Article

The International Rice Research Institute (IRRI) as an International Agricultural Research Center (IARC): From the Cold War to One CGIAR

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Abstract

This paper takes a modest step in sketching the history of the International Rice Research Institute (IRRI) from its Cold War origins to the present. Consolidating different sources to tell this narrative, this paper aims to fill in some gaps in the narrative of IRRI's development, offer some additional details thereto, and extend it to cover IRRI under One CGIAR. The geopolitical rivalry between the United States of America (thereafter US) and the Union of Soviet Socialist Republics (thereafter the Soviet Union) during the Cold War helped establish IRRI in the Philippines in 1960. This ushered the Green Revolution. Formed in the crucible of Cold War geopolitics, IRRI then underwent changes after 1991, such as: (1) formal recognition of IRRI as an International Agricultural Research Center (IARC); (2) stability, increase, and eventual decline of public spending in agriculture research post-2014 (Beintema and Echeverria 2020); (3) the post-Cold War involvement of the Bill and Melinda Gates Foundation (BMGF) in IRRI's activities (Medina 2020); and (4) the expansion of BMGF's corporate involvement, which was facilitated through the centralization of the Consultative Group on International Agricultural Research (CGIAR) under One CGIAR. This

paper offers some insights on the implications of post-Cold War develpments in IRRI for global food security, arguing what states, scholars, and/or members of civil society can and should do in light of these developments.

Keywords

Food Security, Cold War, IRRI, CGIAR, BMGF

Introduction

Since its establishment in 1960, the International Rice Research Institute (IRRI) has played a significant role in global agriculture. So influential has it been that farmers now find it difficult to revert "to traditional ways of farming" (Maenen 2016, 43). Its mandate and research towards increasing rice productivity helped usher the Green Revolution (Anderson 1991; Chandler 1992; Cullather 2004, 2010), and the subsequent introduction of agricultural technologies that continue to be used today. Understanding IRRI and its history is important because its activities affect the global agricultural system and individual states' food security. As such, any knowledge about IRRI offers a glimpse of the agriculture-related challenge/s facing farmers and states, among others.

This paper aims to sketch broadly the history of IRRI from the Cold War to the present. There are multiple angles from which to tell this narrative, but in recognition of the existing literature, this paper incorporates and generally takes the arc traversed by Anderson (1991), Chandler (1992), Cullather (2004, 2010), Tolentino (2019), Beintema and Echeverria (2020), and Medina (2020), as well as the criticisms of IRRI (Ofreneo 2004; Kilusang Mambubukid ng Pilipinas[1] 2007; MASIPAG National Office 2023). Anderson (1991), Chandler (1992), and Cullather (2004; 2010) identify the Cold War origins of IRRI; Beintema and Echeverria (2020) focus on CGIAR funding from 1981 to 2010; Tolentino (2019) deals with IRRI funding until the 2010s, while Medina (2020) has chronicled the involvement of IRRI with the Bill and Melinda Gates Foundation up until the later 2010s. These works generally focus on IRRI's international context (i.e. developments

[1] "Kilusang Mambubukid ng Pilipinas" translates to "Peasant Movement of the Philippines"; thereafter KMP.

outside the Philippines, excluding IRRI's default overseas activities, with a focus on a global political context such as the Cold War and the rise of neoliberalism). It is within such a context that the present paper tells its story.

In light of this framing, it must be noted that the paper's discussion will not focus on, but by no means discount, IRRI's internal operations (Chandler 1992), the impact of IRRI's activities on farmers (KMP 2007), or its entanglement in Philippines' domestic politics such as the Golden Rice project (Kupferschmidt 2013; Medina 2020), as well as IRRI's threat to the Philippines' food security (MASIPAG National Office 2023). Furthermore, the paper will not focus on year-by-year events, but will highlight and elaborate on certain developments, though some are elaborated elsewhere, including IRRI's detailed Annual Reports. As such, this paper by no means claims to be an exhaustive, definitive account. But in tying together the literature on IRRI, it aims to serve as a composite of such literature, which serves to initiate modestly as a step towards building a more comprehensive look at the institution.

Methodology

To sketch IRRI's history from a global context, this paper incorporates and builds on the secondary literature on the institution, and then draws on selected primary sources to refine and extend the narrative. Primary publication materials from IRRI and CGIAR, such as the former's Annual Reports are utilized. Additionally, the One CGIAR database is used to tabulate the share of IRRI's budget since the inception of One CGIAR in 2020. For secondary data sources, this paper draws on journal articles, book chapters, and books. Included here is the involvement of corporations, as well as philanthropic organizations like the BMGF, in IRRI's research activities, and the criticism and impact of such involvement.

This paper is divided into three sections. The first part covers the methodology. The succeeding section proceeds to sketch IRRI's history from the Cold War onwards. And lastly, the last section offers some policy recommendations that emerge from this narrative, particularly concerning more recent developments. These include prospects for further research on IRRI, the need for pro-farmer movements to understand IRRI, and the importance of state funding for agriculture.

IRRI During the Cold War: Geopolitics

The early literature on IRRI discusses the significance of the Cold War period for its establishment (Anderson 1991; Chandler 1992; Cullather 2004, 2010). Anderson (1991) highlighted the impact of US foreign policy on the creation of IRRI as the IARC for rice. Meanwhile, Chandler (1992) discussed insider information behind its establishment. Lastly, Cullather's works (2004, 2010) draw attention to the security dimensions of US foreign policy, especially with respect to the US campaign against Communism.

Following the arguments raised by George Kennan, a US diplomat who originally published the essay, "The Sources of Soviet Conduct," using "X" as his byline (1947), the United States saw the Soviet Union as a threat during the Cold War. As a result, the former focused its attention on the issue of development within and outside Europe, primarily through the European Recovery Plan (Perkins 1998), and the Point Four Program of the Truman administration (Macekura 2013). Nelson Rockefeller (1951)—who was appointed chair of the International Development Advisory Board of the Truman administration, and was eventually selected and confirmed by the US Congress as Vice President under the Ford administration—opined that the US must seriously address the issue of underdevelopment in Third World Countries. One way to do this was to improve food production (Rockefeller 1951). In agriculture, the US had already developed technologies to raise corn production in Mexico and China through a project initiated by the Rockefeller Foundation (Cullather 2010). This experience in biotechnology, plus the need to help resolve poverty in Asia, propelled the Rockefeller Foundation to pursue the establishment of an institution catering to rice research (Rockefeller Foundation 1951). In 1960, the Rockefeller Foundation, together with the Ford Foundation, formally established IRRI in the Philippines (Anderson 1991; Chandler 1992).

