste, while a third can be related to post-harvest activities such as storage, transportation and distribution.

At the same time, Mexico has an opportunity to consolidate its position in agri-food markets through its logistical advantage both in the region and globally. Indeed, one of the CNA's strategic objectives is to empower the private sector in a national effort to increase public-private investments in agrologistics infrastructure and the development of best practices over the next decade.

With this in mind, in May 2018, the CNA created the Vice Presidency of Agrologistics and spearheaded initial discussions for the Vision 2030 of an Agrologistics Platform together with Wageningen University & Research and the Development Banking Sector in Mexico. The Platform seeks to guide and consolidate private sector actions by supporting partnerships for the sustainable development of agri-food chains and agrologistics. We are pleased to join in the presentation of this important report. With the support of *Financiera Nacional de Desarrollo* (FND) and FOCIR from the public sector, and with the expert guidance provided by our academic and research partners in the Netherlands and Mexico, this vision can be further consolidated.

Juan Cortina Gallardo
President
National Agri-food Council of Mexico



Jorge Narvaez
Vice President of Agrologistics
National Agri-food Council of Mexico

Federal government
Secretariat of agriculture and rural development and secretariat of finance and credit.
Development banking sector, Mexico
In 2011, the Federal Government (Ministry of Agriculture and Ministry of Finance and Public Credit), through the initiative of the Fund for Investment and Capitalization of the Rural Sector (FOCIR), formally established its relationship with Wageningen University & Research, with the contracting of Wageningen Environment Research (formerly known as ALTERRA) and its services to initiate the Agri-food Systems for Rural Development. Subsequently in December 2013, it was agreed to start working with Wageningen Food & Biobased Research to develop an Agrologistics Vision of Mexico and culminate it with the National Agrologistics Program that ends in October 2014.

In November 2018, given that the new administration is incorporated into the new Federal Government executives, who have experience with the previous work of WUR, it is considered at the proposal of these executives who initially lead the Project of a new Comprehensive Rural Financing System, to take up the conclusions of the National Agrologistics Program. Therefore, the Wageningen Research group was contacted to propose to take up the subject again, and in response they sent a document for discussion, from which later on, agreements were reached that give basis to the present initiative, fundamentally the integration of a Public-Private Partnership with the participation of the Academy to provide the basis for a scheme similar to the one in the Netherlands (Top Sector). The Central Objective is to boost the potential of the Agri-food System in Mexico by 2030.

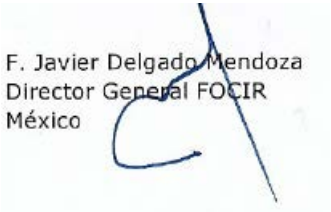
In November 2018, given that the new government has been incorporated into the new federal government, executives who have experience with the previous work of WUR and who are initially leading the Project of a new Comprehensive Rural Financing System, have considered to take up the conclusions of the National Agrologistics Program. To this end, WUR was contacted to take up the subject again. WUR submitted a document for discussion, from which agreements later emerged that form the basis for the current initiative, essentially the integration of a Public-Private Partnership with participation by the Academia to lay the groundwork for a scheme along the lines of those in the Netherlands (Top Sector). The central objective is to boost the potential of the Agri-food System in Mexico by 2030.

At the beginning of the administration and having under the same General Direction, the National Agricultural, Livestock, Rural, Forestry and Fisheries Development Finance (FND), Fund for Capitalization and Investment in the Rural Sector (FOCIR), Risk Sharing Trust (FIRCO) and AGROASEMEX, which would be components of the New Rural Financing System, the initiative was pursued, which was joined by the National Agricultural Council (CNA), and by invitation with its interest in this system of Integral Rural Financing the Inter-American Development Bank (IDB).

Once the integration of the New Rural Financing System was not continued due to higher strategy definitions, FND joined efforts with the Agrologistics Platform and will continue to promote activities in the primary sector through accessible credit and financial services that support strategic projects, thus increasing national productivity and positioning Mexico as an agri-food power.

And for its part, FOCIR, through the promotion of public-private investments, given its great previous experience in this approach and business vision, continues with the alliance with CNA, and WUR for this development, as it has consistently supported strategic alliances between different actors in the sector. As we already referenced since 2010, FOCIR has acted as a specialized agent in the development and promotion of infrastructure and as of 2013 in agrologistics in Mexico. FOCIR has promoted innovation, entrepreneurship and capitalization of the agribusiness sector through Private Equity Investment Funds, which have fiscal transparency and combine public and private resources through co-investments in agribusiness to increase the added value of production, generate more and better jobs, and promote financial innovation and technological achievements.

In this sense, the Federal Government and the previously mentioned development banking institutions play a very significant role in aligning the objectives of this study, since the goal is to develop a model of collaboration between public and private actors and academia to maximize efficiencies in agrologistics and benefit the agri-food sector as a whole.



List of abbreviations

AKIS:	Agricultural Knowledge and Innovation System
ANAPROCI:	*Asociación Nacional de Procesadores de Cítricos,* National Association of Citrus Producers
AMACARGA:	*Asociación Mexicana de Agentes de Carga*, Mexican Association of Freight Forwarders
AMF:	*Asociación Mexicana de Ferrocarriles,* Mexican Association of Railroads
AOASS:	*Asociación de Organismos de Agricultores del Sur de Sonora*, Association of Farmers' Organizations of Southern Sonora
APHIS:	Animal and Plant Health Inspection Service
AMEMAAC:	*Asociación Mexicana de Exportadores de Miel de Abeja*, Mexican Association of Honeybee Honey Exporters
BAMX:	*Bancos de Alimentos de México*, Food Banks of Mexico
BID:	*Banco Interamericano de Desarrollo*, Inter-American Development Bank
CANAINCA:	*Cámara Nacional de la Industria de Conservas Alimenticias*, National Chamber of the Canned Food Industry
CANACAR:	*Cámara Nacional del Autotransporte de Carga*, National Chamber of Freight Transportation
CEPCO:	*Coordinadora Estatal de Productores de Café de Oaxaca*, State Coordinator of Coffee Producers of Oaxaca
CIESTAAM:	*Centro de Investigaciones Económicas Sociales y Tecnológicas de la Agroindustria y la Agricultura Mundial,* Center for Economic, Social and Technological Research on Agribusiness and Global Agriculture
CIMMYT:	*Centro Internacional de Mejoramiento de Maíz y Trigo,* International Maize and Wheat Improvement Center
CNA:	*Consejo Nacional Agropecuario*, National Agri-food Council
COFOCE:	*Coordinadora de Fomento al Comercio Exterior de Guanajuato,* Guanajuato Foreign Trade Promotion Coordinator
CONACYT:	*Consejo Nacional de Ciencia y Tecnología*, National Council of Science and Technology
EMA:	*Entidad Mexicana de Acreditación,* Mexican Accreditation Organization
EMEX:	*Asociación de Empacadores de Mango de Exportación,* Packers' Association for Export of Mango
FERROMEX:	*Ferrocarril Mexicano, S.A*.
FAO:	Food & Agricultural Organization of the United Nations
FIRA:	*Fideicomisos Instituidos en Relación con la Agricultura,* Institutional Trusts in Relation to Agriculture
FICA:	*Fondos de Inversión de Capital en Agronegocios,* Agribusiness Equity Investment Fund
FND:	*Financiera Nacional de Desarrollo, Agropecuario, Rural, Forestal y Pesquero,* National Agricultural, Livestock, Rural, Forestry and Fisheries Development Finance
FOCIR:	*Fondo de Capitalización e Inversión del Sector Rural*, Fund for Capitalization and Investment in the Rural Sector
FONAGA:	*Fondo Nacional de Garantías de los Sectores Agropecuario, Forestal, Pesquero y Rural*, National Guarantee Fund for the Agricultural, Forestry, Fishing and Rural Sectors
GRIVER:	*Grupo Inversos Veracruzano,* Investment Group of Veracruz
IDM:	*Índice de Desarrollo de Mercado*, Market Development Index

IMT:	*Instituto Mexicano del Transporte*, Mexican Transportation Institute
INEGI:	*Instituto Nacional de Estadística y Geografía,* National Institute of Statistics and Geography
ITSON:	*Instituto Tecnológico de Sonora*, Sonora Institute of Technology
KCSM:	Kansas City Southern de México
LA MODERNA:	Grupo La Moderna S.A. de C.V.
LICONSA:	*Leche Industrializada Conasupo S.A. de C.V.,* Consasupo Industrialized Milk S.A.
LNV:	Dutch Ministry of Agriculture, Nature and Food Quality
MIT:	Dutch SME instrument for Innovation Stimulation Region and Top Sectors
NWO:	Netherlands Organisation for Scientific Research
PAN:	*Planeación Agrícola Nacional, National Agriculture Plan*
PhD:	Doctor of Philosophy
PNA:	*Programa Nacional de Agrologística*, National Program on Agro-logistics
PND:	*Plan Nacional de Desarrollo 2019-2024*. National Development Plan 2019-2024
PROMERCADO:	P*rograma Especial de Modernización de los Canales de Comercialización*
PYMES:	*Pequeñas y Medianas Empresas*, Small & Medium Enterprises
SADER:	*Secretaría de Agricultura y Desarrollo Rural*, Mexican Ministry of Agriculture and Rural Development
SAGARPA:	*Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación*, Mexican Ministry of Agriculture, Animal Husbandry, Rural Development, Fisheries and Food *(nowadays SADER).*
SEDESOL:	*Secretaría de Desarrollo Social,* Ministry of Social Development
SEGALMEX:	*Seguridad Alimentaria Mexicana,* Mexican Food Security
SENASICA:	*Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria*, National Service of Agri-Food Health, Safety and Quality
SME:	Small & Medium Enterprise
TNO:	*Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek*, Netherlands Organisation for Applied Scientific Research
TO2:	*Toegepaste Onderzoeks Instellingen*, Applied Research Institutions (including Deltares, Marin, NLR, TNO & Wageningen Research)
TRL:	Technology Readiness Level
UANL:	*Universidad Autónoma de Nuevo León*, Autonomous University of Nuevo León
USDA:	United States Department of Agriculture
UNAM:	*Universidad Nacional Autónoma de México,* National Autonomous University of Mexico
WUR:	Wageningen University & Research

Summary

The overall objective of this report is to contribute to the development of an Agrologistics Platform that will enable Mexico to become one of the top five exporters of agri-food products in the world.

The report summarizes findings on the potential for a top sector approach for the agrologistics sector in Mexico based on inspiration from the Dutch top sector model as an instrument for cooperation between companies, knowledge institutions and government that can support the further development of the agrologistics sector in Mexico.

Mexico is one of the chief economic and political forces in Latin America with the agri-food sector as one of the most significant economic sectors that has shown the greatest dynamics and growth in recent years.

The growth potential of the agri-food sector in Mexico is clearly present. In particular, in the area of agrologistics there is a lot of potential to increase export and domestic food security.

Despite Mexico's successes in becoming the world's eleventh largest producer of food, and the eighth largest food exporter, there is great room for improvement in agrologistics.

Mexico currently sells most of its production to a single market, the United States, with very low added value and very high logistical costs and food losses. There are large gaps in physical infrastructure and cold chain capacity, scarce offer and high costs of specialized freight and logistical services for small and medium-size actors, and economic losses generated by food loss and waste in the supply chain that could amount to 29% of the entire economic value of the sector.

Structuring an agrologistics platform to increase Mexico's food export and food security is an innovative and challenging approach for Mexico to build on its potential in the area of agrologistics to increase export and food security.

Agrologistics may play a significant role in improving the efficiency and position of the sector both domestically and internationally. The potential of implementing a Mexican top sector model for agrologistics has been evaluated upon learnings from the Dutch top sector model, including its origin, major successes and potential pitfalls, and reflected on the Mexican context to arrive at the following twelve conclusions:

1. The collaboration between government, private sector and knowledge institutes in Mexico is developed to a lesser extent than it was in the Netherlands when the top sector approach was implemented in that country.
2. A clear desire for a stronger collaboration exists among the Mexican private sector in the Plataforma Agrologística.
3. High level alignment exists on all agendas on six themes: 1) managing food losses to reduce waste and promote circularity; 2) integrating smallholder producers into sustainable agri-food chains; 3) investing in public goods in the form of intermodal transport and logistics infrastructure; 4) better access to training and certification programs; 5) better access to cold chain storage and logistics services; and 6) increasing food and nutrition security.
4. Despite this conceptual alignment on topics, the stakeholders still operate in silos and are not yet used to working together or partnering up.
5. The financial sector, particularly the development banking agencies, could play a critical role in facilitating funding schemes and aligning the private sector objectives with the government's social development agenda.
6. Working on pilot projects for joint strategic themes with actors from the triple helix will help to build networks, trust and experience.
7. The private sector is clearly willing to collaborate on such pilot projects for joint strategic themes with other private sector partners and with actors from the triple helix.
8. Cuts in government spending for R&D, investing in research on important societal issues and improved collaboration between the three key actors may incentivize a new cooperation structure, like a top sector approach in Mexico.

9. A high level of trust is required, as many stakeholders from different institutions will depend on each other, and bottom-up initiatives (pilot projects) of the tripartite cooperation will help to build this trust.
10. The Dutch top sector model requires mutual investment by public and private sector and there are positive signs from the Mexican private sector on their willingness to do so.
11. Including representatives of micro and small holders in the governance structure is key for the success of a top sector approach, since SMEs are the engine of innovation and job creation in the economy.
12. Generating inclusive business models in all links of the chain is a priority for companies in Mexico.

Mexico seems to be ready for a new way of collaboration between government, private sector and knowledge institutes (triple helix), thus working towards a Mexican top sector approach in the agri-food sector.

Mexico's agrologistics potential is great, as are its social and economic challenges. No single party can address the challenges alone. A new way of cooperation is needed between private sector actors in the Plataforma Agrologística, and between government, and knowledge institutions, to create an innovative and sustainable agri-food sector that can meet domestic demand of nutritious fresh food and will play a major role in world trade in agri-food products.

Mexico would benefit by starting to design a joint vision and knowledge and innovation agenda, that is supported by all parties of the triple helix.

The next step is agreement between all parties to commit themselves in terms of willingness, financial means and in-kind contributions in knowledge and innovation contracts. These are key to success for two reasons. First, one of the tangible goals of the top sector policy is to maximize funds for research and innovation on strategic themes. Second, commitment is very much related to trust, which harbors a fruitful relation.

Mexico best starts the next phase with bottom up public-private partnerships, and simultaneously challenging research institutes to partially move to more applied research, on the basis of the following six recommendations:

1. Start simple: Start with the single theme of agrologistics within the agri-food sector. There is great support for this from the private sector, CNA, FOCIR and possibly also SADER. Especially the commitment of the private sector is clearly visible in the setting up of the Agrologistics Platform
2. Start bottom up: Create PPP constructions through pilot projects and show that this is successful. From this project-based approach trust can be built, which is the basis for a structure as a first step towards a top sector structure. These pilot projects can be identified in the first knowledge and innovation agenda (KIA), supported by all parties of the triple helix.
3. Combine long-term vision with small first steps: For the big picture, look at the long term and for small steps in the short term. It takes confidence and a long-term strategy to introduce a top sector model.
4. Start with two-party collaboration between private and public sector: The commitment of the knowledge institutions is not clear still on the topic of agrologistics. It seems that the needs of the private sector are more investment oriented than innovation oriented. That is why we advise starting with PPP between the government and the private sector as a necessity, and if possible also with the knowledge institutions.
5. Stimulate a partial move to more applied research: Knowledge institutes are required to be challenged to move part of their research from fundamental to applied, on themes relevant for the Platform. This relates to increased private sector investment in research projects with an increased technology readiness level.
6. Raise diversity of people in the top sector: Creating the image of the 'next economy' may have a positive impact. Preferably the representatives must consist of associations of small and large companies, young and old persons, women and men.

A successful 'one-size-fits-all' model of the top sector does not exist.

Mexico is a much larger country than the Netherlands, with a multitude of states and governments, knowledge institutions and companies. This can make the governance structure of the top sector more complex than the Dutch top sector governance model. The challenge is to find a good balance in simplicity, while still representing the interests of a multitude of parties in the Mexican top sector model.

The next phase is to design and validate the Agrologistics knowledge and innovation agenda by mid-2021.

The summarized findings on the potential for a top sector approach for agrologistics in Mexico in this report is based on literature review, including policies and agendas, and complimented with expert interviews. These findings will feed into the design and validation of the Agrologistics Knowledge and Innovation Agenda.

Acknowledgements

As with any study of this scope, there are many people whom we would like to thank. Without their noteworthy contributions this study would simply not have been possible. First, we want to thank two leaders of the Mexican agri-food sector in their respective roles in the private and public spheres for their commitment and dedication: Mr. Jorge Narváez, Vice-president of Agrologistics of the National Agri-Food Council of Mexico (*Consejo Nacional Agropecuario*) (CNA) has led the private sector engagement before and behind the scenes for years, fully committed to making the Agrologistics Platform a success, and Mexico a world leader in this field. Likewise, in the development banking sector, Mr. Javier Delgado has spent over a decade curating this initiative from the public sector, leading National Finance for Agricultural, Rural, Forestry and Fishing Development (*Financiera Nacional de Desarrollo Agropecuario, Rural, Forestal y Pesquero)* (FND) at the onset of the project and currently overseeing its continuation from his new post as General Director of FOCIR.

Our thanks also go to from Mr. Bosco de la Vega, former President of the CNA and Mr. Juan Cortina, current President of the CNA, and all the staff at the Council for their trust in our cooperation.

We are also indebted to the entire team at National Finance for Agricultural, Rural, Forestry and Fishing Development (*Financiera Nacional de Desarrollo Agropecuario, Rural, Forestal y Pesquero)* (FND) for their support in carrying out this phase of the project through their dialogue and management with the Inter-American Development Bank, in particular Dr. Baldemar Hernández Márquez, General Director. In addition, the team at FOCIR has provided valuable insights and support, and we wish to thank Pablo Papacosta, Deputy General Director of Project Development in the Rural Sector and Ramón Hernández Guzman, Deputy General Director of Administration of Sectorial Programs and Operations Control.
Also, the authors would like to thank the input from the Inter-American Development Bank (IDB), in particular from Mr. Fernando de Olloqui, Project Team Leader, and Mrs. Edna Miranda Monroy, Operations Associate for International Development Projects. This first phase would not have been possible without the commitment and funding from the IBD.

We also recognize the value of the valuable collaboration, input and feedback at the various stages of the research from the Dutch Embassy in Mexico, including Mr. Wilfred Mohr, Ambassador, Mr. Erik Plaisier, Agricultural Counselor, and Mr. Frank Hoogendoorn, Agricultural Assistant.

Finally, we are indebted to all the interviewees from Mexico and the Netherlands for sharing their valuable time with us to contribute to this project.

On behalf of the complete project team,
Peter Ravensbergen
Project leader

1

Plataforma Agrologística: contributing to export and food security

1 Plataforma Agrologística: contributing to export and food security

Mexico is one of the chief economic and political forces in Latin America with the agri-food sector as one of the most significant economic sectors that has shown the greatest dynamics and growth in recent years.
The country has a dynamic industrial base, vast mineral resources, a wide-ranging service sector, and the world's largest population of Spanish speakers. The annual GDP in Mexico is USD 1,222,053 billion (2018). Mexico is the third largest country in Latin America, after Brazil and Argentina. The population is 126 million and growing. More than half of the Mexican people live in the center of the country, whereas vast areas of the arid north and the tropical south are sparsely settled. Migration from rural to urban areas has resulted in a situation in which nearly four-fifths of Mexicans are living in urban areas. Mexico City, the capital, is one of the most densely populated cities and metropolitan areas in the world.

Mexico has a territory of 198 million hectares of which 15% is dedicated to agricultural crops and 58% to livestock production. Much of the country is too arid and/or too mountainous for crops or grazing. Forests cover 67 million hectares or 34% of the country. The climate and topography limit agricultural production to 20.6 million hectares or 10.5% of the nation's territory. Twenty-five percent of this land must be irrigated.

The agri-food sector in Mexico clearly has growth potential. On the one hand, due to population growth, national consumption of agri-food products will increase by 27.8% until 2030 (Gobierno de México, 2019). On the other hand, the export possibilities are enormous. On a global level, Mexico occupies the 9th place as an agricultural producer and the 8th place as an agri-food exporter (Anaya, 2019), so that it is consolidated as an exporting power of agri-food products. Mexico is already one of the main producers of avocado, tomato, pepper, mango, lime, papaya, strawberry, pepper, green beans and onions in the world. Since 2014, Mexico has reversed its trade balance for agri-food products, and the export value has grown by more than 25%. The main exports are: beer, avocado, tomato, tequila, cookies, chili peppers and berries. Even so, Mexico could improve its global position in agri-food exports by diversifying their export destinations. Mexico is dependent on the U.S.A., which is the destination for 73.1% of Mexico's agricultural exports (Chatham House, 2020). Also, although consumption forecasts in the US show a potential for increasing these exports, and the new free trade agreement (USMCA) will have no export limitations with the US and Canada, it is clear that a diversification of Mexican exports to the European Union and even to other areas such as the Middle East and the Gulf is required. In 2014, the public policy proposal called the 'National Agrologistics Program', led by the Mexican Ministry of Agriculture (then SAGARPA) and developed by Wageningen University & Research (WUR), showed numerous opportunities to improve agrologistics (Ravensbergen et al., 2014).

Structuring an Agrologistics Platform to increase Mexico's food export and food security is an innovative and challenging approach for Mexico to build on its potential in the area of agrologistics to increase export and food security.
The overall objective of this (research) collaboration is to improve the supply chain, to improve the potential of the agri-food system and to make Mexico a global Agrologistics Platform that will enable Mexico to be one of the top five exporters of agri-food products in the world. In 2018, the private sector, represented by the National Agri-food Council (CNA), took the lead in the first steps to form a group of Mexican companies, named the Agrologistics Platform, who wanted to embrace that objective, with the support of Wageningen University & Research (WUR). This Agrologistics Platform seeks to implement a program of practical solutions and projects, initiated by the private sector and supported by public institutions and academia. Since these projects should be strategic, an agenda should be established to identify these projects and organize the support and engagement of all public and private stakeholders involved. The integral project consists of two phases. First, an analysis of the

current situation through an integral diagnosis of the agrologistics sector. The second phase will consist of the design of an **Agrologistics Agenda 2030**, containing activities and pilot projects, validated and supported by the sector.

The term agrologistics in Mexico was born through the consolidation of several initiatives from the public sector, multilateral institutions and the business sector. Agrologistics as an area of opportunity for growth and investment in Mexico has become very relevant. The discipline of agrologistics includes all activities in the agri-food chain so that the supply of the product meets the market demand. For export this means providing inputs to optimize the supply chain. For food security this means creating inclusive supply chains through the integration of small producers into innovation processes to guarantee the food security for the growing Mexican domestic demand. The current administration spends USD 44 billion on improving the current infrastructure, focusing on 2 major projects: The Maya Train, a proposed 1,525-kilometre (948 miles) intercity railway that would traverse the Yucatán Peninsula, and the Interoceanic Tehuantepec isthmus rail corridor between the country's Gulf and Pacific coasts.

This report summarizes findings on the potential for a top sector approach for the agrologistics sector in Mexico based on inspiration from the Dutch top sector model as an instrument for cooperation between companies, knowledge institutions and government that can support the further development of the agrologistics sector in Mexico.

