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**CENTER ON CONFLICT
AND DEVELOPMENT**
TEXAS A & M UNIVERSITY

HIGHER EDUCATION SOLUTIONS NETWORK - FINAL REPORT

Texas A&M University
Center on Conflict and Development
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I. Program Summary

On November 8, 2012, the United States Agency for International Development (USAID) awarded funding to the Texas A&M University System (TAMUS) to establish the Center on Conflict and Development, one of eight university development labs begun as part of the Higher Education Solutions Network (HESN). The plans for the center had first been proposed in a concept note by TAMUS in response to a USAID solicitation RFA-0AA-12-000004 of February 12, 2012, building on the recent establishment at the Texas A&M Department of Agricultural Economics of the Howard G. Buffett Endowed Chair on Conflict and Development. Expected USAID funding of \$6.1 million was complemented with a \$1.25 million cost share by the Howard G. Buffett Foundation. The future work of the Center was further defined through a joint workshop among USAID, TAMUS and partners in Washington, D.C., in April, 2013.

HESN brought together seven renowned universities to contribute to addressing world development challenges using innovative ways implemented through eight development labs. The development labs in the seven universities include: AidData Center for Development Policy (AidData) at the College of William & Mary; Development Impact Lab (DIL) at the University of California—Berkeley; Social Entrepreneurship Accelerator at Duke (SEAD) at Duke University; the Comprehensive Initiative on Technology Evaluation (CITE) and the International Development Innovation Network (IDIN) at Massachusetts Institute of Technology; the Global Center for Food Systems Innovation (GCFSI) at Michigan State University; the Resilient Africa Network (RAN) at Makerere University, Uganda; and the Center on Conflict and Development at Texas A&M University (ConDev).

TAMUS was an optimum location for the new center. Texas A&M University colleges of agriculture and engineering are well-regarded nationally and the largest such colleges in the USA. National Science Foundation records show that Texas A&M AgriLife Research consistently invests more in agricultural research than any other US university system. The College of Engineering is home to Texas Task Force One, a first responder in national emergencies. The George H. W. Bush Presidential Library and School of Government and Public Service is located at Texas A&M, and the Corps of Cadets is one of the more storied military science programs in the USA. The number of military officers graduated by Texas A&M is comparable with that of the service academies. These resources positioned the university system well to provide development assistance in regions of armed conflict. This was demonstrated beginning in 2002 when the College of Agriculture and Life Sciences, Texas AgriLife Research, and Texas AgriLife Extension, components of the Texas A&M University System, participated in the major US development initiatives in Afghanistan and Iraq.

TAMUS was designated as the US university lead for the USAID-supported Future Harvest Consortium to Rebuild Agriculture in Afghanistan, led the 7-year USAID Afghanistan PEACE (Pastoral Engagement, Adaptation and Capacity Enhancement) project, and led the 5-university consortium in the USDA Iraq Agricultural Extension Revitalization project. TAMUS was a major participant in the USAID Agricultural Reconstruction and Development project for Iraq (ARDI) led by DAI, and the USAID Iraq Inma project led by Louis Berger, Inc. A number of graduates and faculty worked in related projects such as the

USAID Afghanistan RAMP (Rebuilding Agricultural Markets Project), and the USDA Afghanistan Agricultural Development Project. The President of Texas A&M participated in a special mission of University presidents to Iraq; a Deputy Vice Chancellor for Agriculture and Life Sciences served a year as Senior Agricultural Coordinator to the Afghan Ministry of Agriculture, Irrigation and Livestock; and an AgriLife Extension irrigation engineer served a year as water management advisor to the US Ambassador to Afghanistan.

Beginning in 2002 Texas A&M agricultural faculty continually responded to numerous inquiries from personnel serving in US military Civil Affairs units in Iraq and Afghanistan. This led in 2007 to a formal agreement with the US Department of Defense Task Force for Business and Stability Operations under which 40 faculty, staff and grad students served directly under the US military commands in Central, Northern, Western and Southern Iraq to assess, plan and improve agriculture. The TAMUS group fielded to Iraq was known as Team Borlaug. U.S. generals under whom Team Borlaug deployed, Rick Lynch, Michael Oates, Raymond Odierno, Jefforey Smith, John Kelley, Mark Hertling, and David Petraeus, regarded the Team as a key factor in winning the hearts and minds of Iraqi communities during the period 2007 – 2010.

TAMUS expertise and experience in war zones led the Howard G. Buffett Foundation in 2010 to seek TAMUS assistance to construct facilities for the Nangarhar Islamic University College of Agriculture in Jalalabad, Afghanistan. This in turn led to the establishment of the Howard G. Buffett Foundation Endowed Chair on Conflict and Development at Texas A&M. Filled in 2011, the chair led a program to support teaching, research, and service for the advancement of the welfare of communities enduring conflict or emerging from conflict. The chair served as the nucleus for the TAMUS response to USAID's formation of the Higher Education Solutions Network (HESN) in 2012. HESN provided the opportunity for TAMUS to expand the Conflict and Development Program to the status of a university center, officially approved by the Texas A&M Board of Regents in May, 2014.

Aimed at improving the effectiveness of development programs and policies for conflict-affected and fragile countries through multidisciplinary research and education, ConDev uses science and technology to reduce armed conflict; sustain families and communities during conflict; and assist states to rapidly recover from conflict. In an agreement with USAID, research is focused largely on mitigating conflict related to food security, natural resources, youth populations, and local institutions.

ConDev's mission is accomplished through (1) multidisciplinary, interlinked research, teaching and practice, (2) dissemination of results into development policy, program design and management, and (3) scholarly publication on the causes of conflict and its remediation through the application of science and technology. **The Center tests the general hypothesis that conflict at the interface of human communities is caused by perceived differential benefits from capital in its various forms, and that science and technology can be used to modify perceived benefits at those interfaces to reduce conflict and the damage it causes.**

Goal: Improve the efficiency and impact of development solutions for fragile and conflict-affected countries.

Objectives:

1. Improve solutions to development challenges facing fragile and conflict-affected countries through data collection, analysis, and integration.
2. Identify, assess, and foster wide adoption of development solutions for fragile and conflict-affected countries.
3. Expand the community of problem solvers to create a global network addressing development challenges in fragile and conflict-affected countries.

Based in the Department of Agricultural Economics, College of Agriculture and Life Sciences, ConDev was initiated through a cooperative agreement between USAID and TAMUS on November 8, 2012. In accordance with the State of Texas statute requiring five-year periodic reviews of state entities, The ConDev Center received approval by the University for another term of five years on January 29, 2018. The Center continues highly active collaboration with USAID, the Howard G. Buffett Foundation (HGBF), the World Bank-funded Fond Social of the DR Congo, MasterCard Foundation, Texas A&M University System partners (i.e. the Bush School, the School for Public Health, the College of Liberal Arts, AgriLife Research and AgriLife Extension), and the Conflict and Development Foundation (CDF). The latter entity was formed to facilitate receipt and management of external funds, and to contract operations as a complement to ConDev's university functions.

With the maturity of the Conflict and Development Foundation (CDF) from a charity into a permanent foundation under IRS regulations, a new 501(c)(3) non-profit partner, the Conflict and Development Research Foundation (CDRF), was formed to permanently support ConDev as a center of the Texas A&M University System. Fiscal stability of the Center has been strengthened with the establishment of a CDF-associated \$4.3 million trust fund. The income from this fund will be mainly allocated to sustaining fellows and PhD graduate research assistantships for ConDev research. The trust fund includes \$1.2 million designated to support conflict and development research in the Africa Great Lakes Region and \$300,000 for research in the Middle East. The latter fund is named for the late Tony Laos, a stalwart leader of TAMUS wartime agricultural development programs in Iraq.

The HGBF Endowed Chair (\$1.2 million) is complemented by a \$600,000 HGBF endowed program for student photojournalists, known as the Student Media Grant Program, to document issues in conflict and development. Separate student scholarships are endowed at Columbia University, Oregon State University and Texas A&M University. Total endowed resources available to ConDev at present are approximately \$6.7 million.

Prior to the end of the cooperative agreement, USAID issued a no-cost extension to allow ConDev an additional five years of programming without additional core funding. By the end of the initial period of the HESN cooperative agreement, USAID had invested \$4.81 million in the core program, the HGBF had invested \$1.25 million in matching funds, and TAMUS and CDF had invested \$8.66 million in cost share. Additionally, USAID buy-ins had added \$2.15 million for ConDev programs, and CDF and CDRF had managed \$93.67 million of leverage funding from the HGBF. ConDev programs were further leveraged by \$429,000 of World Bank funding for peacebuilding in DR Congo, and \$35,000 from the

MasterCard foundation for youth entrepreneurship in Eastern Congo. Total expenditures on ConDev related programs from November 2012 through 2018 are approximately \$112 million. This does not include \$1.81 million in USAID sub-contracts through FHI 360 to CDF for improvement of energy engineering curriculum in Afghan universities.

2. Program Achievements

Key Program Achievements: The achievements below reflect the work conducted from all of these investments. Sources of funds are shown in parentheses and Italics. The Salaries of most of the staff at ConDev were funded by HESN, and those not funded by HESN were included in the TAMUS cost share to the HESN funding. Because these staff had roles in managing, monitoring and reporting of all ConDev activities, regardless of the funding source of the specific activity, effectively all ConDev activities had implicit HESN support. When HESN is mentioned specifically as a source of funding, it means that additional HESN core funds were specifically invested in the activity. Similarly, since ConDev is based in the Department of Agricultural Economics, College of Agriculture and Life Sciences, and administered through the Texas A&M University System, TAMUS resources are used implicitly in every ConDev activity. The citation of "TAMUS" as funding source indicates that additional financial support was explicitly contributed by a unit of the Texas A&M University System, including ConDev, the Bush School and other TAMUS schools and colleges, or any academic departments thereof. TAMUS funding also includes funds made available by the Howard G. Buffett Foundation Endowed Chair.

OBJECTIVE I: Improve solutions to development challenges facing fragile and conflict-affected countries through data collection, analysis, and integration. This objective focuses on exploring the causes and consequences of conflict with respect to economic development, and usually involves answering key questions and testing hypotheses. Objective 2 follows through with program implementation utilizing knowledge gained from research, and Objective 3 follows with dissemination of results from research and project implementation.

A. Strategic Analytics Laboratory (SAL)

The Strategic Analytics Lab (SAL) serves as the Center's quantitative research arm, conducting in-depth analyses of the development programs led by ConDev and its partners. ConDev staff and students were supported directly by USAID/HESN, USAID buy-ins, HGBF, and Texas A&M University funds to conduct research on key issues in development and conflict. This research was internal to the Center, and did not involve competitive grants, unlike the other research programs identified under this objective.

I. **Historical and Geographical Pathways of Civil Conflict in Sub-Saharan Africa: An Exploration through Growing Season Weather Shock and Slave Trade (TAMUS)**

Innovation: Discovering the historical and geographical roots of conflict in Sub Saharan Africa

Key Learnings: Conflict trends in Sub-Saharan Africa are jointly determined by its historical roots and current climate shocks.

This study investigates how slave trade in history affects the relationship between weather shock and civil conflict. We construct a unique cell-level disaggregated dataset by using geo-coded information within a set of sub-Saharan African countries over 1997 – 2014. Exploiting weather variation during the growing season of the locally dominant crops, we find that (i) adverse weather shock significantly increase the likelihood of conflict incidence, onset, and intensity; (ii) this effect of weather shock on the risk of civil conflict is substantially amplified by the exposure to slave trade. The interactive effect of weather shock and slave trade remain robust to the use of instrumental variable approach and extensive robustness checks. Our study suggests that both geography and history (for instance, the interaction between climate and exposure to the slave trade) affect the current political outcomes in Sub-Saharan Africa and agricultural development may be effective in reducing conflict in the region.

2. The Impact of Slave Trade on Current Civil Conflict in Sub-Saharan Africa (TAMUS)

Innovation: Understanding and discovering causal relationship between ancient slave trade and current civil conflict of Sub-Saharan Africa.

Key Learnings: Slave trades 500 years ago shaped current institutions and sowed seeds of mistrust thereby causing civil conflict of present Sub-Saharan Africa.

Although the causes of armed conflict in Africa have been well studied, it remains important to explore the long-run effects of slave trade on contemporary civil conflict. By using a geo-coded disaggregated dataset in sub-Saharan Africa and exploiting variation of slave trade intensity within countries, we find a robust positive relationship between slave exports from a region and current conflict prevalence. Evidence from an instrumental variable approach suggests that the relationship is causal. We then investigate the potential causal channels underlying this relationship, finding that slave trade is correlated with mistrust, local institution deterioration, and a weaker sense of national identity.

3. The Impact of School Safety on Students' Academic Performance (USAID Buy-in, TAMUS)

Innovation: Understanding and discovering causal relationship between school safety and characteristics on students' academic achievement.

Key Learnings: School safety and facilities have significant influence on students' academic achievements.

In recent years, school safety has gained increasing attention from policymakers as well as academics. It generally refers to broad issues that include physical, psychological, and sexual violence that schoolchildren experience in and around school. A safe and healthy learning environment is essential for students to maximize academic performance and learning. Specifically, early research indicates that

unsafe schools will affect students' class attendance, engagement, and motivation. In the extreme cases, students at unsafe schools may have severe health problems, such as inability to concentrate, depression, and reduced self-esteem, etc. Although issues with school safety are evident around the globe, they are more pervasive in developing countries. While recent literature has established clear causal effects of school violence on academic performance, there has been limited exploration of the broader issue of school safety and student performance. The issue is more germane for developing African countries due to possible gender aspects and discrimination. ConDev proposes to extend its previous research on school violence and investigate all aspects of school safety including bullying, school facilities, and neighboring environmental factors on students' academic performance in African countries.

4. A Causal Exploration of Conflict Events and Commodity Prices in Sudan (TAMUS)

Innovation: Understanding and discovering causal relationship between commodity prices and conflict.

Key learning: Imported/donated commodities may cause conflict in developing nations.

Though recent literature uncovers linkages between commodity prices and conflict, the causal direction of the relationship remains ambiguous. We attempted to contribute in this strand of research by studying the dynamic relationship of commodity prices and the onsets of two civil wars in Sudan. Applying Structure Vector Autoregression (SVAR) and Linear Non-Gaussian Acyclic Model (LiNGAM), we find that wheat price is a cause of conflict events in Sudan. We find no feedback from conflict to commodity prices. This paper was published in the Journal of Policy Modeling.

5. On Forecasting Conflict in Sudan: 2009 – 2012 (TAMUS)

Innovation: Offering forecasting of conflict events with commodity prices.

Key Learning: It is possible to forecast conflict events using commodity data, however “big events” are harder to predict.

This research considers univariate and multivariate models to forecast monthly conflict events in Sudan over the out-of-sample period 2009 – 2012. The models used to generate these forecasts were based on a specification from a machine learning algorithm fit to 2000 – 2008 monthly data. The idea here is for policy purposes we need models that can forecast conflict events before they occur. The model that includes previous month's wheat price perform better than a similar model which does not include past wheat prices (the univariate model). Both models did not perform well in forecasting conflict in a neighborhood of the 2012 “Heglig Crisis”. Such a result is generic, as an “outlier or unusual events” are hard for models and policy experts to forecast.

6. The Impact of Conflict Induced Exclusion on Entitlement of Food: Evidence From Rural Liberia (HGBF, TAMUS)

Innovation: Our study aims to forward UNHCR's initiative to rehabilitate returning refugees in a post conflict zone.

Key learning: An efficient rehabilitation process for returning refugees that addresses social, emotional and technical integration will result in food entitlement.