Food aid was instrumental to securing food during the Cold War (Charlton 1997). As part of the broader struggle against the spread and threat of communism in the Global South, the Green Revolution took off in 1968, seeking to improve agricultural productivity through genetic

engineering. IRRI played a significant role therein[2] (International Food Policy Research Institute 2002; thereafter IFPRI). One genetic rice variety, IR-8, was developed from the Dee-Geo-Woo-Gen and Peta rice varieties from Taiwan and Indonesia, respectively (Peng and Khush 2003). The IR-8 rice variety eventually became widespread in the Philippines, Vietnam, Sri Lanka, Indonesia, and India (Cullather 2004; 2010).

The Green Revolution came with various adverse issues. For instance, the IR-8 rice variety was noted to produce more chalk and starch content than traditional rice varieties (Anderson 1991; Chandler 1992). In addition, there was the loss of such varieties (Stone and Glover 2016 as cited in Candelaria 2022), as well as the impact of toxic chemicals (Carson 1994; Conway 2000; IFPRI 2002; Layosa 2007; Patel 2013 as cited in Candelaria 2022). Additionally, IRRI's research during the Green Revolution affected the domestic politics of several Asian nations (Cullather 2004, 2010). The Green Revolution ended in the late 1970s. However, since then, IRRI has continued its research, improving rice varieties such as the IR64 and hybrid rice, which in the 1990s was eventually commercialized in Asian countries (Peng and Khush 2003).

IRRI After the Cold War

Despite the improvement in global food technology in the 1980s and 1990s, issues such as malnutrition, hunger, and poverty persisted (Conway 2000). The post-Cold War world recognized the need "to review the world food situation and to chart a future direction for attaining world security" (Charlton 1997, 440). In 1996, the World Food Summit led to a more holistic conceptualization of food security. It was no longer simply defined based on food availability alone, but also on global factors such as energy demand through biofuels, volatile markets, and climate change (Kuntjoro et. al. 2013). For its part, IRRI (1991) recognized that urbanization and a rapid population growth would negatively affect rice production, necessitating further research on how to increase rice productivity. To help address this, IRRI (1991, p. 1) set the following vision in the statement called "IRRI toward 2000 and beyond:"

[2] The Green Revolution was a term coined by the United States Agency for International Development (USAID) director, William S. Gaud, in 1968 (International Food Policy Research Institute 2002).

> The goal: improved well-being of present and future generations of rice farmers and consumers, particularly those with low incomes.
>
> The objectives: to generate and disseminate rice-related knowledge and technology of shot- and long-term environmental, social, and economic benefit and to help enhance national rice research systems.
>
> The strategy: to increase rice production efficiency and sustainability in all rice-growing environments through interdisciplinary research and to ensure the relevance of IRRI research and the complementarity of international and national research efforts through close collaboration with national programs.

As with all institutions, the end of the Cold War marked a transition in the evolution of IRRI. In this respect, some key developments are worth noting.

IRRI's Changing Recognition as an IARC: From Tacit to Explicit

As an IARC, IRRI has always had international engagements. With the exception of its involvement in the Green Revolution, much of IRRI's impact overseas were on the following areas: (1) participation of scientists from different countries in Southeast Asia in IRRI's training programs (Castillo 2017); and (2) assistance with the creation of national agricultural research centers in Thailand (IRRI 2020b), Indonesia and Vietnam (Brennan and Malabayabas 2011). Despite the extent of its global involvement, when IRRI was established in the Philippines in 1960, its relationship with other states, except the Philippines, was tacit.[3] States were not compelled to engage its services, though they certainly did so. For example, IRRI-Thailand relations begun in 1960,

[3] The situation for the Philippines was different. IRRI's initial relationship with the Philippines was defined by the Memorandum of Understanding (MOU) between the Philippines and the Rockefeller and Ford Foundations in 1959 (Chandler 1992). As IRRI was formally established a year after, the Philippine Congress also formally legislated Republic Act (RA) No. 2707 s. 1960, which gave tax exemptions to IRRI (Chandler 1992). Recognition of IRRI under Philippine laws changed when Presidential Decree (PD) No. 1620 was enacted in 1979. Apart from formal recognition as an international organization under Philippine laws, the law provided IRRI the rights normally accorded to international institutions such as diplomatic and legal immunity as well as tax exemptions (Official Gazette 1979).

when a Thai prince was formally invited as a member of IRRI's board (IRRI 2020b). Indonesia-IRRI relations, meanwhile, began in 1974 (IRRI 2001a).

Starting in the 1980s, IRRI received more funding from other nations besides the US, as shown below. As such, it was perhaps only a matter of time, if not a formality, that international recognition of IRRI became explicit in 1995. That year, the agreement *Recognizing the International Legal Personality of the International Rice Research Institute* was signed by twenty signatory countries (Table 1).

Table 1. States that Signed the International Agreement Recognizing the International Legal Personality of IRRI

State	Date of Signature
Republic of the Philippines	May 19, 1995
People's Republic of Bangladesh	
Kingdom of Bhutan	
Republic of Cuba	
Kingdom of Denmark	
Republic of Indonesia	
Republic of Iraq	
Lao People's Democratic Republic	
Russian Federation	
Socialist Republic of Vietnam	
Government of Papua New Guinea	
Islamic Republic of Iran	June 14, 1995
Swiss Confederation	
The Republic of the Union of Myanmar	July 12, 1995
India	September 12, 1995
Brazil	October 20, 1995
Australia	March 29, 2996

State	Date of Signature
Italy	April 12, 1996
Republic of Korea	May 17, 1996
Romania	

Source: Agreement Recognizing the International Legal Personality of the International Rice Research Institute 1995, as cited in Candelaria (2022, 93).

The 1995 agreement arguably reflected the multilateral turn in international relations, with the collapse of the bipolar world order and the emergence of multiple actors in the global stage. But it also represented the formalization of long-standing recognition of IRRI. At any rate, the 1995 Agreement gave IRRI a juridical personality. It provided mechanisms for other countries and/or international organizations willing to formally recognize, through accession, their relations with the institution. Lastly, the 1995 agreement provided a framework for other countries to grant privileges and/or immunities to IRRI.