The Netherlands is known as one of the leading countries in agriculture. This lead position is not only from a production perspective, but also because great economic value is created through the transformation, trade and logistics of agri-food products to the rest of Europe and the world. The Netherlands is the 2nd largest exporter of agri-food products in the world, with an export value of about €100 billion. The development of this potential by the Dutch sector is based on 2 strategies:

- First, to understand the logistic vocation of the country in relation to its neighboring markets in the region, both clients and competitors, offering a cluster of services for those products that are exported and those that are imported and re-exported.
- Second, the importance of the sector's tools for co-operation: the sector advances when there are investments in supply chain co-operation, platforms, association processes and exchange of knowledge among the actors.

From this perspective, the success of the Dutch sector could be attributed to a public policy model for the leadership of the sector called 'Top Sector', which proposes a tripartite governance scheme, also known as the 'triple helix' or 'golden triangle', consisting of the Dutch government, academia and the private sector. The hypothesis is that this could also have potential for the Mexican agrologistics sector because it would help make efficient decisions generated by a governance model from the private, public and research point of view through the participation of academia and research institutes.

In Section 2 we explore the agendas of public and private sector on six priority themes based on the review of 12 documents and 27 interviews. Next, we provide in Section 3 more details on the Dutch top sector approach based on a review of 27 documents and 12 interviews with key actors from the Dutch top sectors, including the enablers and barriers. In Section 4, we discuss the formation of the Private sector leadership group – a crucial element for the next phase of the Agrologistics Agenda, using interviews with actors from the Mexican public and private sector. Finally, we combine all these findings and conclude in Section 5 on the top sector potential in Mexico and describe the steps forward in Section 6.

The conclusions and recommendations of this report will feed into the design and validation of the agenda until mid-2021. We are doing this in two phases, subject to funding and mutual agreement. First, the design of the agenda with the 2030 vision and the design of a strategic plan for the financing of pilot projects. The objective of the first phase is to prepare a draft strategic document that will contribute to defining the sector's objectives for the next two six-year periods and the organizational framework for achieving them. Second, validation and alignment of the sector to carry out the roadmap embodied in the designed agenda. The objective of this phase is to align the sector, opinion makers and key actors with the objectives of Agenda 2030.

2

Exploring the agendas: identifying sweet spots

2 Exploring the agendas: identifying sweet spots

This chapter identifies sweet spots between the government's political agenda, industry/sector agendas and scientific research agendas in order to reveal the potential of the agrologistics sector in Mexico**.** Here, we elaborate on the analysis done of the strategic agendas of parties with the aim to look for areas of convergence between the government's political agenda, industry/sector agendas and scientific research agendas. The purpose of this analysis is to reveal the current and potential alignment and shared priorities of the agrologistics sector in Mexico.

The chapter is structured into five components. This chapter opens with an overview of key stakeholders and a summary of previous and current diagnostic studies to provide a clear overview of the agrologistics situation in Mexico. Second, an analysis of the strategic agendas of each sector: public agenda, private sector or industry agenda and knowledge agenda. Followed by an elaboration of the points of convergence between agendas, also called 'sweet spots'. In additon opportunities for alignment and setting up integrative projects and challenges faced are identified. Finally, the chapter concludes with a list of 10 key recommendations for a preliminary action plan.

2.1 Key stakeholders

The multidisciplinary nature of agrologistics requires the integration of knowledge from many fields. This also extends to the integration of multiple stakeholders from different sectors. The defining characteristic of any supply chain is the transversal integration of actors and the complexity derived from this. In agri-food supply chains these actors will form a ecosystem of suppliers, buyers and service providers. The services sector includes logistics services (packing, storage, transport and last-mile distribution, export, freight-forwarding, customs and inspections) as well as marketing, certification, insurance and financial services.

In this section we will identify the key stakeholders in the agri-food supply chain who also have a stake in the agrologistics field.

2.1.1 Public sector

At the policy level, the key government actors are ministries and federal agencies, while on the project implementation level they are municipal leaders and state regulators. The Ministry of Agriculture (SADER), the Ministry of Economic Affairs (SE) and the Ministry of Transport & Communications (SCT) are the sectoral heads. Other federal actors include the Tax Administration Service, the National Health and Food Safety Service, the national development banks (FND, FIRA, FOCIR) and customs and regulatory agencies. The state and local level counterparts, specially state ministers of Agriculture, Economy, Transport, mayors and local regulators are also important allies, playing a defining role at the level of project implementation and insfrastructure development, and in the enforcement of national policy in their territories. As developed later in Section 2.4.3, *Challenges*, a key stakeholder and enabler of public sector investment is the development banking system, primarily through FND and FOCIR.

2.1.2 Private sector

Private actors come from all sectors of the economy, but the key interest group focusing leadership of the agrologistics field is the National Agri-food Council (Consejo Nacional Agropecuario (CNA)). In that sense the success of a strategic agenda for agrologistics rests heavily on the ability for the National Agri-food Council to build a strong alliance with the food processing industry and the business associations and chambers of commerce in the warehousing, compliance, financial and logistics sectors. A visual representation of the agrologistics ecosystem is presented in Figure 1.

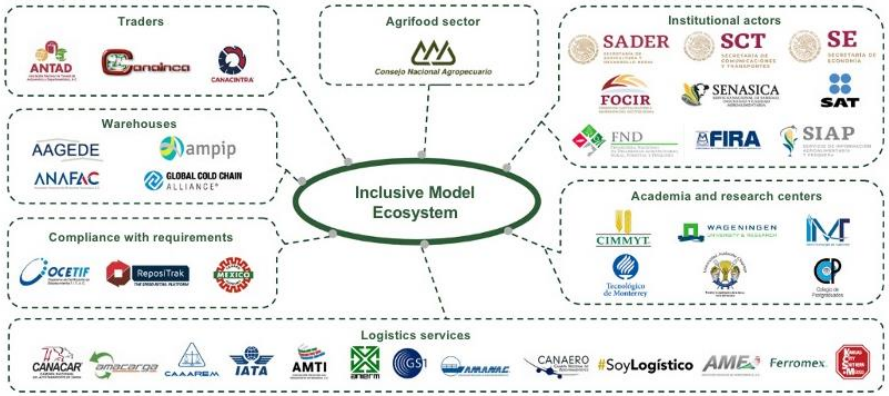


Figure 1 *Key stakeholders in the agrologistics ecosystem*

2.1.3 Knowledge sector

In Mexico there are many universities and research institutes active in the field of food and agriculture, but few focus on post-harvest research and development. A handful are effectively integrating projects from both the agri-food and logistics fields. One of these institutions is the CGIAR *Centro Internacional para el Mejoramiento de Maíz y Trigo* (CIMMYT), which has brought together government and industry leaders in the corn chain to develop an extensive network of technical assistance hubs for small-scale farmers extending beyond production and harvest. The program called *Maíz para Mexico* (formerly *MasAgro*) also supports farmers in terms of storage and distribution of crops. The project receives government funding while securing market demand, through contract farming, is the responsibility of industry leaders. Alternatively, in the logistics field, an example of an organized knowledge group is the thematic research network 'Transport and Logistics Systems' [SiT-LOG] part of the CONACYT framework. [SiT-LOG] Lab and network was created by the Instituto Mexicano del Transporte (IMT), and several universities such as the Instituto Tecnológico de Sonora (ITSON) and the Universidad Autonoma de Nuevo León (UANL). This research and collaboration network brings together 116 national and international researchers, most of them experienced PhD-level scientists, which can increase the exposure of the research program internationally and foster further innovation. The network however, does not specialize in the particular issues affecting the agri-food sector but in the logistics field more broadly. Also, these networks do not receive regular funding from the government but have to apply to specific project funding via the CONACYT grant system.

From those centers funded by the government, the National Institute of Forestry, Agricultural and Livestock Research (INIFAP) is primarily responsible for the national R&D agenda in food and agriculture, however its resources are not focused on agrologistics. INIFAP has an annual budget of USD 58 million and its research agenda has three main themes: food security, sustainability of natural resources, and technological innovation. Unfortunately, the agenda does not produce substantial post-harvest and agrologistics research. The National Agri-food Council, in its 2030 Vision, has clearly indicated that INIFAP, as the leading agri-food R&D institution in the Mexico, should receive at least twice the current budget within 10 years. In this sense, it would be an enormous success for the entire eosystem if INIFAP were to receive annual budget increases in the order of USD 5 million per annum as this would afford the expansion of the agenda to include topics such as agrologistics.

2.2 Current situation

While Mexico possesses all the conditions to become one of the leading countries in the production and trade of agri-food products, particularly fresh produce, it currently exports most of its production to the United States with very low added value and very high logistical costs and food losses. This summary conclusion is drawn from various studies (such as Ravensbergen et al., 2014) and policy documents published in the past decade as well as multiple interviews with stakeholders. The general point is that Mexico, although it has experienced sustained growth over the past years, has not fully developed its potencial in the agri-food sector and that agrologistics may play a important role in improving its efficiency and position both domestically and internationally. A summary of the three most relevant diagnostic studies provides further substantiation into this claim.

2.2.1 Study 1: National Agrologistics Program (*Programa Nacional de Agrologística (PNA)*), 2015, SAGARPA (now SADER).

The PNA offers the most comprehensive diagnosis of the agrologistics sector in Mexico to date, specifically in its infrastructure, planning and organizational gaps. It is a federal policy program developed by the Ministry of Agriculture between 2013 and 2015 with the support of Wageningen University &

Research, with a specific focus on the development of agrologistics. While the program was never fully implemented as intended, it has had an impact on subsequent individual policies and policymakers. Below we present the key conclusions regarding gaps in physical infrastructure.

Mexico's investment in transport and communications infrastructure is well below its trading partners and competitors. Between 1992 and 2011 it represented 1.1% of its GDP. This relative low investment is quite visible in the overall conditions of the infrastructure and of the agrologistics infrastructure in particular.

High dependence on road transport. Nearly 80% of the food is shipped by road, except for grains which are mostly transported by railway. Road transport in Mexico is more costly than in other countries; for example, about 50% higher than in the United States. This is due to various aspects. The radial pattern of the highway network in the center of the country weakens east-west and north-south interconnections. Lack of highway connectivity in regions such as Sinaloa, Durango, the coasts of Jalisco, Michoacán, Guerrero and Oaxaca, increases distances and raises freight costs. The lack of safety entails high insurance premiums, as well as the use of alternative routes to avoid unsafe areas. These adverse road conditions, of which only 36% are paved, generate additional expenses to the shippers due to greater mechanic maintenance operations. These deficiencies increase the prices of the products between production areas, wholesale markets and consumption areas.

Very few ports are prepared for export or short-sea shipping of perishable agri-food products. Those terminals that are specialized in loading and unloading containers and cold storage installations are scarce, where only the ports of Manzanillo, Lázaro Cardenas, Veracruz, Altamira and Ensenada are capable of handling substantial agri-food commerce. The rest of the ports operate with semi-specialized terminals (known as multi-purpose) and conventional terminals to handle shipments. The inspections of the different authorities are scarcely coordinated, producing delays in crossing times, which are substantially higher than those of the OECD countries. Connectivity between the port infrastructure and the railway system remains inadequate. A main challenge of the ports in Mexico is their scarce association with other international markets. While no Mexican port links Asia with Europe seamlessly, regional competition increases, with logistics centers being built in the Dominican Republic and studies carried out for a second channel between the Atlantic and the Pacific in Nicaragua. At the same time, this degree of connectivity could rapidly change in light of the intermodal infrastructure spending planned by the current Mexican government linking ports in the Gulf with the Pacific region.

The railway system is scarcely connected with other transportation means. Although the freight railway system has grown 90% in the last 20 years and the railways have become the backbone to the development of the grain supply chain, signifying 24% of total railway freight, the lack of cold storage capacity and cold inspection installations undermine its potential to ship and handle fresh produce. There are few railway centers, especially in the south, and a lack of alternative lines to change cars severely limits connections with maritime and road means. Additional to the lack of connectivity, the main challenges include low speed (estimated to be 30 km per hour in the South-East region covered by the Chiapas-Mayab line) caused by inefficient crossing of urban areas, outdated rolling stock, regulations and lack of signposts.

Air transport is undervalued in agrologistics. In 2015, the volume of fresh products shipped by air was practically zero. Five years later there is a variety of commercial routes from and to air-cargo terminals, bridging to North American, Asian and European hotspots for high-value fresh Mexican products, an example of this growth is the Guadalajara Cargo Terminal. Some of the largest challenges facing air freight are: the limited available flight capacity of main airports, especially in Mexico City, the wear and tear of the infrastructure, and scarce regional connectivity.

Cold storage capacity in Mexico is low compared to other countries, and the price of refrigerated transport is higher. For example, the shipment of tomatoes is 41% higher in costs than in the United States. These weak points may explain why nearly 50% of perishable food products are transported without any refrigeration. Lack of investment

in the cold chain contrasts with growth expected for refrigerated freight. Lack of refrigerated freight is also an obstacle for the feasibility of storage assets. The market quota of refrigerated shipment in trucks has not grown during the last 10 years, and stayed at around 7% of the total shipments transported through highways.

2.2.2 Study 2: Guidelines for cold chain technology components and application in reducing losses in fruit and vegetable handling[1]

This cold chain technology guide offers a unique insight into the cold chain services sector, by providing the first national survey on this matter. It is commissioned by the Consejo Nacional Agropecuario (CNA) with funding from the Ministry of Agriculture, and expands on the diagnosis of the PNA, as elaborated above. Below are some of its key conclusions, which are also presented in Figure 2.

Cold chain storage capacity in Mexico is approximately half of the world's average, and 41% of this capacity is concentrated in the hands of 6 companies. The cold storage capacity is estimated to be at a total of 15 million m^3, or 0.152 m^3 per urban inhabitant, which is close to half the world average. The geographic distribution of this capacity is also inadequate, with uneven dispersion of warehouses, and vast regions, often productive ones, underserved by cold chain storage and logistics.

Cold chain logistics services also suffer from structural gaps. It is estimated that up to 55% of the cold chain storage capacity in Mexico is private, which translates into limitations for small and medium size companies which are not able to invest in their own cold chain equipment and require 3PL logistics services at competitive prices to reach more distant markets. Additionally, this privately-owned capacity is rarely used year-round. CNA has estimated that it is only used 60% of the time.

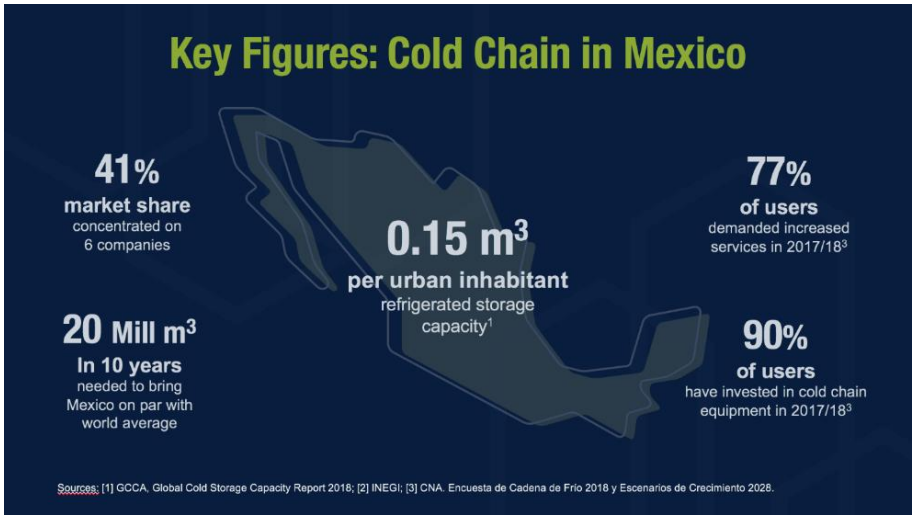


Figure 2 *Highlights from the first national survey on cold chain services and infrastructure, CNA & SAGARPA, 2018*

2.2.3 Study 3: A conceptual framework for a national strategy on food loss and waste (FLW) in Mexico

More recently this document prepared by the World Bank has provided significant details regarding the impact of food loss and waste (FLW) in Mexico (World Bank & WRAP, 2019). Although in 2013 FAO had developed estimates for FLW in various agri-food chains, concluding an average FLW of 37% across the sector, this new document is the first comprehensive analysis of 79 products. It is also the first one to estimate the economic cost of not counteracting food loss and waste, as well as identifying the main places where FLW occurs, the 'hotspots', and their underlying causes. The key points of the analysis are:

An estimated 20 million tons of food loss and waste occur each year from just 79 products from farm gate to retail, representing over 35% of total food produced in the country. The scale of the challenge is large, with at least 20 million tons of FLW annually from farm gate to retail and an estimated further 11 million tons at households and small

[1] Guidelines for cold chain technological components and application in reducing losses in the handling of fruits and vegetables, 2018, CNA & SAGARPA (now SADER).

businesses. However, there are many actions that can be undertaken to solve this challenge, including further developing national statistical data on FLW to monitor action-based progress, and implementing a voluntary agreement between government and businesses to reduce FLW.

The economic value associated with FLW has been estimated at USD 25 billion, representing 2.5% of Mexico's GDP. This figure is equivalent to 29% of the total economic value of the agri-food sector, currently representing 8.5% of Mexico's GDP. Because of the lack of reporting mechanisms, and the difficulty to track wholesale markets, restaurant and food service waste, the World Bank concludes that these estimates could be conservative, and the true levels of food loss and waste could be even higher.

2.2.4 Conclusions

Based on the review of key studies, the conclusions may sound alarming, namely the gaps in physical infrastructure and cold chain capacity, scarce offer and high costs of specialized freight and logistical services for small and medium size actors, and the scale of the economic losses generated by food loss and waste**.** Nevertheless, it is important to place these conclusions in a broader context. While the conditions in agrologistics can be greatly improved, the Mexican agri-food sector has experienced great dynamism in the past years: trade surplus was reached in 2015 and a historical agricultural production of 263 million tons was achieved in 2017, 21.3% more than in 2012. Today, Mexico is the world's eleventh largest producer of food, and the eighth largest food exporter. Thanks to the international success of avocado, tomato and berries, among other products, where annual growth rates are around 4%, agri-food is expected to be the best performing economic sector in 2020, even after considering the effects of COVID-19.

2.3 Overview of strategic agendas

Given the existing gaps and potential for growth in the agri-food sector it is important to explore the alignment of the strategic goals defined by the public sector, private sector and knowledge institutes in Mexico. This to better understand their perspectives on agrologistics and to lay the foundation for identifying potential collaboration between parties in realizing these goals, as addressed in Section 2.3.

2.3.1 Public sector agenda

Two federal policy documents for the current administration (2018-2024) are analyzed in regards to agri-food and logistics. Relevant objectives, targets and proposed actions are identified in the case of the Sectoral Program by the Ministry of Agriculture and Rural Development, and the National Development Plan set forth by the Office of the President.

The two policy documents consulted are the backbone for policy for the public sector. In both cases we observe a heavy focus on increasing production and improving self-sufficiency and distribution of basic crops, as well as extending subsidies to reach more small and micro farmers. All policy programs must follow the guidelines and pursue the objectives established in the National Development Plan. Similarly, public funding for programs under the responsibility of the Ministry of Agriculture or state-level counterparts must follow the guidelines and be designed in line with the themes and objectives established in the Sectoral Program.

#1	Public sector
Actor	SADER (Ministry of Agriculture)
Strategic agenda	Programa Sectorial de Agricultura y Desarrollo Rural 2020-2024 (Sectoral Policy Program)
Published	25 June, 2020
Horizon	2024
Legal standing	Public policy programs under the responsibility of the Ministry of Agriculture must follow the guidelines and be designed in line with the themes and objectives established in the *Sectoral Program*.
Relevant objectives	**Objective 1**. Achieve food self-sufficiency through increased production and productivity in agriculture, livestock and fisheries; **Objective 2**. To contribute to the well-being of the rural population by including producers who have historically been excluded from rural and coastal production activities, taking advantage of the potential of local territories and markets; **Objective 3**. To increase sustainable production practices in the agricultural and aquaculture fishing sector in the face of agroclimatic risks.
Relevant targets	• Food self-sufficiency is expected to increase from 75% to 80% in 2024; • Agricultural self-sufficiency is expected to increase from 62.4% to 67.4% in 2024; • Livestock self-sufficiency is expected to increase from 85.8% to 90.8% in 2024; • Increase in the budget for small and medium scale producers and vulnerable groups by 66.6%.
Relevant actions / projects	1.1. Boost productive capacity with direct support to small and medium scale producers to jumpstart agricultural and fishing/aquaculture activity; 1.2. Promote the production, use and access to technical inputs in order to increase productivity; 1.3. Promote scientific development and innovation in agriculture and fisheries with a sustainable approach to resources in order to improve agricultural, aquaculture and fishing production processes; 1.4. Strengthen the domestic agri-food market with micro, small and medium-sized agroindustrial and trading companies to create jobs and income in rural areas; 1.5. Strengthen agricultural and fishing/aquaculture health and safety for the production of healthy and nutritious food; 2.1. Promote the productive inclusion of small and medium scale producers for inclusive regional development; 2.5. Implement policies differentiated by agri-food region to take advantage of geographic potential and various competitive advantages; 3.1. Implement a policy for the use, conservation and recovery of agricultural soil and water for the sustainable use of natural resources.

#2	Public sector
Actor	PND, Office of the President
Strategic agenda	Plan Nacional de Desarrollo 2019-2024 (National Development Plan 2019-2024)
Published	12 July 2019
Horizon	2024
Legal standing	All public policy programs must follow the guidelines and pursue the objectives established in the National Development Plan.
Relevant objectives	1. Food self-sufficiency (national food security), re-investment in rural areas 2. Regional infrastructure projects
Relevant targets	Food self-sufficiency: • Provide assistance 2.8 million small and medium scale producers (up to 20 hectares), which make up 85% of the country's agro-productive units, with priority given to 657,000 small indigenous farmers. • Subsidy of MXN 1,600 per hectare for plots of up to 5 hectares, and of MXN 1,000 for plots of between 5 and 20 hectares. • Provide assitance to 250 thousand small coffee producers and 170 thousand sugar cane producers. • Establish guaranteed prices for basic commodities for the benefit of 2 million small producers.
Relevant actions / projects	• Creation of the Mexican Food Security Agency (SEGALMEX) • Livestock Credit Loan Program • Guarantee Price Program for corn, beans, wheat, rice and milk (basic crops) • Coffee and Sugarcane Growers Support Program • Production for Welfare Program • Strategic Infrastructure projects in logistics and connectivity: Tren Maya, Interoceanic Corridor, Santa Lucia Airport.

2.3.2 Private sector agenda

The key policy proposal by the private sector is the *Visión 2030: Propuesta de Modelo de Política Pública para el Sector Agroalimentario y Forestal* (Vision 2030: A Public Policy Model for the Agri-food and Forestry Sectors) elaborated by the National Agri-food Council (CNA) in 2018.

Compared to the government policy focus on food security and subsidies for micro-scale farmers, the vision set forth by the private sector focuses on the competitiveness of the sector and argues for increased governement spending**.**
Here are some key points:

- Increase public investment in research and development, with a goal to double the annual budget of INIFAP in 10 years.
- Focus on promoting profitability throughout the chain, instead of extending the geographic reach of subsidies for the very small.
- Relevance of developing 'credit-worthy' farmers and to promote new financial instruments for all actors across the chain.
- Only agenda to describe specific targets for reducing food loss and waste, by 50% in 10 years, and to promote circularity.

