2018 SCOPING MISSION IN GUATEMALA

FOOD SYSTEM, STAKEHOLDER ANALYSIS AND CLIMATE SERVICES ANALYSIS

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Cover Photo: Interactive exercise to identify sources of climate information, at the south-central MTA, held at ANACAFE in Guatemala City.

Credit: Elisabeth Gawthrop (IRI)

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Reference: Reports written by Carmen Gonzalez Romero and Jennifer Bradshaw during the summer of 2018 within the framework of Columbia World Project and ACToday project.

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INTRODUCTION

As part of the scoping mission of ACToday, Jennifer Bradshaw and Carmen Gonzalez Romero, two students of the School of International and Public Affairs (SIPA) of Columbia University, traveled to Guatemala in the summer of 2018 to analyze the ecosystems of the food chain and the climate services in the country. The objectives of this mission were to assess: 1) the policy landscape and the food system, 2) Climate Services available in the country, 3) the value chain of a staple crop and a cash crop.

The methodology used by the SIPA students included literature review as well as semi-structure interviews with local experts in agriculture, nutrition, food systems, climate services, officials from the Ministry of Agriculture and Livestock and Food, the Ministry of Environment and Natural Resources, the National Meteorological Service, local farming cooperatives and federations, international organizations, members of the Academy in Guatemala and focus groups with famers and local experts. Observational data from participation in agroclimate round tables and nutrition and health round tables were also taking into consideration for the purpose of the assessment.

This document summarizes the key findings and recommendations based on the research and field work developed during the summer of 2018 by the SIPA students.

COUNTRY OVERVIEW

Guatemala has the largest GDP in Central America[1], but it ranks number 10 in the world in terms of wealth distribution as indicated by the Gini Index. Guatemala is a predominantly poor country which struggles in many areas of development including health, malnutrition, education and literacy, and infant, child and maternal mortality. Guatemala has the fourth-highest level of chronic malnutrition in the world and the highest in Latin America and the Caribbean[2] and nearly half of the population is unable to afford the cost of a basic food basket. The average prevalence of stunting in children under five in the country is 46.5 percent, the highest in Latin America and the Caribbean, reaching 70 percent in some departments[3]. Almost a third of pregnant women in certain areas of Guatemala are anemic[4] and the anemic rate in non-

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[1] As per 11 June 2018

[2] Food Assistance Fact Sheet Guatemala, USAID, 2018, https://reliefweb.int/sites/reliefweb.int/files/resources/FFP%20Fact%20Sheet_Guatemala_09.30.18.pdf

[3] "Guatemala." World Food Program, 2018, www1.wfp.org/countries/guatemala

[4] Food and Nutrition Technical Assistance III Project (FANTA). 2015. Technical Brief: Micronutrient Malnutrition among Women and Young Children in the Western Highlands of Guatemala: What Are the Needs and What Can Be Done?

pregnant women varies from 19% (in the department of Petén) to 9% (in Guatemala City)[5]. Two-thirds of the overall population live on less than $2 per day and the country's large indigenous population is disproportionately impacted by poverty, 80 percent of them experience deprivation in multiple aspects of their lives, including food security, health and education.[6]

There are several factors that can be associated with such a high level of undernutrition. Firstly, the land distribution is among the most unequal in the world, with 2.5 percent of the farms in Guatemala owning two-thirds of the land.[7] Land rights triggered the Internal Armed Conflict, and it was also one of the main topics covered in the Peace Agreements singed in 1996. The tension among the actors of the conflict is not fully resolved yet as there is a great mistrust of the indigenous communities towards the Public Administration. However, a major achievement for the Mayan culture is the recognition of the Mayan Common Law within the Peace Agreements. It is usually applied at a municipality level in relation to issues regarding land, water, forest, meadows and other natural resources. Secondly the population, which is overwhelming rural and indigenous, is concentrated in the southern half of the country, primarily in the mountainous regions, making them extremely vulnerable to climate shocks and natural disasters.[6] Thirdly, the effects of climate variability have had severe impact on the livelihoods of small subsistence farmers, who rely on rain-fed agriculture. [6] The most recurrent climate shocks are caused by rainfall variation and temperature increase. These impact the sowing and harvesting season and the expansion of plagues and plant diseases like coffee rust and aflatoxin. Another significant factor to explain undernutrition is water availability and water quality.