The Philippines and IRRI signed another agreement in 2006. The Headquarters Agreement Between the Government of the Republic of the Philippines and the International Rice Research Institute not only protects IRRI's rights to maintain its headquarters in the country, but also enjoins IRRI to "cooperate at all times with the appropriate authorities of the (Philippine) Government to facilitate the proper administration of justice and secure the observance of the laws of the Republic of the Philippines." The 2006 Agreement was formally ratified by the Senate of the Republic of the Philippines in 2008 (Palec 2008).

IRRI Funding Before and After the Cold War

There is already scholarly literature on IRRI's funding (Tolentino 2019; Beintema and Echeverria 2020), which I will summarize and update. In 1960, IRRI's funding mainly came from the Ford Foundation (IRRI 1962). By 1970, financing came not just from Ford but also from the Rockefeller Foundation and the USAID (IRRI 1971), all of which were equal partners of the research center.

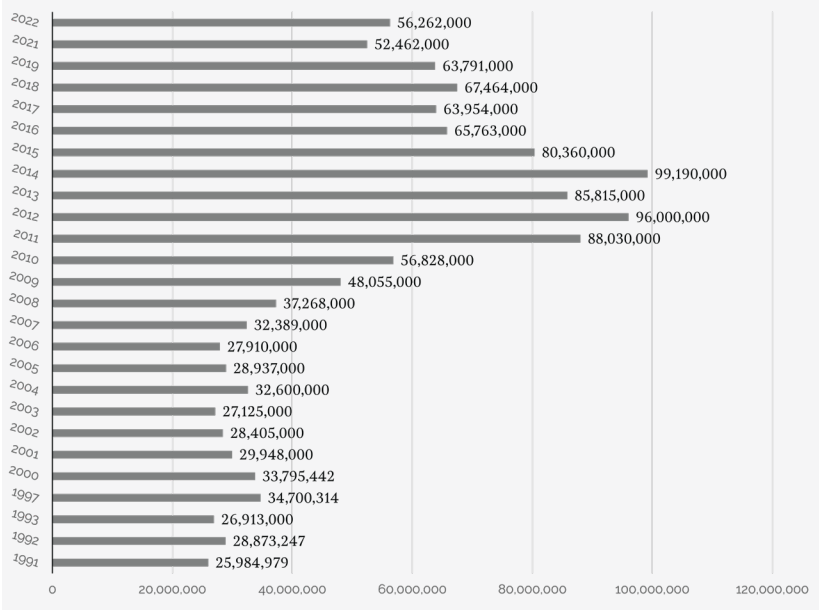
Funding Figures: 1991 to 2022

Tolentino (2019, 76) charted IRRI's funding from 1960 to 2017, noting in particular that "ODA for agriculture generally and for IRRI specifically fell in the 1990s as the development community slipped into complacency about food security and continuing agricultural growth" (Tolentino 2019, 75), remaining stable in the decade or so after the Cold War (Figure 1). Tolentino then shows that research funding for IRRI increased due to the Global Financial Crisis of 2008,[4] reaching its peak in 2014 and falling anew afterwards (Tolentino 2019). This peak was also observed, not only within IRRI, but also with other CGIAR institutions (Beintema and Echeverria 2020).

For my part, I combed through IRRI's Annual Reports from 1991 to 2022, which updates Tolentino's (2019) account and utilizes different metrics. Figure 1 below (my own) uses the reported amounts received from all funders, both public and private, while Tolentino used the real US dollar price. Using the reported amounts from IRRI's Annual Reports shows the nominal value of funding that IRRI received from different funders. I utilized the nominal value reported in the Annual Reports, instead of updating Tolentino's account, since the latter did not discuss the constant price used in the reporting of IRRI's funding. In Figure 1, data for 1994, 1995, and 1998 are omitted because the 1994-1995, 1995-1996, and 1998-1999 IRRI Annual Reports are not available online. Data for 1996 is not included because the copy of the 1996-1997 Annual Report is unclear. Data for 1999 is also omitted because of the missing financial data in the 1999-2000 Annual Report, as is Data for 2020 because of the unavailability of the 2020 IRRI Annual Report.

[4] As Brinkman et. al. (2010) explained, the Global Financial Crisis caused food prices to increase, thereby affecting one's capability to secure nutritious food.

Figure 1. Funding Grants Received by IRRI (1991-2022) in US Dollars



Source: IRRI Annual Reports 1992-1993 to 2022, data processed by author

Sources of Funding: During and After the Cold War

Tolentino also noted the evolution of the number of funders of IRRI. During the Cold War, IRRI was funded almost exclusively by the Ford Foundation and the United States government (Tolentino 2019, 76). Things changed when IRRI's funding sources diversified starting in 1980 (pp. 76–77). Apart from the US, the Rockefeller Foundation and USAID (IRRI 1981), IRRI received financing from Japan, Canada, United Nations Development Programme (UNDP), United Kingdom, the European Economic Community (now the European Union), International Fund for Agricultural Development (IFAD), Germany, Australia, World Bank, Belgium, Austria, Denmark, the Philippines, Switzerland, Sweden, Kenya, South Korea, Mexico, and other funding sources (Tolentino 2019, 76). Since then, IRRI has always had multiple funders (p. 77). By 2016, other countries, such as China, India, and the Philippines, as well as international philanthropic organizations like the BMGF, became significant funders (p. 77).

From 2020 to the present, a period which Tolentino does not cover, I provide more recent data from the One CGIAR Funder analysis webpage, which is part of the One CGIAR website (IRRI is a member of One CGIAR; see below). The same states continue to be IRRI's biggest funders: India, the Philippines, US, China, Germany, Japan, Switzerland, United Kingdom, Republic of Korea, Australia, Taiwan, and Bangladesh (CGIAR n.d.c.). It also includes funding from entities such as the European Commission, UNEP, and the Global Crop Diversity Trust, as well as private organizations such as the Bill and Melinda Gates Foundation and the Syngenta Foundation (CGIAR n.d.c.). Table 2 shows IRRI's top fifteen funders from 2018 to 2022.