#3	Private sector
Actor	CNA, Consejo Nacional Agropecuario (National Agri-food Council)
Strategic agenda	Visión 2030. Propuesta de Modelo de Política Pública para el Sector Agroalimentario y Forestal.
Published	2018
Horizon	2030
Legal standing	Public policy proposal,long-term strategic outlook, non-binding
Relevant objectives	It proposes six strategic solution models. **M1 RESEARCH AND INNOVATION** **M2 PRODUCTIVE CHAINS** **M3 SUSTAINABLE PRODUCTION AND CLIMATE CHANGE** **M4 MARKETING AND MARKET DIVERSIFICATION** **M5 PUBLIC GOODS: INFRASTRUCTURE AND STORAGE** **M6 WORKPLACE WELLNESS**
Relevant targets	• **Innovation, certification and training**: Increase spending on agricultural R&D to USD 2.5 billion for 2030; current annual budget of the National Institute of Forestry, Agricultural and Livestock Research (INIFAP) is USD 58 million, or $1,156.9 million MXN. The goal is to double the amount allocated to INIFAP to $2,313.8 million MXN by 2030 with an annual increase of $96.4 million MXN. Increase to 50% of the total number of production units receiving technical assistance from SADER, with a 3.91% annual increase in technical assistance coverage. • **Infrastructure**: Increase from 345 to 2,000 biodigesters installed on farms in selected states. Expansion of existing rural roads from 74,550 km to 90,123 km, and paved roads from 152,879 km to 198,743 km in the Southeast. Expansion of 6,000 km of national road network and increase in cargo from 935,000 tons to 3,179 million tons. Increase railroad network from 26,704 km to 30,000 km.
Relevant actions / projects	• **Inclusive business model for agri-food chain management**: Promote credit loans with competitive interest rates differentiated by type of produce, starting with interest rates of 2.6% for small and medium producers. Increase the number of people employed in the livestock sector by 30%. Invest in gender equality, current wages in the sector are $13,608 MXN for men and $2,488 MXN for women. • **Circularity**: Mexico aims to reduce its total emissions to less than 36% by 2030, emissions generated by agri-food activity and deforestation are a target. Increase soil conservation for at least 132,314 hectares. Reduce water consumption in the agricultural irrigation sector from 256.5 million m^3 to 128.25 million m^3 per cycle. Reduce untreated wastewater used in the industrial by 14.42%. • **Cold chain**: Improve the occupancy rate of existing cold chain infrastructure managed privately; increase refrigerated capacity by 10% to reduce post-harvest losses, Decrease FLW by half, from current average of 37%.
	• **Innovation, certification and training**: create new research centers with public-private participation; update information systems (INEGI's agricultural census), invest in training and capacity-building. Critical need: public-private partnerships that enable a commercial regulatory system of compliance with Federal Labor Law through certifications. • **Infrastructure**: Design of a public infrastructure program to strengthen the agri-food sector in order to meet mobility and intermodal demand. Critical needs: national inventory of basic grain storage infrastructure; national system of logistics platforms with special emphasis on the cold chain.

2.3.3 Knowledge sector agenda

CONACYT's *Programa Institucional 2020-2024* provides the framework for federal investment in science and technology for the coming four years. It is also the only strategic agenda to hold national policy status from the knowledge sector.

To bring this policy framework further, several sectoral strategic documents have been written with relevance to the agri-food sector; first and foremost by INIFAP, in its *Programa de Desarrollo del INIFAP 2018-2030*, second the *Sistema Nacional de Investigación y Transferencia Tecnológica para el Desarrollo Rural Sustentable, (SNITT)*. Finally, individual knowledge institutes such as universities and research centers prepare strategic agendas and

annual plans, though rarely are these documents sector specific. Some exceptions are UNAM and the Instituto Tecnológico de Sonora (ITSon).

Non-government agendas were also analyzed, notably the *Agenda de Cambio Climático y Producción Agroalimentaria*, developed by IICA and GIZ, and published in 2019. This agenda calls for a national state policy on climate change and agri-food production. However, in this exercise only the broader strategic agenda of CONACYT is presented, since neither the sectoral program developed by INIFAP nor the agenda elaborated by IICA & GIF, included mentions to these key concepts; logistics, agrologistics, post-harvest, transport, distribution or storage.

Compared to the public and private sectors, the knowledge sector demonstrates in its priorities a greater focus on positioning national spending targets for R&D, currently at a low 0.4% of GDP, and the integration of multiple sectors into national research agendas to facilitate strategic dialogue and collaboration in the implementation of projects.

#4	Knowledge sector
Actor	CONACYT, Consejo Nacional de Ciencia y Tecnología (National Science & Technology Council)
Strategic agenda	Programa Institucional 2020-2024 del CONACYT (Institutional Program)
Published	23 June, 2020
Horizon	2024
Legal standing	CONACYT, which is by mandate the advisory and specialized entity to articulate the public policies of the Federal Government and to promote scientific and technological research, development and technological modernization, non-binding
Relevant objectives	**O1**: To strengthen the Science, Technology & Innovation communities (CTI), through their formation, consolidation and linkage with different sectors of society; **O2**: To articulate an innovation ecosystem; **O3**: To increase the incidence of humanistic, scientific and technological knowledge in the solution of the country's problems; **O4 and 5**: Strengthen and consolidate the capacities of the country's scientific community, to generate scientific knowledge through the linkage with regional actors to influence strategic national problems; **O6**: Expand the impact of Science, Humanities and Technologies, through the articulation, collaboration and definition of standards between higher education institutes, research centers and government agencies.
Relevant targets	• Number of researchers as a proportion of population (AP). In 2016, Mexico had only 0.7 researchers per thousand inhabitants (AP). Singapore, Japan and France had 10 scientists per every thousand people (AP). Argentina and Brazil have three and two researchers per every thousand people (AP). • Mexico allocates 0.4% of its GDP to GIDE (Expenditure on Scientific Research and Experimental Development), while some OECD countries, such as Japan and the United States, invested seven times more. The business sector only financed 19% of the FDI carried out in Mexico, while the rest of the resources were contributed by the government (77%) and other sources (4%), contrary to what happens in developed countries where, on average, the business sector is the main financer of research and experimental development activities (on average 60%) and in a smaller proportion the government and other sectors (40%). • Total budget in the period 2013-2018: MXN 142,543.26 million • Annual Budget 2021: MXN 26,573.1 million (an increase of 11% vs annual budget up to 2018)
Relevant actions / projects	• Focus on FRONTIER SCIENCE, fundamental research • Promote the creation of national research agendas through a strategic dialogue between the different sectors involved in the ecosystem of science, technology and society. • Actively promoting the participation of different actors at the national and regional level, including the business sector and the government. • Generate public policies to close the gender gap and incorporate more indigenous and underrepresented groups into the consolidated scientific community. • Promote and strengthen multidisciplinary academic research communities.

2.4 Sweet spots, opportunities and challenges

In the previous section we evaluated the strategic agendas of different sectors and highlighted their goals and priorities. Building on this understanding, in this section we describe the alignment of these agendas in greater detail, how their priorities overlap or differ, and which topics may constitute productive overlaps or 'sweet spots'.

2.4.1 Sweet spots

Sweet spots are points of coincidence or synergy between governmental policy agenda, industry/sector agendas and scientific research agendas, that reveal the potential for Mexico's strategic leadership or top sector. The overlap in agendas underlines the importance for further development, and where the government can provide an incentive by funding or otherwise encouraging a public-private-knowledge collaboration. This is shown schematically in Figure 3 and with descriptions and examples in Figure 4.

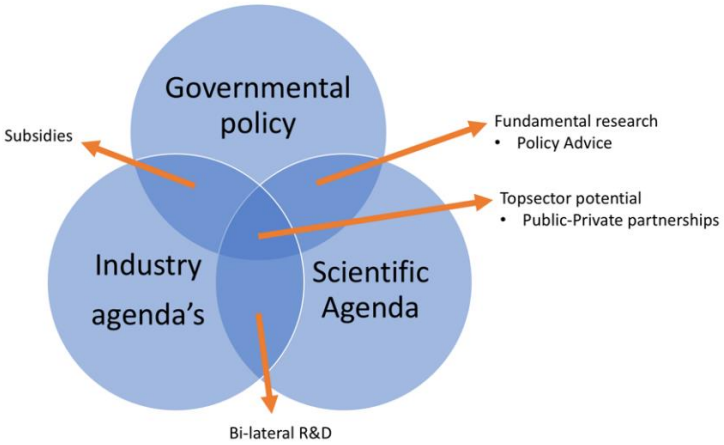


Figure 3 *All three sectors are needed to enable a public-private knowledge collaboration model or sweet spot*

Overlap area	Description	Examples
Government & Science (Fundamental research)	Government has topics of public interest which require fundamental research. Either for unbiased policy advice or because topics has not yet industry interest from funding (financial) perspective.	Research on food system approach Research on regulatory changes, such as allowing insects as feed (food safety) or changing landscapes.
Government & industry (Subsidy)	In public interest government stimulating industry to do investments. No research is needed.	Export stimulation schemes, tax relaxations on investments, direct subsidies. For example, India is giving tax breaks of 25% for companies investing in postharvest technology
Industry & research (Bi-lateral research)	Industry initiated research as there is a commercial interest but requires R&D from scientific perspective or scientific backing.	Development of novel packaging solutions. Optimizing cooling technology of reefer containers.
Government, research & Industry	PPS Sweet spot	Waste stream valorization in food system Protein production from new plant-based sources

Figure 4 *Description of types of overlap and potential examples of collaborative applications*

In our analysis, six topics are identified as priorities for all sectors and could form the basis of a common strategic agenda or sweet spot moving forward. Interestingly, the six topics are in perfect aligment with the priorities recognized by stakeholders in the area of agrologistics, as a result of preliminary workshops in 2019. These six topics are:

- managing food loses to reduce waste and promote circularity
- integrating smallholder producers into sustainable agri-food chains
- investing in public goods in the form of intermodal transport and logistics infrastructure
- better access to training and certification programs
- better access to cold chain storage and logistics services
- increasing food & nutrition security.

Although an alignment on topics is found, alignment on implementation is a more long-term goal. Partial alignment for integrative projects can already be found at the intersection of the interests 1) of the public sector and academia: policy and fundamental research; and 2) of the private sector an academia: bilateral R&D projects. At this stage, it seems too early to align all three sectors, but this could serve as a long term goal. The private sector could take a leading role in the alignment of policy goals and in defining how it could contribute to achieving those goals. This will form the basis for more public-private collaborations and pave the way towards a top sector model where the triple-helix approach works to reach societal goals and promote an innovative industry. Figure 4 illustrates the currect state of development of the different overlap areas following our analysis.

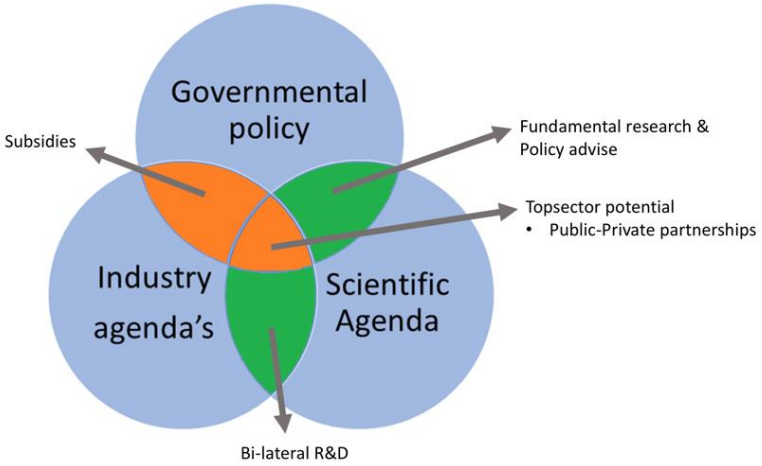


Figure 5 *The intersecting areas in green are currently more predisposed to collaborating whereas the orange sections need to be further developed. The purpose of a top sector model is to strengthen the overlap at the center and to promote integrative projects and innovation with the participation of all three sectors (triple-helix)*

2.4.2 Opportunities for alignment

One successful way of creating alignment is by measuring and sharing specific targets. Measuring the impact of improved agrologistics can provide this opportunity. Agrologistics as an industry, stands halfway between the transport & logistics sector and the agri-food sector, which means it is likely not monitored by official statistics and not conceived as a separate economic activity. The best proxy for the agrologistics demand is the size of the agri-food sector itself. Agrologistics activities are essential to connect the place of production and place of demand and could drive primary production, by virture of making better market connections. If we add the GDP figures of the primary sector (agriculture, livestock, fisheries and forestry) to those of the food, beverage and tobacco industry, the two sectors combined represent 8.5% of the national GDP and employ more than 13% of the active population. From this perspective, agrologistis can have vast impacts on society as a whole. For example, according to the World Bank about 53 million people live in poverty in Mexico, of which 24 million are in food shortage and 9 million more in extreme poverty. In this sense, a small change in the provision of food through the redistribution of food which would have otherwise been lost, among the most vulnerable population becomes an opportunity to improve the situation of food and nutrition insecurity for millions.

In 2014 Wageningen University & Research estimated that a policy program to stimulate agrologistics infrastructure requiring a sustained public investment of less than 1.5% of the annual SAGARPA (now SADER) budget over a period of 4 years, could yield economic impacts between USD 6 and 7.5 billion. The projected impacts were attributed to the prevented value loss due to a reduction in food loss, increased trade facilitation and multiplier effects such as matching private investment and job creation. The results are presented in Figure 6.

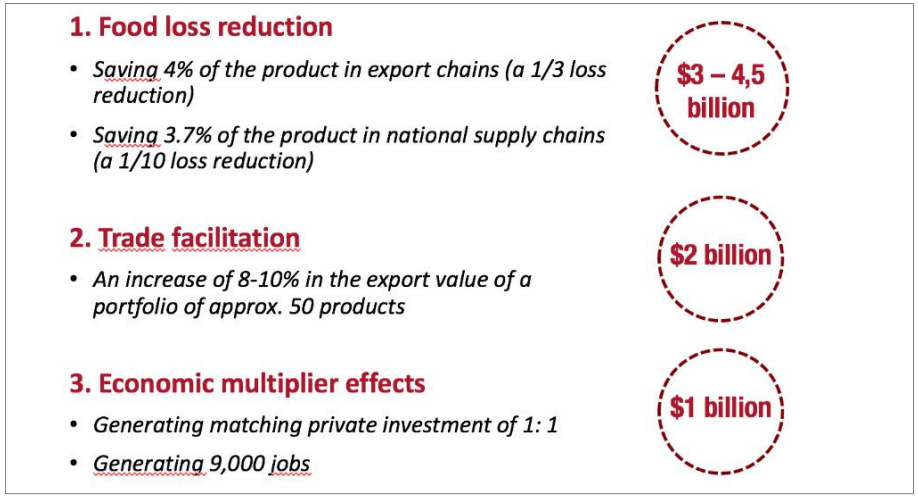


Figure 6 *Impact analysis of proposed public spending in agrologistics for the period 2014-2018 by the Programa Nacional de Agrologística. WUR, SAGARPA 2014*

Another opportunity for sector alignment lies in the current government plan to invest heavily in intermodal infrastructure including road and rail corridors, ports and airports**.** The three key infrastructure projects of the current administration are the Interoceanic Corridor between the Gulf of Mexico and the Pacific coast, connecting the ports of Salina Cruz and Coatzacoalcos; the Tren Maya, 1500 km of rail network for passangers and cargo in the Southeast of Mexico; and the Felipe Angeles Airport, mostly a cargo hub to compete in the Latam and Northamerican regions with other hubs such as Denver, Miami and Bogotá, and located in the metropolitan region surrounding Mexico City. Together these large public infrastructural works could significantly alter the map of Mexico in terms of logistics. Such wave of public spending will also likely require practical solutions and demand large increases in logistics capacity across a large geographic zones. The projects are also platforms for the involvement of multilateral agencies, financial actors, and Mexican federal agencies and state governments. This collaboration is expected to last for the next 4-10 years, and could offer a unique opportunity to align industry and academia with the public sector in innovation, business and knowledge development. Figure 7 illustrates the geographic region affected by the extension of the logistics network and new key public infrastructure investments.

Figure 7 *National network of multimodal platforms linking ports of entry. In red the regions affected by the extension of the logistics network and new key public infrastructure investments. Source: own elaboration with data from Tren Maya and the Asociación Mexicana de transporte Intermodal (AMTI)*

2.4.3 Challenges

Despite the conceptual alignment on topics, the three stakeholders still operate in silos, and are not yet used to working together, and partnering up. Collaboration between the tri-partite parties as requisite for funding is one of the important recommendations. This can be observed in the way each sector choses to implement a specific policy, rarely producing a triple-helix approach on its own. For example, the public sector focuses its subsidy programs on production assistance, targeting smallholders with less than 20 hectares, whose primary mark is domestic, and choosing as key indicators food security and self-sufficiency for basic crops, particularly for grains. On the other hand, the private sector focuses its strategic actions on increasing competitive exports through investment in technology, capacity-building and added value for mid-size and export-ready companies, particularly for higher-value

products such as horticulture. From the knowledge sector, represented by CONACYT's institutional program, although there is a desire to develop national research agendas through strategic dialogue between the different sectors, CONACYT has set a departure in their policy program in that their main funding priority will be to favor fundamental and frontier science research, instead of applied research projects involving the participation of the private sector. Only the program '*Proyectos Nacionales de Investigación e Incidencia para la Soberanía Alimentaria* (National Research and Awareness Project for Food Security)' considers practical collaborations with other stakeholders, and the recently announced 2021 call[2] focuses on issues of subsistence and food security for low income communities, and does not mention issues of competitiveness. In addition the total budget for these projects is MXN 20 million, or USD 973,000 to provide nationwide coverage.

The financial sector, particularly the development banking agencies, could play a critical role in facilitating funding schemes and aligning the private sector objectives with the government's social development agenda. Figure 8 below summarizes some of the key aspects of the strategic agendas in light of the challenges posed by their lack of allignment. In terms of public policy, *Strategic Priority 1.4,* found in the sectoral program of SADER[3] offers the most relevant opportunity to allign public and private interests: *'Strengthen the domestic food market with micro, small and medium-sized agro-industrial and trade enterprises to generate employment and income in the territories.'* Within this strategy, specific actions 1.4.1, 1.4.3, and 1.4.5, should be noted:

> *1.4.1 Strengthen processes of economic-productive organisation and associativity among producers for their incorporation and positioning in value chains.*
> *1.4.3 Promote a new system of investment, financing, insurance and rural credit for micro, small and medium-sized enterprises.*
> *1.4.5 Promote investment in collective goods that enable the linking of the production chain, the reduction of waste, and consolidated purchases of agricultural and fisheries inputs.*

Public investment in public goods related to agrologistics has been unclear in recent years. From a funding perspective, the most efficient way to advance *Strategic Priority 1.4,* strengthening micro, small and medium enterprises (MIPyMES), would be through the use of financial instruments to leverage investment in both public and private goods. In this sense, the key enabler might not be the Ministry of Agriculture, due to its limited budget reach and policy priorities, but the development banking sector, represented by Financiera Nacional de Desarrollo Agropecuario, Rural, Forestal y Pesquero (FND), and Fondo de Capitalización e Inversión del Sector Rural (FOCIR). In the priority objectives of the institutional program for the development banking sector, the *Programa Nacional de Financiamiento para el Desarrollo* (National Development Financing Program), objective 6 reads:
Expand and strengthen the financing and planning of the Development Banking sector and other financing vehicles of the Federal Public Administration, as well as promote greater financial inclusion of the target sectors and **greater participation of the private sector**, to contribute to the sustained economic development of the country and social welfare.

The criteria for these institutions to identify the needs of different stakeholders is based on a commonly agreed stratification of Rural Economic Units (REUs) in Mexico, developed by FAO[4] and published in 2012. According to this classification, there are six strata, E1 through E6, with varying degrees of commercial maturity, whereby the smallholder target groups for the financial institutions are represented by the following strata:

> **Stratum E2: Family subsistent REU with market linkage**, consists of 2.7 million REUs that represent 50.6% of the total, agriculture is their main economic activity; they are mostly located in the southeast and central region of the country. Their characterisics are: family based, low level of schooling, low income, high level of marginalisation. 26% of the families in this stratum speak some indigenous language. Due to the low income they live in conditions of poverty, in particularly food poverty. They sell their labour force outside the REU and venture into non-agricultural and/or secondary activities.

[2] https://www.conacyt.gob.mx/Convocatoria-Programas-nacionales-estrategicos-2021-Propuesta.html
[3] http://dof.gob.mx/nota_detalle.php?codigo=5595549&fecha=25/06/2020
[4] Diagnóstico del Sector Rural y Pesquero de México, 2012: http://www.fao.org/3/bc980s/bc980s.pdf

Stratum E3: REU in transition, made up of 442,000 REUs that represent 8.3% of the total, located mainly in the west, lowlands, centre and gulf of the country, and 71% of their income comes mainly from the exploitation of agricultural and livestock activities. In this stratum, 66.2% of the REU (292,849 units) present problems of endowment of productive assets. This stratum is considered to be in transition, because the income they obtain is sufficient to cover the basic needs of a family, but not enough to maintain a stable economic activity, as many of them face problems in maintaining and improving the profitability of the small business.

Stratum E4: Entrepreneurial REU with fragile profitability, consists of 528 thousand REUs, which represents 9.9% of the total. These units have an entrepreneurial character, the national market is the main destination of their production; primary activities are their main source of employment and income and they are located in the Gulf, West and Bajío regions. Some of the causes that explain their fragile profitability are their low business management capacity, low technological level, the degradation of natural resources and the weak integration of productive chains.

Credit loans could be the single-most efficient means to integrating these participants. In each of these strata, producers present specific and differentiated problems, so a government-funded strategy would need to facilitate tools, access to growth opportunities, and specialized and differentiated attention in each market development stage. According to information from the National Agricultural Survey (2017), of the 5.32 million REUs characterized by FAO, only 9.9% had access to credit or loans; a figure that represents an opportunity to generate targeted strategies to address the 90.1% of this target population, and to strengthen the primary sector as a whole.

The key challenge for a strategic agenda that is based on the triple-helix approach would be to address the needs of the different target groups, by integrating all actors into sustainable supply chains. In this scenario, the more mature commercial actors and market-integrated producers would receive incentives to invest in the development of smallholder supply networks with the participation of the public and knowledge sectors, into a win-win situation.

