

Food Security and Conflict in Sub-Saharan Africa

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1. Introduction

The Food and Agriculture Organization of the United Nations (FAO) outlines four dimensions of food security: availability, access, utilization, and stability. Food availability represents the actual food that is accessible for consumption, access indicates the economic and physical aspects of attaining food, utilization refers to the nutritional value of the food available, and stability denotes the overall stability of the food supply and means of access. Corresponding to both supply and demand of food, each category can have a significant impact on individual household food security. Food supply can be affected by external factors such as agriculture productivity and weather patterns, as developing countries are particularly sensitive to drought and diminished yields (Koren & Bagozzi, 2016). From a demand perspective, individual access to food can be influenced by income, food prices, market fluctuations, ineffective government, and the institutions in place for proper physical and economic access to food (Adelaja, 2019).

The lack of food resources and the subsequent socioeconomic issues that arise from food insecurity can often entice violent conflict to break out where food security issues are prevalent (Hendrix & Brinkman, 2013). Conflict and social unrest has been linked to rising food prices and differing levels of democracy across the developing world (Bellemare 2015, Hendrix & Haggard 2015). In Africa specifically, conflict within the underserved regions of the continent have been directly connected to food security, demonstrating evidence of conflict points where food is produced (Koren, 2018). This study aims to explore the relationship between food security and conflict patterns in Sub-Saharan Africa, utilizing the four dimensions of food security to assess the propensity of conflict against the level of food security.

2. Conceptual Framework

To understand the relationship between food security and conflict, it is important to understand the factors that influence the decision process of an individual to instigate violent conflict. The decision can be measured by the differing levels of utility derived from violent conflict and from ordinary activities, in addition to the opportunity cost between those activities. The individuals in this model are assumed to be utility maximizers, seeking to maximize their benefit from food. In this simple model, the utility function for an individual's food consumption activities can be represented by:

$$U_c(\gamma, \epsilon)$$

where γ represents normal food consumption behavior and ϵ represents all other economic activities related to food consumption. The utility function can then be maximized subject to the budget constraint, or the general level of food security. Given the utility function for normal food consumption, the utility function for violent action is:

$$U_v(\gamma_b(F), s, m)$$

Where γ_b represents the direct food related benefit of seeking conflict as a function of the food security level, s represents the satisfaction the individual gleans from expressing his/her grievances, and m indicates other material and ideological benefits gleaned from violent conflict. If the utility of the violent conflict outweighs that of normal activities, the individual will engage in conflict.

$$U_v(\gamma_b(F), s, m) > U_c(\gamma, \epsilon)$$

3. Methodology

Data retrieved from the FAO Suite of Food Security Indicators, the World Bank Group, and the Polity Project V from 2000-2016 evaluate the four dimensions of food security through five different measures: food production index, GDP per capita, prevalence of undernourishment, government stability, and prevalence of anemia in women of child-bearing age. Social conflict data was retrieved from the Armed Conflict Location and Event Data Project (ACLED) to indicate the frequency of conflict on both the aggregate and disaggregate level. The food production index from the World Bank assesses food availability. GDP per capita and prevalence of undernourishment from the FAO Food Security Indicators act as proxy measurements for food access. Government stability is gauged by the polity score from the Polity V project. Utilization is evaluated by the prevalence in anemia within women of childbearing age from the FAO Food Security Indicators. The Polity Project scores range between -10 and +10 where -10 indicates a full autocracy and +10 indicates a full democracy. The scores for 2016 were coded so that countries with a score between +6 and +10 count as democracies and -6 to -10 act as autocracies. Scores between +5 and -5 indicate anocracies, governments that embody inconsistent characteristics of democratic and autocratic systems, while also being susceptible to political instability and regime ineffectiveness (Marshall & Elzinga-Marshall, 2017).