Agriculture in Guatemala accounts for over 11 percent of its GDP and it employs one third of the population. The farmers' profile is predominantly subsistence family farming (approximately one million). The agricultural activity can be broken down into cash crops (typically sold as exports) or crops cultivated for domestic consumption (primarily staple grains such as maize and beans). While the agriculture sector has overall remained in a positive trade balance in most recent years, Guatemala still remains a net importer of staple grains such as maize and rice.[8]

Guatemalan legal framework to tackle malnutrition and to promote sustainable agriculture and economic growth is very extensive and complex- there are over 25 regulations and laws just

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[5] ENSMI 2014-2015

[6] Guatemala." World Food Program, 2018, www1.wfp.org/countries/guatemala

[7] Hurtado, Laura. "Land Reform in Guatemala." The New York Times, The New York Times, 29 June 2017, www.nytimes.com/2017/06/29/opinion/land-reform-in-guatemala.html?login=email&auth=login-email.

[8] "Trade Policy Review Report by the Secretariat Guatemala." Edited by Angelo Silvy and Martha Lara, World Trade Organization, World Trade Organization, Trade Policy Review Body, 28 Sept. 2016, www.wto.org/english/tratop_e/tpr_e/s348_e.pdf.

related to agriculture and rural development. Despite the legal complexity, there are several National Plans that needs to be highlighted due to their impacts on agriculture, food security and rural development:

- *2016 National Action Plan for Climate Change (PANCC)*
- *2016- 2020 Family Farming Program for strengthening of peasant-farmer economy (PAFFEC)*
- *2016-2020 Strategic Plan for Nutrition and Food Security*
- *2032 K´tun National Plan for Development*
- *2016-2020 Rural Agenda*

STAKEHOLDER ANALYSIS

Figure 1 is an example of the network map of the key institutions identified and assessed during this scope mission and their connections. We acknowledge that this is not an exhaustive list and that more institutions could be involved in the food system in Guatemala, and that the connections might be more complex than the ones represented in this map.