Institution	SADER Public sector	CNA Private sector	CONACYT Knowledge sector
Main objectives (as expressed in the strategic agendas)	**Food security:** incr. 10% average by 2024 **Subsidies for vulnerable groups:** incr. 67% average 2024 *Source: SADER Sectoral Programme, 2020-2024.*	**Public R&D investment:** incr. 100% of INIFAP's budget in 10 years (2030). INIFAP budget in 10 years (2030). **Financial instruments:** Main priority is the development of credit institutions **Reduction of food losses and waste:** Economic value capture by reducing FLW by 50% in 10 years (2030). *Source: Vision 2030. Public Policy Model Proposal.*	**Increase in R&D investment:** currently 0.4% GDP only 19% financed by the private sector and 4% by other sources compared to other countries where the private sector contributes 60% of the R&D budget and the government 40%. *Source: CONACYT Institutional Programme, 2020-2024.*
Main tools available	**Sectoral Programme Priority Strategy 1.4:** *'Strengthen the domestic food market with micro, small and medium-sized agro-industrial and marketing enterprises to generate jobs and income in the territories'.*	**Private investment in services or collective goods, and supplier development.** Co-investment through the financing of small and medium-sized enterprises. In addition to commercial banks, the private sector has access to financial instruments offered by development banks: FND (loans for micro and SMEs), and FOCIR (venture capital for medium and larger scale enterprises).	**National Strategic Projects** *Priority themes (2021):* *1) Rural Self-supply* *2) Urban and peri-urban self-sufficiency* *3) Small and medium commercial production* *4) Specialty production and consumption networks* *5) Fishery and aquaculture food production and supply.*

Institution	SADER Public sector	CNA Private sector	CONACYT Knowledge sector
Main challenges	**Lack of budget or disappearance of post-harvest support programmes:** Historically less than 5% of the budget of the Ministry of Agriculture has been allocated to programmes related to agro-logistics. Since 2019 this figure has been further reduced. Priority strategy 1.4. does not to date have an articulated support programme with operating rules and an established budget.	**Lack of incentives for the integration of economic actors in the productive chains:** There are no concerted opportunities for the integration of the different actors of the private sector in the formation of supply networks and the strengthening of productive chains for the benefit of all the strata.	**Lack of budget for applied research**: the 2021 call for proposals for the *National Research and Advocacy Projects for Food Sovereignty* has a limited national budget (MXN 20 million). **Lack of transversality in research:** the priority themes subsidized for the sector do NOT include mentions of the following key concepts: logistics, agro-logistics, post-harvest, transport, distribution, storage, or reduction of FLW.

Figure 8 *Comparison of key aspects in the strategic agendas: main objectives, tools and challenges*

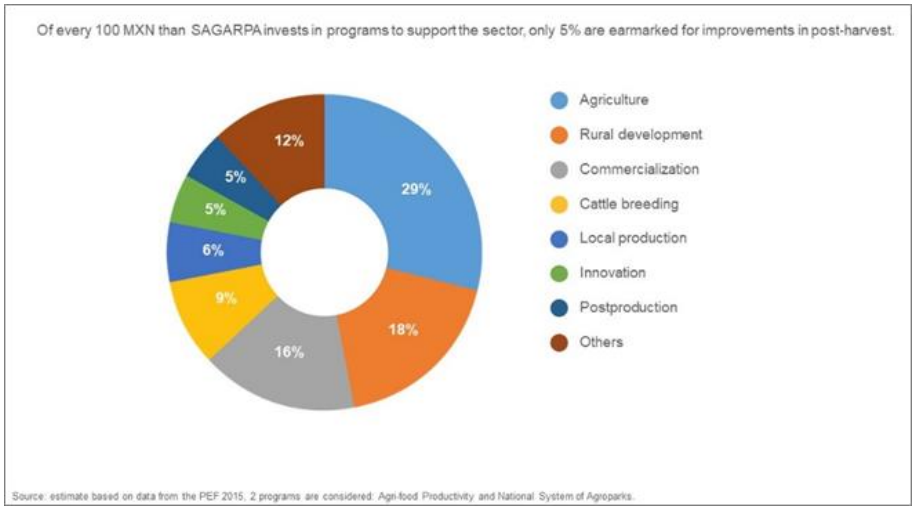


Figure 9 *Public investment breakdown for the Ministry of Agriculture (SAGARPA) in 2015, where 5% of the budget corresponds to agrologistics-related spending*

Specific budgets allocation is another issue where there is a need for convergence. There is poor alignment between the general goals of the agri-food sector and the way each group funds their priorities. Post-harvest activities, at the center of agrologistics, can represent over half of the added economic value in the agri-food chain, however these activities receive a small percentage of public investment compared to productivity projects. In 2015, public spending from the Ministry of Agriculture in post-harvest programs was 5% of total spending in agri-food policy at the federal level, as presented in Figure 9. Furthermore, since 2018, both federal and state subsidies for post-harvest projects have greatly diminished, research grants have moved towards fundamental research, and venture capital funds are looking toward technlogy projects aiming to disrupt the food supply chain instead of investing in basic logistics equipment and infrastructure.

BOX 1. Results of public investment in Agroparks in the period 2014-2015

Understanding the impact of a policy program in the agri-food sector is essential for ensuring private sector participation. According to the Ministry of Agriculture, SAGARPA, in 2014 alone, 33 applications were approved in regards to the four subsidy concepts available as part of the National System of Agroparks[5], while in 2015 the number rose to 40 applications. The increase in the nuber of projects receiving funding was not followed by an increase in the total amount allocated, in 2014 it was MXN 489.01 million while in 2015 the amoung went down to MXN 364.92 million.

Of all the subsidy concepts, the category 'For the Integral Development of Agroparks' is the most relevant in the framework of this analysis, since it corresponds to funds granted for direct investment in basic infrastructure and equipment, and requires that the applicants have reached an advanced level in the development of their Agropark, and must make available to SAGARPA the executive projects complete with construction permits and licenses needed for their execution. In this category, 27 applications were received in 2014, of which 3 were granted with an average amount per project of MXN 126 million; while in 2015 32 were received, of which 5 were granted, with an average amount per project substantially lower, of MXN 39 million.

With regard to the type and scale of proposals approved, including all available concepts, the applications granted in 2014 focused on vegetable and meat production chains with 21 and 9 applications respectively; however, by 2015 applications were concentrated on supporting vegetable and fruit chains with 24 and 22 applications. The scale of the projects also varies greatly, with applications ranging from 2 to 1,556 hectares in 2014, and from 3.99 to 1,736 hectares in 2015. The average area per project in 2014 was 215 hectares while in 2015 it was 147 hectares.

Another challenge is that the agendas do not share a common framework for sustainable long-term planning. The time horizon of the public and knowledge sector agendas does not extend beyond the current administration period concluding in 2024. The policy plans consulted include the *Plan Nacional de Desarrollo 2018-2024* (National Development Plan), *the Programa Sectorial de la Secretaria de Agricultura y Desarrollo Rural 2018-2024* (SADER), and the *Programa Institucional del CONACYT 2018-2024* (National Council of Science and Technology Program), all of them with a time horizon of 3 years into the future. At the same time, the private sector leads in terms of strategic thinking. Represented by the *Consejo Nacional Agropecuario* (National Agrifood Council) business leaders have developed a longer-term 2030 Vision for the agri-food sector. At this moment, this vision document is considered to be the most complete view on long-term strategic planning involving agrologistics.

2.5 Recommendations for an action plan

From the review of previous and current studies and policy programs this chapter concludes with 10 key recommendations for an action plan that would enable the integration of the strategic agendas from all three sectors and address the current situation.

10 Key recommendations: where to start the development of Agrologistics in Mexico

- Improve the coordination and integration of the three sector agendas at the national and state level, with the commitment of the public, private and knowledge sectors in a high-level leadership group (also known as a top sector approach). Focus on investing in integrative projects (triple-helix) and innovation as pre-requisite for funding. Pursue long-term investment in research and development for the sector from all actors.
- Create market access programs for small-scale actors by promoting cooperative models, inclusive financing and added value facilities (i.e. Agroparks and next generation wholesale markets).
- Monitor food loss and waste and create incentive programs for FLW reductions.
- Invest in creating a continuous cold chain: through first mile cold storage programs to logistics hubs and refrigerated rooms in wholesale markets as well as for border inspections. Introduce an adequate pool of refrigerated containers in the market (reefers) with intermodal functionality.
- Improve connectivity between multimodal transport systems to decrease logistical costs, uninterrupted seaport-railway-roadway connections and national maritime shipping routes (short-sea shipping).

[5] Concepts supported by the National Agropark System: 1) Feasibility study; 2) Executive project; 3) Integral Development of Agroparks; 4) Infrastructure and equipment for Rural Transformation Centers (CTR); 5) Infrastructure and equipment for agro-industries installed in Agroparks.

- Align customs and inspection processes at ports by simplifying SOPs (Standard Operating Procedures) down to one review process and one inspection.
- Incorporate risk-based inspections and a certification system so that third parties can perform the inspections at production zones and perishable goods can pass through the border without further review.
- Create an information and communications technology program (ICT) that focuses on compliance and traceability to ensure food quality and safety.
- Combat insecurity in transport through a specific agenda against theft and illegal selling of stolen goods in roads and railways.
- Develop a hands-on training and education program to build the new pool of human capital in Agrologistics.

3

Lessons from the Dutch top sector model

3 Lessons from the Dutch top sector model

Identifying key barriers and enablers for The Dutch top sector approach. In this chapter the Dutch top sector model is described and analyzed. The description contains the background and history of the top sector approach, the organizational structure and instruments currently used to force the innovation power of the top sectors. Main sources are the evaluations of the Top sectors in 2014 (Source: AWTI, 2014) and 2017 (Janssen et al., 2017, part 1 and part 2) and the websites of the top sectors. In the analysis barriers, enablers and opportunities are identified, as well as insights are given in drivers of success of network-focused innovation policies. For this purpose, we reviewed existing literature and conducted 12 interviews with actors in the supply chains of the agri-food sector (see Annex 1 Interview guide and Annex 2 List of interviewees).

3.1 What is the Dutch top sector approach?

The Dutch top sector approach is the instrument for cooperation between companies, knowledge institutions and government. In 2010 the top sector approach was introduced by the Dutch government. The uniqueness of this approach is that a number of economic focus areas (top sectors) have been identified and that the steering of (generic) financial instruments takes place through optimal cooperation in the 'triple helix' of companies, knowledge institutions and government itself. In each top sector a top team will draw up a joint vision and a strategic agenda with accompanying activities. Important focal points in this integrated vision include research and development (innovation), linking education and the labor market (human capital) and economic diplomacy (internationalization) (AWTI, 2014).

Top sectors are developed to focus governmental resources, to stimulate public private partnerships by drawing up a joint vision and strategic agenda supported by all stakeholders. The main reasons for introducing the top sector approach were (AWTI, 2014):

- The desire to set the knowledge agenda for the entire research infrastructure
- The desire to replace subsidies with fiscal policy
- The desire to stimulate public-private partnerships from regular funding
- The desire to have a less fragmented innovation policy
- The desire to involve other departments (other than Economic Affairs) more.

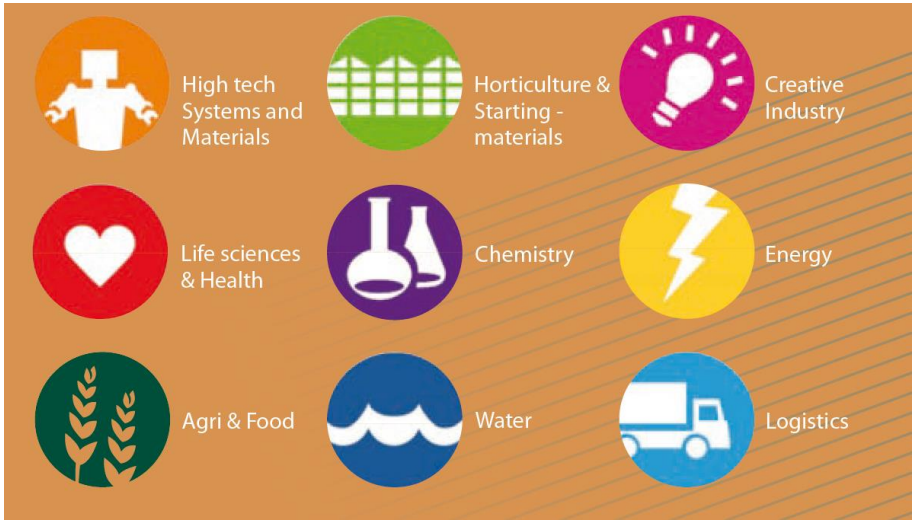


Figure 10 *Nine top sectors in the Netherlands*

Nine top sectors have been appointed as well as three cross-cutting domains. Nine top sectors have been appointed (see Figure 10). The following three cross-over domains have also been identified over time: Biobased Economy, Nanotechnology and ICT. The agri-food sector is represented by two top sectors: top sector Horticulture & Starting Materials and top sector Agri & Food. In addition, the top sector Logistics and top sector Water are also relevant for the agri-food sector.

3.2 Background & history of top sector approach

The establishment of the top sectors is the result of a process of almost 10 years in which the policy changed its focus to a limited number of themes in which the Netherlands are strong and to strengthen the themes even more with an integrated approach with tailor-made solutions. The origin of the current top sector approach can already be traced back to a policy advice from 2003. In essence, two things were important in this advice: focus on a limited number of strategic themes and choose an integrated approach with tailor-made solutions. This advice was further elaborated in the Innovation Platform, which issued an advisory report on Key Areas in 2004. Again, the core of this Key Areas approach, which aimed to strengthen the Dutch economy, was to focus on promising key areas. The idea behind this was that the most opportunities arise in those areas where the Netherlands has an excellent position in terms of innovation, knowledge and business. The Ministry of Economic Affairs has taken up the Key Area Advice and has been implementing it since 2005 as 'the programmatic approach to innovation' (better known as 'Key Area Policy'). (AWTI, 2014)

Societal Innovation Agendas were launched in 2007 to pay more attention to societal value of innovation. That is why an interdepartmental program directorate was set up at the time to launch so-called Societal Innovation Agendas (SIAs) and subsequent societal innovation programs (AWTI, 2014).

To keep investment in knowledge and innovation in times of crisis ten innovation programs were announced in 2010. In 2009, as a result of the crisis and the ensuing economic crisis, the government was looking for opportunities to make savings, concerned that knowledge and innovation would also be cut back. To this end, the top sector approach (although not mentioned at the time) was announced in 2010 (Source: AWTI, 2014). In 2010, there were ten so-called innovation programs. These were integrated programs with various instruments such as Technological Top Institutes (TTIs), grants for R&D cooperation, innovation vouchers, 'innovation brokers' and human capital activities. The TTIs formed an important part of the innovation programs. Each TTI received about €5 million a year. For the agri-food sector there was a Top Institute Food & Nutrition and Top Institute Green Genetics. Those TTIs that still had a run time beyond the launch of the Top Sectors became part of the top sector approach.

3.3 Objectives of the top sector

The general objective for the top sector approach is to be among the world's top five knowledge economies by 2020. The objectives of contributing to a stronger capacity for innovation of the Dutch economy were (AWTI, 2014):

- The ambition is for the Netherlands to be among the world's top five knowledge economies by 2020.
- The Netherlands has set itself the target of spending 2.5% of its gross domestic product on research and development (R&D) by 2020.
- In addition, it is an ambition of business policy that public and private parties participate in Top Consortia for Knowledge and Innovation for at least €500 million in 2015, of which at least 40% is financed by the business community. Specifically for top sector Agri&Food, this would be a too dramatic reduction in R&D volume, hence top sector Agri&Food decided to be more ambitious and aimed at 50% private co-funding.

The top sector approach is consistent with generic innovation policy, economic goals and societal goals. Figure 11 shows the coherence between the generic business policy and the top sector approach on the one hand, and the general economic and societal objectives on the other. These ambitions can only be realized through a joint effort by companies, knowledge institutions and governments, known as the 'triple helix'.

The top sector approach played a major role in making the Netherlands one of the most competitiveness economies according to a 2017 evaluation. In 2015 the Netherlands was again in the top 5 of the most competitive economies according to the World Economic Forum rankings and the R&D spending rose to over €800 million in 2015 and spending on R&D rose by 2% in 2014. This led to the conclusion that the Dutch top sector approach had almost achieved its goals and impact. Therefore, one of the conclusions of an evaluation of the top sectors in 2017 was to continue top sector policy (Janssen et al., 2017).

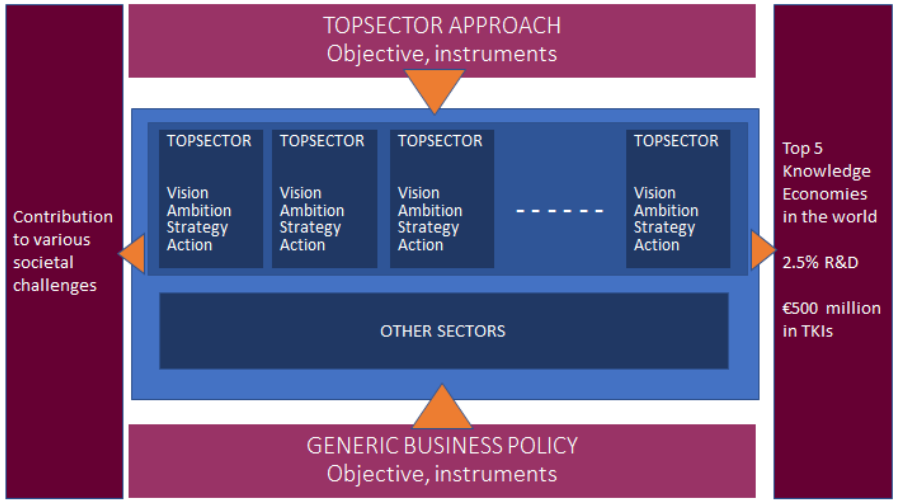


Figure 11 *Consistency of top sector approach, generic innovation policy, economic goals and societal goals (source: AWTI, 2014)*

Three basic documents underpin the objectives of the top sectors: the first is the Knowledge and Innovation Covenant. In the so-called 'Knowledge and Innovation Covenant (KIC)' the three parties (private sector, knowledge institutions and government) ratify their effort for the coming years on important innovation themes. The most recent KIC, KIC 2020-2023, follows KIC 2018-2019 and KIC 2016-2017 and builds on the collaboration of the triple helix of recent years.

Since 2018, the second key document is the governmental Mission-driven Top sector and Innovation Policy. Inspired by leading missions of the past, such as the Dutch Delta Works and the U.S. Apollo Space Program, the government launched a new approach to innovation policy in 2018, so-called Mission-driven innovation, with the aim of further strengthening the collaboration of scientists with governments and societal stakeholders. Four themes were introduced: 1) Energy Transition and Sustainability, 2) Agriculture, Water and Food, 3) Health and Care and 4) Safety. Mission 'Agriculture, Water and Food' has become the guiding principle for the current innovation policy for the Dutch agri-food industry.

The third document is the Knowledge and Innovation Agenda. In the Knowledge and Innovation Agenda (KIA) it is described which knowledge and innovation are to be developed to realize the mission. Each top sector prepared, together with a wide range of stakeholders, a KIA. To ensure that overlapping themes are covered through the top sector approach, top sectors also join forces is developing the KIAs. Examples are the top sector Horticulture & Starting Materials, Water and Agri-Food. In Figure 12 a schematic overview is given of how a top sector is organized, where the Missions, the KIC and the KIA are starting points.

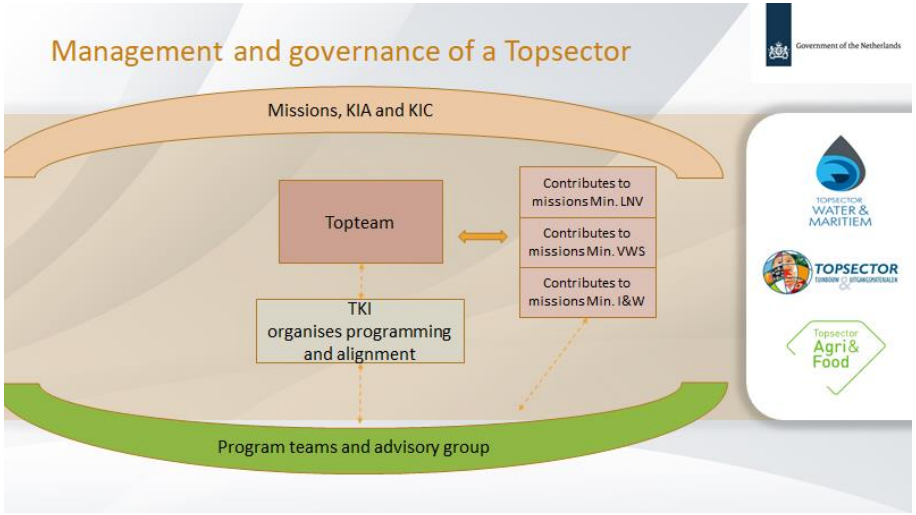


Figure 12 *Management and governance of a top sector (source: Website TKI Agri-Food (adapted))*

3.4 Organization

Each top sector has a top team that consists of an elected chairman (captain of industry), a scientist, a representative of the government and an innovative SME entrepreneur. The members of the top team are elected/nominated by the Ministry for a period of 4 years. After that period the members can be re-elected. The chairman and SME entrepreneur receive remuneration, respectively for a working time factor of 0.3 (3 half-days in the week) for the

figurehead and 0.222 for the SME entrepreneur. The other board members receive only an allowance for costs made (Institutional Decree on the Top teams Mission-driven Sectors and Innovation Policy, 2019).

Since 2018, the mission-driven policy has created an additional consultation structure at the mission level. For the Mission Water, Agriculture and Food there is a mission team consisting of the Captains of the three top sectors and the DGs of the ministries concerned. This consultation is aimed at harmonization between the various sectors.

In addition to the top team each top sector has one or more offices called the Top Consortia for Knowledge and Innovation (TKIs). These TKIs are responsible for the implementation of the activities within the context of the Knowledge and Innovation Agenda. For example, top sector Water has three TKIs, named Delta, Water and Maritime: all TKIs are dealing with water but in different applications and with different companies. Top sector Horticulture & Starting Materials and top sector Agri-food have each one TKI office.

Each TKI is represented by a board with members from the 3 parties (private sector, government, knowledge institutes). The members of the TKI board are appointed by the top team. The TKI board Horticulture & Starting Materials has six members: one chairman, three members from the business community, one from the knowledge institutes and one from the government (Ministry of Economic Affairs). The TKI board Agri & Food has fifteen members: one chairman, nine members from the business community, two from knowledge institutes and three from the government (Ministry of Agriculture, Ministry of Public Health and a representative of a Province). The government representatives in both TKIs formally have the status of observer. The board members receive only an allowance for costs made.

In addition to the board, each TKI has an office in charge of operations and coordination. The TKI office is the operational body and coordinates the Knowledge and Innovation Agenda (KIA). The TKIs for Horticulture & Starting Materials and Agri-food work closely together, for example they join the same program coordinator. The TKI office consists of approximately six people who are seconded part-time from different organizations such as the Ministry of Agriculture, Nature & Food Quality and Wageningen University & Research. The staff consist of a director, a program coordinator (deputy director), a financial manager, a communication manager, a controller and a secretary. The total size is 2.5-3.5 FTEs. The TKI office coordinates the agenda-setting, programming and accountability, and advises the TKI board. In Figure 13 a scheme of governance structure of the top sector is given.

Program teams and advisory groups are in place to ensure continues input from the sector. Program teams, appointed by the TKIs and existing of representatives of the relevant Ministry, research entity and TKI office, advise the TKIs. The program teams pick up signals from the field through several advisory groups. The advisory groups are also appointed by the TKIs. Tasks of the program teams are set up and actualize the innovation programs within the knowledge agenda, input for the knowledge and innovation priorities for the annual PPP call, review of project ideas and proposals in collaboration with external experts.

Innovation brokers ensure SMEs receive proper guidance in line with the top sector agenda. Finally, top sectors have several 'innovation brokers' to guide SMEs with:

- The start-up of an innovative business
- Making innovations market ready
- Determination of value propositions and the business model (earnings model)
- Making of the business case and financing proposal for market introduction
- Finding the right collaboration partners
- Setting up consortia and partnerships with other companies and/or knowledge institutions.