4. Results

Figure 1. Conflict over Time in Africa

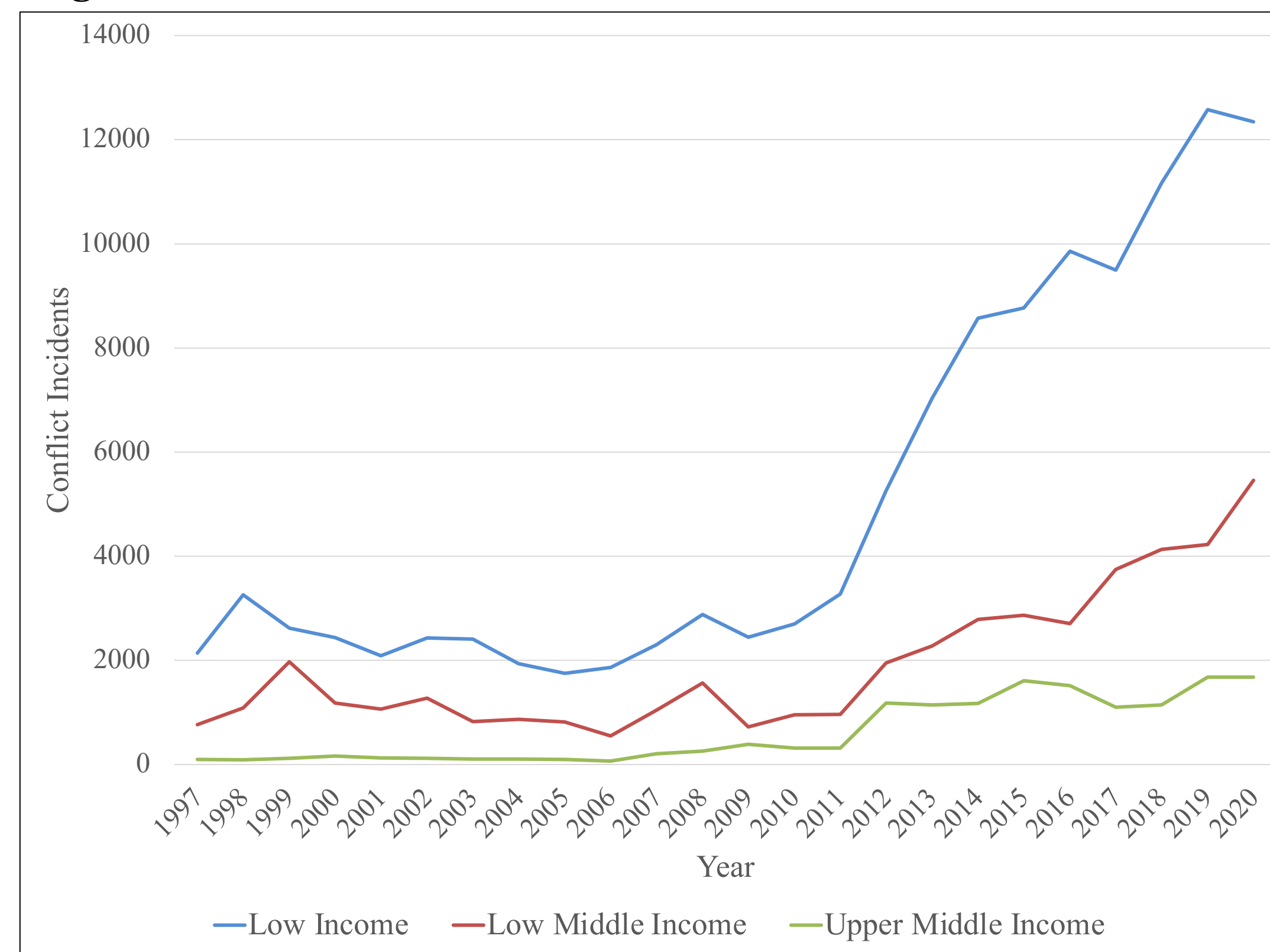


Figure 2. Prevalence of Undernourishment

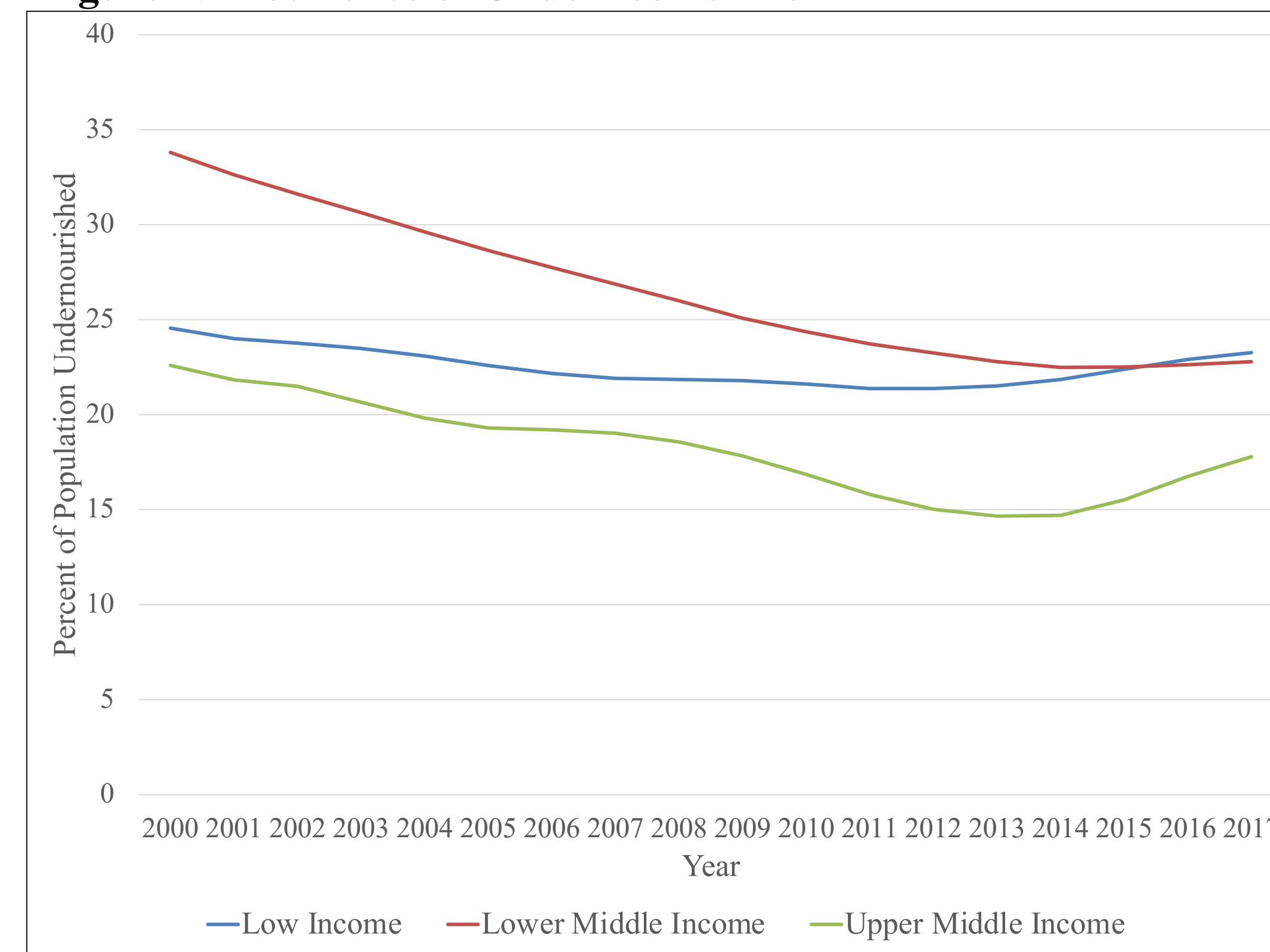


Figure 1 illustrates how conflict is increasing in Sub-Saharan Africa, particularly amongst the Low-Income countries. Figure 2 indicates that the overall trend of undernourishment is decreasing across each income classification, though the trend has stagnated from 2012-2017 with undernourishment slightly increasing in both Low Income and Upper Middle-Income countries. The data indicates there is no explicit correlation between the undernourishment trajectory and the rise in conflict, requiring a more in-depth analysis of additional factors influencing both conflict and food insecurity. Subsequently, future analysis should include control measures placed on confounding factors to more directly assess the relationship between food security and conflict.

Figure 3. Data Summary Across Countries of Interest in Sub-Saharan Africa from 2000-2016