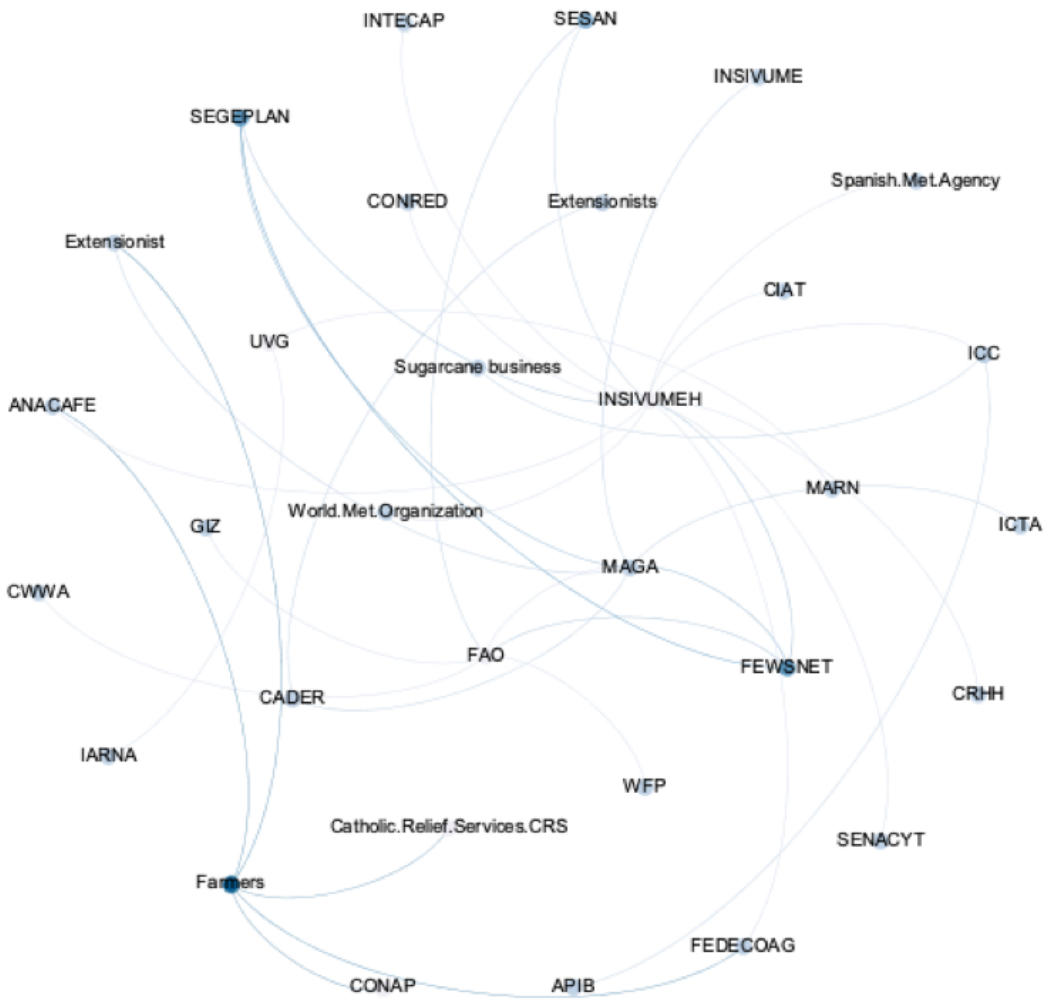

Figure 1: Network map of the relationship between the institutions assessed during the internship

CROP VALUE CHAINS

Coffee value chain analysis

Coffee is the major economic driver in rural communities. 20 out of 22 departments produce coffee and it is estimated that the livelihoods of about 300,000 families in the country depend on coffee.[9] The coffee industry employs 437,000 workers in Guatemala, which composes 7 percent of the workforce of the country.[10] Smallholder farmers represent 97 percent of the producers and they produce 47 per cent of the total production. The disproportionate poverty level among coffee farmers is driven by the small size of the land and the low productivity of the yields (60% lower than the international average). The low productivity is the result of farming practices and is highly exacerbated by the effects of climate variability and change.[11] Additionally, production costs for small holder farmers are 84.74 USD more expensive than the average in the country[12], which reduces the capacity of smallholder farmers to compete in the market. In order to survive, small farmers restrict their use of inputs and discount their own labor from the costs of production. Smallholder farmers do not have access to climate services and suffer the burden of the economic loss if the harvest is destroyed by a climate shock, earthquakes or natural disaster.

Since the 1970s, nearly 80 percent of the coffee produced in the lowlands moved to the highlands, and the lowlands coffee was replaced with sugar and other more profitable crops. This crop migration is a consequence of mixed factors: high vulnerability to coffee rust, consistently low prices in the international commodities market and increasing production costs. As a result, many farmers are forced to abandon production altogether or switch commodities.

Coffee production in Guatemala faces several different challenges, however the main threat is still considered the coffee rust. In February 2013, a phytosanitary emergency was declared as a consequence to a coffee leaf rust outbreak. This crisis generated disastrous consequences in terms of extreme poverty, food security and malnutrition, and rural unemployment and migration. According to the Ministry of Agriculture, 65,000 households of small coffee producers and 95,000 households of daily workers were affected, and the Secretary for Food

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[9] Cox, Sean, and Karla Tay. "GAIN Report - Coffee International Prices Do Not Cover Costs for Small and Medium Size Farmers.", United States Department of Agriculture Foreign Agricultural Service, 9 May 2018, gain.fas.usda.gov/Recent%20GAIN%20Publications/Coffee%20Annual_Guatemala%20City_Guatemala_5-9-2018.pdf.

[10] Keeps, Quinn."Improving Supply Chain Transparency, Monitoring and Accountability in Guatemala's Coffee Sector."Verité, 13 Jan. 2017, www.verite.org/improving-supply-chain-transparency-monitoring-and-accountability-in-guatemalas-coffee-sector

[11] Improving the Productivity and Sustainability of Smallholder Coffee Farmers in Guatemala: A Case Study of TechnoServe's Coffee Project in Sololá, Chimaltenango, and Socatepéquez 2012 – 2017." Mcdonalds, 2017, www.technoserve.org/files/downloads/case_study-improving-the-productivity-and-sustainability-of-smallholder-coffee-farmers-in-guatemala.pdf.