This paper is a unique attempt to discover the impact exile duration on the most basic human necessity: food entitlement. We argue that exile from society followed by reintegration attempts will create mental and physical trauma, emotional distress, cultural shock, depletion of technical skills, political oppression, loss of social cohesion and articulation. We use survey data provided by Howard G Buffett Foundation, conditioned upon levels of conflict and propensity of migration from rural households in Liberian villages. Our findings suggest that accounting for household demographics, farm size, attributes, income, and exclusion duration increases the probability of food entitlement failure.

7. Economic shocks, governance and violence: A subnational level analysis of Africa (TAMUS)

Innovation: Studied geo-coded disaggregated data on Sub-Saharan Africa. We discovered how jurisdiction of governance and economic development can affect conflict.

Key Learning: Administrative decentralization along with steady economic development can reduce conflict shocks in Sub-Saharan Africa.

By using a geo-coded disaggregated dataset in Sub-Saharan Africa over 1997 – 2013, we exploit rainfall variation as instruments to estimate the causal effect of economic shocks on conflict conditional to the governance quality. We confirm some earlier findings and show some novel results. Adverse economic shocks increase the conflict risk in Sub-Saharan Africa however, improvements in governance quality can effectively mitigate the detrimental effect of these shocks on regional peace. Yet, due to the limited penetration of countrywide governance structures, this effect appears strong only in the areas close to capital cities but decays in the remote areas.

8. Female Teachers Can Mitigate the Consequences of School Bullying On Academic Performance: Evidence From Ghana (USAID Buy-in, TAMUS)

Innovation: Studying the effects of having a female teacher and how it may mitigate the consequences of bullying on academic achievement.

Key Learning: The negative effects of bullying on academic achievement are significantly mitigated with the presence of a female teacher in the classroom.

Exploiting data from Ghanaian schools' eighth grade students collected in 2011, we estimate the causal effects of school bullying on academic achievement by using propensity score matching and a doubly robust estimator approach. We find that students who have been victimized by bullying

score at least 0.22 standard deviation lower than that of their peers in a standardized mathematics examination. Meanwhile, we document the effects of bullying on students is significantly mediated by the presence of a female teacher in the classroom. These results have held through sets of robustness tests and hence, we recommend teacher gender specific programs to mitigate the adverse impact of bullying.

9. Education and School Safety (USAID Buy-in, TAMUS)

Innovation: Collection and synthesis of information that establishes a link between educational performance with school safety.

Key Learning: Increased school safety can elevate student performance.

A safe learning environment is essential for students to prepare themselves for a lifetime of future success. The issue of school safety is a more severe concern for African developing countries since these students are more likely to be unsafe due to dangerous school building structures, bullying among peers, and the ineffectiveness of school administrations.

This project is designed to explore the qualitative and quantitative relationships between school safety and academic performance of students in African primary schools. By taking advantage of the existing United States Agency for International Development (USAID) datasets and in keeping with the Agency's renewed focus on data-driven development, USAID has invested heavily in developing and operationalizing survey and observational instruments. In the education sector, the two primary tools are Early Grade Reading Assessment (EGRA) and the Snapshot of School Management Effectiveness (SSME). The EGRA has become USAID's standard aptitude test for measuring early grade literacy and the collection of EGRA data is required for all USAID-funded projects working towards an "All Children Reading" goal of the Education Strategy. The SSME collects information on pedagogical approaches; time on task; interactions among students, teachers, administrators, district officials, and parents; record keeping; discipline; availability and condition of school infrastructure; availability of pedagogical materials; and safety. The last element—safety—is of direct relevance to this study. Hence, the interrelationship between school safety (as measured by the SSME) and literacy outcomes (as measured by the EGRA) can be investigated. The objective of this study is to offer policy and programmatic recommendations to USAID on the impacts of school safety and discriminatory treatment with regard to this issue.

10. School Violence in South Africa, Botswana, and Ghana (USAID Buy-in, TAMUS)

Innovation: Assess the effect of school violence on academic achievement in the context of South Africa, Botswana, and Ghana, while also studying how gender may play a role.

Key Learning: Bullying is a significant determinant of lower academic achievement in all contexts; however, the severity of the impact based on gender varies depending on the context.

In this three-country study commissioned by USAID, we assessed the effects of school violence, defined as bullying, on academic achievement in Botswana, Ghana, and South Africa. The data contains information on fourth and eighth graders. For this research, we had three goals in mind: (a) Identify and quantify a causal effect of bullying on academic performance (b) Identify other demographic and economic covariates that influence academic performance (c) Provide possible policy recommendations that would mediate the effect of bullying in enhancing academic performance. Our findings indicate that for all grade levels, bullying has a significant detrimental effect on all subjects. Other demographic and economic covariates have different significant effects which vary by grade level, subject, and country. As a result, a general policy recommendation is ineffective, but rather we recommend policies that address different key issues in each situation. In all cases, the effects of bullying need to be addressed according to how different demographic groups respond to bullying.

11. Enhancing Livelihood and Incomes of Rural Women through Postharvest Technology in Guatemala (HESN and HGBF Match)

Innovation: Technology offering employment opportunities for women in rural Guatemala.

Key Learning: Women who earn income have more decision-making power in their home and are less likely to experience household conflict.

The Asociación de Desarrollo Integral Pueblos Hermanos (ADIPH), a non-profit organization in Guatemala, is conducting work on modified atmospheric packaging (MAP) technologies and providing these for fruit and vegetable packaging centers via the Transformative Solutions Program. The establishment of these centers has provided employment opportunities for rural women throughout Guatemala. We have partnered with (ADIPH) to design a survey that will assess the effects of female employment on their family and social dynamics. The baseline survey is almost complete and the data is being prepared by our partners for analysis with SAL. With the results of this survey, we hope to investigate how this employment may improve education, health, and security of households. More importantly, it will provide evidence to the importance of providing employment opportunities for women in rural Guatemala. Technologies such as MAP allow women to be better trained for the workforce and increase their chances of finding employment opportunities.

12. Tkach, Benjamin. *Special Operations Contracting: 21st Century Approaches for Service and Technology Acquisition*. JSOU Report 17-5, Joint Special Operations University Press, MacDill Air Force Base, Florida. 2017. (HESN and TAMUS)

Innovation: Assessment of procurement of technology and services from the private sector for US Special Operations Command (USSOCOM) and evaluation of alternative processes and policies.

Key Learning: (a) Private sector procurement generates tensions between buyers and sellers, (b) firms that offer goods and services face barriers to entry, and (c) the relatively small budgets of USSOCOM compared to other Department of Defense units limits the acquisition of revolutionary technologies.

The monograph uses a multi-method approach to examine USSOCOM's acquisition and procurement procedures. Quantitative methods are used to examine big picture procurement patterns and trends; and qualitative analysis illuminates key features of the procurement process as viewed by stakeholders.

13. Stevens, Reid, David Bessler, Kelly Prendergast, and Edwin Price. Analysis of Afghanistan's Strategic Grain Reserve Proposal. (USAID Buy-in)

Innovation: Emergency grain reserve and associated policies to reduce grain price volatility in Afghanistan.

Key Learning: In 2015 the Afghan Ministry of Agriculture, Irrigation, and Livestock (MAIL) proposed to construct a 400,000-ton Strategic Grain Reserve (SGR) comprising an emergency reserve and an operational reserve. MAIL would use the emergency reserve to distribute wheat to vulnerable groups during major grain market disruptions. MAIL would use the operational reserve to dampen price volatility and support the Minimum Guaranteed Price (MGP) program by making large wheat purchases when domestic wheat prices are low. The proposed SGR would have cost \$500 million over the first five years, which included the cost of building storage facilities, purchasing grain, and managing the reserve. ConDev recommended eliminating the large operational component of the reserve and establishing only the emergency reserve capable of providing wheat for one month to the food insecure population. This would require an 118,000-ton wheat reserve—a 70 percent reduction from the proposed reserve size. Building and maintaining a large operational reserve would increase price volatility and destabilize the domestic wheat market.

ConDev further recommended the Ministry explore other policies to lower price volatility in the domestic wheat market, such as:

- A. *Incentivizing storage*, by introducing a warehouse receipt system for use of currently available silos, and/or distributing self-storage materials, like PICS bags.
- B. *Improving forecasts* to facilitate private sector imports and storage when shortfalls are expected, and private sector storage and exports when surpluses are expected.
- C. *Increasing productivity* by investing in improved technology to increase wheat yields.

There is no single policy that will solve Afghanistan's food security problem. An emergency grain reserve would only improve food security if it is part of a broader strategy to increase domestic production and private storage. An operational reserve and MGP would hinder development of a robust grain market in Afghanistan by increasing price volatility.

14. Savio, Graham, Emily Baker, Gavin Finnegan, Shahriar Kibriya, Joseph King and Edwin Price. "Explaining Cropping Systems under Extreme Uncertainty: Evidence from Conflict Prone North Kivu, DR Congo". Strategic Analytics Laboratory, Center on Conflict and Development, Texas A&M University, College Station, TX. 2016 (HGBF grant)

Innovation: A study to explore whether crop choices in conflict prone societies can be explained through coping mechanisms from conflict, social empowerment, and access to markets.

Key Learning: Results show that if uncertainties originate from conflict, they can be mediated through specific socioeconomic arrangements.

Description: Through the BPCC (Best Practices in Cocoa and Coffee) project, the Conflict and Development Foundation (CDF) aims to identify long-term sustainable and financially profitable farming practices that reduce likelihood of conflict over land. The premise for this study is that current cocoa and coffee cultivation techniques are likely not sustainable without large inputs of inorganic fertilizer due to the current erosion of the local natural resource base. CDF conducted a survey of cocoa and coffee producing farmers in North Kivu in the Fall season of 2014. SAL helped design the survey, randomizing the villages and sample population. We facilitated a grid-based randomization technique which selected approximately 1,700–2,500 farmers to take part in the survey. CDF constructed a primary database to include farmers' demographic information, agricultural inputs available, services available from the government and NGOs, and information on interactions between farmers, buyers, and landowners as well as crop information.

Much of the literature on developing countries has investigated ways in which farming households choose different cropping systems to hedge against uncertainty. With data gathered through the BPCC project, this paper tests whether cropping decisions of small stakeholder farmers living in conflict prone agrarian province of North Kivu can be explained by the level of exposure to conflict, social empowerment, and market access. We further investigate if social empowerment and contracts, or guaranty from buyers, through market access can partially act as a buffer against the uncertainty caused by conflict. This paper contributes to the literature of choices made by farming households in two important ways. First, we explore whether crop choices in conflict prone societies can be explained through coping mechanisms from conflict, social empowerment, and access to markets. Secondly, our results show that uncertainties originating from conflict can be mediated through specific socioeconomic arrangements.

B. Transformative Solutions Grants

Ten grants of up to \$25,000 of USAID/HESN funds were awarded through international competition to scholars who hypothesized and tested innovations to overcome the negative impacts of conflict that preclude broad-based development. The Transformative Solutions request for application was a model that was adapted and used in the administration of similar programs for Latin America Transformative Solutions, Congo Peace Center grants, Uganda EMCO grants, and the Tony Laos Middle East research fellowships.

1. Gordon, Grant. “Payment and Predation: The Politics of Wages and Violence in the Congolese Army.” Columbia University Department of Political Science. 2015 (HESN)

Innovation: Analysis of soldiers to reveal reasons that soldiers abuse civilians in order to devise policies to reduce abuse.

Key Learning: Leaders use non-payment to distinguish loyal soldiers from those less committed, leading unpaid soldiers to abuse civilians, a process managed by commanding officers to cultivate internal cohesion.

Description: In fragile states, regimes must cultivate military forces strong enough to ward off external threats, but loyal enough to resist launching a coup. This requires that leaders distinguish the loyal from the untrustworthy, a particularly challenging exercise in post-conflict settings with weak institutions. The study explores how Congolese soldiers operating in North Kivu, the largest operational theater in the Democratic Republic of Congo and the epicenter of one of the most violent conflicts in Africa, solve this crucial problem. Leaders use non-payment as a screening strategy that reveals commitment by driving disloyal soldiers to defect and loyal soldiers to endure hard times. This fuels unpaid soldiers to engage in civilian abuse, a process managed by commanding officers that is used to cultivate internal cohesion. To develop and test this argument, thick description based on 100 open-ended qualitative interviews is coupled with a fine-grained quantitative analysis of 350 surveys of soldiers from the Armed Forces of the Democratic Republic of Congo. This analysis provides a novel explanation for how leaders use financial constraints to overcome classic organizational dilemmas in ways that ultimately cause violence against civilians.

2. Gordon, Grant. “Monitoring Militaries: The Role of Citizen Accountability in Reducing Army Abuse.” Columbia University Department of Political Science, 2015. (HESN)

Innovation: A system of monitoring and publicizing soldier behavior instituted by NGO's and the United Nations to reduce abuse of civilians.

Key Learning: Soldiers who were informed of UN and NGO monitoring regimes were significantly less likely to engage in sexual violence against women or kill civilians; however, the monitoring regimes had no impact on extortionary behavior.

Description: Monitoring military abuse is a key strategy used by advocacy groups, governments and international organizations to deter violence against civilians. Monitoring — the process of documenting and disseminating evidence about abuse — informs security sector policy and cooperation globally. The study examined whether monitoring militaries ultimately deters violence against civilians before it takes place? And if so, why? A survey was conducted of 350 Congolese soldiers operating in North Kivu, the largest operational theater in the Democratic Republic of Congo and the epicenter of one of the most

violent conflicts in Africa. Regression analysis was conducted on data on soldier exposure to monitoring regimes implemented in the Eastern DRC as well as soldier histories of extortion and violence. Results suggest that monitoring is most effective when coupled with financial incentives and decoupled from social sanctioning mechanisms. In the short-term, monitoring regimes should focus on disseminating information about abuses to key-policy makers and institutions rather than publicizing abuses local to recruit-sending communities or civil service organizations. In the long-term, policies should focus on empowering local organizations to effectively monitor and hold soldiers accountable with resources rather than just through social sanctioning.

3. Kahumula, Robert and Gavin Finnegan. “North Kivu Market News Service (NKMNS)”. Catholic University of the Graben (UCG), Butembo, North Kivu, DR Congo. 2017 – present. (HESN)

Innovation: A system for collecting market news and disseminating it through a network of radio stations was established to improve information for farmer decision-making in a conflict-prone environment.

Key Learning: Reliable radio market news attracted a number of radio stations reaching 500,000 people which in turn: (a) facilitated other information to be broadcast quelling socio/political rumors (reducing conflict); (b) reduced the spread of Ebola, while; (c) supporting farmers market decisions. Total beneficiaries likely exceeded one million persons.

Description: With a Transformative Solutions Grant awarded in 2016, Catholic University of Graben (UCG) established weekly local market price report that was disseminated between October 2016 and October 2017 using radio stations across the Grand-Nord, Democratic Republic of Congo (DRC). Though UCG could not conclusively determine the impact NKMNS on smoothing local-level commodity price shocks, CDF professors reported increased market knowledge of rural farmers. Once established, NKMNS was adapted to broadcast other important information to isolated and vulnerable communities located in isolated and insecure regions. This information included how to prevent the spread of Ebola and sexually transmitted diseases and the proper application of fertilizer. Major achievements included the following: (a) 128 broadcasts from two radio stations were made to an estimated combined audience of 20,000 individuals per broadcast, significant because ongoing insecurity makes disseminating information to these vulnerable populations extremely difficult; (b) each week NKMNS published a new 10-minute agricultural report, broadcasted every Wednesday and Sunday; (c) NKMNS' 128 broadcasts in Butembo and Beni reached roughly 500,000 listeners, likely benefitting over one million persons; (d) broadcasts were made possible by UCG's development of reliable agricultural data collection networks comprising women in eight rural locations and UCG students processing the data; (e) led by NKMNS and Radio Butembo Director Robert Kahumula, the radio networks are a major tool used by INGOs to prevent the spread of Ebola; (f) NKMNS continues to broadcast agriculturally related information at The Voice of UCG, a radio station in Butembo; and, (g) women's organizations showed a unique familiarity with local markets that helped them minimize the variance bargaining has on NKMNS' commodity data, and once a stream of quality data was established, local radio stations were eager to become broadcast partners.