Country	Total Conflict Incidents	Income Level	Mean GDP per Capita	Mean Undernourishment Prevalence (%)	2016 Polity Score	Mean Anemia Prevalence (%)	Country	Total Conflict Incidents	Income Level	Mean GDP per Capita	Mean Undernourishment Prevalence (%)	2016 Polity Score	Mean Anemia Prevalence (%)		
Somalia	21448	Low Income	102	No Data	No Data	Anocratic	44.95	Burkina Faso	659	Low Income	108	553.66	22.78	Anocratic	52.49
Sudan	9477	Low Income	97	1070.01	21.40	Anocratic	31.84	Tanzania	645	Lower Middle Income	123	667.13	23.34	Anocratic	No Data
Congo, Dem. Rep.	9306	Low Income	104	326.30	No Data	Anocratic	No Data	Chad	601	Low Income	119	678.56	38.93	Anocratic	49.85
Nigeria	9224	Lower Middle Income	102	1843.11	40.08	Anocratic	51.16	Namibia	580	Upper Middle Income	92	4081.29	14.06	Democratic	No Data
South Africa	8136	Upper Middle Income	109	5447.164.75	No Data	Democratic	28.46	Ghana	457	Lower Middle Income	116	1106.64	8.26	Democratic	50.14
Burundi	5257	Low Income	108	199.63	No Data	Anocratic	30.85	Niger	402	Low Income	121	397.64	7.70	Anocratic	51.02
Zimbabwe	5093	Lower Middle Income	92	837.00	43.18	Anocratic	31.94	Mauritania	358	Lower Middle Income	105	1293.05	32.78	Anocratic	39.06
Kenya	4630	Lower Middle Income	108	836.94	26.87	Democratic	33.05	Rwanda	325	Low Income	122	487.95	18.18	Anocratic	20.45
Uganda	3945	Low Income	97	547.94	29.92	Anocratic	33.85	Malawi	307	Low Income	133	337.18	9.11	Democratic	34.08
South Sudan	3601	Low Income	No Data	1432.65	No Data	Anocratic	34.41	Togo	193	Low Income	116	482.34	34.12	Anocratic	52.32
Ethiopia	3441	Low Income	119	324.04	20.29	Anocratic	25.62	Congo, Rep.	187	Lower Middle Income	112	2064.42	38.46	Anocratic	No Data
Central African Republic	3205	Low Income	108	388.03	41.43	Democratic	47.86	Equatorial Guinea	178	Upper Middle Income	105	424.53	No Data	Autocratic	46.47
Mali	1205	Low Income	123	603.44	9.75	Anocratic	58.14	Eswatini	154	Lower Middle Income	103	3189.05	35.62	Autocratic	29.16
Liberia	1123	Low Income	115	474.27	35.40	Democratic	43.10	Gambia, The	135	Low Income	100	668.46	11.85	Anocratic	No Data
Zambia	1015	Lower Middle Income	133	1099.97	49.19	Democratic	32.76	Gabon	119	Upper Middle Income	107	7443.00	10.42	Anocratic	58.07
Sierra Leone	921	Low Income	122	403.94	31.12	Democratic	49.89	Guinea-Bissau	114	Lower Middle Income	115	508.62	24.23	Democratic	45.65
Angola	887	Lower Middle Income	134	2980.16	46.64	Anocratic	48.95	Benin	91	Lower Middle Income	121	939.70	13.94	Democratic	56.85
Madagascar	807	Low Income	108	425.76	22.89	Democratic	39.01	Djibouti	87	Lower Middle Income	117	1413.60	28.56	Anocratic	32.56
Senegal	772	Lower Middle Income	117	1110.16	38.55	Democratic	56.36	Lesotho	66	Lower Middle Income	104	897.11	12.67	Democratic	29.92
Cameroon	753	Lower Middle Income	124	1152.10	16.28	Anocratic	43.91	Botswana	38	Upper Middle Income	111	5729.73	30.17	Democratic	31.51
Guinea	707	Low Income	111	574.84	19.55	Anocratic	52.10	Eritrea	37	Low Income	98	12756.09	No Data	Autocratic	38.67
Mozambique	666	Low Income	118	476.72	29.60	Anocratic	50.15								

Figure 3 shows that within the top ten most conflict-stricken countries in Sub-Saharan Africa, eight were anocracies, implying a correlation between political instability and social conflict. It can also be noted that autocracies display low levels of conflict in comparison to anocracies and democracies. A majority of Sub-Saharan Africa is categorized as low income with an anocratic or transitional government. Undernourishment data is not complete due to lack of reporting in certain regions; however, the conflict afflicted areas demonstrate a greater prevalence of undernourishment as a percentage of the population than areas less impacted by social conflict.