Table 2. Top 15 Funders of IRRI in Million USD (2018-2022)

Funder	Amount in Million USD				
	2018	2019	2020	2021	2022
CGIAR Trust Fund	12	11.22	9.11	11.98	19.95
Bill and Melinda Gates Foundation	11.64	15.16	12.91	12.14	13.4
India	11.47	8.82	4.48	4.63	6.14
The Philippines	3.88	3.68	2.67	2.34	1.59
United States of America	2.02	2.49	2.83	4.31	2.46
China	1.85	0.96	0.83	0.38	0.52
Germany	1.52	1.65	0.84	0.53	0.41
Global Crop Diversity Trust	1.36	1.41	1.41	1.41	1.32
Japan	1.13	0.62	0.33	0.31	0.16
World Bank	1.09	2.75	2.46	1.88	1.95
Switzerland	1.07	1.27	1.21	0.94	0.75
United Kingdom	0.69	0.69	-	-	-
Republic of Korea	0.65	0.68	0.67	0.98	2.46
Syngenta Foundation	0.55	-	-	-	-
European Commission	0.45	-	-	-	-

Funder	Amount in Million USD				
	2018	2019	2020	2021	2022
Australia	-	0.85	0.85	0.78	-
UNEP	-	0.59	-	-	0.15
Taiwan	-	-	0.5	0.5	0.5
Bangladesh	-	-	0.31	0.45	0.41

Source CGIAR n.d.c. Data processed by author. Original data available at: https://www.cgiar.org/food-security-impact/finance-reports/dashboard/funder-analysis/. Data for 2023 are still unavailable as the time of this writing.

From Geopolitics to Neoliberalism: IRRI and the Bill and Melinda Gates' Foundation (BMGF)

Table 2 shows, among other things, that funding from BMGF has overshadowed the contributions of each individual state. The growing role of a private entity like BMGF marks the culmination of a transition that occurred after the Cold War. If the Cold War era featured corporations in the broader fight against communism, corporations in the post-Cold War period have seen the expansion of capitalist imperatives in the agricultural sector. Scholars have spoken of a neoliberal turn in agriculture after 1991, especially with the formation of the World Trade Organization in 1995 (Maenen 2016). This has largely meant privatization and deregulation, which has had well-documented deleterious effects. Certainly, corporate involvement in agriculture did not start with the BMGF. The Green Revolution showcased as much, with, among other things, the promotion of hybrid rice using patented technologies from agricultural TNCs, thereby negatively affecting farmers (Cullather 2004; Ofreneo 2004; KMP 2007). This increased corporations' profits (Sharma 2010) and created new markets for TNCs such as "fertilizer, chemicals, agricultural machinery and irrigation pumps" (Ofreneo 2004, as cited in Candelaria 2022, 119). This development marked IRRI as it approached the twentieth and early twenty-first century. By then, IRRI served as an "intermediary" role, linking up with corporations.

> ....Rosegrant and Hazell wrote on the need to strengthen the new role of IRRI "to serve as an important intermediary between multinational companies, developed-country research centers, and the needs and capacities of national agricultural research systems in Asia". There the cat is out. The agribusiness TNCs, which monopolize the world's R & D on biotechnology, shall play the pivotal role of providing research outputs to the so-called research centers of both developed and developing countries, not the other way. And the role of the IRRI is nothing but that of an intermediary. (Ofreneo 2004, 7)

As the KMP (2007, 28) argues,

> IRRI thus, is an instrument that facilitated and helped to perpetrate the dire and adverse impact on poor farmers of Asia, is guilty and should bear the weight of its offense. IRRI could not hide behind its 'public research institution' cloak, and should be made to answer to the indictment of continually serving the interests of hegemonic powers and of the corporate interests that created it.

Also, the growth of private funding for CGIAR coincides with a relative decline of public financing thereof, at least collectively speaking. The Consultative Group for International Agricultural Research or CGIAR (now only known as One CGIAR) is a consortium of 15 international agricultural research centers (IARCs) established in 1971 at the height of the Green Revolution. IRRI is one of its original members (Renkow and Byerlee 2010). Historically speaking, IARCs like IRRI have always been funded largely by and through governments, but while each country's contributions varied over time, Beintema and Echeverria (2020, 10) note that "support from key funders—such as the World Bank, Canada, and Japan—declined" in the 2010s (Table 3).

Table 3. Share of Funders in CGIAR from 1980s to 2010s

Donor	Share (%)			
	1980s	1990s	2000s	2010s
Australia	2	2	2	5
Canada	6	5	6	1
European Commission	4	5	7	3
Germany	5	6	3	3
Japan	7	11	4	1
Netherlands	2	4	4	5
Switzerland	4	6	4	3
United Kingdom	4	4	8	8
United States	26	15	13	17
Bill and Melinda Gates Foundation	0	0	1	10
World Bank	12	13	11	5

Source: Beintema and Echeverria (2020, 10)

Adding to the existing literature (Tolentino 2019) on BMGF's involvement with IRRI, Table 4 below shows the fifteen biggest funders of CGIAR for 2018 to 2022, with the BMGF as one of the biggest contributors. On average, the BMGF has provided CGIAR funding amounting to USD 92.12 million per annum starting from 2018 until 2022. This nearly equals that which is provided by the US, averaging USD 93.34 million per year. In 2020 and 2022, the BMGF surpassed the US government in terms of the funding to One CGIAR.

Table 4. Top 15 Funders of CGIAR in Million USD (2018-2022)

Funder	Amount in Million USD				
	2018	2019	2020	2021	2022
CGIAR Trust Fund	161.97	163.53	151.56	219.58	236.28
USA	100.62	94.46	84.52	97.98	89.12
BMGF	91.55	92.39	85.71	86.13	104.81
Germany	23.79	20.86	23.38	33.37	33.69
Mexico	22.9	11.39	8.2	-	-
United Kingdom	20.92	26.95	19.99	10.36	8.7
India	18.56	17.75	12.47	11.68	14.86
IFAD	14	15.26	10.98	12.02	9.91
Australia	13.55	6.78	5.54	4.85	-
African Development Bank	10.36	16.19	7.1	7.28	4.88
European Commission	9.25	6.12	7.95	11.7	13.87
Cornell University	8.29	8.71	-	-	-
Global Crop Diversity Fund	8.06	9.8	9.96	8.53	5.56
Norway	3.16	6.18	7.94	7.85	8.48
Netherlands	1.53	-	-	-	-
FAO	-	5.89	4.88	3.69	6.68
Switzerland	-	-	5.86	-	-
World Bank	-	-	-	12.61	52.25
PICAGL	-	-	-	5.67	-
Nigeria	-	-	-	-	6.27
Canada	-	-	-	-	4.78

Source: CGIAR (n.d.c.)