4. Appiah, Bernard. Radio for Integrated Health and Agriculture in Ghana (RIHAG). School of Public, Texas A&M University. (HESN)

Innovation: Use of radio as a tool to provide integrated food safety, nutrition and public health services in remote or disadvantaged communities in northern Ghana.

Key Learning:

- A. Women who listened “at least once a week” were more knowledgeable and had more positive health and nutrition-related attitudes than those who listened less.
- B. Mothers in communities with the integrated health program broadcasts reported higher levels of health/nutrition related attitudes (HNRA) than did the non-intervention respondents ($p < 0.001$).
- C. Using radio for integrated agriculture and public health promotion can help positively influence health and nutritional attitudes in resource-limited settings.

Description: The Goals of the project were to (1) Enhance the capacity of agricultural extension agents and community health workers to disseminate integrated agriculture, public health and nutrition messages via the development of culturally relevant and topic-specific radio programs; (2) Positively change knowledge, beliefs and attitudes of residents in communities with respect to agricultural and public health practices; and (3) Identify best practices and lessons learned in using radio for integrated agriculture and public health promotion. The project used a participatory process to develop a three-month radio intervention comprising 10-minute drama, 10-minute discussion of the radio drama led by trained community health workers, and 30-minute phone-in from listeners of the program. Overall, there were over 150 calls from listeners of the radio program over the three months to assess the impact of the radio intervention, we surveyed mothers with children up to 6 months old in a district of northern Ghana where the radio broadcast occurred (Savelugu district) and a control district (Nadowli district). Baseline and end-line data collection occurred in March 2018 and September 2018 respectively. The health and nutrition-related attitudes (HNRA) were derived from assessing 26 key behaviors/ statements, related to appropriate child feeding, personal hygiene and uptake of health services. They were measured on a three-point Likert scale (response options ranged from ‘agree’, ‘neutral’, ‘disagree’”).

5-6. Shaw, Jon. “Sharing the Land (STL)”. Christian Bilingual University of the Congo. (UCBC). Beni, North Kivu, DR Congo. 2015 – present. (Note: Two successive grants) (HESN)

Innovation: Devolution from central ministries to local communities the function of mapping and registering land use and land claims as a way of reducing land conflict.

Key Learning: Publication of land use and land claims at the community level is an effective substitute or complement to the often slow, ponderous and expensive process of land registry by central governments, and help to reduce land conflicts.

Description: The STL program is an initiative under the Integrated Research Institute (IRI) at the Christian Bilingual University of Congo (UCBC) based in Beni, North Kivu, Democratic Republic of the Congo (DRC). The vision of STL is to promote peace by facilitating transparent, fair, and equitable land ownership practices in eastern DRC. STL's mission is to use research, technology, community engagement, and public sector activism to produce a sustainable, dynamic, effective, transparent land registry system to be implemented in North -Kivu to prevent land conflict. STL started in January with the goal of addressing land conflict and improving urban planning in Beni town. STL collaborated with the government, customary chiefs as well as everyday landowners, tenants, and other community members to develop a digital base map of Beni town, which included a map of 531 land claims and conflict data for Masiani neighborhood, one of Beni's 30 neighborhoods. In so doing, STL developed a model and framework for improving the technical aspects of DRC's land administration. STL has since expanded to the city of Goma in North Kivu, DRC. STL became the first of ConDev's Transformative Solutions projects to surpass 1,000,000 beneficiaries reached.

7. Findley, Michael and Benjamin Tkach. Crowdsourcing Peace: Closing the Feedback Loop in War-to-Peace Transitions. Department of Political Science, University of Texas. 2017. (HESN)

Innovation: A system to monitor compliance with peace agreements through crowd sourcing is posited as a way to prevent a return to violence.

Key Learning: Crowdsourcing appears to be a feasible way to monitor compliance with peace agreements and peacebuilding programs.

Description: After armed conflicts subside, the implementation of peace agreements is constrained by a lack of information about compliance to the terms agreements and the peacebuilding programs that follow. Parties to the peace agreements simply do not know what the others are doing and, fearing for their own safety, preemptively return to violence. Third-party international organizations such as the United Nations are limited in their ability to effectively carry out peacebuilding activities. Indeed, a hallmark problem in the implementation of peace agreements is the weakness of monitoring arrangements to manage a lack of information, information silos, or incentives not to share. Lacking effective external monitors or communication across multiple monitors, and few incentives for monitoring, peace may continue to be extraordinarily fragile. This project sought to identify ways in which the implementation of peace agreements could be facilitated by broader and deeper involvement of a greater number of actors. A pilot project was undertaken to assess monitoring possibilities including geocoding aid, crowdsourcing, and mapping/visualization—to begin to close the feedback loop between international aid and local communities in war-to-peace transitions. A fact-finding mission to DR Congo, Sudan and South Sudan learned many factors to be considered in carrying out a full implementation of a crowdsourcing project. A comprehensive crowdsourcing initiative, conducted with the cooperation and collaboration of the UN Peacebuilding Fund, awaits receipt of funding.

8. **Hamie, Silva, Ren Mu and Andrew Natsios. Syrian Refugees in Jordan and Lebanon: To Stay or to Migrate Onward? The Syrian Refugees in Jordan and Lebanon. Bush School of Government and Public Service, Texas A&M University. 2019. (HESN)**

Innovation: Identification and analysis of factors which cause refugees to stay in the first country to which they migrate, rather than to relocate again, facilitates policy-making with respect to mitigating, sustaining, integrating, or assimilating refugee populations.

Key Learning: Information is key to refugee decision-making, and while ongoing conflict often obscures information, one's being informed of rights and opportunities can lead to more satisfactory migration decisions.

Description: This study explores the experiences of Syrian Refugees in Jordan and Lebanon. It looks at factors that attract the migrant to move to a new destination country, versus factors that influence refugees to stay in the first country to which they migrate. Data comes from 94 in-depth interviews with migrants, 46 in each country. Researchers found that (1) refugees' disappointments with their reception in Lebanon causes regret with their initial choice of destination country, and a desire to move on to other countries, especially Europe, viewed as "freer"; and (2) relatively more satisfactory support in Jordan increases the desire of refugees to remain in that country. The authors discuss the refugee decision-making in relation to the different personal, familial, communal, and governmental factors that affect decisions.

9. **Fehr, Clemens, "Community Collaborative Potential Enhanced Through ICT in North Kivu, Democratic Republic Of Congo". Gourmet Gardens, Kampala, Uganda. Assisted by Graham Savio and Shahriar Kibriya, Strategic Analytics Laboratory, Center on Conflict and Development, Texas A&M University, College Station, TX. 2016. (HESN)**

Innovation: Efficient design of an ICT chain system within a farmer co-operative.

Key Learning: Information Communication Technologies (ICTs) that allow for meaningful and direct communication between people of differing socioeconomic strata can enable disempowered populations to advocate for their own needs and priorities.

Description: SAL partnered with the DRC-based non-profit organization *Domaine Monts de la Lune sarl* and Uganda-based cocoa and vanilla trader Gourmet Gardens, to test how legitimate local institutions can influence cooperation dynamics as seen through farmers in DRC. North Kivu farmers, in eastern DRC, have great difficulties accessing and taking advantage of opportunities in export markets. The proponents of this project hypothesize that local cooperation can be fostered through adequate support and that ICT has a key role to play. Through opening new communication channels that overcome cultural and conflict-conditioned

obstacles, ICT can contribute to building institutions and leadership that serve the interests of rural communities.

10. Kahamula, Robert. “The Effects of Cell Phones and Radios on Smallholder Farmers Decision Making: Evidence from the Democratic Republic of Congo.” Catholic University of Graben, Butembo, North Kivu, DR Congo. Assisted by Graham Savio, ConDev, Department of Agricultural Economics, Texas A&M University. 2016. (HESN)

Innovation: Support and improve the decision-making process of smallholder farmers in conflict affected areas by providing access to communications technology.

Key Learning: There is no impact of cell phone access or usage on conflict perceptions and market decision-making, but the use of cellphones did increase the sense of community among participants, augmenting feeling security when faced with conflict.

Description: Through information gathered from the BPCC survey (Section 2.A.14 above) we investigate the decision making process of smallholder farmers in conflict affected areas by their access to technology. Smallholder farmers choose between cash crops and food staples. Cash crops incur more risk compared to subsistence farming because of violence and its effect on market access and volatility. Specifically, we investigate the role of technology (cell phones and radios) on an individual's crop choice as a function of the perceptions of violence. We use original data collected from 2,260 farmers in the Democratic Republic of Congo's North Kivu region. For perception and propensity to engage in conflict, we use the Armed Conflict Location and Event Data Project household data. We control for demographic, social and economic factors of individual households. Furthermore, we estimate area/groupmate specific effects. Contrary to neo-social media theories, we do not find any impact of cell phone access or usage on conflict perceptions and/or engagement. The study's implications are significant for fragile states that experience high levels of violence. The free transmission of information through radio access provides opportunities for governments and other actors to identify when violence arises.

C. Transformative Solutions— Latin America Programs

USAID/HESN funding was matched by \$1.25 million from the Howard G. Buffett Foundation (HGBF), which was advanced through the original TAMU project proposal and initial agreement with USAID. The HGBF match funding was largely allocated to “transformative solutions” in Latin America, since USAID funding could not be used in the region. The match funding was entirely administered through the Conflict and Development Foundation (CDF).

I. The Stabilization of Marginalized Communities in Guatemala via Food and Nutrition Security on Child Stunting: Employing Systems Thinking Tools. 2015 (HGBF- Match)

This study involved using a Systems Thinking Approach in marginalized and displaced communities in Guatemala through the development of a web-based tool to aid decision makers, from mothers to policy officials, on food and nutrition options that directly impact health of children. A unique tool was developed for USAID, municipalities, and local households to track food security and water, sanitation and hygiene issues. Partners: Missouri University of Science & Technology and Peace Corps Reserve Guatemala

2. National Promotion of Quality Protein Maize (QPM) through Social Marketing in Guatemala. 2015 (HGBF- Match)

As part of Phase II of ConDev's Transformative Solutions Program, our project partners at Semilla Nueva worked to combat the bottlenecks to national use of QPM. They also expanded the consumption through a social marketing approach that included the release of a new brand called Fortaleza, while ensuring seed purchase and seed saving in Guatemala.

3. Learn, Grow, Eat & Go Program in Guatemala: Reducing Bullying by Promoting Teamwork and Inclusion through Gardening. 2015 (HGBF- Match)

Partnering with AgriLife Extension's Junior Master Gardener program and the A&M Garden Club to use the new Learn, Grow, Eat & Go! Curriculum as a tool to promote food security and reduce bullying in selected rural schools by promoting teamwork and inclusion through gardening and physical activities.

4. Enhancing Livelihood and Incomes of Rural Women through Postharvest Technology, Phase II – Guatemala. 2015 (HGBF- Match)

In this program, researchers collected data to study the relationship between women who work in vegetable packing centers using a new post-harvest technology, their decision-making ability in their households, and likelihood of violence committed against them. Partner: Alianza Agroindustrial y Artesanal Rural - ALIAR

5. Food Security, Migration and Conflict in Guatemala. 2015 (HGBF- Match)

The Inter-Relationships between Food Security, Migration and Conflict in Guatemala study promoted focused research on conflict, food security, and migration in Guatemala, in collaboration with the Latin American School of Social Sciences (FLACSO). Objectives included to research the relationship between food security, migration and conflict, especially phenomena that related to the types of conflict that promote displacement, and problems related to reintegration of deported persons. The research report can be viewed in English and Spanish.

6. An Analysis of Youth Violence in Trinidad and Tobago. 2016 (HGBF- Match)

The purpose of the study was to collect youth and violence data from local organizations to develop a comprehensive analysis of youth violence in Trinidad and Tobago, and to be able to give recommendations to develop policies and programs to reduce such.

7. Texting Campaign for Adolescent Mothers in El Salvador. 2016 (HESN)

An innovative approach was taken to create a short messaging service (SMS). Health tool to improve intent to and knowledge of breastfeeding among adolescent pregnant mothers. The objectives of the study were to determine if health education and support tools were effective in increasing perception, knowledge and intent surrounding breastfeeding in pregnant adolescent females ages 10 – 19 in El Salvador. Additionally, the study sought to increase a pregnant adolescent's perception of whether she is allowed to make decisions about the health of herself and her child. CDF funded Texas A&M University's School of Public Health to conduct this study.

8. Reduction of Violence and Gang Involvement in Ciudad Delgado, El Salvador through a Hydroponic Urban Gardening Project. 2016 (HGBF- Match)

CDF worked with Food for the Poor and the New Horizons for the Poor Foundation in El Salvador to conduct a study to evaluate the impact of an agricultural and nutritional innovation –the use of semi-urban hydroponic gardens to produce leafy vegetables – in violence reduction and keeping youth out of gangs.

9. Guatemala: Studying women empowerment and decision-making within women participating in the Enhancing Livelihood and Incomes of Rural Women through Postharvest Technology program. 2016 (HGBF- Match)

This study is linked to ConDev's Transformative Solutions program. The intervention entails testing an innovation to empower rural women through agricultural technology. Mayan women at selected fruit and vegetable packing centers are using modified atmosphere packaging (MAP) for commercial quality processing of pre-washed fruits and vegetables. CDF is supporting the study to test whether the use of MAP technology and employment at these centers will empower women to be able to make decisions at home and make them less prone to domestic violence. Women in these communities are vulnerable due to high levels of unemployment, social and economic marginalization, and lack of education. In addition, they suffer from inequality, poverty, and hunger.

10. Guatemala: Examining the effect of improved family nutrition on violent behavior, stress, and anxiety within rural farming families participating in a Quality Protein Maize project. 2016 (HGBF- Match)

CDF is working with Semilla Nueva, a non-profit organization that works on development of new sustainable agriculture technologies, such as the introduction and promotion of Quality Protein Maize

(QPM). CDF and Semilla Nueva are studying the effect of improved family nutrition (through QPM consumption) on violent behavior, stress, and anxiety within rural farming families in Guatemala. Several studies have shown that malnutrition has been determined as a cause of anxiety, anti-social behaviors, and oppositional disorder and is also associated with violence and crime (Walker, 2007; Hoddinott, 2013). Taken together, the impact of malnutrition on the interrelated problems of poverty, health, and social cohesion makes it a key barrier in the development of a post-civil war Guatemala, and one of the highest priorities for the Guatemalan government, civil society, and international development organizations. This study aims to measure the effects of the intervention (the shift from conventional maize to QPM consumption) on intra-familial violence and stress levels in selected communities of Guatemala.

11. El Salvador: Migration and Youth Development Study, Phase I: Base-line Data Collection. 2016 (HGBF- Match)

CDF funded the Migration and Youth Development Study, Phase I: Base-line Data Collection. This study was developed in collaboration with the Sociology and Political Science Department at Universidad Centroamericana José Simeón Cañas (UCA) in El Salvador. As part of its efforts to create development opportunities as alternatives to emigration and generate a strong desire to “stay rooted” in their country, Catholic Relief Services (CRS) - El Salvador is working on a cacao revitalization initiative in various municipalities of the coast and valleys throughout El Salvador, benefiting a heterogeneous population, within which youth participate. Based on the above, CDF found pertinent to study the inter-relationship between youth development and migration. Collecting baseline data will allow CRS to initiate a monitoring and evaluation process for its cacao project that will allow impact measurement on the intention that youth have to migrate. The baseline data collection had the objective of building a body of knowledge regarding five initial topics that will allow CRS to measure future impact of its cacao initiative in influencing youth intention and plans to migrate from selected municipalities: (1) Major causes of migration in the municipality; (2) Expectations before the migration and development of life projects; (3) Expectations of participation in a productive project related to the cacao initiative; (4) Interest in greater opportunities for youth leadership, participation in various community programs, and strengthening of capacity building of youth; and, (5) Social fabric present in the municipality and potential for greater establishment of “roots” for youth in their communities.