[12] Paulo de Leon, CABA, The Importance of Coffee in the Guatemalan Economy and the Present State of its Productivity and Sustainability, 2016.

and Nutrition Security (SESAN) registered approximately 160,000 householders affected. It is estimated that 71,527 people lost their jobs due to this crisis. In recent years, there has been an emergence and rise of coffee rust in areas of higher altitude (between 1,200-1,600 meters), with climate variability appearing to be the leading factor.

Despite the importance of the National Association of Coffee (ANACAFÉ) in the country, the business structure of coffee production in Guatemala is not as developed as in other neighboring countries due to issues of trust and history. ANACAFÉ was created with the aim of cooperating with the Government of Guatemala to protect the national economy in relation to coffee production and commercialization[13]. It is a private, public-service institution which represents the national coffee producing sector, promotes coffee abroad, issues export licenses and shipping permits, sets minimum prices, and verifies coffee quality. Cooperatives in Guatemala have a reputation for not being strong or popular, however Guatemalan farmers selling via intermediaries still receive a relatively good price for their crop, approximately 70- 85 percent of export price. Moreover, about 35 percent of small and medium-sized farmers are affiliated with the Guatemalan Federation of Agriculture Cooperatives of Coffee Producers (FEDECOCAGUA). This is the nation's largest coffee cooperative and works with 148 associations and independent cooperatives, which are primarily located throughout the coffee belt of Guatemala, being the vast majority of the affiliates, small producers of Mayan origin.

Milpa value chain analysis

Milpa plots combine maize as a centerpiece, interspersed with a second crop that varies from region to region, and which adapts to the geographic and climatological characteristics of the area. The most common combination is maize and beans due to its historical, cultural, economic and nutritional value. Milpa farming generates a proximate equivalent of 264,027 permanent jobs per year - equivalent of 73,927,683 daily wages.

Similar to what happened with coffee plantations, the center of maize production shifted from the flat and fertile Pacific piedmont, where the grain was traditionally cultivated by large-scale mechanized farmers, to the northern lowlands, where it is now grown by small scale farmers on marginal plots of land. This migration was driven by the combination of lack of public infrastructure, severe climate shocks, political turmoil and the internal conflict. Currently the farming land in the southern departments in Guatemala is owned by the sugar cane and palm oil industries, whilst the North of the country, particularly Petén and Alta Verapaz, now produces 24 percent of the total production of maize- despite its unsuitability for agricultural purposes. Bean production is characterized by subsistence farming spread all over the country, although over 60 per cent of the national production is cultivated in the North and East of Guatemala

[13] As per Guatemalan Decree-Law 19-69, a.k.a The Coffee Law

Milpa productivity has been very stable over the last decade, an average of 32 *quintales per manzana*[14] *per year* for each crop[15]. However, Guatemala still depends on international supply to meet its domestic demand for basic grains due to supply shortages driven by climate shocks and natural disasters. This dependency increases the country's vulnerability to fluctuation of global prices, in particular to Mexican prices, which highly impact the market of basic grains in Guatemala due to the high smuggling happening between the two neighboring countries. Both, affordability and availability of milpa impact food security in the country. The lack of economic means is also reflected in the high rates of chronic malnutrition. Although sufficient production nationwide might be available, consumers are not always able to purchase- especially in areas with high population where the price is higher.

The yield of milpa varies depending on several factors but most of all, it depends on the amount of water it receives throughout the phenological stages. With a clear influence of the Mayan culture, the rainy season defines the timing of the planting and also the timing and number of harvest seasons. Climate shocks like droughts, hurricanes, frosts or long "canícula" (mid-summer drought) periods have a great influence in milpa availability. In terms of frequency, recurring droughts and heavy rains are the main factors that constrain milpa productivity. Irrigation systems have not been implemented nor developed since the 80's due to the high cost of the infrastructure, the low margins of the milpa crop and the subsistence profile of the farmers. In 2015 and 2016, a huge part of the country experienced insufficient and erratic rainfall associated with El Niño. During this time, drought phenomena reduced the production of maize and beans for small-scale farmers by 50 to 100 percent.