The Bill and Melinda Gates Foundation (BMGF) has exemplified the emergence of what has been called elsewhere as "philanthrocapitalism," (Thompson 2018), which is defined as "the integration of market motifs, motives and methods with philanthropy" (Haydon, Jung, and Russell 2021, 367). Philanthrocapitalism has the following tenets: 1) "financial wealth equals expertise" 2) "the explicit confusion of the billionaire's private interests with collective interests or even the collective good," and 3) "promote and enshrine expertise over democracy." (Thompson 2018, 53–55). The BMGF has been able not only to sustain, but also to increase its budgetary allocation to agricultural research, not only with IRRI, but also with other IARCs through One CGIAR (Beintema and Echeverria 2020) in the 2010s.

As a private institution, the BMGF (2011, 1) claims that its goal "is to reduce hunger and poverty for millions of poor farm families in Sub-Saharan Africa and South Asia." It is focused on the following areas: 1) research and development, 2) agricultural policies, and 3) access and market systems (BMGF 2011, 4). BMGF's involvement in the agriculture sector began in 2006 when it worked with the Rockefeller Foundation to establish the Alliance for a Green Revolution in Africa (AGRA) (Toenniesen et al. 2008; Cullather 2010; Morvaridi 2012).

Seeking to replicate the Green Revolution, AGRA sought to do the following for African small-scale farmers: to develop resilient crops against climate change, as well as diseases and pests; improve soil and water management systems; improve markets, and improve delivery systems technology (Toenniesen et al. 2008). Within a few years of the launch of AGRA, BMGF dedicated funding amounting to almost USD 2 billion to support the initiative (Morvaridi 2012; Pingali 2012).

BMGF has also worked with IRRI. Medina (2020) provides a list of BMGF-funded IRRI projects from 2007 to 2019, along with a brief description of each purpose, duration, and amount of funding per project. Table 5 is adopted from Medina (2020), but the present paper then adds new data from the BMGF Committed Grants Data, as of 15 December 2023, covering 2022 to the end of 2023 (Table 6).

Table 5: List and Cost of BMGF-Funded IRRI Research (2007–2019)

State	Date of Signature	
RIPE Program (Realizing Increased Photosynthetic Efficiency)[5]	2008 (to 2012)	11,017,675
	2012 (to 2016)	8,375,747
Golden Rice Project	2010 (to 2017)	10,287,784
	2017 (to 2022)	8,375,747
STRASA (Stress Tolerant Rice for Africa and South Asia Project)	2011 (to 2014)	20,000,000
	2014 (to 2019)	32,770,000
TRB Project (Transforming Rice Breeding)	2013 (to 2018)	12,500,000
AGGRi Alliance (Accelerated Genetic Gain in Rice in South Asia and Africa), merged TRB and STRASA	2018 (to 2023)	34,990,000
Other Project Grants	2008	22,128,658
	2009	96,869
	2010	600,000
	2013	690,327
	2014	3,359,914
	2016	880,000
	2019	954,527

Source: Medina (2020, 28–29)

[5] The total amount given to the project was USD 32,648,857, which also includes BMGF funding for the Shanghai Institute of Biological Sciences (USD 481,388) in 2010, and the University of Oxford (USD 7,149,794) in 2015, and funding from the UK Government and IRRI amounting to USD 5,624,253 (Bairagi and Mohanty 2017, 87).

Table 6. List and Cost of BMGF-Funded IRRI Research (2022–2023)

Project Objective	Duration	Amount in USD
Develop rice varieties for India that are adapted to dry direct seeding and reduced flooding, thereby reducing water use and methane emissions from rice cropping systems	October 2022 – October 2027 (60 months)	8,000,000
Support the mission of seed without borders in taking the next steps and building a regional consensus on diversification of seed varieties and capacity building of countries on seed certification	November 2022 – December 2022 (1 month)	50,027
Deliver high rates of genetic gain and rapid climate adaptation in rice to farmers in Sub-Saharan Africa and South Asia through the application of innovative, genomics-driven population improvement approaches.	October 2023 – February 2025 (16 months)	8,000,000
Develop technical and enablement tools, through the CGIAR Genome Editing Initiative, necessary for the development of genome edited crops	November 2023 – September 2025 (22 months)	500,000

Source: BMGF (2023)

The information from the BMGF does not, however, capture the full extent of its involvement with IRRI. Data from the One CGIAR website reveals the broader picture of its involvement with the institute (Table 7).

Table 7: BMGF Funding to IRRI, 2018-2022 (In USD Millions)

Year	Amount
2022	13.4
2021	12.4
2020	12.91
2019	15.16
2018	11.64

Source: CGIAR (n.d.c.)

It is clear how much BMGF has poured into IRRI over the last few years. In 2022, for instance, IRRI received a total of USD 34.85 million for "genetic innovation," and BMGF accounted for USD 12.02 million. This dovetails with the thrust of BMGF-funded projects of IRRI, as Table 6 above reveals: the focus on the development of rice varieties through genetic engineering. Certainly, looking at BMGF funding does not do full justice to the nature of IRRI financing today, which can only be understood better by looking at One CGIAR.

IRRI from CGIAR to One CGIAR

One of the significant global developments that has affected IRRI's history is its longstanding involvement with the Consultative Group for International Agricultural Research or CGIAR (now known as One CGIAR), a consortium of 15 international agricultural research centers (IARCs) including: the Africa Rice Center, Bioversity International, International Center for Tropical Agriculture (CIAT), Center for International Forestry Research (CIFOR), International Maize and Wheat Improvement Center (CIMMYT), International Potato Center (CIP), International Center for Agricultural research in the Dry Areas (ICARDA), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), International Food Policy Research Institute (IFPRI), International Institute of Tropical Agriculture (IITA), International Livestock Research Institute (ILRI), Interational Water Management Institute (IWMI), World Agroforestry Center (ICRAF), and the WorldFish Center (Renkow and Byerlee 2010; Tolentino 2019).

CGIAR "have been conducting applied research and development (R&D) to serve the world's food poor for more than half a century" (Alston et al. 2021, 502). As one of CGIAR's original members in 1971 (Renkow and Byerlee 2010), IRRI has always worked with the consortium in projects such as the Global Rice Science Program (GRiSP), where it sought to streamline CGIAR's research on rice (CGIAR 2011). Under the GRiSP, IRRI was tasked with the leadership of CGIAR's research activities on rice in Asia (CGIAR 2011). GRiPS lasted from 2010 to 2016, and was replaced by the CGIAR Research Program on Rice Agrifood Systems (RICE), which ran from 2017 to 2022, wherein IRRI was designated as the lead institute, together with the Africa Rice Center, the International Center for Tropical Agriculture, the Centre de Cooperation lnternationale en Recherche Agronomique pour le Développement[6] (Cirad), L'lnstitut de Recherche pour le Développement[7] (IRD), and the Japan International Research Center for Agricultural Sciences (JIRCAS) as members of the consortium (CGIAR 2018).