12. El Salvador: Reducing Gang Involvement through the Olympic Values through Sports Program (OVTSP). 2016 (HGBF- Match)

The Olympic Values Study in El Salvador aims to research and evaluate the effects of *Olympic Values through Sports Program (OVTSP)* on participating youth from 12 municipalities in El Salvador and to determine the program's contribution to reducing gang involvement. The specific objectives of the study are to: a) identify the main problems concerning juvenile delinquency in the communities in which OVTSP will be conducted; b) determine whether OVTSP is effective in preventing youths from joining gangs; and, c) to determine if children and young adults' lack of involvement in sports influences communities with higher violence rates. The Olympic Committee in El Salvador is leading this effort.

13. El Salvador: Youth Development Program. 2018 – present (CDF)

CDF supported Food for the Poor and the New Horizons for the Poor Foundation in El Salvador to complete a collaborative program to establish hydroponic gardens and promote youth development activities to help keep youth out of gangs. Through this program, youth participated in social inclusion and innovative crop production activities that are part of Food for the Poor's *Agriculture for Peace* project, which is conducted in communities vulnerable to recruitment by the 18 revolutionary gangs in El Salvador.

14. Guatemala and Mexico: Play for Peace and Junior Master Gardener Workshops. 2018 – present (CDF)

CDF continues to "grow good kids" through *Junior Master Gardener* programs for Guatemalan kids living in coffee-growing communities. Gardens are safe places to promote inclusion and teamwork. We are now combining gardening and nutrition activities with *Play for Peace* workshops to help form the next generation of peacebuilders. Through collaborative play, we teach Mayan kids how to cope with stress due to insecure and unfamiliar environments, poverty, and discrimination. Through the *Play for Peace* model, kids can become architects and leaders of sustained peace. Junior Master Gardener programs are being introduced in several elementary schools in San Miguel de Allende in Mexico.

D. Congo Peace Center Grants: Raising the Voices of Congolese Scholars

Innovation: A permanently endowed competitive grants program supporting research by scholars of the Great Lakes Region of Africa aims to reduce conflict and improve economic development in the region by building understanding of problems and positing solutions created by indigenous scholars from the region, and augmenting or replacing Western scholarship that has dominated historically. The endowment was provided by the Howard G. Buffett Foundation (HGBF), and is administered by the Conflict and Development Foundation (CDF).

Key learning: Financing basic research budgets allows local scholars the rare opportunity to lead local academic and government institutions in designing, implementing and evaluating locally theorized solutions that address the obstacles that impede peaceful development in their communities. Financial support for indigenous scholarship can elicit relevant and useful responses from Great Lakes Regional scholars, supporting home-grown understanding of problems and programs and policies for their solutions.

A grant made in 2013 by the HGBF as part of its support to establishing the Congo Peace Center (CPC) included \$1 million endowment for research on conflict and development issues in the African Great Lakes Region. The initial competitive grants of up to \$15,000 have been awarded using the HESN Transformative Solutions grants format, and designated for scholars in the DR Congo. These grants are intended to "raise the voices of Congolese scholars", one of the four CPC pillars, and respond to the problem that it is mainly Western voices that have been heard in their analyses and recommendations regarding conflict and development in the DR Congo. The grants were administered by CDF

Consultant, Robert Kahumula, and CDF Program Coordinator, Gavin Finnegan. On April 1, 2017, twenty professors from Beni, Butembo and Goma, Democratic Republic of the DR Congo (DRC) submitted applications during the second annual call for proposals. ConDev, worked with professors from Congolese universities to select seven additional grant recipients. All awarded grant recipients are listed below:

1. Duparc, Juhudi, Kyle L Hamilton, Jonathan E. Shaw, and Kevin Wilkins. "Enhancing DR Congo's Economy Through Research on DR Congo's Domestic Coffee Market". Christian Bilingual University of Congo. Beni, North Kivu, DR Congo. 2019. (CDF, HGBF)
2. Kihangi, Kennedy Bindu. "Property Protection and Legal Development: Investigating the Causes of Land Conflict in Eastern Congo, a Competitive Study of Bukavu and Butembo". Free University of the Great Lakes Region (ULPGL). Goma, North Kivu, DR Congo. 2018. (CDF, HGBF)
3. Musongora, Emmanuel Syasaka. "When Development Becomes a Source of Conflict: Electrification of the Beni and Lubero Territories in North Kivu". Catholic University of Graben. Butembo, North Kivu, DR Congo. 2019 (CDF, HGBF)
4. Mathe, Lukanda. "Perennial Crops Strategies that Aim to Reduce Small Landholder Encroachment on Protected Land and Land Conflict". Catholic University of Graben. Butembo, North Kivu, DR Congo. 2018. (CDF, HGBF)
5. Mathe, Kalendi Nelson. "Conflicts Over the Artisanal Exploitation of Timber in the Forests of the Eastern DR Congo: A Sustainable Management Perspective". Catholic University of Graben. Butembo, North Kivu, DR Congo. 2018. (CDF, HGBF)
6. Muhesi, Kahindo Augustin. "Understanding the Nande and Hutu Ethnic Conflict in Lubero Territory (Eastern DR Congo)". Catholic University of Graben. Butembo, North Kivu, DR Congo. 2018. (CDF, HGBF)
7. Muhindo, Katsuva Alphonse. "Youth and Civic Engagement in the Territory of Beni". Catholic University of Graben. Butembo, North Kivu, DR Congo. 2018. (CDF, HGBF)
8. Peyton, David. "Mitigating Property Conflict: Sharing the Land Data Collection and Policy Implementation". Christian Bilingual University of Congo. Beni, North Kivu, DR Congo. 2019. (CDF, HGBF)
9. Siviri, Kasereka Norbert. "The Challenge of Development in the Democratic Republic of the Congo. A Case Study of North Kivu Province". Catholic University of Graben. Butembo, North Kivu, DR Congo. 2018. (CDF, HGBF)
10. Vikanza, Katembo Paul. "Land Conflict Resolution for the Sustainable Management of the Mount Luwbew Reserve". Catholic University of Graben. Butembo, North Kivu, DR Congo. 2018. (CDF, HGBF)

E. Environmental Management in the Oil Sector and ConDev (EMCO). Grants for Research on Environmental Management and Conflict

Texas A&M University Soil and Crop Science Department was a sub-contractor to Tetra Tech for implementation of the USAID Environmental Management in the Oil Sector (EMOS) project in Uganda. Three Ugandan Universities were partners in the project: Kyambogo University, Makerere University, and Mbarra University of Science and Technology. ConDev assisted in managing the TAMU part of the project. Well into the project, participating Ugandan faculty requested that they be better supported to conduct research relevant to the project goals. USAID/EMOS project managers agreed to a plan suggested by ConDev that the two organizations jointly support Ugandan faculty research. The Transformative Solutions model RFA was adapted to the goals of the EMOS project. Three competitive awards were made by ConDev, described below.

I. Kakuba, Sultan Juma and Johan Mary Kanyamurwa. “Insecurity in War Affected Areas in Uganda: A Study Case of Teso Region”. Kyambogo University, Kampala, Uganda. 2018. (HESN)

Innovation. The purpose of the study was to identify indigenous strategies used in production to respond to food insecurity resulting from civil war-inspired conflicts in the Teso region, and improve upon those practices, and evaluate how those practices can contribute more widely in society.

Key learning. While indigenous technologies and strategies were found to predominate in the Teso Region, there was a need and opportunity to integrate modern practices into traditional food production systems.

An ethnographic research design was adopted where qualitative and quantitative data was collected from a random sample of 200 respondents, plus 22 purposely selected informants. The data sources included: questionnaire, interviews, and focus, group discussions. A translator of Ateso Language was used when necessary. Indigenous knowledge dominates in managing soil fertility, pests and diseases management, harvesting and storage as well as animal husbandry. Indigenous knowledge practices needs to integrate into the modern strategies to use to cope with food insecurity. The study suggests that there is need to strengthen awareness among extension workers of indigenous knowledge, and integrate it with modern technology. Farmers need encouragement to appreciate their local knowledge and how it can enhance food security and cope with food scarcity.

2. Twesigye, Charles K., William Epeju, Titus Watmon Bitek, Rosemary Nalwanga, Bakia Wamala Kezaala, Sammy Olal, Martin Baluku, and Joseph Katswera. “Improving Opportunities For Youth Access To Employment In The Oil And Gas Industry In Uganda: A Case Study Of Buliisa And Hoima Districts”. Kyambogo University, Kampala, Uganda. 2018. (HESN)

Innovation: Improvement of opportunities for youth employment in the oil and gas Industry in Uganda, particularly the youths from the Albertine Region in Western Uganda, through targeted vocational and technical training and the promotion of local enterprise to supply the workforce and service needs of the oil sector.

Key Learning: Private oil and gas sector companies can be mobilized to help improve vocational and technical training to better fit youth into the roles needed by the industry.

The project was guided by the following specific objectives: (1) Identify training needs for oil and gas industry in Uganda; (2) Assess the quality of Vocational Education Training in the Albertine Region; (3) Develop oil and gas education Training Modules; and, (4) Create networks between education providers, international oil companies (IOCs), employers and the Ministry of Education for the purpose of improving the quality of training in oil and gas education. The study collected, reviewed and analyzed qualitative and quantitative information and data from both secondary and primary sources. A total of 8 training institutions participated in the study, along with three international oil companies, Tullow Oil plc; Total Exploration and Production; and China National Offshore Oil Corporation (CNOOC). Specific revisions in curriculum at vocations and technical institutes were recommended for closing the large gaps in knowledge and skills needed by the industry.

3. **Twongyirwe, Ronald, and Eleanor Fisher. “Natural Resource Management in the Northern Albertine Rift Landscape, Western Uganda: Agent– based Modelling of Household Land Utilisation for Conflict Reduction”. Department of Environment and Livelihood Support Systems, Institute of Interdisciplinary Training and Research, Mbarara University of Science and Technology, Mbarara, Uganda. 2017 – present. (HESN, CDF)**

Innovation: Application of agent-based modeling of land use decision-making to build understanding of impact of extractive industries on land use and mitigate conflict over land use.

Key learning: (Research in progress)

The discovery of oil in the Albertine Rift Landscape has increased pressure on natural resources and heightened the potential for resource use conflicts. Central to these natural resource use pressures are competing interests over land for agriculture, settlement and industrial development. This undermines people's livelihoods, and threatens biodiversity conservation. In this project, the aim (embedded in the theory of change) is twofold: firstly, to increase our understanding of land utilization patterns and related decision-making through agent-based modeling, in order to fill knowledge gaps regarding how the negative effects of the extractive industries can be reduced. Secondly, to contribute to conflict mitigation over land utilization and access through solutions simultaneously generated through agent-based modeling. The project will employ mixed approaches including: remote sensing, social surveys, and multi-level computer-based simulation, culminating in the construction of the first (proof-of-concept) agent-based model of the landscape. The modeling process, including conceptualization, generation of model runs, and use of results will be undertaken in a participatory manner with local communities. This

will enhance transparency of the model and inform decision making, for policy formulation and conflict management.

F. Anthony Laos Memorial Middle East Research Fund (CDF)

Innovation: Permanently endowed program for research on Middle Eastern issues of conflict and development with emphasis on Iraq, agriculture and rural development, links Texas A&M University scholars with Middle Eastern colleagues, and disseminates transformative solutions to reduce conflict.

Shayma Al-Rubaye from the agronomy department at the University of Baghdad won the inaugural research award for her grant proposal entitled “The Economic and Environmental Impacts of Using the Renewable Energy Technologies for Irrigation Water Pumping and Nanoparticles Fertilizers on Agri-Food Production.” Research is underway.

G. Policy Briefs (TAMUS)

Each research project is typically reported in a project report, academic thesis or dissertation, conference proceedings paper, journal article, or other communication. In many cases the work is further communicated in the form of a policy brief intended to provide policy or program guidance to a public agency such as USAID. Thirteen policy briefs have been issued by ConDev, and more are in process. They include:

1. Bowie, Jeremy, Joshua Chaney, Youngho Kim, Christopher L. Martinez, Sailer Perkins, Joel Taylor & Kevin Thomas. “The Fruits of their labor: Policy recommendation report based upon a pilot study on the impact of informal Syrian refugee settlements on the local agricultural economy of Lebanon’s Bekaa Valley.” Bush School Capstone. 2019.
2. Barrera, K., Fowler, N., Janes, C., Svojsik, S., & Gottlieb, J. (2015). “Information and Voter Evaluation of Legislators in a Clientelistic Democracy: A Field Experiment in Benin.” Bush School Capstone.
3. Brewer, L., Crowder, L., Lee, M., Mikayilov, E., Nepal, S., Perl, A., Hardin Tanguay, B., & Wendelbo, M. with Mu, R. and Ruyle, L. (2016). “The Impact of Conflict on Natural Disaster Resilience: Evidence from Nepal.” Bush School Capstone. condev.org/nepal-resilience-brief.
https://pdf.usaid.gov/pdf_docs/PA00TH36.pdf
4. Carlos F., Jaloway, K., Jones, A., Mason, M., Shtepani, C., Shuler, M., Spiva, R., Ward, J., with Drs. Silva Hamie and Leslie Ruyle. (2016). “NGOs in Jordan and the Response to the Syrian Refugee Crisis.” Bush School Capstone. condev.org/jordan-brief.
https://pdf.usaid.gov/pdf_docs/PA00TGZX.pdf
5. Jones, G., Kibriya, S., and Price, E. (2019). Based upon the PhD dissertation of Yu Zhang, Department of Agricultural Economics, Texas A&M University, “The Long-Run Effects of Slave

Trade on Civil Conflict in Sub Saharan Africa,” in “Three Essays on Civil Conflict.” 2017. https://pdf.usaid.gov/pdf_docs/PA00TQSI.pdf.

6. Jones, G., Kibriya, S., and Price, E. (2019). Based upon the PhD dissertation of Yu Zhang, Department of Agricultural Economics, Texas A&M University, “Weather Shock, Slave Trade and Conflict: Evidence from Sub Saharan Africa,” in “Three Essays on Civil Conflict.” 2017. https://pdf.usaid.gov/pdf_docs/PA00TQSM.pdf
7. Jones, Gordon, with Sultan Juma Kakuba and Johan Mary Kanyamurwa. “Insecurity in War Affected Areas in Uganda: A Study Case of Teso Region.” Kyambogo University, Kampala, Uganda. 2018.
8. Jones, Gordon, with Twesigye, Charles K., William Epeju, Titus Watmon Bitek, Rosemary Nalwanga, Bakia Wamala Kezaala, Sammy Olal, Martin Baluku, and Joseph Katswera. “Improving Opportunities For Youth Access To Employment In The Oil And Gas Industry In Uganda: A Case Study Of Buliisa And Hoima Districts”. Kyambogo University, Kampala, Uganda. 2018.
9. Roman, Johanna. “Reducing Violence and Gang Involvement through Hydroponic Gardening in El Salvador”. The Center on Conflict and Development at Texas A&M University. 2007. https://pdf.usaid.gov/pdf_docs/PA00WF3S.pdf
10. Roman, Johanna. “Learn, Grow, Eat, Go: Promoting Teamwork, Inclusion and Reducing Bullying Behaviors in Kids Through a Garden-Based Education Program, El Tejar, Guatemala.” The Center on Conflict and Development at Texas A&M University and the Conflict and Development Foundation. 2017. https://pdf.usaid.gov/pdf_docs/PA00WF3T.pdf

OBJECTIVE 2: Identify, assess, and foster wide adoption of development solutions for fragile and conflict-affected countries. Objective 2 largely focuses on interventions intended to sustainably and broadly improve the political economy of regions, often involving new physical and social infrastructure.