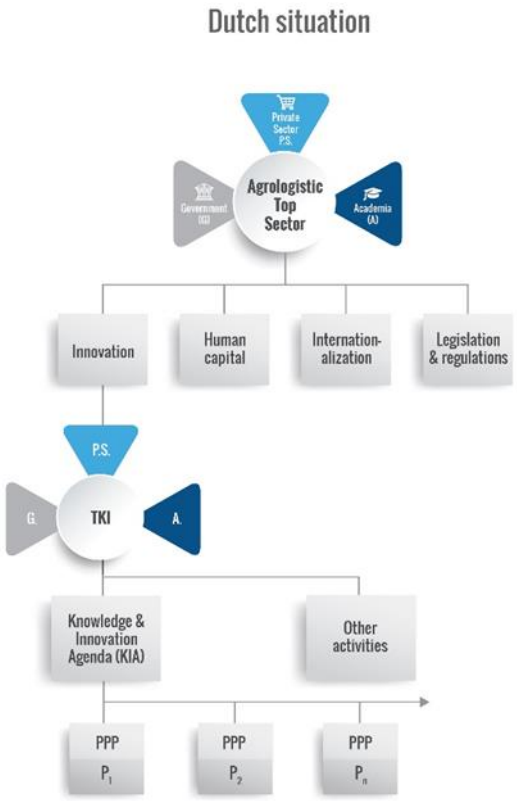


Figure 13 *Scheme of governance structure of the top sector*

The budget for the TKI office Horticulture & Starting Materials and TKI office Agri & Food is between €600,000-800,000 per TKI. The cost for the TKI consist of two key elements: personnel (€400,000) and office costs (€200,000-400,000). The budget for the 'innovation brokers' depends on the number of brokers. For top sector Horticulture & Science this is an additional €25,000 (2019) and for Agri-Food an additional €300,000 (2018).

Resources of the TKI offices consists of PPP surcharges, subsidies and an SME innovation fund. The resources of the TKI-office consist of 1) a Public Private Partnership (PPP surcharge), 2) RVO subsidy instrument called Programme Support Activities and 3) SME Innovation Stimulation instrument for Top sectors (MIT) to be used to appoint 'innovation brokers'. The basic principle of the PPP surcharge is: for every €1.00 of private cash R&D contribution from a company to a research organization, the Ministry of Economic Affairs and Climate adds €0.30 as the PPP surcharge. This PPP surcharge must be used again for R&D. Private-public partnerships and Top Consortia for Knowledge and Innovation (TKIs) can apply for a PPS surcharge. Until now, this application was made via the TKIs. The PPP surcharge is intended for use in research projects and is limited to financing the TKI office, network activities and the deployment of 'innovation brokers' (via MIT).

The Dutch top sector approach embraces the position of SMEs in the Dutch economy. As could be seen, SMEs have a special position within the top sectors in the organization. The European definition of SMEs is based on staff head count and turnover or balance sheet total (see Table 1). SMEs are represented in the top team with their own delegate in the board, as well as in the board of the TKI office with at least one delegate. Moreover, all TKI instruments are open for all types of companies including SMEs and some are specify targeted at SMEs (see Section **Error! Reference source not found.**)

Table 1 *European definition of Micro, Small & Medium-sized company*

Company category	Staff headcount	Turnover (million euros)	or Balance sheet total (million euros)
Medium-sized	<250	≤€50	≤€43
Small	<50	≤€10	≤€10
Micro	<10	≤€2	≤€2

Source: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32003H0361&from=EN

3.5 TKI instruments and subsidy budgets

TKIs use different instruments. As mentioned before the TKIs are the operational bodies of the top sectors. We can distinguish at least four TKI instruments: Fundamental Research, Applied Research in the form of Public Private Partnership, Seed Money Proposal and Knowledge Valorization.

The first TKI instrument is Fundamental Research in collaboration with the Dutch National Research Council. Together with TKI Horticulture & Starting

Materials and TKI Agri & Food, the Dutch National Research Council (NWO) develops programs with sufficient breadth, resulting in applications and stronger competition. Also, there are crossover programs with initiatives that transcend the top sector. The top sectors support such programs as well as co-finance fundamental research projects that are approved in the European R&D programs. The available budget for the three sectors Agri-Food, Horticulture & Starting Materials and Water & Maritime is approximately €11 million per year. Additional required private co-financing is 10-30%. Allocation of the budget remains a responsibility of NWO both in terms of frameworks (amount of money per top sector) and procedure.

The second TKI instrument is Applied Research through Public Private Partnerships (PPP) on Research and Innovations. Every year, these top sectors organize a call for research proposals. For the three joint top sectors Horticulture & Starting Materials, Agri-Food and Water & Maritime, the available governmental budget is approximately €50 million per year. Together with recognized applied research organizations (such as Wageningen Research, Deltares and TNO), private parties in a consortium with companies are requested to submit proposals to carry out research. The Ministry of Agriculture, Nature & Food Quality and the Ministry of Economic Affairs contribute 50% of the costs by financing part of the project costs of the knowledge institutions. The other 50% has to be contributed by the private sector, of which half has to be in cash and half in kind (number of hours, materials etc.). This is according to the European Framework for State Aid regulations for Research and development and innovations (2014/C 198/01). This resulted in 100-120 projects/year for the KIA Mission Agriculture, Water & Food.

PPP proposals are selected in two phases to ensure selection of those linking strongest to top sector agendas The process of submission and selection takes place in two phases: 1) submission of a concise project proposal (pre-registration) and 2) submission of a complete project proposal for public-private partnerships. The pre-registration enables the TKI to staff the assessment committees in a targeted manner and, upon request, to identify any links with other top sectors. The applicant can also receive (non-binding) advice (e.g. on the suitability within the Missions of the KIA, the content and the consortium, etc.). PPPs should be pre-competitive (which justified investment from public authorities), should ideally link to a larger integrated program and clearly indicate how the developed knowledge and innovations are disseminated to relevant sectors and other parties.

The ministry allocates budgets to the research institute for the approved PPP proposals. After approval, all private parties have to sign a PPP consortium agreement with the applied research institute for each project. Based on these agreements the TKI informs the Ministry to allocate the budget to the research institute. Besides, the research institute will invoice all private stakeholders once a year for their committed contribution in cash. For the contribution in kind, all private stakeholders have to keep accounts. Once a year with the invoice, the research institute will request these accounts of the private sector.

The third TKI instrument is a Seed Money Project (SMP) which serves to foster international partnerships for Dutch companies in the Agri & Food and Horticulture & Starting Materials sectors. A Seed Money Project (SMP) is an instrument specially designed by the top sectors Agri-Food and Horticulture & Starting Materials. SMPs serve to initiate (or act as the 'seed' for) international partnerships for Dutch companies and SMEs in the Agri & Food and Horticulture & Starting Materials sectors. The main focus is on forming a consortium and exploring the possibilities for international activities. More specifically, consortia which are already active in the top sectors are encouraged to expand their activities internationally. In addition, the agricultural attaché/counsellor at the Dutch Embassies will be asked to identify opportunities for the Dutch business community and to provide further contacts by applying for a SMP.

The SMP tool should result in a feasibility study of (new) international cooperation. The result of a SMP is a study to assess the feasibility of international cooperation. The study involves the development of new knowledge or the application of existing knowledge under other circumstances. The tool allows an applicant from the business community or an agricultural attaché/counsellor at the Netherlands Embassies to call in experts from Wageningen University and Research.

Total subsidy budget for SMP amounted to a joint budget of € 600,000 with an indicative value between €25,000 and €40,000 for each project. A seed money project has an indicative value of €25,000 but not more than €40,000 including VAT. A budget of €25,000 is suitable mainly for desk research and activities in the Netherlands, while a budget of €40,000 would be appropriate if a visit to

another country is also required, or to organize digital workshops. The contribution from businesses in the project consists of their own travel expenses and the hours that businesses devote to the project. The last years there is a joint budget of €600,000 (including VAT) for Wageningen Research capacity each year. This means that approximately 15 to 20 SMPs can be funded.

The fourth TKI instrument relates to knowledge valorization and consist of two instruments: the first is 'Knowledge Tailor Made'. Since 2020 a new instrument is Knowledge Tailor Made, a special funding to valorize fundamental knowledge towards the private sector, especially SMEs. It should contribute to building capacity on implementing the top sector mission and provide practical advises. The call for proposals is opened three times a year by the top sectors. Projects can be submitted by companies, sector organizations and educational institutions.

A total of €2.5 million is earmarked annually as budget for Knowledge Tailor Made. This instrument aims to translate existing knowledge from research and practice into action perspectives for (future) SMEs. The program's budget is meant to be spent on capacity of Wageningen Research (WR). Private parties must contribute at least 1/3 of the project budget. Part of the budget is reserved for cooperation between companies, green educational institutions (middle and high vocational education institutes) and WR. In this case, the co-financing can also come from educational institutions.

The other knowledge valorization instrument is the SME Innovation Stimulation instrument with a total estimate budget of €16 million for all Missions. The top sector has good experience with the instruments from the SME Innovation Stimulation Top Sectors (MIT) scheme for promoting knowledge valorization. MIT has four instruments for SMEs; each with a budget per region and per instrument (source: RVO).

- Knowledge vouchers that can be redeemed by the SME applicant at research organizations for a basic knowledge questions; a voucher has a maximum value of €3,750. Maximum 50% of the costs of the research organization can be covered with this voucher. The other half has to be covered by the SME itself. A total budget of €2 million is available.
- Feasibility studies in which also limited industrial/experimental research is possible; The subsidy amounts to 40% of the eligible costs and is a maximum of €20,000. A total budget of €3.8 million is available.
- R&D co-operation projects for industrial and/or experimental research. The grant amounts to 35% of the eligible costs. The subsidy is a minimum of €50,000 and a maximum of €200,000 per innovation project, of which a minimum of €25,000 and a maximum of €100,000 per participant. A total budget of €8.1 million is available.
- Subsidy for innovation brokers to facilitate companies in their innovation projects. A total budget of €2.2 million is available.

All TKI instruments have to abide with the EU Framework for state aid for research, development and innovation. All TKI instruments have to comply with the maximum state aid percentages for Research and Development and Innovation according to EU framework, as presented in **Error! Reference source not found.**.

Table 2 *Maximum state aid % for Research and Development and Innovation according EU framework (2014/C 198/01)*

Type of research	Small enterprise	Medium enterprise	Large enterprise
Fundamental research	100%	100%	100%
Applied Research	70%	60%	50%
Experimental development	45%	35%	25%

Source: EU Framework for state aid for research and development and innovation (2014/C 198/01), Annex 2

Note: in case there is a cooperation between enterprises these percentages change: detailed information can be found in EU framework 2014/C 198/01.

3.6 Measured impact of and recommendations for top sectors

In 2014 and 2017 the performance of the top sectors were evaluated and recommendations were given. In this section, an overview is provided of evaluations of the Dutch top sector approach. The evaluation in 2014 concluded that the top sector approach has led to a substantial new dynamics in the Dutch economy. Many parties have entered into discussion with each

other. Concerning research and innovation, there is a broader involvement in the agendas (innovation contracts) drawn up by the top sectors.

The 2014 evaluation led to recommendations to improve the shared vision, governance and connection between key players. When the top sector was running for four years, the evaluation not only highlighted the successes, but also provided recommendation for further strengthening the top sector approach in the Netherlands (AWTI, 2014):

- Shared vision still too unclear: too many actors in the field still see the top sector approach as financial support for the established order, disguised cutbacks or a grip on fundamental research coffers.
- Governance: those directly involved experience considerable administrative pressure. The top sectors have been particularly busy in recent years with the internal organization of their top sectors and setting agendas.
- Connect all players: There is a lack of connection between several important parties. Not every party feels sufficiently connected to the Top Sector approach.

The 2017 Top Sector Impact evaluation showed the importance of PPPs to move away from the subsidy-based innovation landscape. The top sector approach has contributed to more demand-driven research programming at Dutch knowledge institutions. This has led to a transition where innovations are created through public-private partnerships of companies and knowledge institutions. Of the more than USD 800 million invested in PPP projects with TKI allowance, 47% was funded by private parties. Obtaining more than 40% private funding was 1 of the objectives of the top sectors approach during the period in question (Janssen et al., 2017).

The top sector approach has created space for sectoral and cross-sectoral collaborations.

The top sector approach has shown that companies and knowledge institutions can work together with the government on knowledge development and innovation. This works best with partners active within sectors, but the TKIs and Knowledge and Innovation Agendas (KIAs) also provide ample opportunities to work on crossovers (Janssen et al., 2017).

The 2017 evaluation led to - amongst others - recommendations about closer connection to societal challenges, better integration with other policy instruments and implications of governance structures. The recommendations after 7 years implementation of the top sectors were (Source: Janssen et al., 2017):

- Define the precise objectives of the top sector approach and how its policy is structured.
- Match the top sector approach (more) clearly with societal challenges. This also requires the strengthening of the interdepartmental component;
- Make efforts to ensure the top sectors' knowledge and development agendas are not too freely and broadly defined, but are selective.
- Challenge parties to create cross-sectoral top projects on concrete societal issues, thereby specifically involving 'challengers'.
- Create a modest budget for flexible spending of Economic Affairs' share in collective facilities for experiments in top sectors and top projects.
- Consider to what extent other Economic Affairs' instruments could be more explicitly included in the top sector approach.
- On the internationalization agendas, widen the scope from trade to include knowledge, acquisition and human capital, and if possible an experimentation agenda.
- Strengthen the involvement of regions, colleges and other research institutes in the top sector approach.
- Make sure the openness of the top sector approach is guaranteed;
- Simplify the governance and clarify the transparency, accountability and communication concerning the top sector approach's functioning and results.

Finally, an impact evaluation about top sector 2013-2018 period showed significant results in terms of investments, scientific output and follow up projects. An impact analysis of the subsector Starting Materials of the top sector Horticulture & Starting Materials for the period 2013-2018 showed the following measurable results (Stolk, 2019):

- 80 PPP research projects: 49 were finished by the end of 2018.
- Total budget €25 million (MXN 625 million) of which 50% contributed by the government and 50% private sector.
- 17 scientific promotions, 93 scientific publications (46 to be expected).
- 2 patents filed and another 2-3 expected to be filed.
- Of the researchers at PhD level already 8 persons are working within a breeding company.
- 46 follow-up projects.
- One startup company in process.

3.7 Enablers, Constraints & Opportunities

Key enablers, constrains and opportunities are identified based on interviews with key stakeholders. In this section, the most important enablers, constraints and opportunities for the Dutch top sector approach are described, derived from the interviews held with persons with a strong involvement in the introduction, the further development and the current operations of the top sectors (see Annex 1 Interview guide and Annex 2 List of interviewees).

Enablers

To start a top sector approach, there has to be a reason or an incentive. A reason that worked very well for the Dutch setting were significant cuts in government spending on R&D. In addition, a significant part of the budget for fundamental research was redirected to applied research. For the universities this meant a shock and there was a lot of resistance in the beginning. Applied research could only make use of this redirected budget if there was private funding in return. This also caused quite a change, because the business community was going to influence what kind of research was going to happen, provided it also co-financed it. This co-financing was not new for the agri-food community but new for the other business community. What was new for the government was that the business community would have a say in the R&D budget and where it would be spent on. A joint vision and knowledge agenda are therefore crucial to start a top sector approach.

It could be said that the top sector policy is a formalization of practices that emerged out of the Dutch agricultural sector. Farmers, Universities - Wageningen in particular- and the government have historically been familiar with joint agendas. This concept was termed 'the triple helix'. The top sector policy bears great similarities with the concept of the triple helix, but it is adapted to be applicable to a wide range of sectors. As the Dutch - especially the agricultural sector - were very familiar with this way of coordination, the introduction of this policy went smoothly. And so, it can be said that the Dutch were very 'ready' for the adoption of this approach. Another factor for success in the early stage, was the selection of the right people and organizations. Candidates for the top team were to be visionary, trustworthy and experienced. Often, they would be individuals who were well respected throughout the whole sector. It could be said that the launch of the top sector policy was grounded in pragmatism.

As many stakeholders from entirely different institutions will depend on each other, high level of trust is expected. For example, stakeholders from the private sector may be inclined to take entrepreneurial risks and aim for high profits. However, they should consider that the public sector tends to be averse to risks and seeks to create societal value. Such a form of coordination is possible when all stakeholders can align their agendas on shared interests, such as common issues. It is crucial to clearly define the interest of each party and set realistic objectives. When two or more sectors have overlapping objectives and they experience difficulties in reaching their objectives, a thematic approach may be undertaken to reach those objectives. In a thematic approach, agendas of multiple top sectors are aligned. The effect is that stakeholders from both sides meet each other and get exposed to new ideas and perspectives.

The private and public sector must be committed with time and money. In the knowledge and innovation contracts intentions of commitment are included. These are key to success for two reasons. First, one of the tangible goals of the top sector policy is to maximize funds for research and innovation. Second, commitment is very related to trust, which harbors a fruitful relation.

Constraints

Compartmentalization seems to be a concern. In the top sector context this means that too strong a focus on each top sector has an inhibiting effect on new innovations. It can be argued that in its early stage, the top sector policy was designed with an economical character, which discouraged 'crossovers'. Adding to that, different organization of the management of the top sectors could have led to a decrease of trust amongst the people from different sectors. Thematic programming can be a solution to this development. By inserting stimuli (e.g. adding extra criteria in the selection procedure regarding crossovers) to collaborate with other sectors, crossovers are encouraged.

The reach and benefits of the top sector policy are complex to define and measure quantitatively. However, that should not be a reason to address this matter appropriately. It could be said that reporting and evaluating has been undervalued, as it can be very useful for communication and creating societal support. As the spoils of the top sector policy are best expressed qualitatively, the successes are best expressed in the form of 'story telling'. Nevertheless, it

is important to determine measurable KPIs in order to create more trust and transparency.

As the top sector approach follows a multi-year agenda, it can be time-and-money consuming to participate. This may fit better to the vision of big corporations (due to higher innovation budgets), but less for Small/Medium Enterprises (SME) and possibly also for smaller institutes. Sector/branch associations and cooperatives are somewhere in the middle. Although in general the willingness to invest depends on the strategy and vision of each business, regarding their innovative power. Including SMEs in a multi-year agenda is perceived as complex. It could be said that SMEs often - but not always - have a shorter interest span than their larger counterparts. Hence, they often go along for a relatively short period of time and leave when their demands are met. As by definition public and private stakeholders have opposing interests, it could be strongly emphasized to properly address the concepts of trust and commitment: when some parties feel that the process benefits some more than them, they may abort their involvement. When the private sector is insufficiently united or organized, for example in case of many SMEs without sector organizations, the functioning of the triple helix is weaker. In some top sectors there is a need to put effort in the involvement of more national or regional sector organizations.

Another problem for SMEs is the lack of funding to invest in pre-competitive programs. This is very difficult for research consortium formation. The provision of a private R&D sector fund would be a solution, but broad-based support is difficult to organize in general.

The perks of a top sector should be divided equally among the participating stakeholders. If any of the participating stakeholders - and the sectors that they represent - feel that the top sector doesn't represent their interests as much as it does for others, their trust and commitment may decline. This is particularly true for SMEs and possibly also for smaller institutes.

Opportunities

As a collective of stakeholders share common issues (circularity, digitization, health), which they are unable to deal with individually, they may be strongly interested in a collective approach. By aligning their agendas and making use of each other's resources, they can achieve things that are 'bigger than themselves'. And so, the Dutch economy became pre-competitive on the themes to which it aimed its scope.

Due to the top sector approach stakeholders started to think of their common interest instead of the differences. It is important to identify the challenges and have a clear insight towards what every stakeholder is working. By putting effort on this the maximum output can be obtained.

There is a need to maintain a strong connection among all stakeholders, especially regarding SME involvement and the connection between smallholders and big companies. Research concepts like living labs are of great potential in order to get involvement of all stakeholders. In a living lab all stakeholders are brought together to think about specific topics relevant for the innovation agenda.

The involvement of the younger generations may have a positive impact. The current top team set up with captains of industry can give the appearance of the 'old economy'. In the same line, the involvement - or promotion - of start-up companies becomes increasingly more important for the top sectors, in order to contribute to the mission driven knowledge and innovation agenda.

Challenge

Over the last 10 years there is a shift from an economical accent to Mission-driven accent of the Dutch Top sector policy. In 2018 this has led to a mission-driven knowledge and innovation agenda. A positive aspect is more involvement of 'specialist' Ministries in the top sector policy instead of mainly on the initiative of the Ministry of Economic Affairs. Critical point for the future of top sector is to maintain balance within the tri-partite, government, private sector and academia. On one hand it might be more difficult for SMEs to participate in innovations serving the mission-driven agenda, on the other hand, and more important, it is crucial for the private sector to have enough space to give input to the defined missions. Stronger connections, transparency and trust will be necessary for the future success of the top sector concept.

The future of the top sector policy is based on the strong concept of the 'triple helix' with drivers described in overarching missions, as described in Section 3.5. To maintain the balance in the tri-partite more effort is needed to

connect the private sector (mainly SMEs) to the missions. This could be done more 'bottom-up' on a regional level, include more sector associations, by have a renewed attention to human capital. In addition, involving more ministries to form a single vision is quite a challenge.

3.8 Drivers of success of network-focused innovation policies

This chapter describes the drivers of success of network-focused innovation policies findings from the international scientific literature.

The institutional context of innovation policies such as the Dutch top sector approach has been researched at length since the 1980s using varied terminology. Concepts such as 'golden triangle', 'triple helix', 'national system of innovation', 'new/modern industrial policy', and 'Mode 2' have all been used to describe and analyze what is roughly the same mechanism characterizing the co-operation between government, academia and private sector (Edler & Fagerberg, 2017; Etzkowitz & Zhou, 2018; Gibbons et al., 1994; Lundvall, 1988; O'Sullivan et al., 2013; Porter, 1990; Rodrik, 2004). Drivers of success of these policies (success being defined as creating economic and/or social value, resulting in sustainable cooperation, or increasing innovative activity) can be identified, as well as relevant contextual factors.

Modern industrial policy requires government and (semi-)public research institutes to cooperate with the private sector to stimulate and guide innovation (Rodrik, 2004). This is generally agreed in the literature. A network governance approach should be taken to structure this cooperation (Flanagan et al., 2011), building on existing institutional structures, be it at the regional or national level, involving individual firms or business associations.

On the 'orgware' side, this requires a platform structure that is accessible to all parties willing to participate in collaborative innovation, and ensures continuity and predictability of the collaborative setting regardless of shifts of positions and priorities in politics or industry (Porter, 1990). At the same time this structure should be flexible and facilitate ongoing discussion and (re)negotiation of roles, expectations and definitions (Leydesdorff & Etzkowitz, 1996), and be open to reshaping the arrangements where relevant (Etzkowitz & Leydesdorff, 2000).

On the 'software' side, this approach entails a process of stakeholders agreeing on shared values, building mutual trust between parties, and developing communicative competence to bridge differences in worldviews between the three domains (Blume, 1992; Blume & Leydesdorff, 1984; Leydesdorff & Etzkowitz, 1996). More formalized codes of conduct and financial disclosure should be considered to address stakeholders hesitance to commit in the absence of trust (Devlin & Pietrobelli, 2016). More generally, (institutional) contextual factors should determine the structure and scope of 'triple helix' networks – a successful 'one-size-fits-all' model does not exist (brief country case studies drawing on previous research outline how approaches can be tailored to the context). Universally, preconditions should be present or created that incentivize exchange and collaboration, and a context should be created that provides a platform for interaction and cooperation that is robust and stable in the long run.