IRRI is presently the lead center for CGIAR Research Program on Rice (Rice CRP) (IRRI n.d.). It is also a member of CGIAR Research Program on maize, CGIAR Research program on Climate Change, Agriculture and Food Security (CCAFS), and CGIAR Research Program on Policies, Institutions, and Markets (IRRI n.d.). Certainly, there are other projects, but during the Thirteenth Meeting of the CGIAR System Council 9-10 June 2021, IRRI's operations were said to focus broadly on the following areas: genetic innovation, systems transformation, and resilient agri-food systems, together with six regional initiatives in the following areas: West and Central Africa, East and Southern Africa, Central and West Asia and Northern Africa, Southeast Asia and the Pacific, South Asia, and lastly, Latin America and the Caribbean (CGIAR 2021).

In 2019, CGIAR transitioned to the One CGIAR movement, which "was born of a recognition that the evolving, interconnected global challenges facing our food systems require a unified and integrated

[6] Centre de Cooperation lnternationale en Recherche Agronomique pour le Développement translates to "Center for International Cooperation in Agricultural Research for Development."

[7] L'lnstitut de Recherche pour le Développement translates to "The Institute of Research for Development."

response from the world's largest publicly[-]funded agricultural research network" (CGIAR n.d.d.). This meant, among other things, that CGIAR centers' once-independent boards became centralized under the One CGIAR framework (CGIAR n.d.d.; Rübel 2020).[8] Major decisions are longer made at the level of IARCs such as IRRI, but at the level of the CGIAR board itself (CGIAR n.d.d). According to the CGIAR (n.d.a.),

> The CGIAR System Board ('System Board'), comprising eight Voting members, two Ex-Officio Non-Voting members and six Active observers, is responsible for providing dynamic leadership and governance for CGIAR in the delivery of its mission, and for appointing and overseeing the Executive Management Team.

Even so, the CGIAR claims that One CGIAR "is not a legal merger of CGIAR's Research Centers" (CGIAR n.d.d., 3), so the operations of each individual member remain as is. At any rate, One CGIAR has continued implementing partnership programs across its members, and developed a plan called the CGIAR 2030 Research and Innovation Strategy to address current issues affecting global food security (Meinke et al. 2023).

What has One CGIAR meant? McIntire and Dobermann (2023, 4) argue that the centralization of CGIAR resulted in "a ONE CGIAR with less selectivity, less science and even more bureaucracy," since this created another layer of decision-making, instead of relying on the expertise of individual IARCs to determine its own research agenda. More germane to our purposes is criticism against the BMGF, which has had a huge impact on CGIAR's operations, and operated for its own interests, often without accountability (Medina 2020, 24). In 2009, it obtained CGIAR membership (Sharma 2010) and eventually became "the only private/non-governmental voting member in the CGIAR System Council" (Medina 2020, 24), the primary decision-making body of the organization. It also managed to force IARCs to support the CGIAR Centralization plan (Sharma 2010). In addition, employees and members of the Gates Foundation have occupied positions in

[8] CGIAR member-organizations collaborated due to its plan to centralize. This was set as early as 2009.

the CGIAR board (Mushita and Thompson 2019). In this capacity, it acquired influence on IARCs (cf: Sharma 2010). At any rate, as an ardent supporter of One CGIAR, and as a testament to continuously growing private involvement in agricultural research, BMGF has provided CGIAR funding amounting to USD 95.65 million. Table 8 shows the specific CGIAR projects funded by BMGF.

Table 8. BMGF-Funded CGIAR Projects (2019-2023)

Purpose	Duration	Amount in USD
to support the implementation of organizational changes to position CGIAR, a major foundation partner, in providing leadership in agricultural research required to transform agriculture and respond to changing climate	October 2019 – November 2021 (25 months)	9,905,878
for a program of education and advocacy	April 2020 – January 2021 (9 months)	45,000
To support a CGIAR Gender Research Platform that will catalyze targeted research on gender equality in agriculture and climate-resilient food systems	October 2020 – January 2023 (27 months)	4,900,000
to stimulate demand for healthy, sustainable diets and ensure delivery of nutritious, safe, affordable, and sustainably produced foods, while improving livelihoods, gender equity, and social inclusiveness in all subsectors of food systems	May 2022 – December 2024 (31 months)	5,000,000
to develop and deploy analytical tools and metrics for informing the prioritization of policies and public investments for achieving outcomes relating to inclusive agricultural transformation and climate adaptation	May 2022 – December 2024 (31 Months)	7,000,000

Purpose	Duration	Amount in USD
to support livestock research for genetics, gender, and policy in partnership with the CGIAR experts at ILRI	June 2022 – December 2024 (30 months)	15,000,000
to support the development of functional seed systems that enable small scale producers to access, and plant improved varieties of staple food crops in the developing world	August 2022 – December 2024 (28 months)	4,500,000
to implement an international agronomy research alliance towards improving the productivity and profitability of crops, increasing climate resilience, and rehabilitating soil health for sustainable intensification in the Global South	August 2022 – December 2024 (28 Months)	28,000,000
to increase fruit and vegetable intake and improve diet quality, while also improving farmer and market actor livelihoods, empowering women and youth, and mitigating negative environmental impacts	August 2022 – December 2024 (28 Months)	2,500,000
to support the One CGIAR research initiative called HER+ that will focus on identifying what innovations can overcome restrictive social norms to promote women's roles in climate resilient food systems	August 2022 – December 2024 (28 Months)	3,600,000
to support evidence generation on market innovations for sustainable agriculture transformation	November 2022 – January 2025 (26 months)	2,000,000
To support dedicated NARIS & CG partnerships to drive impact outcomes in-country	November 2022 – December 2024 (25 months)	4,749,084
to support 2023 corporate service implementation for One CGIAR	July 2023 – January 2024 (6 months)	2,500,000
to support One CG genebanks specifically dryland cereals and grain legumes	October 2023 – May 2024 (7 months)	500,000

Purpose	Duration	Amount in USD
to strengthen CGAIR and partner innovation portfolio management and capacity to deliver outcomes and impact along the CGIAR 2030 Research and Innovation Strategy and its 2022-24 business cycle	October 2023 – October 2024 (12 months)	550,000
To support the One CGIAR's Gender Platform to serve as a global source of research, evidence, and synthesis on the gender issues in climate adaptive agriculture and food systems	October 2023 – December 2027 (50 months)	4,900,000

Source: BMGF (2023)

Moving Forward

Given its significant influence in global agriculture, IRRI can "easily quash any suggestion for alternative and genuine pro-Filipino rice technologies" (MASIPAG National Office 2023).[9] Meanwhile, two decades into the twenty-first century, the neoliberalization of agriculture continues unabated.