A. Botswana EcoExist Project on Human Elephant Conflict. TAMU Department of Parks, Recreation and Tourism, CDF, ConDev. (HGBF)

Innovations: Elephant resistant cropping patterns, elephant retardant practices using capsaicin, and elephant avoidance policies preventing habitation in mapped elephant pathways identified by electronic collaring of elephants, is reducing deaths from human-elephant confrontations.

Key learning: Electronic tracking showed that elephants follow customary paths over long distances each year and that human and elephant deaths can be reduced by posting pathways and regulating human habitation within the pathways.

Description: In an area of northern Botswana roughly the size of Yellowstone National Park, 15,000 elephants compete with 15,000 people for access to water, food, and land. These elephants are not neatly contained in parks—they roam freely, often in areas where people are planting fields, herding livestock, and walking their children home from school. As more land is converted to arable farming and as the elephants' range expands, encounters between people and elephants are becoming more frequent as are incidents of devastating human-elephant conflict. EcoExist seeks to reduce conflict and foster coexistence between elephants and people. The team finds and facilitates solutions that work for both species. Our approach connects science with practice. In the short term, we empower farmers with practical, affordable, and effective tools to reduce conflicts with elephants. In the long-term, we collaborate with local, national and international stakeholders to develop political and economic strategies for addressing the root causes of conflict. We endeavor to address human-elephant conflict in ways that may be modeled throughout Botswana and beyond.

B. Botswana Human-Elephant Conflict Workshop. Amy Smith, MIT D-Lab/IDIN; Leslie Ruyle, ConDev; University of Botswana and EcoExist. (HESN)

Innovation: ConDev and D-Lab collaborated on a makers-workshop to engage students and local communities in co-creating solutions for human-wildlife conflict in Botswana. The workshop simultaneously served as a high impact learning experience for students from a diverse set of disciplines. Additionally, the two HESN labs leveraged their own networks and expertise to develop a new method for assisting in the development for rural Botswanan farmers.

Key Learning: Local community members faced with threats from wildlife to their lives, property and farm enterprises, identified their key issues and available local materials. The intense engagement of students with local farmers in solving local problems with local communities is a quick and highly effective way of introducing students to the practical aspects of international development while also developing novel local solutions.

Description: The workshop included 10 farmers, 10 representatives from a local NGO (Ecoexist) focusing on human-elephant conflict, nine students from Texas A&M University, one student from South Africa, a representative of a local NGO Healing hands, a USAID representative, Texas A&M University engineering professor, and the organizers Amy Smith and Leslie Ruyle. Farmers presented details of their problems and then they broke into groups to brainstorm potential solutions. Inventions included a crank system for dipping rags into a vat of chili pepper solution for fences to deter elephant movements into farms. The system improved upon a local method of burning a chili mixture and protected people's hands and eyes from the discomfort caused by contact with chilies. The method of high impact learning was documented in a journal article that is being submitted for publication. The success of the workshop earned a lot of attention and has led to a new grant for work with the NGO Cheetah Conservation of Botswana.

C. Congo Peace Center (CPC). Catholic University of Graben, TAMU Department of Political Science, Colombia University, CDF, ConDev. (HGBF, HESN)

Innovation: With headquarters built in Butembo, North Kivu (2014), and office in Kinshasa, the Congo Peace Center: (1) formed and maintains an expert facilitators' network to promote local and local-to-national peace-building dialogue; (2) established and maintains a Congo scholars network to elevate and build respect for the voices of Congolese in setting the future of the DRC; (3) promotes economic progress especially in less secure areas to give all communities a greater stake in a stable society and economy; and, (4) established and maintains an institutional resource for high-level policy advice, formation and implementation aimed at supporting social, political and economic progress. Succinctly the four CPC pillars are dialogue, scholarship, development and policy (See <http://youtu.be/E5XplstykbQ>).

Key learning: Voluntary initiatives to carry out functions of a civil society based on community values and aspirations can provide stability when formal national and international institutions of governance have failed in fragile regions.

Description: An informal network of Congolese civic leaders, HGBF, CDF and Texas A&M University's Center on Conflict and Development established the Congo Peace Center (CPC) at the Université Catholique du Graben (UCG) in Butembo, North Kivu, DR Congo, to support and achieve sustainable peace in the Democratic Republic of the Congo (DRC) and facilitate its integration into a more stable and peaceful Great Lakes region. An auditorium-style university building with offices was constructed to house the Center (<https://flic.kr/s/aHsk2ow3yw>). The center aims to promote regional dialogue, conflict and development scholarship, entrepreneurial activities and national policies with the goal of leading to stability. The CPC is committed to achieving good governance, inclusive economic development, and national integration and reconciliation. CPC is recognized in the statutes of the Government of the Democratic Republic of the Congo as a functioning affiliate of the STAREC (Stabilization and Reconstruction Plan for Eastern Democratic Republic of the Congo), a United Nations and United Nations Development Program body. Three of the four components of CPC are reported in this Final Report: Raising the Voices of Congolese Scholars, Dialogues in Violence Prone Communities, and Youth Entrepreneurship in South Kivu. The fourth component on national policies is ongoing.

D. Dialogues in Violence Prone Communities of the Democratic Republic of the Congo CPC, CDF, ConDev. (HESN, HGBF)

Innovation: Representatives drawn from various strata of different sectors following Elinor Ostrom model convened in communities of intense conflict to formulate strategies for conflict resolution and economic development promoted to policy makers.

Key Learning: Dialogues mobilize local initiatives to elicit actions by high-level governmental actors, and encourage ongoing activism at local levels; but can also elicit push-back from other public entities competing for influence.

Description: By 2014, 20 years of recurrent armed conflicts in Eastern Congo had deeply eroded social cohesion and economic and rendered official governance ineffective. On December 3, 2014, the Governor of North Kivu Province issued letter # 01/1543/CAB/GP-NK/2014, commissioning the Congo Peace Center and the Provincial Cell of Support to Pacification (CPAP) to conduct a series of

community dialogues for peace building and economic development in Rutshuru, Masisi, and Lubero Territories. The dialogues were held from December 2014 to June 2015 and attended by representatives of key social strata including customary chiefs, politico-administrative authorities, representatives of ethnic communities and civil society, and others. They were framed in the context of the strategic pillars of the North Kivu 5-year development plan, and the peace building and local development objectives of the UN supported STAREC (Stabilization and Reconstruction Plan for Eastern Democratic Republic of the Congo). Results were synthesized into highly detailed provincial plans at a workshop in Goma (“Meeting of Restitution of Resolutions and Recommendations of Community Dialogues,” January 22-23, 2016, identifying actions to be taken, person responsible, timelines and means of implementation. The results were also incorporated into a comprehensive proposal, submitted by the governor of North Kivu to the International Fund for Agricultural Development (IFAD) in Rome. Follow-up continues in new programs emanating from IFAD, World Bank and the provincial government. The plans focus on reducing ethnic tension, job creation while protecting the environment, strengthening local government, local participatory management of natural resources, integrated step-wise approach to land issues involving relevant parties (extended families, farmers, pastoralists, artisanal miners, and traditional chiefs), gender equality, rural markets and market roads, micro-dams for electricity and reduction of charcoal use, and other areas.

E. Youth Entrepreneurship in South Kivu, DR Congo. Bilingual Christian University of the Congo, CDF, ConDev, Bush School. (HGBF, Mastercard Foundation)

Innovation: Training and mentoring was combined with seed funding for competitively selected projects to encourage the development of business enterprises led by youth and young adults in violence-prone South Kivu, DR Congo.

Key Learning: Youth were highly responsive, creative and enthusiastically engaged in competitive proposal preparation and written and “Leopard’s Lair” oral presentation; businesses formed are thriving, creating employment and incomes.

Description: One of the four components of the Congo Peace Center is “economic development”. The peace dialogue component (held in Rutshuru, Massisi, Lubero and Goma) had earlier identified entrepreneurial thinking and inclusive economic development as a crucial need to mitigate local conflict. This development component, funded by HESN, HGBF and MasterCard Foundation, was to encourage entrepreneurship, independence, and economic prosperity in lieu of conflict for the youth of DRC. ConDev/CDF partner, the Bilingual Christian University of the Congo (UCBC), surveyed the business climate and helped to formulate a training program focusing on how entrepreneurs can be successful in: (1) a conflict-affected region (2) an area with limited infrastructure and connectivity, and (3) an area of great biodiversity importance. Applications for business support were invited through radio, newspaper and local organizations. From 25 written proposals, 18 entrepreneurs were selected to compete for seed funding. They pitched their businesses for 3 minutes in the “Leopard’s Lair” (Shark Tank, Congo style) in front of the judging panel. (See “They Come & They Go”, <https://www.youtube.com/watch?v=EcVybPU40wU&feature=youtu.be>). Business ideas included soap making, a car wash, a data analysis enterprise, a coffee shop, restaurants, selling shoes, selling eggs, a laundromat, a movie/ fashion/ video company, and other agricultural enterprises. Business training was

provided for 6 weeks to the 18 entrepreneurs plus all other interested entrepreneurs (45 total). The project helped to register the companies with the Federation of Enterprises of the Congo (FEC). Initial profits were around \$50/month for most applicants. The initiative not only launched businesses, but in the broader community it promoted investment and entrepreneurship, improved skills and entrepreneurial thinking, increased awareness of investment opportunities, and established collaboration between local entrepreneurs and government entities. A business hub "Wakisha" (Ignite) was established at UCBC offering co-working space with advisory and training services. It continues to serve the South Kivu Region.

F. Conflict mapping in the Bas Uele Province of the Democratic Republic of the Congo. ConDev-Congo Peace Center, Stabilization and Reconstruction Plan for Eastern Congo (STAREC). (World Bank Fond Social of the DRC)

Innovation: Using Participatory analysis, a detailed mapping of a fragile province is constructed to show its socio-economic profile; composition of communities; nature, causes, frequencies and impacts of conflicts; local mitigation capabilities, potentials, and dynamics; and conflict prevention and resolution mechanisms— to provide a basis for a conflict management and peace plan for the area.

Key Learnings: Conflict is widespread throughout Bas Uele Province and is driven by land and border disputes overlying differences in identity. Conflicts can be resolved by transforming community difference into communion, and replacing exclusion with inclusion. Communion in this case is intended to imply mutual sharing of group concerns, grievances, aspirations and other feelings across social boundaries in an atmosphere of mutual respect for peace, political governance and sustainable economic development.

Description: The Congo Peace Center posits that rival communities comprise different "community orders" that prevent the formation of a true "homogeneous order" of collective and national thought, conducive to the combination of individual efforts for long-term development. This blocks creativity, economic integration, socio-cultural exchange, and political harmony. The method for resolution is to (1) Identify local communities in a geographic area in the form of community identities; (2) Indicate the major characteristics of the communities present and competing in an area to the extent they can explain distinct beliefs and traditions; (3) Identify traditional powers and find out how they are or are not responsible for the good or bad governance of the management of ancestral heritage in the form of "customary power"; (4) Evaluate whether the state (as opposed to customary power) is able to inject a new form of social cohesion to effectively manage conflicts by promoting the peaceful coexistence of people around the notion of "landowner"; (5) Identify the exclusions and grievances that arise in the wake of modern state power politics and civil society organizations and enterprises as potential sources of inter-community conflict through the analysis of "alternative resources and incomes"; (6) Identify common thoughts and collective behaviors that may or may not exacerbate existing conflicts in relation to the actions of "politico-administrative authorities and law enforcement officials"; and finally, (7) survey and record current conflicts in their local empirical expressions in a single table by territory so that their internal connections, and possibly their circular causality, can be detected. These conflicts are then

classified into five types of major conflicts in order to understand the types of exclusions from which that people suffer: interpersonal conflicts, conflicts of orientation, conflicts of processes, conflicts of roles and finally so-called external conflicts. From this, a conflict management plan and community/intercommunity pacification plan are developed. To accomplish this ConDev CPC followed a mixed methodology involving four researchers, 20 resource persons and 400 respondents (including the 20 resource persons) across four targeted territories. The conflict resolution plan included detailed recommendations at the national and provincial levels, based upon 12 findings with respect to customary conflicts, land disputes, farmer/pastoralist disputes, religious conflicts, and political/administrative conflicts.

G. Ghana Center on Conservation Agriculture. HGBF, CDF, ConDev. (HBGF)

Innovation: A research, demonstration and training center was established to adapt and promote in tropical conditions and small farms the no-till practices that were proven useful in temperate climates.

Key Learning: Minimum tillage combined with a range of tropical food and cover crops can reduce soil loss, conserve soil moisture and improve productivity, especially in times of drought.

Description: The main focus is the Center for Conservation Agriculture which serves as a research and training center in a public-private partnership between agribusiness and agricultural institutions. This first of its kind institution in the tropics that serves as a focal point for no-till research and activities as part of a Brown Revolution soil conservation approach. This center's research is an in-field example of how conservation-based techniques can lead to better long-term results for smallholder farmers than traditional practices, and its outreach activities are becoming well-known throughout Ghana, and more widely in Africa. The center designs, tests, and implements context-appropriate, high-yielding, conservation-based agriculture systems for rural smallholder farmers in Africa. Improving land productivity can reduce the need for clearing forests for farming, or farm expansion that might encroach on other land users, or migration.

H. Rwanda/DR Congo One Stop Border Posts. Government of Rwanda, Government of the Democratic Republic of the Congo, Economic Community of the Great Lakes Countries, HGBF, CDF, ConDev. 2018. (HGBF)

Innovation: Back-to-back border customs facilities in Goma, DRC, and Rubavu, Rwanda, with orderly pedestrian and vehicle gateways, inspection bays for trucks, cold rooms, computer-based processing, and other features are designed to facilitate cross-border trade and business development, intergovernmental cooperation, migration and intelligence sharing.

Key Learning: While it is too early to assess the impact of trade and business facilitation on armed conflict between populations in the two countries, the processes that were required to establish one-stop customs and immigration have created dialogue and cooperation that have reduced intergovernmental hostilities.

Description: Since the early 2000s, the transformation of traditional border crossings into One-Stop Border Posts (OSBPs) has expanded throughout many parts of Africa. By facilitating intergovernmental cooperation, OSBPs address a main inefficiency facing trade, migration and intelligence sharing. CDF, ConDev, the Economic Community of the Great Lakes Countries (ECGLC), and the governments of Rwanda and DRC are working together to overcome the challenges that prevent Rwanda and DRC from transforming one of Africa's principle economic channels, The Grande Barrière de la Corniche, into a proof of concept and an example of OSBPs to be emulated throughout Africa. Grande Barrière de la Corniche OSBP has a dedicated facility in each country, each serving one direction of traffic. The OSBP combines two stops into one and consolidates border operations in a shared work space for exiting one country and entering another. It is expected that if trade between DRC and Rwanda becomes more efficient then conflict will subside as prices of goods and volumes of trade gain resiliency.

I. Virunga Alliance Monitoring and Evaluation Program, Virunga National Park, the Université Catholique du Graben in Butembo, HGBF, CDF, ConDev. (HGBF)

Innovation: Mixed methods metrics and monitoring system aligned with International Finance

Corporation standards designed to support the evaluation of impacts of investments in economic infrastructure (hydro-electric power) in areas prone to armed conflict.