An inspiration for the Mission Driven Innovation approach is the publication The Entrepreneurial State (Mazzucato, 2011). Mazzucato discusses where a greater role for the government is desirable, how this could/should take shape, and which pitfalls are relevant in this regard. Mazzucato argues that in many sectors (high-tech, communications, pharma, etc.) the innovations that underlie 'innovative' products largely come from public programs (at universities or in public laboratories). Thus, the examples she discusses such as pharmaceuticals (public research, private profit for the pharmaceutical industry) and the smartphone (almost all the technology in it comes from US government research by e.g. NASA or DARPA), stem from a government that invests and takes risks in doing so. The more recent 'neoliberal' narrative is that government is unwieldy and inefficient, and business is dynamic, efficient, and innovative. When a government acts on this and steps back, the kind of bold basic and applied publicly funded research that underlies many important innovations also falls away. Mazzucato argues that there does need to be an active role and responsibility for governments to be more entrepreneurial and innovative, especially in sectors such as green energy, with a strong public interest and some reluctance from the private sector.

Beyond the creation of the context where government, academia, and industry actors can interact, the policy mix for innovation deserves attention: the instruments used to incentivize cooperation between industry and knowledge organizations. Both engagement (win-win cooperation between research and

industry) and commercialization (research conducted with commercial aim by researchers) are stimulated through policy (co-funding, creating triple-helix structures) (Perkmann et al., 2013). The scientific literature shows that the choice of funding instrument does not matter significantly: contract research, targeted subsidies, patenting, bilateral R&D, spin-offs, public-private partnerships all work and in fact reinforce one another (Looy et al., 2011). The degree of competitiveness of acquiring funding does not matter significantly either for stimulating engagement and commercialization (Haeussler & Colyvas, 2011; Perkmann et al., 2013). Engagement and commercialization are most observed in engineering and life science disciplines (Perkmann et al., 2013) and in departments with interdisciplinary orientation (Confraria & Vargas, 2019), suggesting that an emphasis on interdisciplinarity in research can positively contribute to the success of innovation policy.

Case study – Brazil

The Brazilian case is relatively well-researched (Maculan & Zouain, 1999). Brazil, as other Latin American countries, faces the challenge of relatively limited corporate R&D and a dominance of imported technology (Luna & Tirado, 2008). For the specific purpose of bridging the gap between pure and applied research and stimulating domestic R&D, the government founded the National Institute of Technology (INT) (Mello & Etzkowitz, 2008). In the 1990s a more decentralized policy was pursued with regional governments and local knowledge institutes, to benefit from existing regional networks (Casas et al., 2000). Emphasized sectors, particularly high-tech aeronautics, benefited from research-industry collaboration, but this did not spill over to other sectors (Suzigan & Albuquerque, 2011). The intellectual property rights regime in Brazil was successful in safeguarding access to innovation for a wider range of companies, including SMEs, leading to a relatively competitive market (Fuck et al., 2008).

Case study – Mexico

Research and development in Mexico predominantly takes place in publicly funded universities and public research centers with little exchange between research and industry, and between firms in different sectors (Confraria & Vargas, 2019; Luna & Tirado, 2008; Thorn & Soo, 2006). Previous policies mostly targeted university-industry collaboration at the bilateral and regional level, capitalizing on (mostly regional) networks of industry organizations (Luna & Tirado, 2008). The more recently created regional State Productivity Commissions (CEPs) are criticized for not functioning effectively, mainly due to the initiative being perhaps too ambitious (32 CEPs created simultaneously) while at the same time lacking adequate technical, administrative, and financial support from (national) government. As a result, they are at present more a reality on paper than full-fledged functioning platforms for cooperation, and suffer from a lack political commitment and coordination (Devlin & Pietrobelli, 2016). A 2016 report from the Inter-American Development bank recommended a strong focus on institutional capacity building to salvage the initiative. Moreover, in a low-trust context with the risk of corruption present, platforms for innovation benefit from more formally specified roles and responsibilities of participating actors, including specific codes of conduct and financial disclosure (Devlin & Pietrobelli, 2016).

Project MasAgro 2019 CIMMYT – www.cimmyt.org/projects/masagro

An example of a bottom-up triple helix research project is ‘Crops for Mexico’. This is a research for rural development project supported by 4 different Secretariats, the national Agri-Food Council (CNA), CIMMYT and 3 other research institutes. The project promotes the sustainable intensification of maize, wheat, rice, beans, milk, coffee and cotton production in Mexico. The program also seeks to increase farmer income and production systems sustainability by implementing collaborative research initiatives, developing and promoting the use of improved seed, sustainable technologies and farming practices.

In this project small and large farmers work together with researchers of different research institutes of Mexico and four different secretariats to intensify the linkage between all stakeholders. Connections are made with new infrastructural projects like the Maya Train and the Trans corridor connection.

CIMMYT is ready to upgrade this project also with high value crops like vegetables, fruits and flowers.


4
Formation of private
sector Leadership Group

4 Formation of private sector Leadership Group

Generate a structure for governance and decision-making to form and implement the Agrological Agenda 2030. According to the Dutch top sector model discussed in previous chapters, the competitiveness of a country or region can be increased through linkages between government, the private sector and knowledge institutes. In this regard, a key element of the top sector approach is the structuring of a vehicle to coordinate private sector decision-making, which helps to create an ecosystem of linkages between knowledge institutes and government. For interactions between the three actors in the top sector to flow into efficient decision-making, there is a need for clearly and strategically coordinated. A leadership group is therefore essential and necessary as a governance tool for the formation and implementation of a coordinated agenda for the development of the agrologistics platform.

In this regard, the CNA, through its Vice-presidency of Agrologistics and in cooperation with WUR, invited the private initiative *(Annex 3 CNA-WUR Webinar invitation)* to participate in a process of interviews to identify areas of opportunity that contribute to the definition of strategies to generate the above-mentioned linkage ecosystem and to evaluate a governance vehicle or instrument for the decision-making of the agrologistics platform.

Once the open invitation to the private sector was made by the CNA, it was possible to contact and conduct 29 interviews *(Annex 4 List of interviews conducted and Annex 5 Interview Format*). These interviews provide valuable insight in the current situation of the company and actor interviewed, with respect to the agrologistics field, its priorities and envisioned solutions. This to help create lines of action for the design of a strategic agenda that seeks to improve the agrologistics system in Mexico and to make the food supply chain more efficient. Additionally, the interview process gathered the interest of these actors *(Annex 6 Letter of Intent Format)* to participate in the formation of the Leadership Group. The results obtained from this process of interviews with the three types of actors (private, public and academic) can be found in this chapter.

4.1 Reflection on six key priorities themes by the private sector

The interviewed actors have a focus on three priority topics: 1) improving supply chain infrastructure and equipment, 2) cold chain management and 3) innovation, certification and training. In order to identify the current perspective on the six priority topics (see chapter 2) for developing the agrologistics platform, the actors interviewed gave their opinion and weighed up from their perspective the following question: What aspects of agrologistics are a priority for your company? The priority topics in order of importance to the sector are presented in Figure 14.

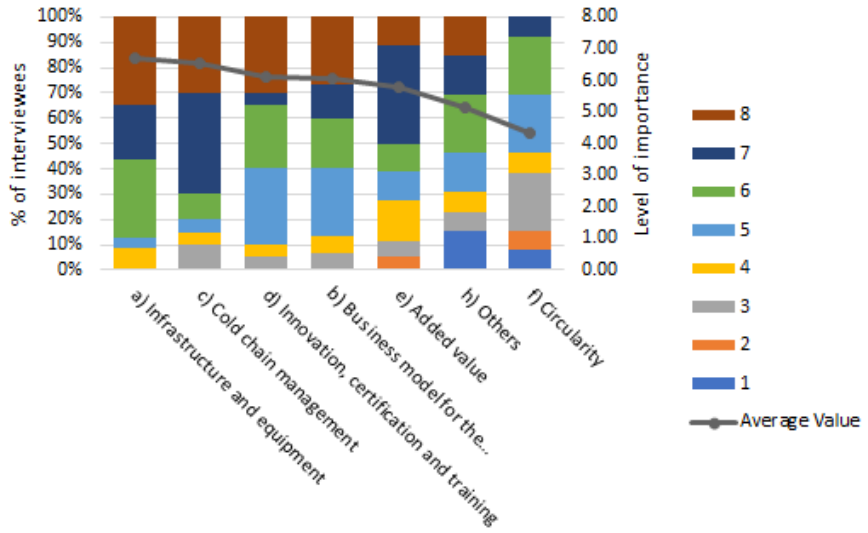


Figure 14 *Priority themes (Source - Own elaboration with information from the field survey, 2020)*[6]

Challenges related to infrastructure, connectivity and equipment were identified as the key priority. As Mexico is a country with a large territory, there is a major challenge in creating efficient connectivity between the points of supply and demand. In the information gathering through the interviews, it was observed that the need for connectivity infrastructure is a priority issue and that while it is important to optimize the processes of the entire supply chain, the private sector has also been resilient to the lack of public investment and has managed to adapt to the conditions, however this mostly translates into generating high operating costs and therefore reduces the competitiveness of Mexican companies.

Notable examples from the interviews conducted on infrastructure priorities and focus include the following: The railway network in our country has a wide territorial scope, however, in the opinion of the Mexican Railway Association (AMF), there is a lack of storage infrastructure at the points of origin and destination, highlighting that Cold Chain storage is the most urgent for the sector; there are only 5 to 10 refrigerated spurs, that is, cold warehouses that have access for train cargo and that do not break the chain, an aspect that is insufficient for the volume of products that are distributed in our country, so that rail transport is limited to the growth of distribution of perishables by this aspect.

The AMF itself mentions that there is an important opportunity to take advantage of the country's railway network. Mexico has a railway network that covers its national territory extensively, linking most of the productive and consumer areas, the main ports and border points. However, the concentration of the infrastructure is focused and exploited mainly in the Central and Bajio area that has the automotive and hydrocarbon industry clusters nearby. This is since in this area of the country there are facilities for rapid loading and unloading where the railway can be unloaded in just one day. In the case of the southeast, the facilities of this type that are further south are those of Puebla, in the state of Puebla and Orizaba, in the state of Veracruz. For this reason, there is a lack of development in the majority of the states in the southeast of the country, for example Oaxaca, Chiapas, Quintana Roo, etc.

Regarding the equipment to move food sector products, especially perishables, it is important to consider that the equipment needed to make a refrigerated train is expensive and specialized, in addition to the fact that the key variable is the volume of origin and destination, so it would be important to find a way for the routes to generate full departures and returns so that the trip makes logistical sense and in turn is profitable for the rail industry.

In this regard, the AMF considers that most fruit and vegetable producers prefer motorized transport because they cover short and diverse routes (an aspect where the train cannot compete), and because they do not have an

[6] Graphic with Likert scale. Each column represents a priority theme, and the order of the bars corresponds to the average level of importance obtained according to the prioritization of the aspects of the actors interviewed. The colors represent the percentage of mentions in the interview. Scale: 8 (brown) = Very important, 1 (blue) = Minimal importance the grey line crossing all the bars indicates the average response of the interviewees regarding the level of importance of each topic.

integral cold chain, the use of motorized transport does not put perishable goods at such risk, another aspect that ratifies the need for infrastructure investment in the cold chain to make train use more competitive and efficient.

On the other hand, in the opinion of the company SYNGENTA the infrastructure that is necessary and a priority to have a professional system of food logistics is that of productive infrastructure, it is indispensable to reduce costs and losses, an example of urgent infrastructure is that of technology through the digitalization of processes. In terms of road infrastructure, Mexico is considered to have acceptable infrastructure and connectivity, and although the vehicle fleet has been modernized, the issue of refrigerated transport is still far from being resolved and remains obsolete. For SYNGENTA business opportunities in the southeast of Mexico are centered in the state of Yucatan. The Port of this state, Puerto Progreso, is a strategic point to develop international markets. However, for the economy of the southeast of the country to take off, many investments must be made to become an agro-exporting node.

The company Coca-Cola mentions that investment is needed in road infrastructure to collect inputs from productive areas, as well as for distribution. The lack of infrastructure in refrigerated storage and processing has always been the Achilles heel of the growth of the agri-food sector in Mexico. For example, the lack of infrastructure to access producers means that this company imports 40% of the apples they use for their products. In Puebla, Durango, and Coahuila there are conditions to produce apples, however, due to logistical issues and lack of infrastructure it is more affordable to import the product. Examples of projects that see priority in developing the sector are Agro-industrial infrastructure such as investment in dehydration plants, investment in infrastructure for milk collection and above all investment in technology to migrate to bigdata.

From the academic perspective, the Economic, Social and Technological Research Centre for the Agroindustry and World Agriculture (CIESTAAM) mentions that the main problem around this topic is the lack of productive infrastructure and lack of professionalism in the productive units. He considers that there is a large area of opportunity mainly in supply chains of perishable products where professionalization is extremely low and there is a large area of opportunity derived from the high rate of shrinkage and waste. The necessary infrastructure investment should be focused on public goods that support safety, sustainability, security, training, etc., such as investments in roads and accesses, cold chain, and inspection points.

From the government's point of view, the Secretary of Agriculture and Rural Development (SADER): points out that the present administration is considering investing in collective goods to ensure equality in the North and South of the country. For example, there are projects being carried out with the World Bank, the FAO and CIMMYT. One of these is the project for grain and information storage for agricultural competitiveness agreed upon between the Federal Government and the World Bank, with the aim of improving access to grain and information storage for small and medium-sized agricultural producers in Mexico. This project is essential, especially in the South-South-East zone where production is expected to increase by strengthening adequate storage to receive grains.

Cold chain management: identified as a second key priority. The strengthening of the cold chain depends on several aspects, not only on infrastructure itself.
Although cold chain infrastructure is largely covered in the above topic, actors report as a second key priority the need to strengthen the cold chain in Mexico from several important aspects. Mainly through the professionalization of land transportation providers' services, the inclusive provision of cold chain infrastructure for small and medium enterprises, and staff training.

In the opinion of the CIESTAAM, one of the aspects where the greatest deficiencies in agrologistics are identified is in the cold chain. In this regard, the National Chamber of Cargo Transportation (CANACAR), shared during the information survey, that in Mexico, there are around 160,000 auto-transport companies, however, there are few companies specialized in the trade, there are not many providers of refrigerated transport services and there is an informal market, which means that many customers continually change their logistics provider in order to offer the lowest price, leaving service quality, safety and security as secondary points for transporting their products; an example of this is the case of Chayote Producers and Exporters, which shares that the main problem they face in their export activity is the continuous breakdown of refrigerated containers during the transportation of the cargo and is largely due to obsolete equipment or lack of maintenance by the supplier.

In addition to the above, another example is that mentioned by SYNGENTA, where it indicates that the productive sector is characterized by the existence of a culture of lower prices in logistics, where transport without refrigeration is a daily practice to save, which translates into increases in losses and waste.

On the other hand, in the opinion of several interviewees, the review at the U.S. border customs is also a constant problem and also leads to the management of processes in the cold chain, since the authorities carry out these operations on platforms without controlled temperature. Chayote producers and exporters indicated that the duration of these inspections is around 2 to 3 hours. This problem has also been identified by CANACAR and the company Berries Paradise, who suggest that the flow of goods should be expedited and that investment should be made in infrastructure to make sanitary inspections faster, as well as investing in digitalization so that the cold chain is not broken. Similarly, Grupo Inversor Veracruzano (GRIVER), has detected a serious problem in the review processes by the customs authority that affect the cold chain. What they suggest is to explore bi-national mechanisms to certify that the cargo is safe from origin.

Finally, another important finding on this topic was mentioned by the AMF, where out of 7 railway companies in Mexico, only two have refrigerated service (KCSM and Ferromex). Refrigerated transport is not a market that has grown due to insecurity (theft of diesel, batteries, or cargo). In the opinion of this association, the railway sector in Mexico is characterized by the transport of bulk and not very high value products.

Innovation, certification, and training: identified as the third key priority

Training: Most companies have internal training and modernization programs. However, these are limited to the day-to-day operations of each entity. Such is the case of Berries Paradise, this company provides training along the entire chain to its producers: from learning how to cut each fruit in the best way and making a first selection or quality control, where they separate the perfect fruit, the one that is in the process of ripening and the one that can be sold to juice and derivative companies, to training for the handling of controlled temperature. This supplier development programme can be replicated as a pilot project, as it is currently only focused on strengthening the value chain of the red fruits exported by this company.

On the other hand, with respect to land transportation of cargo, CANACAR reports that there is a high rotation of personnel in the sector, so companies do not have incentives to establish long-term relationships with their employees, which limits investment in training to specialize human capital.

Certification: The issue of product and process certification in Mexico is entirely related to the level of requirements that the international market demands.

Large companies such as Grupo Herdez have an internal food safety scheme to ensure the quality of their products and to guarantee production with high quality standards. However, they say that they only seek certification from their suppliers when required by their customers, whether in the domestic market or abroad.

Innovation: Only a few large companies – with well-trained human capital and credentials/certifications to successfully enter new markets –use innovative when it comes to their operations. These companies deliberately explore new ways of doing business and being more competitive in their export destinations through innovation.

Companies such as Coca-Cola, Syngenta, Cargill, Berries Paradise and Grupo Herdez, report that they have ongoing programs to innovate their production processes and have programs to transfer innovation to the producers with whom they collaborate. This process can be generalized as a corporate practice in Mexico, where only producers within the process of large companies in Mexico have access to constant innovation and training.

On the other hand, in the academic sector, it was possible to identify that there are research centers that have relevant knowledge in the field of agrologistics. CIESTAAM has a specialized line of research called Science, Society, Technology, and Innovation in the Rural Sector focused on constant innovation in order to generate proposals for action among producers and decision makers to influence competitiveness, productivity and rural development. Similarly, the Technological Institute of Sonora (ITSON), through the National Transportation and Logistics Laboratory, has a Research Group called Agrologistics for a Better Future. This Research Group has the mission to contribute to effectively connect the supply of agri-food products and the

market demand in a way that reduces costs and losses. While both academic institutes seek to promote demand-based business models that allow producers to better orient their inputs to meet market demands, there is a lack of business and government support to permeate the entire sector with these capabilities.

Another example to be taken into account is that of the State Coffee Producer Coordinator (CEPCO) through 45 cooperatives and over 3,500 producers. CEPCO has achieved success in international markets with an inclusive, sustainable, but above all, coordinated business model. CEPCO has been successful in supplying both domestic demand for specific niche markets in Mexico City, as well as entering more sophisticated markets such as Europe through production and export cooperatives.

Added value: identified as the 4th priority

Companies report this element as an important priority in their market niches. Companies such as Grupo Herdez, La Moderna and Minsa, refer to this point derived from the transformation processes that they have very well identified through their product portfolio.

With regard to the public sector's vision, the Coordinating Body for the Promotion of Foreign Trade (COFOCE) mentions that the value-added approach it disseminates among its community is very particular since, based on case studies and through workshops with agricultural producers, they raise awareness of the positive impact that good manufacturing practices have not only in adding value to the product per se, but also in adding value to the operation in general to obtain a better profit in their commercial transactions. In addition to this, COFOCE has developed a global competitiveness ecosystem in agri-food that aims to prepare exporting SMEs to integrate into the supply chain and export their products. A kind of accompaniment for companies in the state of Guanajuato from training in tools for an export plan to business missions abroad with potential customers in specific markets.

For its part, SADER seeks to strengthen the capacities of southeastern Mexico to promote the country's agroindustry. For example, through port-customs and railway infrastructure to generate triggers for regional development in that region of the country.

Business model for inclusive supply chain management: identified as the 5th priority. A more integrated value chain, encompassing all producers in the chain, is necessary to increase the level of professionalization and added value. These efforts stand alone and there is a lack of leadership to coordinate an impact strategy in an inclusive model.

Some examples of inclusive projects are the project of the company Berries Paradise, which works with a system for the development of suppliers in all regions where they are located, in a win-win model. Another example is that of the State Coordinator of Coffee Producers of Oaxaca (CEPCO), which promotes the inclusion of all its producers through the project 'Obio Commercial Initiative: sustainable products and communities', with the aim of opening up market channels for high quality products made by small producers. It is a project promoted by 24 campesino organizations - so far -, in alliance with Tienda UNAM, Fomento Social Banamex and the Mexican Civil Council for Sustainable Forestry.

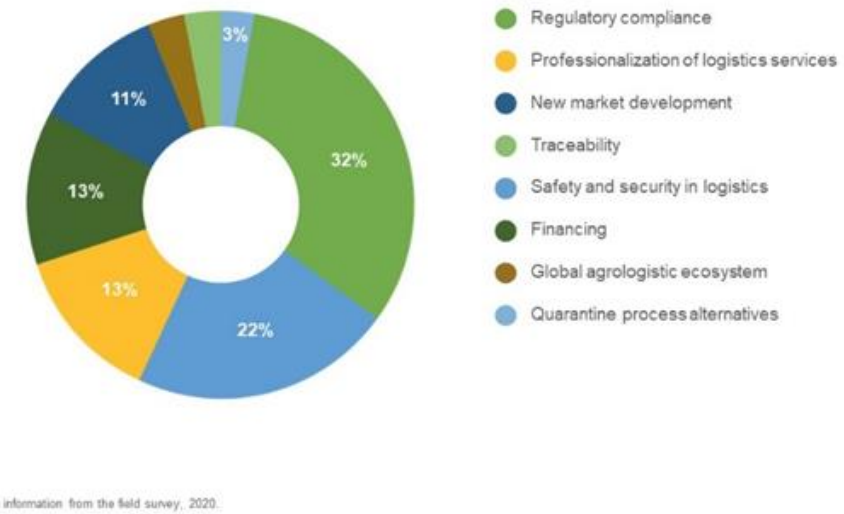
Circularity: the last theme identified as priority. Only very few interviewees indicate the theme of circularity and/or sustainability as a priority. This can be partly explained by the fact that this topic is a public value and the lack of awareness around these topics limited dissemination of good practices and organizations that act as leaders of public-private initiatives in this area. Few companies have committed to a long-term strategy in this area. One example comes from Coca-Cola's #WorldWithoutWaste program, which includes goals in terms of (100%) recycling, reducing overall carbon footprint, and improved human rights in all their chains.

Food security, as a transversal issue to all the identified topics, plays a vital role in these times of pandemic. The academia sees the need of the Agrologistics Platform 2030 project to place great emphasis on greater traceability of value chains with information (and access to information) from the point of origin of the products to their consumption. In addition, they also considered a stronger focus on inclusive value chain important, with greater emphasis on coordination and participation of local actors. The private sector, on the other hand, is focused on strengthening its production processes to achieve the safety standards required by the international market – not necessarily food security for the internal market. This is the case for the members of the Mexican Association of Honey Exporters; Chayote Producers

and Exporters; Export Mango Packers and the National Association of Citrus Processors, which together with other actors consider this element to be a medium priority.

4.2 Reflection on other priorities identified by the private sector

In addition to the six key themes, several other important priorities are identified with regulatory compliance being most common. As can be seen in Figure 15 the 'Others' category represents the 6th of the priorities identified by the interviewees. It is interesting to note regulatory compliance is listed as a big priority, following by Security in logistics.



oration with information from the field survey, 2020.