Figure 4. Prevalence of Undernourishment among Regime Types

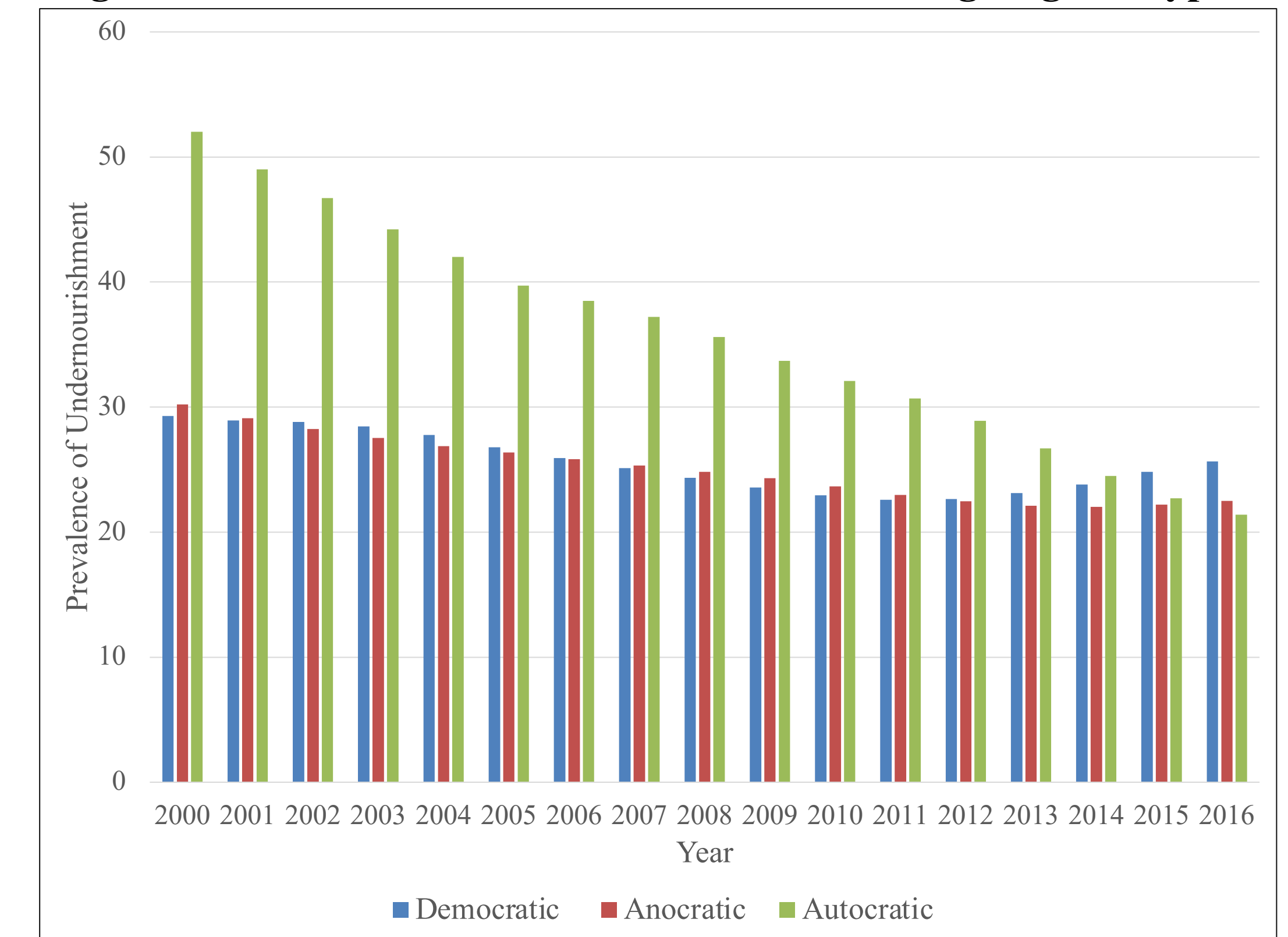


Figure 4 depicts the changes in mean undernourishment levels over time among the three polity classifications. Undernourishment levels have fallen steadily in autocracies since 2000, meanwhile undernourishment rose in democracies and showed little change in anocratic governments.

The raw data and initial analysis suggest a relatively weak unconditional relationship between food security and conflict. In order to more directly test the hypothesis, additional factors such as regime type, civil wars, and regional conflict patterns need to be examined and controlled in further analysis. As the study is still ongoing, the next steps include more formally quantifying the relationship between food security dimensions and conflict, controlling for the interfering variables, and further examination of the institutional differences between democratic, anocratic, and autocratic polities and their specific impacts on food security. The study will also be narrowed to focus more specifically on violent conflict initiated by terrorist organizations and the food implications.

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