In Guatemala, 67 percent of milpa producers are Mayan origin small-holder farmers. They own plots of land of less than 7 hectares and are classified as subsistence farmers Their yiels usually have low productivity, they use marginal technology and the work is intensive labor family-driven. The usage of fertilizers and pesticides is scarce, and they consume "criolla" seeds, inherited from family members. A very low level of association among growers is frequently observed among milpa farmers, and the level of involvement of women in milpa farming varies greatly. It depends on the customs of the different communities, their position in the household and the social and economic level of the families themselves. Despite their subsistence profile, those farmers who manage to obtain a surplus on the harvest sell the stock to a large trader who uses the services of "coyotes", who receive a commission in exchange for locating milpa growers with whom to negotiate over their harvest.

Farmers in Guatemala barely have access to the financial sector. Just 5 percent of credits in rural areas come from the banking system and they only represent 6 percent of the total amount of credits approved in the country. Equally, farming insurances are not very popular among famers, there are just a few institutions offering insurance to cover economic losses driven by

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[14] One quintal in Guatemala is approximately 46 kg and one manzana is 6987.39 m^2 http://www.one.cu/publicaciones/cepal/cepal_sector%20agropecuario/Glosario%20de%20unidades,%20equivalencias%20%20y%20factores%20de%20conversión%20utilizados%20por%20pa%C3%ADs%20y%20signos%20convencionales.pdf, http://biblioteca.usac.edu.gt/tesis/04/04_9144.pdf

[15] Ministry of Agriculture and Livestock, 2017

climate shocks or plagues. G&T Bank, through its subsidiary company called Proagro, is one of the few that offers insurances to farmers. The prime depends on the type of crops, the geographic location, the type of risk and the vulnerability to that risk. This type of insurance covers economic losses from strong winds, droughts and flooding. It does not consider the technology used and it does not require to proof property rights of the land. Similarly, *Esfuerzo Seguro*, the first natural catastrophe index insurance product in Central America covering business interruption, was officially launched in November 2016. It covers the clients' business interruption caused by drought, excess rain and earthquakes and it is offered by Aseguradora Rural to clients of Banrural. In addition to the index insurance, clients receive information and incentives to help them adopt measures for better risk reduction and resilience against natural disasters. The Coordinadora Nacional para la Reducción de Desastres de Guatemala (CONRED) and MiCRO, an insurance company, are involved in this project.

CLIMATE SERVICES ANALYSIS

There is relatively little information on Guatemala's climate, due to a limited number of instrumental records and restricted high-resolution paleo climate data. This lack of information is caused by significant gaps on yearly climate data record and also, the limited number of weather stations in the country. These two factors limit quality control continuity of the data, which hinders climate analysis and planning at the local and regional level. On average, it has one station per 1,000 square meters, but most of the weather stations have a limited temporal resolution dating back to the 1970s. The climate data available are predominantly sourced from weather stations surrounding urban hubs and southern regions with export-oriented crops. As a result, most small-scale subsistence farmers in rural areas lack access to climate information. Here is a brief description of some of the most important Guatemalan climate services stakeholders.

The National Institute for Seismology, Volcanology, Meteorology and Hydrology (INSIVUMEH), is the government agency responsible for met services. It has 53 weather stations that keep record of data on rainfall, maximum and minimum temperature and relative humidity level, although only 37 weather stations meet the World Meteorological Organization standard requirements. INSIVUMEH transmits information to ministries, food associations, international organizations, academia and private organizations by publishing a weekly, monthly, and tri-monthly bulletin. They also have social media channels with information available to the general public. Despite not having an app, they collaborated with ANACAFÉ to initiate an application for coffee farmers. INSIVUMEH develops a prediction map every month for the following three months, some of which are used in the Climate and Hydrological Outlook Fora of Center America (CACOF), organized by the Regional Committee of Hydraulic Resources. Until recently, INSIVUMEH was isolating itself from many stakeholders in Guatemala interested in climate and meteorology, mainly due to political reasons and they did not tend to tailor their climate products to meet final users' requests. However, it is the only institution in the country capable

of providing official climate and meteorological data, which makes it inevitable for all other private and public institutions to eventually work with them.