Figure 15 *Other identified problem (Source - Own elaboration with information from the field survey, 2020)*

i. Regulatory compliance was mentioned as an important topic to be contemplated. Based on the analysis of the comments gathered during the interviews, regulatory compliance should be analyzed from two angles. The first angle concerns the lack of national culture regarding the alignment of best operational practices and the Federal Government's lack of efforts to raise awareness on this issue. Although the regulatory framework exists, the national sector is unaware of the scope and impacts to which they are subject in the market. CANACAR suggests that it would be good to link the regulation with the transport companies so that they can comply with it, that they know all the regulatory standards and adhere to them. The Mexican Accreditation Entity (EMA), reiterates in the diffusion of the new changes in the law, above all by the New Quality Infrastructure Law in Mexico to avoid falling into regulatory non-compliance.

   Second, the change in the rule of law both nationally and internationally, on the issue of certification of products available in the markets. Cases of corruption in the granting of quality certificates are reported. As already mentioned, regulatory compliance and certification of products and processes is only reactive when starting the process of exporting to the United States, mainly. In addition, irregularities have been detected in the certification procedure, such as the case of the Mexican Association of Honey Exporters. (AMEMAAC), which reports corruption in obtaining certifications at a national level, mainly for organic products.

ii. Security in logistics: This topic is intricately linked to the infrastructure problems that occupy the first place in the project's 'Ranking of Priorities'. The opinion of interviewees considers that security during the transport is highly susceptible to risks of theft. Road safety is an important aspect for the company Coca Cola, in fact, they have already detected several points in the country where there are major incidents of theft from trucks: in Guanajuato (Celaya and Villagrán), Puebla-Veracruz, Sinaloa, Reynosa and in some parts of the metropolitan area of the country's capital.

   For its part, CANACAR has identified that in the Puebla-Veracruz section, 80% of the robberies occur. Other dangerous corridors are Mexico-Querétaro-Guanajuato, in addition to Reynosa and the south due to the movement of hydrocarbons. They recognize that there are no safe inns, nor is investment being made in them, and the cargo is being put at risk by organized crime.

iii. Professionalization of logistics services: Agrologistics merges 2 of the sectors with the most economic activity in our country, namely agri-food sector and logistics. However, it is important to point out that a very small

percentage represents the actors who have managed to professionalize their production and service processes at a significant level in order to strengthen each other. In this sense, the issue of professional and vocational training of infrastructure is considered vital, with emphasis on those in direct contact with the cargo. Addressing these issues would be an interesting way to reduce the risks and accidents of cargo during the journeys to export destinations.

At this point, we refer to the issue detected by Cargill regarding irregularities in the rules on weights and dimensions, which put them at a competitive disadvantage in the market against companies that do not respect national legislation and use unprofessional carriers.

In this sense, the Mexican Association of Freight Forwarders, A.C. (AMACARGA), in their role as logistics architects, recognize and have experienced the need for training and professionalisation of logistics providers in the supply chain. They believe in the urgency of implementing a logistics planning model in conjunction with shippers, since there is a serious coordination challenge in order to achieve a more efficient operation.

iv. Financing: Cash flow problems, mainly among SMEs, have increased since the COVID pandemic. However, organizations such as COFOCE have set up new projects to disseminate information and strategies to mitigate the financial risks for companies in Guanajuato. Through the State Secretariats, efforts are being made to promote the use of public funds to support the most affected small and medium enterprises.

v. Development of new markets and a global agrologistics ecosystem. We already mention this, but in term of new markets, the state of Guanajuato by COFOCE has reported that there is a need for a strategic strengthening of the commercial efforts of Mexican companies abroad. This is partly related to the lack of a national body to promote and facilitate the export position of Mexico. In this sense, COFOCE has implemented support strategies for companies in Guanajuato that wish to enter the international market through the promotion of exportable supply via e-commerce and trade missions, as well as strategic relations with national embassies abroad.

Another significant example is the work carried out by the Export Mango Packers (EMEX), which through an analysis of the marketing of their products abroad, have detected the need to implement a commercial reengineering project to strengthen and ensure the accuracy of Mexican mango exports. In fact, they have already initiated efforts to represent their associates in export destinations through trade fairs and trade missions.

vi. Traceability: There is no doubt that traceability is receiving increasing attention in the agricultural sector. However, the lack of information technologies in the sector that automate and provide timely information makes traceability a major challenge. In this sense and taking into account the new regulatory and cultural schemes that the pandemic has accelerated in international markets, this issue has regained importance within the actors and is considered part of the work in the medium term.

Syngenta considers that, when developing the issue of digitalization for traceability, the industry could use sensors and satellites (by means of coordinates) to prevent pests, fertilize more accurately and thus make the issue more efficient.

vii. Quarantine process alternatives: Although the Export Mango Packers' Association (EMEX) has pointed out the need to install an irradiation plant at some strategic point in the country, the Chayote Producers and Exporters and GRIVER Group also find it interesting to explore options that provide agility and guarantee the safety of products exported from origin.

4.3 Solutions identified by actors

Given the priorities identified by the actors, the solutions they propose focus on technical, technological and regulatory framework aspects. As can be seen in Figure 16[7], the solutions that were collected from the interviews focus on technical, technological and regulatory processes, and it is interesting to note that financing, investment and market solutions are considered less of a priority by the actors interviewed.

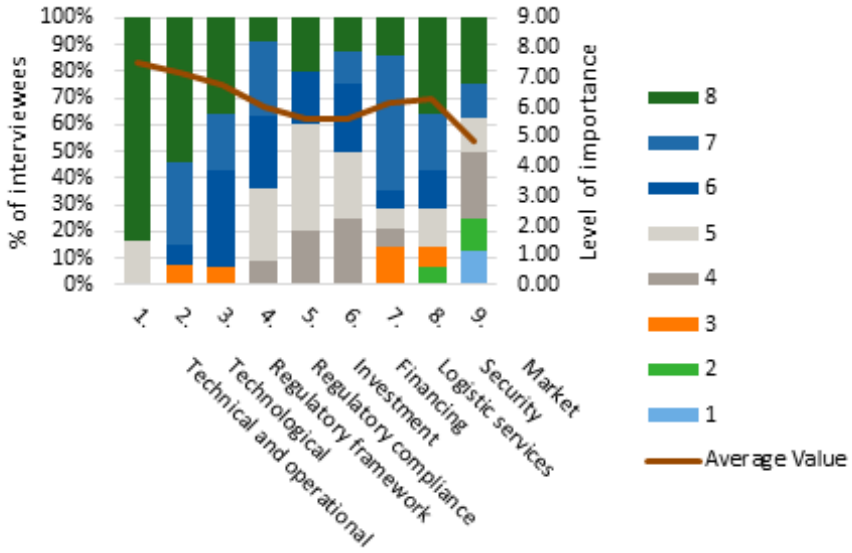


Figure 16 *Solutions to the identified problems (Source - Own elaboration with information from the field survey, 2020)*

Some examples of the solutions that were mentioned to us in the interview process are:

i. Technical: In Syngenta's opinion, customs agents need to be trained to speed up the trade processes, border checks need to be expedited and inspection points need to be set up at origin, document checks are very late, and flows are slowed down. In Coca-Cola's opinion, it is important to professionalize and train human capital in the agrologistics sector. Certifications are expensive, so many producers cannot access them, and all knowledge must be permeated into the sector through direct collaborations with companies and academia. Another example of the solution mentioned by this company is the coordination and union of producers to access training and certification with the aim of reducing costs.

ii. Technology: The issue of digitalization for traceability needs to be developed. Use sensors and satellites (by means of coordinates) to prevent pests, fertilize more accurately. CANACAR indicates that it is important that the entire guild migrates to the use of information technology. For example, it is important to have systematized technology to program loads before departure from origin and in this way logistics costs would be greatly reduced.

iii. Regulatory framework and compliance: CANACAR and AMF suggest that inspections should be at source and not at destination, this is resolved by creating a comprehensive regulatory framework. It is reported by suppliers and companies in the sector that on many occasions shipments are stopped for hours, mainly at the border with the United States, and that procedures with health and trade authorities are slow, which puts the goods at risk. They suggest having inspection points in the interior of the country so that they do not have to stop for days, at the border, to carry out checks. GRIVER and Producers and Exporters of Chayote suggest that

[7] Graphic with Likert scale. Each column represents a priority theme, and the order of the bars corresponds to the average level of importance obtained according to the prioritization of the aspects of the actors interviewed. The colors represent the percentage of mentions in the interview. Scale: 8 (brown) = Very important, 1 (blue) = Minimal importance the gray line crossing all the bars indicates the average response of the interviewees regarding the level of importance of each topic.

inspections be carried out in port to facilitate all conditions of the cold chain at the loading points so that the shelf life of the products is not compromised.

In Syngenta's opinion, the regulatory framework in Mexico is an obstacle to its operations. Prohibitions on some herbicides and agrochemicals have affected the industry, however, if food self-sufficiency is to be achieved, it is necessary to make use of these inputs to achieve good yields.

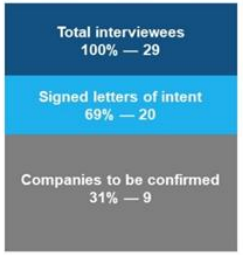
The COVID 19 Pandemic has reconfigured the priorities within organizations providing logistics services. During the COVID pandemic, the issues that became more relevant were food security, traceability and financing, mainly for small and medium producers.

The logistics and distribution of agri-food products became essential for food security, but CANACAR reports that because of the COVID 19 pandemic, freight rates decreased, for example, from five to three per month. In addition, the shortage of trained truck operators came to light, and that is why companies are now beginning to place greater value on the operational capacity of their workers. In addition, measures have been increased to prevent contagion.

Security in communication channels is vital so that the supply chain is not disrupted. Another important aspect of the country's current situation is the increasing importance of food banks such as BAMX. The number of people depending on the food bank has increased because of the economic crisis. In the Food Bank's view, the priorities for rescued and purchased food have become more acute, and the need for transport at preferential rates or donation services has increased considerably.

4.4 Collaboration and participation of the private sector in the agrologistics platform

In response to the question to the interviewees of: Would you company be interested in participating in a private sector leadership group to advise on? An agenda of required actions, Coordination of the required actions together with the government and scientific institutions and Monitoring and evaluation of the actions carried out and initiation of new actions; 69% (see Figure 17) of the interviewees responded positively, an aspect that is relevant to lay the foundations with the private initiative to have a governance and representation body of the agrologistics platform.



Source: own elaboration with information from the field survey, 2020.

Figure 17 *Acceptance to form leadership group (Source - Own elaboration with information from the field survey, 2020). As of the date of this report, there are 20 formalized letters of intent to form the leadership group*

4.5 Consejo Nacional Agropecuario de México (CNA) as leader of the platform

Consejo Nacional Agropecuario de México (CNA) is appointed as the leader for the Agrologistics Platform. The CNA, through the Vice presidency of Agrologistic, was designated in May 2019 to be the leader as the initiative taker to form the Agrology Platform. In this regard, it is important to put into context the role of the CNA in the sector; it is a national civil association with voluntary membership that reports to the Business Coordinating Council (CCE). The objective of this Council is to represent, defend and promote agricultural activity. It is made up of producer organizations and companies from the agricultural, livestock and agro-industrial sectors.

CNA is organized through a general assembly, a steering committee, an executive committee and working committees. CNA is governed by a statute that is executed by the President of the Council, Vice-Presidents, a Treasurer, a Secretary and Council members.

CNA Governance bodies

- **General Assembly**: This is the supreme body and is made up of the Members and Associates.
- **Steering Committee**: This is the body responsible for directing the CNA, and is made up of the President of the Council, who will also be the President of the Steering Committee, the Vice-Presidents, a Treasurer, a Secretary and Council members. The Steering Committee is composed of 75% of Associate members and 25% of Associate members, who serve for one year.
- **Executive Committee**: This is the body headed by the President and is responsible for implementing the general action policies set by the Steering Committee, proposing long-term strategic actions and specifying the work of the production chains based on the coordination of the sectoral vice presidencies. The structure of the Executive Committee consists of the President, Secretary and Treasurer. And the Vice-presidents.

Working Committees: The Working Committees act as coordination, consultation and decision-making bodies. The working committees aim to act as bodies to generate management, consultations, projects and initiatives; to define actions or institutional positions and recommendations, to promote them and to follow them up with the Executive, Legislative and other bodies. The Commissions are chaired by the respective Vice Presidents or Coordinators. Currently, the National Agricultural Council has 27 Vice-Presidencies and 21 Working Committees focused on different themes of interest to the sector, which are listed in Annex 7.

4.6 Private sector leadership group

CNA will lead the group of experts who will propose solutions as input for the Agrologistics Agenda with a 2030 horizon. With the aim of adopting a top sector model like the Dutch one (see Chapter 3), the CNA will lead the group of experts who will propose solutions as a contribution to the Agrologistics Agenda with a 2030 horizon. To establish an Agrologistics Platform with a 2030 horizon, the business sector, headed by this Council, will form a Leadership Group that will seek to coordinate solutions to the challenges of Agrologistics in Mexico. This Leadership Group aims to be a governance vehicle that facilitates decision making in the private part of the agrologistics sector, and in turn be the representative in the Mexican top sector model in case it is feasible to implement it. Figure 18 shows the interaction of the leadership Group and its possible key functions to strengthen the strategy of a top sector model in Mexico.

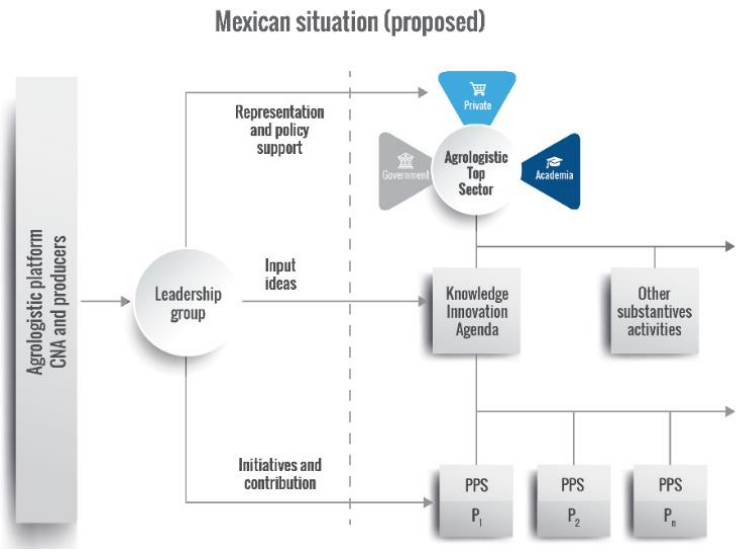


Figure 18 *Interaction of the Leadership Group in the top sector Ecosystem proposed for Mexico (Source: Own elaboration)*

The mission of the leadership group is to improve the competitiveness of the export sector and to meet growing domestic demand. The Leadership Group's mission will be to improve the competitiveness of the agri-food sector and, therefore, the food security of Mexico's growing domestic demand. The Leadership Group will do this by focusing on the agrologistics platform, creating strategic alliances that promote the sustainable development of agrofood chains and through a commitment to joint collaboration. The vision of the Leadership Group will be to lead Mexico to be a global agrologistics platform.

It is important that the Leadership Group encourages public-private attention to the needs of each type of producer (small, medium and large) in a constant and permanent manner, as described in its 2030 vision. The generation of inclusive models through the agrologistics platform can reduce the gap

between producers in Mexico. The models can be promoted through public-private initiative projects; one recommendation is that they be governed by the basic principles or drivers identified by FAO-FIDA[8] for developing inclusive value chains, which are summarized below:

a. Market-based approach to chains (analysis of demand for a given product to include additional producers before launching an initiative).
b. Promotion and involvement of models with all private stakeholders (primary traders, processors, wholesalers and retailers such as supermarkets).
c. Promote the professionalization of producers. Creating and promoting the organization of producers facilitates their integration into value chains and improves their bargaining power when dealing with private actors. In order to expand the scale of value chains, it is important to work with the government to formulate the appropriate regulatory framework that will translate into public policies to encourage this.
d. Empower producers in decision-making through professionalization to ensure that the results of value chains are sustainable.

FAO, through FIRA, identifies that in order for value chain scaling-up initiatives to exist, four types of partners must be involved (4P's model): i) the private sector; ii) producer organizations; iii) donors; and iv) governments at different levels. The interaction of these 4 types of partners or actors is not simple and not only involves injecting economic resources, but there must also be willingness and incentives to access knowledge and take advantage of the parties' capacity to influence and reach.

This 4Ps mechanism identified by FAO and IFAD can be a tool for institutional innovation to attract private sector partners and can be led through the Agrologistics Platform Leadership Group.

The first objectives of the Leadership group are to develop a private sector agenda, design and implement pilot projects and promote innovation, research and development of human capital. The first objectives to be achieved by the Leadership Group are:

1. Develop a private sector agenda, facilitated by the CNA, which will serve as a first step to subsequently generate a joint agenda with the public and academic sectors.
2. Design and implement pilot projects for the integration of inclusive agri-food value chains.
3. Promote innovation, research and development of human capital.

The figure of the leadership group will be supported by the statutes of the CNA, therefore it can be adopted as a working committee focused on Agrologistics, where the Vice-president of Agrologistics will chair the group.

Two examples of potential projects are shown below:

[8] Sustainable inclusion of small producers in agricultural value chains, International Fund for Agricultural Development, 2016.

Potential project – Avocado export supply chain

Mexican producers seek to increase export volumes to e.g. the European Union. Some of the challenges are consistency in quality, meeting societal and environmental standards, and optimal logistics.

Figure 19 *How to get consistent quality?: from heterogenous (left) to equal ripe avocados (right)*

There is a need for standardized postharvest protocols, (societal) certification, and optimal infrastructure in order to meet the requirements at point of sale.

Figure 20 *Challenges: identify optimal picking time for long distance transport and temperature control.*

Mexican producers, packers and traders are eager to improve their processes and besides that willing to invest time and money in collaboration with the public sector and (international) knowledge centers. In 2020 this is underlined in several webinars, resulting in this project idea.

Mexican producers, packers and traders are eager to improve their processes and besides that willing to invest time and money in collaboration with the public sector and (international) knowledge centers. In 2020 this is underlined in several webinars, resulting in this project idea.

Figure 21 *During webinars stakeholder explained their challenges and expressed their willingness to collaborate in public-private-partnerships (left). This resulted in a project outline concentrating on certification of (small) farmers, avocado quality and optimal agro-logistics*

Potential project 2- Honey supply chain

Mexico is positioned as the third largest honey exporter worldwide. In 2020, international sales of Mexican honey increased 3.3% over the previous year, with a value of USD 65.37 million. The main country that buys Mexican honey is Germany, where Europe accounts for 40% of the destination of Mexican honey. Other countries that consume a significant volume of Mexican honey are: United States, United Kingdom and Saudi Arabia.

National production amounted to 47.7 thousand tons in 2020. Yucatan is positioned as the main national supplier, with 9.8 thousand tons, representing 15.8% of the national total. Jalisco (5.7 thousand tons), Campeche (5.4 thousand tons), Veracruz (4.5 thousand tons) and Chiapas (4.2 thousand tons) also stand out.

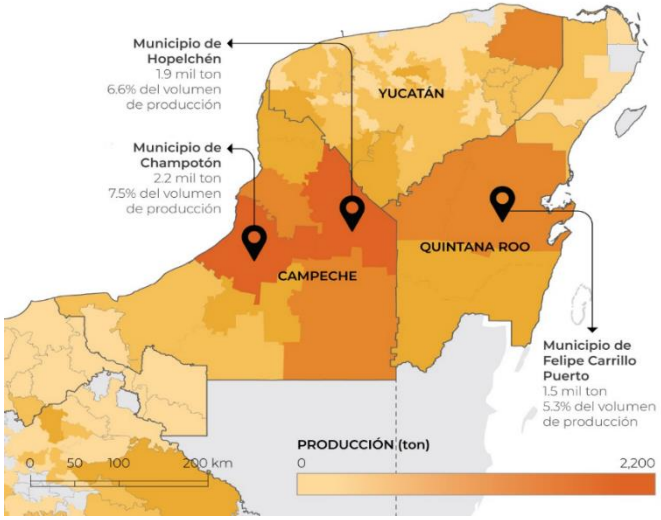


Figure 22 *Honey production in Southeast Mexico, 2020.*

This sector has opportunities to continue growing at the international level, training, technification and sustainability aspects for the care of bees are essential to be considered in public-private-academia projects.

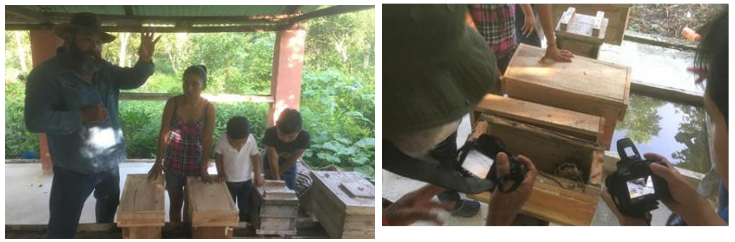


Figure 23 *Producers in the Yucatan Peninsula, 2020.*


5

5 Conclusion: Top sector potential in Mexico

Using an Agrologistics Platform has potential to increase Mexico food export and domestic food security.

The overall objective of this (research) collaboration is to improve agrologistics, in order to unlock the potential of the agri-food system and to make Mexico a global agrologistics platform that will enable Mexico to be one of the top five exporters of agri-food products in the world. In this section we will apply the learnings derived from the Dutch top sector model, including its origin, major successes and potential pitfalls. These learnings will be reflected on the Mexican context, to evaluate the potential of implementing a Mexican top sector model for agrologistics.

The collaboration between government, private sector and knowledge institutes in Mexico is developed to a lesser extent than it was in the Netherlands when the top sector approach was implemented.

The establishment of the Dutch top sectors is the result of a process of almost 10 years, in which government, private companies and knowledge institutes increased their collaboration. This paved the path for the top sector model, a policy of the government, to focus its research funds on a limited number of strategic themes. These strategic themes are knowledge areas in which the Netherlands is strong or envisions to develop towards and simultaneously addressing societal needs. The approach envisions to become world leading on the strategic themes, this through strengthening this public private partnerships in market development, applied research and development.

The collaboration between government, private sector and knowledge institutes in Mexico is developed to a lesser extent than it was in the Netherlands when the top sector approach was implemented. When implementing a top sector model like in the Netherlands, this has to be taken into consideration, as the collaborative approach is key for the success of the top sector model. For Mexico it is therefore envisioned that stronger collaboration needs to be built over time, increasing the trust between parties, creating an environment and willingness to collaborate in public private partnerships.

A clear desire for a stronger collaboration exists among the private sector themselves in the Plataforma Agrologística.

A sweet spot analysis was conducted, comparing the strategic agendas of the sectors represented in a top sector; government, private sector and knowledge institutions. High level alignment was found on all agendas on six themes, namely:

- managing food loses to reduce waste and promote circularity
- integrating smallholder producers into sustainable agri-food chains
- investing in public goods in the form of intermodal transport and logistics infrastructure
- better access to training and certification programs
- better access to cold chain storage and logistics services
- increasing food & nutrition security.

Despite the conceptual alignment on topics, the three stakeholders still operate in silos, and are not yet used to working together, and partnering up.