Key Learning: Early evidence from the Mutwanga facility indicates that on a per megawatt basis, 969 jobs are supported by the Mutwanga hydro facility, of which 420 are directly attributable to the facility, supporting further investment by multilateral banks.

Description: Protracted violence in the eastern Democratic Republic of Congo has long disincentivized investment in the region, and yet pervasive and persistent poverty itself fuels banditry, armed groups, and violent conflict. Insecurity and poverty not only significantly hinder investment in the region, but these dynamics also present multiple threats to the survival of Virunga National Park (PNVi), the oldest park in Africa and one of the most ecologically rich regions in the world. To address these issues, the Virunga Alliance makes investments in the region's natural resources in order to support sustainable development that leads to increased security, local employment, regional productivity, reductions in poverty, and improved conservation outcomes for Virunga National Park. A mixed-methods research program by the Center on Conflict and Development at Texas A&M University served to monitor, analyze, and communicate the impact that Virunga Alliance investments are having in Rutshuru and Lubero territories, and in the Mutwanga sector of Beni territory in North Kivu, and on the four million people who reside within a day's walk of Virunga National Park's (PNVi's) borders. The monitoring system supports evaluation of the economic impacts of electrification on previously unconnected communities, and how these impacts are connected with measures of household wellbeing, regional conflict mitigation, and conservation outcomes for PNVi. The mixed methods utilized in this research are household surveys, focus groups, business interviews, and local-level market tracking.

J. Nasho Solar Powered Center Pivot Irrigation System. HGBF, CDF, ConDev, the Rwandan Ministry of Agriculture, 2018. (HGBF)

Innovation: Economic Infrastructure (very large scale solar powered center pivot irrigation system) to recover from and prevent armed conflict in drought prone communities.

Key Learning: Economic infrastructure complemented by cooperative farm operations and technical advisory services can radically improve farm productivity and reduce anxiety over food security.

Description: Drought stress on crops has been found to be associated with armed conflict across sub-Saharan Africa. In 1994 Rwanda suffered ethnic violence that has been termed the Rwandan Genocide. A drought-prone area of Southeastern Rwanda sixty-three center pivot irrigators powered by approximately 3 acres of solar panels, scheduled by advanced electronic monitoring of weather and soil moisture, and utilizing lake water, were established to serve 1200 farm families. Farmers have been able to transition from a single food crop of highly variable yield to fairly secure cropping system of 2 or 3 crops per year. During the first 4 years of operation, improved varieties of familiar crops of maize, beans and soybeans have been grown. Permanent forage intercrops and other cover crops are being tried as well. Evolving soil, pest, engineering and market issues are continually solved through farmer entrepreneurship and scientific expertise provided by the Ministry of Agriculture and partners.

K. Confined Animal Husbandry in Conflict Zones, Iraq and DR Congo. ConDev, Catholic University of Graben. (USAID, HGBF, CDF, US Department of Defense, Qatar Foundation)

Innovation: Compact animal production operations that can be fully operated by, and often concealed within, a household provides food and income during periods of armed conflict.

Key learning(s): (1) Because of the premium that is paid for animal protein when external meat supply chains are cut by conflict, local production of eggs, dairy, meat and fish often thrive during conflict; (2) After starting small during conflict, confined animal feeding operations can expand and integrate vertically and horizontally into major peacetime industries.

Description: ConDev staff initiated or studied numerous animal enterprises during armed conflict and instability in Iraq and DR Congo. In DR Congo, farmers and institutions reported widespread destruction of cattle production in North Kivu. ConDev documented the emergence of clandestine live cattle imports from Uganda and slaughter in the Butembo region. In 2014 ConDev staff introduced household cavy production in Butembo, providing household food and income for women operators. Fish production was also supported in Butembo. In 2013, ConDev worked with the Howard G. Buffett and Qatar Foundations to document thriving red meat value chains in Kurdistan, Iraq, that ConDev staff had started earlier with USAID support ("Agricultural Development in Kurdistan, Iraq: Factors in Post-Conflict Recovery," Report to the Howard G. Buffett Foundation, 2012). Another Evaluation was conducted by ConDev in 2016 (https://pdf.usaid.gov/pdf_docs/PA00TH3M.pdf). Several of these cattle and lamb feedlots prospered until they were closed by ISIS, but one survived and has now become a

nationwide meat production, processing, cold storage and refrigerated meat distribution firm, Euphrates Valley fish farming was revitalized by new broodstock imported from Hungary by AgriLife Research and the US Department of Defense, and recently evaluated by CDF grantee. AgriLife staff conducted several studies of poultry meat, eggs and dairy production in Iraq during the 2008-2010 period, with follow-up by ConDev in 2013. Entrepreneurs in these industries consistently reported that business was feasible and especially profitable during conflict.

L. Military Farmers: Enhancing the Democratic Republic of the Congo Military Agriculture Infrastructure. US Department of State, US Department of Defense/AFRICOM, Armed Forces of the DR Congo (FARDC), Borlaug Institute, ConDev. (US Department of State)

Innovation: Training of food insecure military personnel in production of crops and animals on military lands for consumption by military personnel and their families.

Key learnings: Military production and processing of its own food supplies on land belonging to military bases increases food security of military personnel, reduces conflict between military and surrounding civilian community, improves confidence and morale of military personnel, and extends food production technology and food security to the civilian community.

Description: The main objectives of the project were to: improve food security of the FARDC, transform and train militants into agriculturalists to ensure the sustainability of operations after foreign support ends, reform the security sector in the DRC by building trust while reducing conflict amongst soldiers and civilians, and lastly to ensure this groundbreaking initiative serves as a model for future endeavors. Funded by the US Department of State and awarded initially in 2010 to the Texas A&M Borlaug Institute, and under supervision by the US Department of Defense and USAID, the project's leadership migrated to ConDev in 2014. US funding to FARDC ended in 2015, while monitoring by ConDev continued through 2017. FARDC personnel continued the program after the US funding ended, demonstrating the sustainability and value of the program to participants. Its enterprises included maize, cowpea, cassava, cattle, fish and pig production. Many of the personnel who joined the project, termed AGCO, were formerly members of insurgent militias. Soldiers uniformly reported satisfaction in learning agricultural skills, and spread the technologies to the civilian communities. The program was subsequently implemented among the South Sudanese military and was reported to ConDev by the President's Education Advisor in August, 2019, to be a continuing success.

OBJECTIVE 3: Expand the community of problem solvers to create a global network addressing development challenges in fragile and conflict-affected countries. Objective 3 focuses on the dissemination of knowledge and skills that emanate from research and intervention related to conflict and development, through formal and informal means of human capital formation.

A. Undergraduate/Graduate Courses on Conflict and Development (HESN and TAMUS)

ConDev faculty and associated staff have taught and will continue to teach courses at Texas A&M University. Three of the courses comprise an academic minor in Conflict and Development. Both of the Agricultural Economics courses focus on real-world applications but include development theory and some econometric. ConDev researchers often visit and interact with students, highlighting their projects and presenting opportunities for students to become further involved with the Center. The three courses are as shown below.

1. **AGEC 408/608** “Economics of Foreign Intervention, Conflict and Development”. This is a “stacked” course for undergraduate and graduate students. The two groups have slightly different requirements. It is reading intensive comprising journal articles complemented by 3 hours/week of lecture and discussion, and some guest speakers. Students write 7 essays and two exams. This course is taught during the fall semester.
2. **AGEC 420/620** “Food Security, Climate and Conflict.” Like 408/608, this course is stacked, reading intensive, with 7 required essays, classroom discussion and lecture, guest speakers, and two exams. This course is taught during the spring semester.
3. **INTA 702** “Women, International Development and Environmental Conflict”. Taught in the Bush School of Government and Public Affairs, this course emphasizes readings and classroom discussion.

B. Graduate Student Assistantships (HESN, HGBF, TAMUS)

ConDev provides research and teaching assistantships for MS and PhD students, and ConDev faculty and staff guide graduate student research on topics on issues conflict and development. Subsequently, 35 students have received degrees in association with ConDev and 12 current students receive(d) support from the Center. Graduates have taken positions in industry, NGOs, academic institutions, military and governmental agencies including especially USAID. Past and present students are as follows:

Graduate Student Degrees Granted (35 Total)

Padmaja Pancharatnam PhD AGEC	Natalia Gonzales MA BUSH
Ruth Aisabokhae PhD AGEC	Jonah Fjelsted MA BUSH
Narishwar Ghimere PhD AGEC	Molly Walsh MA BUSH
Yu Zhang PhD AGEC	Evania Robles MA BUSH
Phil Xi PhD AGEC	Julia Swenson MA BUSH
Junyi Chen PhD AGEC	Gavin Finnegan MA BUSH
Chengcheng Fei PhD AGEC	Ben Fain MA BUSH
Song Zhou PhD AGEC	Caroline Weir MA BUSH
Alise Dykstra MS AGEC	Chris Janes MA BUSH
Chuks Obineche MS AGEC	Christine Harrison MA BUSH
Kwadwo Amponsah MS AGEC	Gabriel Vanderhey MA BUSH
Prudhvi Maddala MS AGEC	Shiva Thompson MA BUSH
Caitlan Shaw MS AGEC	Moses Youn MA BUSH
Clement Sohoulande PhD SCSC	Zike Chen MS BUSH
Benjamin Davies MS SCSC	Deepthi Rajshekhar PhD BAEN
Lauren Pitts MS SCSC	Katherine Dennis PhD RPTS
Aparupa Chatterjee PhD ALEC	Jifar Nata PhD TWRI
Joseph King PhD ALEC	

Current Graduate Degree Students (12 Total)

Natalia Gonzales PhD AGEC	Taya Brown PhD HORT
Ogaufi Maripe MS AGEC	Patricia Moktedi PhD RPTS
Jorge Martinez MS AGEC	Juan Whiting PhD SCSC
Olelakan Faromiki MS AGEC	Andrea Batarse MS ARCH
Sam Priestly PhD AGEC	Marie Payne MA ESSM
Jaehyun Ahn PhD ALEC	Gordon Jones JD Law applicant

C. Bush School Capstone Courses. (TAMUS and HESN)

Each class of students graduating from the George H. W. Bush School of Government and Public Service, undertakes capstone projects intended to help solve real world problems. Students approach each problem in teams of 5 to 7 persons. ConDev has posed at least one problem each year since 2011 and supported the student teams to complete the work, guided by a Bush School faculty member with consultation from ConDev staff. Below are some of the problems and corresponding faculty mentors:

- I. Kishore Gawande, "A Database on US Foreign Assistance to Afghanistan". 2012. (HGBF Chair)

2. Kishore Gawande, "Evaluation of Three Potential HESN Transformative Solution Projects: Afghanistan, Burma, and DR Congo". 2013. (*HGBF Chair*)
3. Kishore Gawande, "DR Congo Child Nutrition and Reintegration of Youth Combatants". 2014. (*HESN*)
4. Jessica Gottlieb, "Information and Voter Evaluation of Legislators in a Clientelistic Democracy: A Field Experiment in Benin". 2015. (*HESN*)
5. Ren Mu, "Youth Employment in Ghana: Conditions and Determinants". 2015. (*HESN*)
6. Ren Mu and Leslie Ruyle, "The Impact of Conflict on Natural Disaster Resilience: Evidence from Nepal". 2016. (*HESN*)
7. Silva Hamie, "The Future of Xenia: A Pilot Study of the Perceptions and Attitudes of Greek Students towards Refugees". 2016. (*HESN*)
8. Silva Hamie and Leslie Ruyle, "NGOs in Jordan and the Response to the Syrian Refugee Crisis". 2017. (*HESN*)
9. Silva Hamie, "UNICEF's Non-Formal Education Programs to Syrian Refugee Children in Lebanon". 2018. (*HESN*)
10. Morten Wendelbo, "Initial Operational and Cost Feasibility of Enforcing Fortification in Small Maize Flour Mills in East Africa". 2018. (*USAID Buy-in*)
12. Leslie Ruyle, "Understanding Entrepreneurship in the Democratic Republic of the Congo". 2018. (*HGBF Chair*)
13. Silva Hamie, "The Fruits of their labor: A Pilot Study on the impact of Informal Syrian Refugee Settlements on the Local Agricultural Economy of Lebanon's Bekaa Valley." 2019. (*HGBF Chair*)

D. Student Media Grants Program (HGBF, TAMUS)

In 2011 the Howard G. Buffett Foundation amended their contribution to the endowed chair to add \$500,000 designated for students to use photojournalism to explore issues in conflict and development. Competitive awards are made once a year to students from anywhere in the world, selected by a panel of Texas A&M University faculty. Past projects include:

I. 2019 Projects

- **Colombia**- Ricardo Velasco. The University of Texas at Austin. "Memory and Sustainability for Peace and Reconciliation in Transitional Colombia"

- **Mexico**- Jorge Choy. The University of Texas at Austin. “Where dreams and nightmares meet: Central American, African, and Asian migrants and asylum seekers in Mexico’s Southern Border”
- **Colombia**- Alexis Aubin. University of Montreal. “A Wounded Land.”
- **Guatemala**- Nathalia Hernandez. The University of Texas at Austin. “Curanderas (Healers): Mayan Women’s Voices and Bodies in Resistance”
- **Brazil**- Daoud Qamar, Texas A&M University. “Living in Neglect: The People of the Hill”
- **Uganda**- Jessica Spence. Texas A&M University. “Photovoice over Gender-based Agriculture Issues with Smallholder Female Farmers”

2. 2018 Projects

- **Guatemala**- Maryanna Nascimento. Universidade Federal da Bahia, Brazil. “Photo with Coffee— Guatemalan Children Telling their Stories”
- **Brazil**- Plinio Luis Pereira. Federal University of Parana in Brazil. “Brazil: Living with Fear – The War Inside Brazil”
- **Ghana**- Debbie Onuoha. Universidade Lusófona de Humanidades e Tecnologias, Lisbon, Portugal. “Illegal Artisan Gold Mining in Ghana” – Not completed

3. 2017 Projects

- **Turkey**- Özge Sebzeci. Marmara University in Istanbul. “Turkey: The Struggle for Women’s Rights.”
- **Kenya**- Brian Otieno and Anthony Ochieng. Moi University, Kenya. “Closing Dadaab”

4. 2016 Projects

- **Ethiopia**- Menychle M. Abebe. NLA University College, Norway. “Fighting for Childhoods”
- **Nepal**- Purushottam “Puru” Shah. Georgia Institute of Technology. “The Plight of the Labor Migrant”
- **France and Greece**- Andrea Batarse. Texas A&M University. “A Day in the Life of a Refugee”

5. 2015 Projects

- **Bangladesh & India**- Amit Ghoshal. Texas A&M University. “Human-Wildlife Conflict in the Sundarbans”
- **Haiti**- Diana Juárez-Sánchez. Texas A&M University. “Rural Food Security through a Woman’s Lens”
- **India**- DJ Katju . Texas A&M University. “Ethnic Conflict and Forest Governance in Assam”
- **Kenya**- Ally Krupar. Pennsylvania State University. “Learning Empowerment as a Refugee”
- **Peru**- Jessica Gilbert. Texas A&M University. “Land Use in Protected Areas”
- **Nigeria**- Immanuel Afolabi. University of Ibadan, Nigeria. “Boko Hazards”

6. 2014 Projects

- **Guatemala**- Christopher Bieleki. Texas A&M University. “Rephotography”
- **India**. Meghan Luckett. Texas A&M University. “Boosting Nutrition through Female Ag Extension”
- **Mali**- Ryan Vroegindewey Michigan State University. “Markets and Household Food Security”
- **Nicaragua**- Michael Petriello. Texas A&M University. “Natural Resource Conflict”

7. 2013 Projects

- **India**- Meghan Luckett. Texas A&M University. “Poverty and Food Insecurity”
- **Mali**- Ryan Vroegindewey. Michigan State University. “Household Food Insecurity”

E. Undergraduate Clubs and Activities (TAMUS)

ConDev staff routinely give presentations to student organizations concerning the Center’s programs and serve as faculty advisors to undergraduate clubs that in turn assist in various ConDev events. Student groups assist with community film showing and lectures, on-campus lectures, hosting visitors, and other events. Approximately 6 such events occur each academic year, which include: the Corps of Cadets, Bethancourt, Aggie Gents, and several others.