> Today, only four agrochemical corporations namely Syngenta-Chemchina, Bayer-Monsanto, BASF, and Corteva dominate the global agriculture market. Spearheading the dominant yet failing industrialized food and agriculture that we know today, these five agrochemical corporations would not be able to forward their corporate agenda without the aid of IRRI. For 63 years, IRRI has been criminally legitimizing and masking these agrochemical corporations as the messiahs for food insecurity by being their research and development arms. (MASIPAG National Office 2023)

The ever-present influence of corporations in agriculture raises the spectre, if not a reality, of a repeat of the well-documented failure of the Green Revolution (Sharma 2010). The Green Revolution

[9] MASIPAG has documented the effects of corporate involvement in agriculture in its own publications such as *GM Corn in the Philippines* (2013).

changed, through chemical inputs, how agriculture is done (IFPRI 2002), which made the cultivation of traditional rice varieties more difficult (Maenen 2016). Corporate involvement has also meant corporate determination of the agricultural research agenda (Mushita and Thompson 2019), and the development of related technologies (Ofreneo 2004; Morvaridi 2012), which are input-expensive (Morvaridi 2012) and costly to farmers (Medina 2020). Also, the inadequacies of "technical fixes, such as GM crops, do not adequately address the complex challenges of social relations in agriculture that often exacerbate social and environmental harm" (Morvaridi 2012, 1199). Other issues include: lack of consultations with farmers on particular plans (Holt-Gimenez et al. 2006); loss of biodiversity to genetic modification of IRRI projects (Mushita and Thompson 2019; Stone and Glover 2016; Medina 2020); the lack of accountability (Medina 2020); and pollution and health issues arising from the use of toxic chemicals developed by multinational corporations in the agricultural sector (Carson 1994; Conway 2000; IFPRI 2002; Layosa 2007; Patel 2013 as cited in Candelaria 2022).

The dominance of neoliberal policies in agriculture is clear; however, even as private funding for IRRI and One CGIAR increased, collective funding from "high-income countries" still dwarfs those from foundations (Beintema and Echeverria 2020, 10). This observation is also reflected in the reporting of the CGIAR's sources of funding, through the CGIAR Funder Analysis, with the BMGF being recognized as the largest private funding source for CGIAR. The CGIAR Funder Analysis indicates that financing for IARCs like IRRI come in three "Windows" and through Bilateral funding, i.e. it goes directly to an IARC (see Table 9 for IRRI's funding according to Window type). The differences of these funding sources are explained below:

> Investments in CGIAR may be delivered through the multi-Funder CGIAR Trust Fund and/or directly to specific projects at CGIAR Research Centers (outside the Fund), which is called Bilateral Funding. Funding for the CGIAR Trust Fund is channeled through three Windows, at increasing levels of Funder collective action:
>
> **Window 3 (W3)** – Project investments: funding allocated by Funders individually to projects that are defined by the Funders themselves (with partners) and that are aligned with system-wide investments.

> **Window 2 (W2)** – Program investments: funding allocated by Funders individually to any component (CGIAR Research Program [CRP], Platform, or Initiative) of the system-wide portfolio as prioritized, defined, and approved by the Funders collectively through the System Council; and
>
> **Window 1 (W1)** – Portfolio investments: funding allocated to the entire CGIAR Portfolio of approved system-wide investments prioritized and allocated by Funders collectively through the System Council — supporting CGIAR as a whole. (CGIAR n.d.b)

Table 9: IRRI's Funding According to Window Type (in USD Millions)

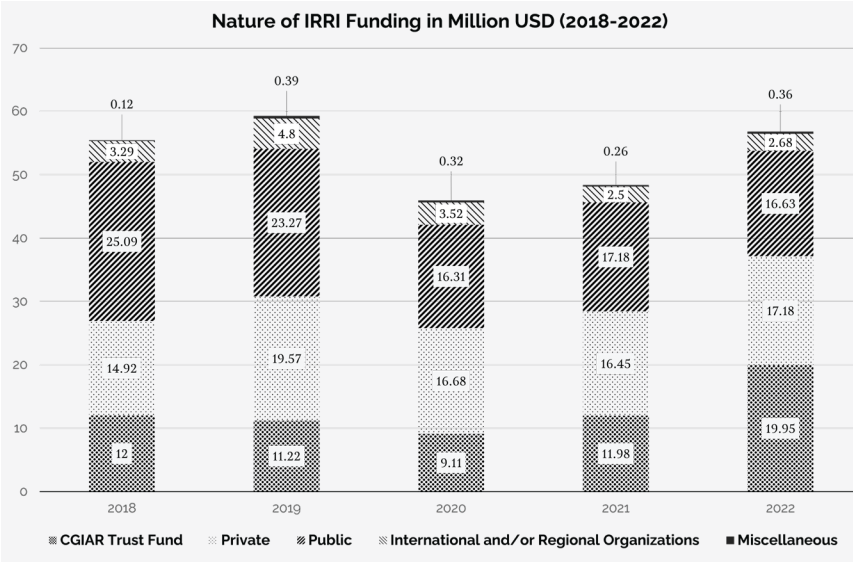
Year	Windows 1 and 2 (CGIAR Trust Fund)	Window 3	Bilateral	Total
2022	19.95	15.87	20.33	56.15
2021	11.98	15.40	20.98	48.36
2020	9.11	15.52	21.27	45.90
2019	11.22	17.50	30.48	59.20
2018	12	14.90	34.11	61.01

Source: CGIAR (n.d.c.)

In terms of IRRI's funding per Window, the disaggregated reporting of the CGIAR Funder Analysis does not distinguish between private and public funding. It just simply lists all funders. For instance, IRRI's Window 1 and 2 funding are reported under the CGIAR Trust Fund, while IRRI's Window 3 and bilateral funding are both sourced from public funders such as states, and private funders like the BMGF, other private foundations, corporations, and private universities.