Zooming further into the agendas, it is observed that all parties do have their own interpretation on how these strategic themes are to be met and hardly any overlap was observed in the action to execute the agendas. Key to the implementation of the top sector approach, is further alignment of the agendas of all parties, to be able to mutually invest in the research and development of strategic themes, in which all parties play a role. On the positive side, comparing the agendas identified the high level common interest on themes and the leadership interviews showed the willingness to build stronger collaborations between the government, private sector and knowledge institutes: this with the goal to stimulate agrologistics developments to reach the mutually identified goals. The top sector approach for agrologistics in Mexico envisions both to stimulate economic activity of the private sector and simultaneously addressing societal needs, such as rural development, food and

nutrition security and reducing food losses. This would require a public private agenda for research, development, loans, subsidies and tax reliefs for agrologistics investments, in addition to reducing administrative burdens.

The financial sector, particularly the development banking agencies, could play a critical role in facilitating funding schemes and aligning the private sector objectives with the government's mission-driven development agenda.

Credit loans could be the single-most efficient means to integrating all participants. According to information from the National Agricultural Survey (2017), of the 5.32 million REUs characterized by FAO, only 9.9% had access to credit or loans; a figure that represents an opportunity to generate targeted strategies to address the 90.1% of this target population, and to strengthen the primary sector as a whole. The key challenge for a strategic agenda that is based on the triple-helix approach would be to address the needs of the different target groups, by integrating all actors into sustainable supply chains. In this scenario, the more mature commercial actors and market-integrated producers would receive incentives to invest in the development of smallholder supply networks with the participation of the public and knowledge sectors, into a win-win situation.

Working on pilot projects for joint strategic themes with actors from the triple helix will help to build networks, trust and experience.

One suggestion to build stronger collaborations over time, is to already start bottom-up initiatives (pilot projects) together with parties from the triple helix. This will help to gain experience, make the success of this approach visible, but also to further align the interests of each party and identify potential pitfalls. This will serve as a stepping stone and lower the threshold to roll out the governance structure more broadly. The Dutch top sector approach covers nine strategic themes, which all have their individual knowledge and innovation agenda (KIA). From this perspective, when the top sector model is chosen for Mexico, it is required to set the strategic focus for Mexico as well, on themes in which Mexico want to invest in mutually and strategically excel.

The private sector is clearly willing to collaborate on pilot projects for joint strategic themes with other private sector partners and with actors from the triple helix.

100% of the actors interviewed agree to participate in a Leadership Group to carry out participation, coordination and cooperation activities; as of the date of this report, 69% of the formalized letters of intent have been received. The interviewees are willing to collaborate in the working groups, to design and formulate the agrologistics strategies and projects determined by the Agrologistics Platform. This is of major importance since the Mexican private sector is not used to work together in such a way. This is a great perspective and incentive to work in a new cooperation model. Within the formalized letter of interest, they expressed their interest in participating in the formation of the Leadership Group, meaning that each actor will designate a person who will act as an institutional link in the implementation of participation, coordination and cooperation activities, as well as in the working groups, in order to design and formulate the agrologistics strategies and projects determined. National Agricultural Council (CNA) will take the lead in the further development of the Agrologistics Agenda 2030.

Cuts in government spending for R&D, investing in research on important societal issues or improved collaboration between the three key actors may incentivize a new cooperation structure, like a top sector approach in Mexico.

A reason the top sector approach has been initiated in the Netherlands, was the reason that the government wanted to cut the R&D budget significantly and, simultaneously, expected more private sector investment in mission-driven research. Another reason was to have a stronger focus on a limited number of themes important for the Dutch economy and society. This motivated the development of the top sector and the development of a mutual agreed Knowledge and innovation. The question arises, what the strategic motivation of the parties in Mexico would be to roll out the top sector approach. Such motivations could be threefold. First, more strategic allocation of government spending on R&D might be a good incentive for Mexico, one of the trigger points are the current cuts in research funds in these times of corona crisis and fluctuations in oil prices. Second, also the research topics for societal issues like reduction of food losses and waste, climate change, food safety, healthy food in relation to obesity, sustainability & circularity are becoming more relevant for the private sector to take into account and to invest in. Third, another motivation is the call from the private sector for improved cooperation with the government and research institutions. The last 5 years Mexico has developed well economically, but there are enough challenges that the business community cannot solve on its own and is therefore willing to invest in this together with the other stakeholders. The interest in participating in the Agrologistics Platform shows that the private

sector is ready for more intensive private-private and public-private collaboration, through atop sector approach.

A high level of trust is required, as many stakeholders from different institutions will depend on each other, and bottom-up initiatives (pilot projects) of the tripartite cooperation will help to build this trust.

The co-operative nature of the Netherlands and particularly of the agricultural sector, for with trust is a crucial factor, has helped in the forming of the top sector approach. Mexico is not familiar with such a co-operative nature. Also for this issue it would be interesting for Mexico to already start bottom-up initiatives (pilot projects) of the tripartite cooperation, to show that trustful relations can be made and maintained. Then, it will be easier to roll out the governance structure more broadly.

The Dutch top sector model requires mutual investment by public and private sector and there are already positive signs by the Mexican private sector on the willingness to do so.

The Dutch top sector approach is based on mutual investment of both the private and public sector in research. These investments entail monetary contributions and in-kind contributions of working time and facilities of companies. In the Dutch knowledge and innovation contracts intentions of commitment are included. These are key to the success. The Mexican private sector organized in the Agrologistics Platform has shown their commitment in the interviews performed. They want to take the lead in setting up an strategic agenda. A stimulation for a partial move towards more applied research (TRL 5-7) with a private commitment in cash and in-kind (40-50%) is recommended.

Including representatives of micro and small holders in the governance structure is key for the success of a top sector approach, since SMEs are the engine of innovation and job creation in the economy.

The Dutch top sector approach embraces the position of all companies in the Dutch economy and the selected strategic themes. To stimulate participation of SMEs in the Dutch top sector, the SMEs have a special position and remuneration in the organization as well as for specific instruments. The policy of the current Mexican Administration is strongly focused on micro (E2) and small (E3-E4) farmers, especially in the southern states of Mexico. Therefore, special attention is required to include representatives of them in the governance structure as well as in the specific instruments in a Mexican top sector approach.

Generating inclusive business models in all links of the chain is a priority for companies in Mexico.

A more integrated value chain, encompassing all producers in the chain, is necessary to increase the level of professionalization and added value. However, these efforts stand alone and are isolated initiatives. There is a lack of sector leadership to coordinate an impact strategy for implementing inclusive models in supply chains. An example of an inclusive project is the project of the company Berries Paradise, which works with a system for the development of suppliers in all regions where they are located, in a win-win model. Another example is that of the State Coordinator of Coffee Producers of Oaxaca (CEPCO), which promotes the inclusion of all its producers through the project 'Obio Commercial Initiative: sustainable products and communities', with the aim of opening up market channels for high quality products made by small producers. It is a project promoted by 24 campesino organizations so far, in alliance with Tienda UNAM, Fomento Social Banamex and the Mexican Civil Council for Sustainable Forestry.

Mexico seems ready for a new way of collaboration between government, private sector and knowledge institutes (triple helix), thereby working towards a Mexican top sector approach in the agri-food sector.

The momentum seems to have arrived now. Mexico's agrologistics potential is great, as are its social and economic challenges. No single party can solve the problems alone. A new way of cooperation is needed between the private sector themselves in the Plataforma Agrologística, and between government, and knowledge institutions, creating an innovative and sustainable agri-food sector that can meet domestic demand of nutritious fresh food and will play a major role in world trade in agri-food products.

Mexico would benefit by starting to design a joint vision and Knowledge and Innovation Agenda, that is supported by all parties of the triple helix.

There are 3 basic documents underpinning the objectives of the Dutch top sectors: the Knowledge and Innovation Covenant ('KIC'), the governmental Mission Driven Top sector and Innovation Policy ('Missions') and the Knowledge and Innovation Agendas ('KIAs'). In order to establish a top sector model, Mexico should start to design a joint vision and Knowledge and Innovation

Agenda, initiated by the private sector and supported by all parties of the triple helix. That is the basis. The next step is agreement between all parties to commit themselves in terms of willingness, financial means and in-kind contributions in a Knowledge and Innovation Contracts. These are key to success for two reasons. First, one of the tangible goals of the top sector policy is to maximize funds for research and innovation on strategic themes. Second, commitment is very related to trust, which harbors a fruitful relation. In a later stage, after a couple of year operating of the top sector model, the government might see the need to increase the focus on societal issues, which can be described in Missions, that will be the guidelines for the next KIA. In the Netherlands the top sector approach is evaluated every three years to determine strategic adjustment to it governance.

Mexico best starts the next phase with bottom up public-private partnership and simultaneously challenging research institutes to partially move to more applied research.

In moving forward we formulated seven recommendations:

1. Start simple: We propose to start with the single theme of agrologistics within the agri-food sector. There is great support for this from the private sector, CNA, FOCIR and possibly also SADER. Especially the commitment of the private sector is clearly visible in the setting up of the Agrologistics Platform
2. Start bottom up. Create PPP constructions through pilot projects and show that this is successful. From this project-based approach you build trust, which is the basis for a structure as a first step towards a top sector structure. These pilot projects can be identified in the first knowledge and innovation agenda (KIA), supported by all parties of the triple helix.
3. Combine long term vision with small first steps. For the big picture, look at the long term and for small steps in the short term. It takes confidence and a long term strategy to introduce a top sector model.
4. Start with two party collaboration between private and public sector. The commitment of the Knowledge institutions is not clear still on the topic of agrologistics. It seems that the needs of the private sector are more investment oriented than innovation oriented. That is why we advise starting with PPP between the government and the private sector as a necessity and if possible with the knowledge institutions.
5. Stimulating a partial move to more applied research. Simultaneously, knowledge institutes are required to be challenged to move part of their research from fundamental to applied, on themes relevant for the Platform. This relates to increased private sector investment in research projects with an increased technology readiness level.
6. Diversity of people in the top sector may have a positive impact, creating the image of the 'next economy'. Preferably the representatives must consists of associations of small and large companies, young and old persons, women and men.
7. A successful 'one-size-fits-all' model of the top sector does not exist, but keep it simple. Mexico is a much larger country than the Netherlands, with a multitude of states and governments, knowledge institutions, and companies. This can make the governance structure of the top sector more complex than the Dutch top sector governance model. The challenge is to find a good balance in simplicity while still representing the interests of a multitude of parties in the Mexican top sector model.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Annexes

Annex 1 Interview guide Top Sector

Questionnaire Top sector experts by experience
With the launch of the Top Sector Approach, in 2011, The Ministry of Economic Affairs (EZ) of The Netherlands, had adopted a definition of a new 'corporate policy'. In this approach, the business community, knowledge institutions and government work together to strengthen the innovation system and earning capacity of nine Top sectors. These Top sectors are areas where Dutch business and research centers occupy a leading position, worldwide. The Top sectors promote their interests through joint agendas in areas such as knowledge and innovation, internationalization, human capital, regional involvement and the reduction of regulatory pressure.

The Mexican public and private sector are interested in the Dutch Top sector model and its possible translation to the Mexican situation. WEcR and WFBR have been funded for a project (phase 1 of which is covered by the Inter-American Development Bank). The following research question must be answered:

Questions:

Involvement now and in the past:
1. How are you currently involved in the Top Sectors? Which Top Sector? Role / function / ....
2. How did you become involved in the Top Sectors?
   a. When was that?
   b. What was your role / function?
   c. How did the appointment come about?
   d. Is there a rotation obligation / reappointment?
3. Practical matters regarding your position:
   a. Do they receive compensation ?
   b. How much time do you spend ?

Reason
1. What was the reason for the start of the top sector approach?
2. Why was this model chosen?
3. What were the enablers and barriers?

What are obstacles or successes?
1. To what extent is the design of the Top sector approach suitable for achieving the policy objectives of government, industry and academia ? (Policy impact)
2. What are the bottlenecks facing the Top Sectors in strengthening and transforming their innovation system? What effort (collection of impulses) has been made to address these bottlenecks, what have the results been and how does this contribute to the development of the Top Sectors?
3. How do the revenues of the Top Sectors approach relate to the costs involved? (Efficiency)

What points of interest and recommendations do you have?
1. How can the effectiveness and efficiency of the Top Sector approach be improved?
2. What are the lessons learned?
3. What is your perspective on the future resilience of the top sector approach ?
4. What would be an alternative to the Top Sector Policy?

Mexico:
1. What do you advise us and the Mexican partners to transform the NL Top Sector model into a Mexican model?
2. Do you know of other foreign examples of the top sector approach?

Annex 2 List of interviewees Dutch Top sector

Sector	Name	Current occupation	Relevance
Academic	Ernst van den Ende	Managing Director Plant Sciences Group of Wageningen University and Research	Active as Captain of Science in top team of top sector Horticulture & Starting Materials: 2012-present
	Raul Bino	Senior Strategic Advisor Executive Board at Wageningen University & Research	Former Captain of Science in top team of top sector Agri&food: 2015- aug 2020
	Charon Zondervan	Program coordinator Environmental Sciences Group	Former Coordinator of Knowledge and Innovation Agendas of TKI Agri&Food 2013-2017
Public	Marcel J.A. de Groot	Secretary top team of top sector Agri&Food, Ministry of Economic Affairs & Climate	Secretary top team Agri&Food 2011-present
	Peter Paul Mertens	MT-member Strategy, Knowledge & Innovation at Ministry of Agriculture, Nature & Food quality (LNV)	Support to LNV representative in top team Horticulture& Starting materials and Agri&food: 2016-present Senior coordinator top sector: 2012 Former chairman of the Dutch National Science Agenda 2017
	Guido Landheer	Director International Agro-economic Affairs at the Dutch Ministry of Agriculture, Nature & Food Quality	Director Top sectors & Industrial Policy: 2011-present Former Program director top sectors 2011
Private	Richard Schouten	Director at Fresh Produce Centre (*GroentenFruit Huis*)	Active as member of TKI program committees
	Fred Beekmans	Director Innovations at private company Darling Ingredients	Member of TKI board: 2019-present
Other	Hans Huis in't Veld	Chairman of the supervisory board Janssen de Jong Group	Former Chairman of top team of top sector Water 2012-2018
	Jaap Bond	Chairman Top team Horticulture & Starting Material	Chairman of top team of top sector Horticulture & Starting Material: 2019-present
	Kees de Gooijer	Chief Inspiration Officer of TKI Agri&Food and of TKI Biobased Economy	Chief Inspiration Officer of TKI Agri&Food and of TKI Biobased Economy: 2012-present
	Martin Kropff	Director CIMMYT, Mexico	Former Captain of Science in top team of top sector Agri&Food: 2012-2015

Annex 3 Invitation and agenda webinar CNA

WEBINAR

ALIANZAS ESTRATÉGICAS A TRAVÉS DE UNA PLATAFORMA AGROLOGÍSTICA PARA ENFRENTAR LOS DESAFÍOS DEL SECTOR

-Hacia un modelo de Top Sector agrologístico mexicano-

Martes 06 de octubre de 2020, 12:00 hrs.

Inicio	Final	Sesión
11:50	12:00	Ingreso de los panelistas a la plataforma
12:00	12:05	**Bienvenida** **Presentación y perfiles de los panelistas**
12:05	12:20	**C.P. Jorge Narváez (Vicepresidente Agrologística-CNA)** • Plataforma agrologística 2030 • ¿Cómo migrar a un modelo Top Sector Agrologístico? • Invitación a participar en el proyecto WUR-BID-FOCIR-CNA
12:20	12:35	**Mtro. Matthijs Montsma (WUR)** • Beneficios e impactos de Modelo Top Sector holandés
12:35	12:40	**Mensaje** Ing. Bosco de la Vega Valladolid Presidente del Consejo Nacional Agropecuario
12:40	12:45	**Mensaje** Ing. Javier Delgado Mendoza Director General de Fondo de Capitalización e Inversión del Sector Rural
12:45	12:50	**Mensaje** Excmo. Sr. Wilfred Mohr Embajador de los Países Bajos en México
12:50	13:00	Ronda de preguntas y respuestas
13:00	13:05	Conclusiones y palabras de cierre

Annex 4 List of interviewees Agrologistics Platform

LIST OF INTERVIEWS CONDUCTED		
NO.	COMPANY	SECTOR
1	National Chamber of Freight Trucking *Cámara nacional del autotransporte de carga* (CANACAR)	Private
2	Mexican Association of Railroads *Asociación mexicana de ferrocarriles* (AMF)	Private
3	Mexican Association of Honeybee Honey Exporters *Asociación Mexicana de exportadores de miel de abeja* (AMEMAAC)	Private
4	*Grupo la Moderna S.A. De C.V.*	Private
5	GS1 México	Private
6	Cargill México	Private
7	Syngenta	Private
8	*Grupo Herdez*	Private
9	Food Banks of Mexico *Bancos de Alimentos de México*	Private
10	Mexican Association of Freight Forwarders, a.c. *Asociación Mexicana de Agentes de Carga, a.c.* (AMACARGA)	Private
11	Mexican Coca-Cola Industry *Industria Mexicana de Coca-Cola (IMCC)*	Private
12	*Grupo Inversor Veracruzano* (GRIVER)	Private
13	Berries Paradise	Private
14	Coordinating Office for the Promotion of Foreign Trade of the State of Guanajuato *Coordinadora de fomento al comercio exterior del estado de Guanajuato* (COFOCE)	Public
15	Chayote Producers and Exporters *Productores y Exportadores de Chayote*	Private
16	Center for Economic, Social, and Technological Research on Agribusiness and World Agriculture *Centro de investigaciones económicas sociales y tecnológicas de la agroindustria y la agricultura mundial* (Chapingo - Ciestaam)	Academia

LIST OF INTERVIEWS CONDUCTED		
NO.	COMPANY	SECTOR
17	National Autonomous University of Mexico *Universidad Nacional Autónoma de México* (UMAN)	Academia
18	Mexican Accreditation Entity *Entidad Mexicana de Acreditación, a.c.* (EMA)	Private
19	Sonora Institute of Technology *Instituto Tecnológico de Sonora* (ITSON)	Academia
20	National Autonomous University of Mexico *Universidad Nacional Autónoma de México* (UNAM)	Academia
21	Minsa, S.A. De C.V.	Private
22	National Chamber of the Canned Food Industry *Cámara Nacional de la Industria de Conservas Alimenticias* (CANAINCA)	Private
23	Export Packers for Mango *Empacadoras de Mango de Exportación*	Private
24	Grupo Alpura	Private
25	Rainforest Alliance	Private
26	National Association of Citrus Processors *Asociación nacional de procesadores de cítricos* (ANAPROCI)	Private
27	Ministry of Agriculture and Rural Development *Secretaría de Agricultura y Desarrollo Rural* (SADER)	Public
28	Tomato product system *Sistema producto tomate*	Private
29	CEPCO	Private

Annex 5 Interview format

The purpose of this interview is to learn about the current situation of your company with respect to the theme of agrologistics, in order to identify gaps and opportunities that can contribute to create lines of action for the design of a strategic agenda that seeks to improve the agrologistics system in Mexico and make the agri-food supply chain more efficient.

1. In the area of agrologistics, what are the most relevant areas for your company's operations (storage infrastructure, cold chain, transformation, value added, distribution, certification, training, etc.)?

2. What aspects of agrologistics are priorities for your company? (Explain each one and prioritize according to the level of importance)
    1. Infrastructure and equipment ( )
    2. Business model for supply chain management ( )
    3. Cold chain management ( )
    4. Innovation, certification and training ( )
    5. Value added ( )
    6. Circularity, sustainability ( )
    7. Food safety ( )
    8. Other, which ones? ( )

3. What type of agrologistics solutions do you think are necessary for your company and why?
    1. Technical and operational
    2. Technological
    3. Regulatory framework
    4. Regulatory compliance
    5. investment
    6. Financing
    7. Logistics services
    8. Security
    9. Market

4. Have these priorities changed since Covid-19? How?

5. What specific actions are you taking to solve these and other problems?

6. Are you planning to invest resources (human, information, facilities, technological equipment, economic, among others) to solve these problems? In what time frame (short, medium, long term)?

7. In your business model, what are the areas of opportunity for a better integration of the supply chain?

8. Considering that the challenges can be addressed more effectively in collaboration, would you be interested in cooperating with other private companies, government, academic and research institutions to solve some of the problems mentioned above?

9. What associations does the company currently belong to and what actions in agrologistics matters have you taken as an association to solve any of the problems that have arisen?

10. Is there any other company/association that you think might be interested in being part of this initiative and to which you can refer us for further contact? (Name and contact)

Annex 6 Declaration form of interest to participate in a leadership group

DECLARATION OF INTEREST

Within the framework of the activities related to the 'Agrologistics Platform Mexico 2030', the present parties declare that they are aware of and agree with the following:

1. That the National Agri-food Council (CNA) and Wageningen University & Research signed a Collaboration Agreement on Agrologistics, formalized on December 13, 2018, following which they have identified multiple lines of action to improve the development of Mexico's agri-food potential. The vision is to lead Mexico to be a global agrologistics platform and provide healthy and sustainable food to the growing population. To achieve this, it is necessary to develop a collaborative Agrologistics Platform, with the following three general objectives:
   a. To favor a public-private participation approach by establishing a priority agenda for agrologistics with a 2030 horizon;
   b. Design and implement pilot projects and agrologistics information systems for the integration of agri-food chains;
   c. Promote innovation, research and human capital development in the area of agrologistics.
2. That key stakeholders in the agri-food sector recognize that agro-logistics is a priority area for the development, competitiveness and growth of Mexico's agri-food sector.
3. That given the geographic and productive advantages of our country, the development of agrologistics should be carried out in a structured, coordinated, immediate and priority manner.
4. That the leadership of the private sector is strategic in the development of agrologistics, for which reason the participation and collaboration of the private sector is necessary, and the exchange of information among companies and associations is of fundamental importance.
5. That the National Agri-food Council (CNA) will be designated as the head within the structure of the present initiative and will be responsible for integrating a Leadership Group, coordinating the agenda and the corresponding budget.
6. That it expresses its interest in participating in the conformation of the Leadership Group, for which it will designate a person who will serve as institutional liaison in the execution of the activities of participation, coordination and cooperation, as well as in the work tables, with the purpose of designing and formulating the strategies and agrologistics projects that will be determined.

NAME REPRESENTATIVE COMPANY	LIC. JORGE NARVÁEZ NARVÁEZ VICE-PRESIDENT AGROLOGISTICS NATIONAL AGRI-FOOD COUNCIL

Annex 7 List of CNA Vice-Presidencies and Commissions

Vice-presidencies	Commissions
1. Agriculture	1. Balanced feed
2. Fisheries	2. Cattle
3. Forestry	3. Pig farming
4. Agribusiness	4. Dairy
5. Fish and aquaculture	5. Sugar and alcohol industries
6. Horticulture and fruit	6. Agro-industrial competitiveness
7. Foreign trade	7. Aquaculture
8. Sectoral budget	8. Berries
9. Financing and insurance	9. Follow-up to the T-MEC
10. International relations	10. Financing
11. Institutional linkage	11. Risks
12. Public policies	12. Commercial practices
13. Production chains	13. Public-private partnerships
14. State councils	14. Midwest region
15. Fiscal	15. Northwest region
16. Hydraulic affairs	16. Central region
17. Standardization	17. Northeast region
18. Legislative liaison	18. South-southeast region
19. Communication	19. Rural area
20. Strategic inputs, innovation and technology	20. Animal health
21. Health and food safety	21. Research and technology
22. Vice-president of the CNA foundation	
23. Agrologistics	
24. Safety	
25. Labor welfare	
26. Government liaison	
27. Business liaison	

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Wageningen Economic Research
REPORT
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The mission of Wageningen University & Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 6,800 employees (6,000 fte) and 12,900 students, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.