F. Student Workers and Interns (HESN, TAMUS)

ConDev routinely hires undergraduate and grad students to assist with the work of the center. These students become involved in the issues of conflict and development, and many decide to include conflict and development in their further studies or in their careers. Former student workers work with USAID and other international agencies or otherwise stay associated with the field in their careers. Approximately 35 students have worked at ConDev since the center’s inception.

G. International Projects in Education

The Afghanistan projects were competitive awards by the University Support and Workforce Development Program led by the firm FHI 360, funded by USAID, and executed by ConDev 2014 – 2019. These projects include:

- I. **Afghanistan Renewable Energy Curriculum Program at Kandahar University (USAID competitive award)**. ConDev partnered with the Conflict and Development Foundation, Kandahar University and FHI360 to develop Afghanistan’s first energy engineering bachelor’s program. With a market-oriented curriculum focused on practical application, this collaboration enabled Kandahar University faculty and graduates to better advise Afghanistan’s energy sector. This partnership was funded through USAID’s Afghanistan University Support and Workforce Development Program.

2. **Afghanistan Petroleum Curriculum Revision at Jawzjan University (USAID competitive award).** ConDev partnered with Jawzjan University in Afghanistan to strengthen the country's higher education sector and create a market-oriented curriculum that increased students' exposure to innovative technologies. This program was funded by USAID's University Support and Workforce Development Program (USWDP).
3. **Evaluation of the Kinshasa School of Public Health (HESN Buy-in).** Led by Brian Colwell of the Texas A&M University School of Public Health, and funded through a buy-in from USAID, this project aimed to assess the effectiveness of support in helping the school fulfill its mandate for teaching and research. A secondary aim was to identify what further assistance might enhance KSPH's role in providing human resources for health in DRC, assess how well the school serves stakeholders such as the Ministry of Health, and recommend business practices that help assure sustainability. Among its strengths, are the recognized rigor of their Masters in Public Health (MPH) program, competitiveness of admission to the MPH program, continual improvement of business and accountability practices, and provision of leadership nationwide in disease prevention and control. Remaining problems include the need for faculty to partly support themselves by external employment, and overcrowding and disrepair of facilities and equipment.

H. Other Achievements

In addition, ConDev has been successful in strengthening or forming organizational partnerships and collaborations, submitting scientific publications, supporting student innovators, and working on a variety of developmental programs and activities related to our four program areas: Food security, Natural Resources Management, Youth Employment, and Local Institutions. Additional details about these achievements are included within different sections of this report.

3. Discussion of Results Measurement

From the outset of the ConDev initiative, there were three key measures to which the leadership of ConDev was continually attentive: (a) acceptance of the central proposition that technical innovation has a role in preventing conflict, sustaining families and communities during conflict, and recovery from conflict; (b) the creation and use of specific technical innovations to reduce conflict; and, (c) evidence of an institutionalization of approach. Taking the last first, institutionalization of the approach has become evident from the renewal of ConDev by the Texas A&M University System through 2022, the accumulation of approximately \$6 million in sustaining endowments for Center programs, a no-cost extension of the ConDev agreement with USAID for another 5 years, and permanent establishment of the Endowed Chair on Conflict and Development in the College of Agriculture and Life Sciences at Texas A&M University.

While a sizeable number of innovations have been produced by Center staff and grantees, the most notable ones in each of the USAID/ConDev agreed areas of activity (youth, local organizations, natural resources and food security): *AgriCorps* recently authorized by the US Congress as program of USDA; *Congo Peace Center*, licensed by the government of the Democratic Republic of the Congo (DRC) and currently funded by World Bank; *Sharing the Land* approach to reducing land conflict, adopted more widely in DRC following proof of concept in Beni, DRC; and *conflict resistant farming systems* identified and adopted in Ghana, Iraq, DR Congo, Guatemala, and El Salvador.

Over the decades, even centuries, the polite way of intellectual treatment of warfare was to refer to “peace” and “peace building” such that today’s peace centers and institutes abound. We sought to call our effort what it was – an approach to reducing “armed conflict”, and ameliorating its causes and effects. . Potential partners, such as the Korean International Cooperation Agency, and even USAID in 1990 to 2010, were reluctant to speak of armed conflict. Increasingly however, perhaps in part due to USAID using the language of armed conflict mitigation and TAMUS’s effort, the terminology of civilian intellectual and practical efforts to work on armed conflict has gained currency. The Center is now represented on the US DoS Council on Stabilization, and is included in the US DoD IDIQ on Advanced Expeditionary Warfare Development. Considerable progress has been made in gaining acceptance of the proposition that the tools of development can and should be used to favorably impact the dynamics of armed conflict. Much of this is reflected in policy briefs prepared by ConDev for USAID.

3.1 Evaluation Framework

ConDev has adopted the HESN recommended framework for monitoring and evaluation, which counts outputs and outcomes such as numbers of beneficiaries impacted by programs, numbers of students trained, number of adopters of innovations, number of scholarly publications, number of partners, policies adopted, etc. These are meaningful and we will continue to utilize and publicize these as measures of our value as a center. However, there are several less tangible measures that mark the Centers overall impact.

Acceptance of key precepts:

1. “Conflict”, denoting armed conflict, is a cogent subject of/for economics research and teaching.
2. Armed conflict and development are non-linear processes which interact over a range of momenta. It is counter-productive to distinguish conflict and post-conflict regimes.
3. Development initiatives can increase conflict, have no effect on conflict, or reduce conflict, depending upon how they are designed and implemented.
4. Development initiatives can and should be designed and undertaken to moderate and prevent violent conflict.
5. Applied sciences and technology from physical, engineering, and biological sciences can be critical components in solutions to armed conflict.

Institutional validation

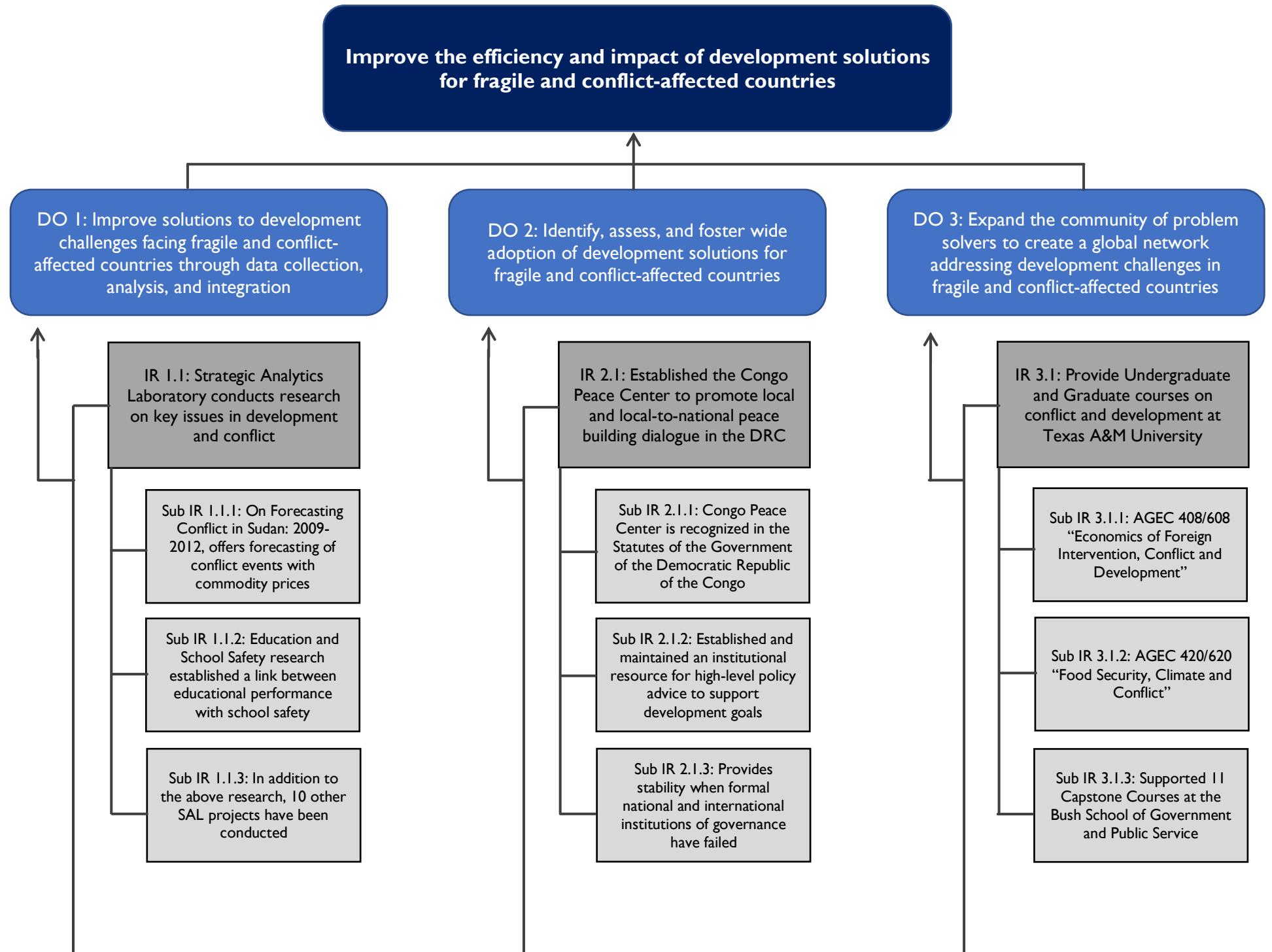
1. Establishment of the Center by the Board of Regents as a University Center.

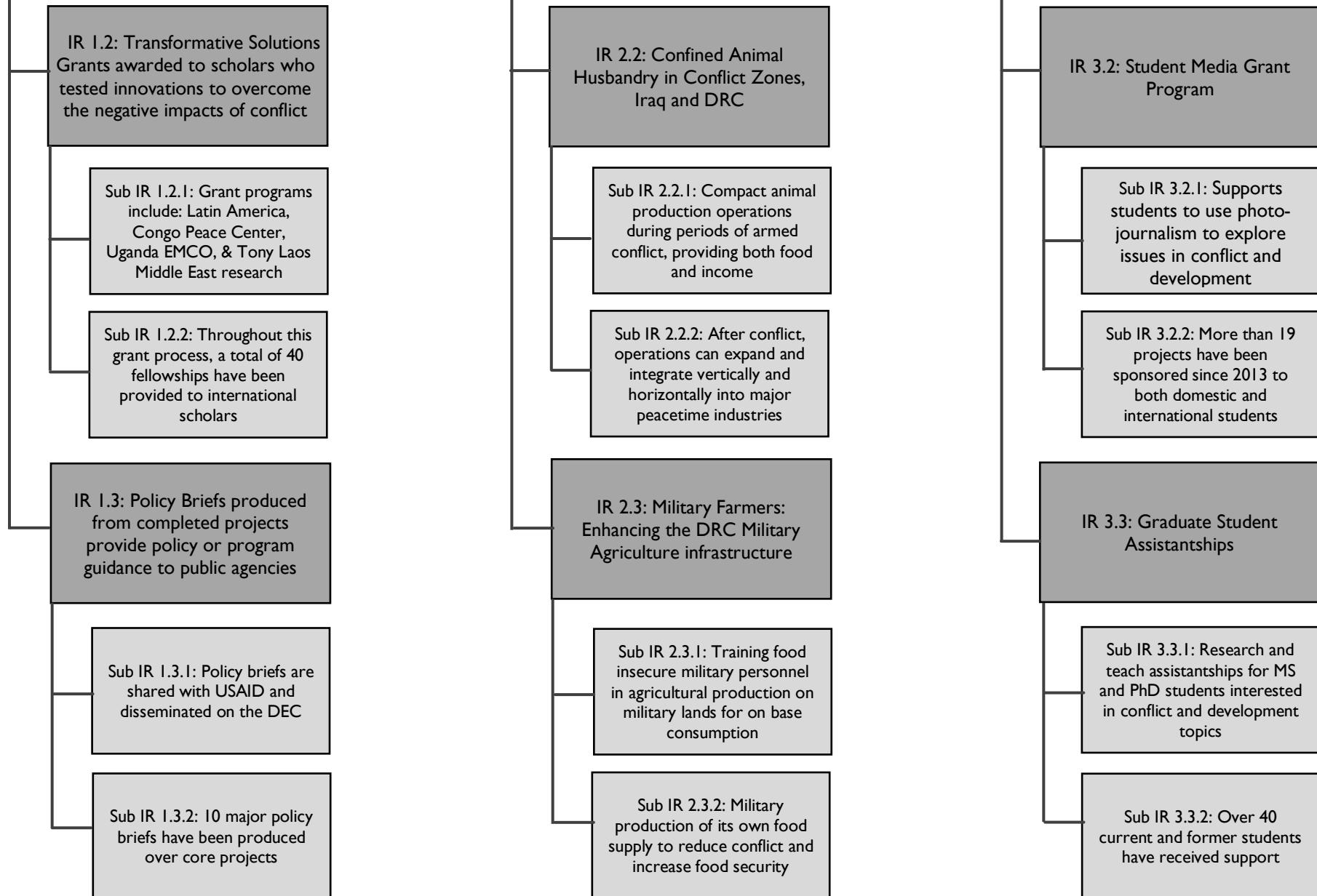
2. Respected multi-disciplinary partnerships across the university and with external public and private institutions/firms.
3. Establishment catalogued/regular courses taught by the Center staff as official academic courses of the university, espousing principles of conflict and development.
4. Recognition of the Center by US federal and international agencies.
5. Recognition of the Center's work in national and international media.

Identification and adoption of key technical solutions

1. Recognition and uptake of conflict resistant agricultural technologies
2. Devolution of land access documentation to community levels
3. Use of radio for integrated information on markets, agricultural technologies, and family health.
4. Approaches identified and adopted to engage youth in organizational and entrepreneurial alternatives to violence
5. Scholars in conflict-prone regions routinely informing the public about, and offering analyses of and solutions to, issues of conflict

Results Framework (Partial)





3.2 Overall Performance

Overall Performance

Through this award, we were able to establish and grow the nation's first multidisciplinary center that conducts teaching, research and extension on the role of science and technology in mitigating the effects of armed conflict. A strength of ConDev has been its support of faculty and graduate student research on development and conflict. ConDev has been uniquely successful in attracting grants and contracts for research and extension in the field of conflict mitigation. This research and development engagement in and for conflict zones has helped to build recognition among the wider community of development scholars and actors that development "on" conflict is not a niche concern, but a distinct, substantial, crucial, and little understood area of development theory and practice.

ConDev is contributing influentially to the field of Conflict and Development and considered one of the founders of this area of practice. Based on field work in conflict zones in cooperation with US government agencies beginning in 2002, and on more recent HESN research and discussions with program and policy leaders, ConDev staff have discerned and advocate three key macro-policies for foreign assistance in conflict regions. First, development assistance programs can and should be designed and implemented to impact the dynamics of conflict; not merely "do no harm". Second, policy and program designers should avoid the (sometime deliberately) misleading distinction between "conflict" and "post-conflict" because conflict often reoccurs in the same places for the same root causes and similarly adapted development tools need to be employed across the continuum of conflict occurring at various intensities. And third, the mitigation of conflict should be pursued through integrated programs of security, relief and development under unified leadership, with reduced competition between federal agencies. [See for example E. Price testimony to the Senate Foreign Relations Committee on March 24, 2009; and Public Comment to the Board for International Food and Agricultural Development on October 16, 2019].