The Private Institute of Research on Climate Change, ICC, works primarily with private sugar, banana and palm oil companies in the south of Guatemala. Its lines of work include: hydrometeorological information, flood Investigation and management, greenhouse gases, environmental management, protection and restoration of forests and soil, integrated water management, adaptation practices, and capacity development. ICC has 28 automatic weather stations which are dispersed along the southern coast of Guatemala that, on average, collect data every 15 minutes. ICC has a collection of data dating back to before 2007. ICC also offers a service for the capacity building of community leaders or employees from local municipalities on climate mitigation, variability, meteorology, adaptation and water management.

ANACAFÉ began installing weather stations in 2007, monitoring climatic conditions of the coffee zones in Guatemala improve decision-making in the sector. To date, ANACAFÉ has established a total of 106 meteorological stations, and they are planning on installing ten more. ANACAFÉ uses the watchdog model weather stations to capture data on the direction of wind, rain, temperature and humidity patterns. In 2016, ANACAFÉ launched the mobile phone application Coffee Cloud with the aim of expanding climate information services to coffee farmers. The application is free to download and has approximate 2,300 users.

Farming Cooperatives Federation (FEDECOAG) has had 6 weather stations installed since 2015 thus, they strongly depend on INSIVUMEH data and bulletins. They also issue a bulletin cooperatives and farmers which contains information about the most likely climate scenario given the following factors: rainfall, average maximum and minimum temperature, absolute maximum and minimum temperature. They have developed their own round tables on agriculture and climate called Agrotec.

The Guatemalan Federation of Agriculture Cooperatives of Coffee Producers (FEDECOCAGUA), does not have any weather station and depends on the climate services provided by INSIVUMEH. They manage to overcome the language barriers when transmitting climate information with Mayan communities by have local leaders known as "promotores" who are bilingual and can relay information to farmers.

The World Food Program launched an information and communications technology project called AgriUp with the objective of transmitting climate information to vulnerable smallholder farmers. The pilot project launched in June 2016 with 60 farmers and expanded until December 2017 reaching over 22,300 farmers. The project was terminated because of lack of funding but had a great success among farmers. The project involved several stakeholders including INSIVUMEH, MAGA, MIDES, and the TIGO Foundation.

FEWSNET has a strong partnership with FAO in Guatemala. FEWSNET's products include weather forecasts and seasonal outlooks highlighting trends, anomalies and hazards, in addition to mapping and geospatial data of rainfall, water usage and vegetation.

There are several NGOs in Guatemala with weather stations that transmit climate information to farmers and local communities. As an example, Vivamos Mejor (CEDRACC) have meteorological stations that provide climate information in real time and produce weekly forecasts.

CONCLUSIONS

Based on the previous analysis, the following eleven opportunities have been identified for ACToday in Guatemala for the following year.

- ***Promote sustainable agriculture*** *and tackle food insecurity by supporting the MTAs (agroclimatic round tables).*
- ***Lay foundation for success*** *in achieving SDG2, and other SDGs, by supporting development of Guatemala's National Framework for Climate Services.*
- ***Provide economic safety nets*** *to build economic livelihoods and thus food security by co-developing index insurance*
- ***Reduce the impact of drought*** *on food and agriculture through preparedness enabled by forecast-based financing*
- ***Enhance a common institutional culture*** *of knowledge-to-action strategies related to climate services by Help establishing the Guatemalan Climate Service Academy*
- ***Support FAO's goal*** *of developing preparedness, mitigation and response plans for agricultural drought through the implementation of the forecast component of its Agriculture Stress Index System (ASIS)*
- ***Provide decision makers with tailored tools*** *that show concrete agro-climate adaptation strategies to increase food production*
- ***Co-identify****, with the Guatemalan Nutrition and Food Security Secretariat, MAGA and other governmental institutes, strategies for increased access to sufficient and nutritious food, based on national, regional and global trade/market patterns*
- ***Reduce food insecurity*** *by establishing an early warning system that allows decision makers to diminish the impact of climate shocks in agriculture production.*
- ***Collaborate with*** *ministries and other local institutions to help embed the new climate services developed during ACToday in decision-making frameworks*

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