For this paper, I processed the data from the One CGIAR website based on where it came from, i.e., public and private institutions, as well as international and regional organizations, and others (classified under "miscellaneous"), and the results appear in Figure 2. It reveals the more recent picture of IRRI's funding sources, which covers its budget from 2018 to 2022, as well as the public and private nature of such sources.

Figure 2. The Public and Private Sources of IRRI's Funding (2018–2022)[10]



Source CGIAR n.d.c. Data processed by author. Original data available at: https://www.cgiar.org/food-security-impact/finance-reports/dashboard/funder-analysis/

At any rate, the data do show that the share from public funds for IRRI decreased from USD 25.09 million in 2018 to USD 16.63 million in 2022. Meanwhile, funding from private sources varied. It nevertheless increased from USD 14.92 million in 2018 to USD 17.18 million in 2022, with the peak in 2019 at USD 19.57 million, and USD 17.18 million by 2022. Both trends confirm what has been discussed above, but what this graph also reveals is that while overall public funding did decline in 2022, public funds for IRRI en masse is still on par with private funding.[11] This much is clearer if we separate Window 3 and bilateral funding altogether.

[10] Only the fiscal years 2018 to 2022 for IRRI's budget are retrievable from the CGIAR Funder Analysis website. The data was processed by the author by aggregating the sources of IRRI's funding into these categories.

[11] However, the picture may get more complicated if we take into account private/public funding from the CGIAR Trust Fund.

Such significant bilateral funds arguably present a rather narrow opening that offers an equally tight window for action. For starters, future research must be done on the extent and role of public funding in the operations of IARCs such as IRRI, notwithstanding One CGIAR centralization. As we have seen, much of the literature criticizing IRRI has focused on the growing involvement of private entities like the BMGF (Medina 2020). While such an alarming trend rightly deserves focus, it must not be forgotten that IRRI and other IARCs still receive a significant share of public funding (Figure 2 and Table 9). Even if one concedes the involvement of the BMGF in IRRI as a case of philanthrocapitalism, the extent of bilateral funds suggests at the very least the theoretical possibility of tempering such philanthrocapitalism. Despite, and perhaps even because of, the neoliberalization of agriculture, there is a need to see if, how, and to what extent IRRI's public funds can still be leveraged as a potential check on corporate involvement. Certainly, this of course assumes that states themselves do not subscribe to a neoliberalizing ethos.

There is more work to be done in this regard. In the face of privatization, there is a need to bring back the role of the state in helping provide public goods. Indeed, public funds (should) serve public interest, which dovetails with what, say, peasant movements have long advocated. For La Via Campesina, the state must not only secure food for its people (Patel 2009 as cited in Candelaria 2022; Candelaria 2020). But more than simply regaining their role or funding scientific research, as pointed out by Raquiza (2012 as cited in Candelaria 2022), state-led development is critical to a country's agricultural sector, primarily through the implementation of a proper land reform system. But since individual states by themselves cannot match the financial contributions of the BMGF, they must and could first band together and rally under an advocacy that promotes a certain form of state-led agricultural development, and then demand that IRRI do the same. This would essentially mean placing the control of the One CGIAR Council in the hands of governments. At the very least, they should have a substantial say on its operations.

In the meantime, there are a lot of facets of IRRI's history that need to be told, but it is hoped that the present paper has set up the stage, as it were, for such an endeavor. Future research can uncover a comparison between private funders like the Ford and Rockefeller Foundations of the Cold War period and the TNCs of today. We can

determine exactly if, how and to what extent has private funding changed and affected IRRI's operations, as can more granular studies on the different funding mechanisms of IRRI (Windows 1, 2, and 3).

Another topic that can be pursued, albeit with significant difficulty, is the changes in, and comparison of the dynamics of, IRRI's decision-making from the IRRI board to that under One CGIAR board. This will contribute to existing analysis of, and recommendations for, One CGIAR moving forward (McIntire and Dobermann 2023; Meinke et al. 2023). In particular, the examination of BMGF's involvement with IRRI's activities should build on Medina (2020), the "Gates-Watchers," and MASIPAG's trenchant works. Since the BMGF is a significant donor to and partner of IRRI, there is an equal need to identify any developments between this collaboration.

In particular, it must be stressed that to look at IRRI and at One CGIAR is see agriculture from global perspective. This is important because food security is affected not only by domestic factors but also by international ones (Kuntjoro et al. 2013), particularly by transnational corporations. In this respect, this paper reiterates the earlier recommendations of other stakeholders. For instance, an awareness of international context must equally reckon with the initiative needed to revisit the idea of how food should be secured. Instead of relying on market forces to do so, as embodied in neoliberal agriculture, there is the need "to grow their own food" (Jehlička, Daněk, and Vávra 2018 as cited in Candelaria 2022, 20) and to consider independence from market forces through food sovereignty. Kahiluoto (2020, 853 as cited in Candelaria 2022, 20) points out that "dialogue, transparency and collective learning in food value chains and networks, sovereignty over resources, and built-in diversity in response to change" must happen to develop resilient food systems, but this needs a level of awareness of agriculture's global context. Even if one spurns transnational corporations, in many ways, the struggle for pro-farmer agriculture is much a local as a global struggle. It is part of a broader resistance to neoliberalized agriculture.

Indeed, identifying how IRRI and One CGIAR works can help map out the terrain of struggle. Moreover, it can identify emerging and perennial actors, locales, and mechanisms, so that stakeholders, not least farmers, can craft the appropriate to confront and challenge

the most recent forms of corporate involvement in agriculture. Such challenges aim to, then and now, lessen the dependence on corporations and to mobilize members of the civil society in developing resilient food systems by, among other things, addressing food waste issues (Bajželj et al. 2020 as cited in Candelaria 2022).

Summing Up

Building on both primary and secondary literature, this paper outlines the significant developments for IRRI from the Cold War to the present, covering the Cold War origins of IRRI, the 1995 Agreement, the nature of IRRI funding from the 1960s to the present, and the ever-present involvement of corporations in IRRI's operations from the Ford Foundation to the BMGF, and the emergence of One CGIAR. As organizations like the BMGF further consolidate their influence over IARCs, including IRRI, states and civil society must work together to challenge this development. The former should not depend on businesses to steer developments in terms of food security and must do their job of addressing socioeconomic issues that are beyond the scope of agricultural technology. Meanwhile, civil society, and states themselves, must develop and sustain its own efforts to counter the dominance of corporate interests in the global agriculture system.

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