Three innovations each impacted more than one million persons

1. Sharing the Land devolving informal land conflict mitigation to local communities. ConDev and its private sector partner Trimble Navigation Global Solutions trained Ghanaian extension workers to use handheld devices to create maps to support farmers' land use rights. A similar effort was undertaken in Beni, Eastern Congo as a HESN ConDev Transformative Solution by the Bilingual Christian University of the Congo. The latter effort known as "Sharing the Land" received wide acclaim and is now widely applied by national and international organizations. Hundreds of thousands of farmers and urban dwellers have benefitted from stronger claims of the land they use, thousands more have benefitted from reduced conflict over land, and strain has been reduced on public agencies to adjudicate and administer land claims and accommodate displaced persons.
2. Broadcast market news as a vehicle for agricultural improvement, abatement of disease epidemics, and conflict mitigation. A way of reducing anxiety and improve livelihoods in

communities affected by armed conflict is to provide market news. A talented local radio broadcaster was a successful competitor for an HESN Transformative Solutions grant to work with faculty at Catholic University of Graben, Butmebo, North Kivu, to provide market news across a wide area of villages and farms where travel and public gatherings were treacherous. Agricultural market news was expanded to other public announcements and communications, but the service became especially vital when Ebola broke out. The radio station and the HESN partner-broadcast, Robert Kahamula, were leaders in quelling the epidemic and saving lives. Over a million persons benefitted from market and health information, and the ultimate decline of Ebola in North Kivu.

3. Confined animal production providing food and incomes in fragile states. Among the agricultural enterprises that TAMUS introduced in Iraq under the USAID Inma project, was the establishment of beef and lamb feedlots in Kurdistan, just coming on line in 2012 when HESN ConDev was taking shape. The TAMU leader of the Inma project joined ConDev and continued his assistance to the feedlot operations, most of which were destroyed with the resurgence of ISIS in the Region. ConDev kept up its service to a lone remaining operation, and helped to guide it toward vertical and horizontal expansion, with the support of the Qatar Foundation. Bland Enterprises is now one of the largest cold storage and transportation, meat producer/processor/ exporter/ importers in Iraq, with operations from Kurdisatan, to Baghdad, to Basrah, serving millions of customers. Confined animal feeding is one of the transformative solutions that ConDev has found to work in conflict zones.

21-fold Return on Investment: USAID's \$4.83 million investment in core HESN Phase I funds was leveraged by \$103.11 million non-federal Conflict and Development Program expenditures:

Howard G. Buffett Fdn. Matching funds through HESN	\$1.25 million
Texas A&M cost share funding (TAMU SF425)	5.56
Conflict and Development Fdn. cost share funding (CDF SF425)	1.85
Fond Social DR Congo – ConDev/Congo Peace Center	0.43
Master Card Foundation Congolese Youth Entrepreneurship	0.35
Howard G. Buffett Fdn. projects through CDF (2012-18)	93.67
Sub-total non-federal leverage	\$103.11 million

USAID Bureau of Education FHI-360 Sub-contracts	\$1.81 million
USAID Buy-ins (DRC Pub. Health Sch., School Bullying, Mexico Crime prevention, Afghanistan grain reserves, Kenya cereals processing, Vietnam CORDS, Research communications)	\$2.15 million

1000+ student beneficiaries (Some numbers approximated)

Graduate student scholars supported	47
Student media grant recipients	26

Student interns and workers	35
Bush capstone students	80
Students taught in conflict and development classes	100
Students in Aggies Invent	100
Students attending special lectures	500
Students/faculty benefitting from new Afghanistan curriculum	200

Thirty-four countries have benefited from ConDev through the work of students, researchers and development specialists:

- **Africa:** Benin, Botswana, DR Congo, Ethiopia, Ghana, Kenya, Liberia, Mali, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, South Sudan, Uganda
- **Latin America:** Colombia, El Salvador, Guatemala, Haiti, Nicaragua, Peru, Trinidad
- **Asia:** Afghanistan, India, Indonesia, Nepal, North Korea, South Korea
- **Middle East:** Iraq, Jordan, United Arab Emirates
- **Europe:** France, Greece, Turkey,

Note: USAID funds were only used in countries where activities were pre-approved by USAID/LAB and the relevant USAID/Mission.

Discrepancies between expected and actual results:

A. Assumptions, iterations

Originally ConDev posited seven areas of possible research on conflict corresponding to seven forms of capital: Human, natural, institutional, technological, physical (meaning “manufactured”), financial and cultural. Research was intended to be conducted on conflict associated with each form of capital, with comparable cases studied across world regions, comprising a problem-by-country matrix. To confirm and refine research a start-up workshop was held among USAID, ConDev and partners in Washington DC in April 2013, with 30 contributors representing different world regions invited to present ideas with respect to the various topical areas. In the end a reduced set of countries and problem areas was selected. Four forms of capital were selected for focus, including technological capital, natural capital, human capital, and institutional capital. These in turn were narrowed to specific subsets of each form of capital, respectively, youth, natural resources, local organizations and technology for food security. Specific questions related to conflict mitigation were formulated:

- **Food Security:** How can interventions be designed that build upon local coping strategies to incentivize food security and promote resilience?
- **Natural Resource Management:** How can natural resource management be used as a peace-building approach?

- **Youth Employment:** How can youth populations be engaged through workforce development linked to jobs?
- **Local Institutions:** How do legitimate local institutions redirect elite competition and promote cooperation dynamics?

ConDev had planned international research with partners in several countries without realizing the extent to which there would need to be concurrence between Mission programs and ConDev objectives. This resulted in reorganization of the problem-by-country matrix. We particularly regretted not being able to follow through in Indonesia (mineral resource conflicts) and Bangladesh (land conflicts).

Also, we would have sought greater engagement in the more conflicted countries, e.g. Afghanistan, Iraq, Syria, South Sudan and Burma, but for various reasons, these were not possible at the time. On the other hand, picking up substantial activity in DR Congo, Ghana, and Central America enabled ConDev to examine the range of problem areas – natural resources, youth, food security, and local institutions – at field sites across a robust number of countries in different world regions. Further, by the end of Phase I of HESN, Bush School Capstone courses had focused on Syrian refugees in Lebanon, and Iraq was covered by two CDF projects. Additionally ConDev was awarded two USAID sub-contracts in Afghanistan, outside of HESN. It should be noted these two education awards in Afghanistan were not entirely independent of HESN; a member of the original USAID/HESN guidance team for ConDev, brought the competitive sub-contracts to the attention of ConDev.

The center of attention of our work shifted from the field to TAMU-USAID/Washington axis. For example, we sought to have our first planning workshop(s) in the field, but that shifted back to Washington, DC. Perhaps owing to the center director's experience with CGIAR (the Consultative Group for International Agricultural Research) international research networks, we had envisioned research to largely based in LDCs (Less-Developed Countries). However, given our USAID resources, the US base was more effective. The majority of our USAID resources were dedicated to home office functions – M&E, planning, communications, etc., while our matching, cost share and leverage resources on balance were mainly invested in the field.

The partner configuration also changed. Perhaps with any new, many-faceted and geographically distributed research, teaching and extension enterprise, it takes a while to discover participants' strengths, interests and commitments. Some early partnerships were replaced by emerging, better fitting arrangements.

It is useful to consider what progress was made with respect to the four questions regarding food security, natural resources, youth, and local organizations. Progress was made with respect to all four questions, but as one might expect, there remains much more that can be explored. Progress on the four questions is reported in brief summaries.

Food Security: The question comprises two propositions, (a) local strategies that provide for food security during conflict can be identified, and (b) researchers/practitioners can improve upon and further disseminate those strategies. ConDev identified local strategies for food security during conflict, and

conducted research to improve upon the strategies, and in a few cases introduced measures to improve food security during conflict. Some of the key findings and actions are listed below.

- Confined animal feeding was observed among successful entrepreneurs during conflict and further tested and introduced by ConDev (Euphrates fisheries, DR Congo Cavies, Kurdistan beef and lamb feedlots, broiler and egg production in Kurdistan and Central Iraq and Eastern DR Congo).
- Underground crops observed to provide durable food supply in conflict and targeted for further research, (Peanuts, potato, cocoyam, cassava).
- Crops requiring processing may be reliable for cash or food in conflict (cassava, quinine, coffee, cacao, papain, safflower, unmilled rice)
- Intensive, protected and high-valued foods crops near homes (Greenhouse vegetables in Iraq, home gardens, pineapple)
- Indeterminately maturing crops are resilient to raids (cowpea, tomato, okra, eggplant, peppers)
- Vulnerable enterprises identified (maize, range cattle, land extensive food crops, crops regulated by government)

Natural Resources: Natural resources can fuel and support conflicts, but can also be managed in ways that reduce conflict. ConDev developed applications of technology to (a) facilitate sharing of resources, (b) increase the productivity of natural resources to better satisfy people's needs, and (c) protect natural resources such as land, water and wildlife from damage. Some examples of these advances are listed below.

- Technology helped to reduce land conflict by local documentation and mapping of land use claims.
- Water and nutrient delivery technologies (drip irrigation and nano-nutrients) improved efficiency of resource use.
- Small-scale hydropower electricity production supports local industry and reduces wasteful exploitation of wildlife and forest resources.
- Large-scale solar-powered irrigation increased land productivity using renewable energy.
- Soil and water conservation technologies (tropical no-till methods and cover crops) were introduced to improve productivity while protecting soil and water resources.
- Methods were developed to reduce crop damage by elephants, and consequently reduce the destruction of elephants.

Youth Employment: Youth who feel they have no future in their communities become a force for instability and violence. ConDev focused on (a) assessing the situations, aspirations and potential of youth in fragile communities, (b) innovative approaches to developing youth leadership and entrepreneurship, (c) promoting and supporting youth as change agents and peacemakers, and (d) recovery of youth from conflict trauma. Innovations included the following.

- Training and employment of former combatants in food production, construction and other skills (Congo Peace Center, FARDC farms, FARC coffee entrepreneurs).

- Assessment of street youth aspirations and willingness to accept rural occupations (Ghana, Chennai Study).
- Entrepreneurship and leadership training and engagement (Leopards Lair, 4-H Ghana, South Africans Envisioning the future, Enterprise and Olympic values in gang-prone communities in El Salvador, Learn-Grow-Eat-Go in Guatemala and Mexico).
- Introduction of modified atmosphere packaging for vegetables in Guatemala, resulting in employment opportunities for young women.

Local Institutions: A frequent consequence of conflict is the weakened ability of central governments hear and respond to the needs of local communities, especially remote local communities. Formal systems of governance fail and distrust pervades horizontal relationships across local communities, and vertical relationships between local communities and regional and national bodies of government. ConDev has endeavored to (a) create formal and informal local institutions (social capital) to provide rudimentary forms of governance to help communities identify, prioritize and meet their needs in the near term, and provide the basis for eventual emergence of strong and effective national system of governance, (b) pioneered the horizontal and vertical articulation of these institutions through systematic conflict mapping and dialogue, and (c) stimulated scholarship to weave the fabric of reflective analysis, and technical and socio-political problem-solving. Some of the innovations include those listed below.

- Establishment and strengthening of local broadcast and cellphone communications, including market news, agricultural technology, health information and other services (North Kivu),
- Establishment and/or strengthening of problem-solving youth clubs and adult organizations in Ghana, Rwanda, Uganda, DR Congo, South Africa, Iraq, DR Congo, El Salvador, and Guatemala.
- Establishment of the Congo Peace Center, dedicated to local dialogue, economic development, local-national policy linkages, and raising the voices of Congolese Scholars.
- Conflict mapping in Bas Uele, DR Congo.

There is satisfaction among ConDev scholars and practitioners that a good start has been made with respect to the four questions that guided the first years of the ConDev Center. These questions derived from the exploration of the relationships of four forms of capital to conflict: technological capital, natural capital, human capital and institutional capital. Not only are there realms of discovery yet to be made in these four areas, but the remaining three forms of capital and their relationship to conflict are yet to be explored: Physical Capital, Financial Capital and Cultural Capital.

B. Community engagement – how did you go about establishing the need, continue to engage communities, and bring in new partners?

Engagement with communities proceeded mainly on three paths, all guided by research objectives – e.g. conducting research on the four questions listed above.

The first path was that of worldwide solicitation for proposals on (a) research on transformative solutions to conflict, and (b) student photo-journalism grants related to conflict and development. Winning proposals drew us unto communities and in a few cases the initial relationships matured into longer lasting engagement.

The second path was that of inviting university partners to formulate research responding to the four hypotheses. Inevitably their proposals focused on communities in which the partner had experience, interest and/or ongoing programs. Our research built on these existing relationships with communities.

The third path is donor driven in which typically decisions to work on a conflict issue, or a problem region, is been identified by donors external to the Center. Communities are then invited to cooperate in the effort.

C. How HESN changed conventional practices at your university?

Multi-college cooperative efforts have not been common or especially successful at our university. ConDev has been able to gain the support and participation of four colleges, coordinated at the top through an advisory board comprising the four deans or their representatives. By promoting collaboration as an opportunity for greater achievement through working with others, cross-college working arrangements were quickly achieved at the faculty/scientist level. However at the administrator level, relationships were initially more difficult. The problem was eventually solved by convening the highest-level administrators of the Bush School (Ambassador Ryan Crocker) and AgriLife Research (Craig Nessler and David Lunt). Others within the university are trying our model.

Providing support for collaborative research in conflict-affected areas has been especially beneficial for researchers, faculty and students at four colleges, resulting in tangible outcomes including publications, new and revised capstone courses, and curriculum enhancements. Some less tangible benefits from multi-college collaborations facilitated by ConDev continued to evolve as faculty and students from different disciplines met, exchanged ideas, and learned from each other. These occasions included Aggies Invent, Capstone courses, USAID buy-in projects, and Transformative Solutions projects.

TAMU was unaccustomed to managing competitive sub-grants for international recipients. Also increasing national security precautions complicated the process. Although it has been an occasionally painful learning experience, the volume of international grant agreements that have been executed is sizeable, more than previously attempted by any Texas A&M University program.

Endowed Support

ConDev has attracted endowment investments in its programs totaling \$6.9 million, including the Howard G. Buffett Foundation endowed chair (\$1.2 million), Student Media Grants (\$ 0.6 million), Voices of African Great Lakes (\$1.2 million), Tony Laos Middle East Scholars fund (\$0.3 million), and the

CDF Trust Fund (\$3.6 million). Altogether this total of \$6.9 million can generate over \$300,000+ per year for ConDev programs, in perpetuity.

Return on Investment

USAID HESN has remitted to ConDev \$4.83 million of the original USAID/HESN commitment of \$6.15 million. Texas A&M AgriLife/ConDev has reported \$8.66 million of cost share, \$0.32 million more than the original TAMUS commitment of \$8.34 million. Additionally, ConDev's operating partner, the Conflict and Development Foundation (CDF) has generated \$93.67 million in additional funds for ConDev/CDF programs (in addition to that reported as cost share). The World Bank Funded Fond Social supports the ConDev Congo Peace Center for conflict mitigation in the DR Congo in the amount of \$429,000; and the Mastercard Foundation has contributed \$35,000.

The cost share (\$8.66 million) plus the additional related program funding from Howard G. Buffett Foundation project through the Conflict and Development Foundation (\$93.67 million), World Bank Fond Social (\$0.43 million), and MasterCard Foundation (\$0.35 million) are regarded as leverage. **In total, ConDev has generated \$103.11 million compared to the USAID/HESN investment of \$4.83 million, representing a 21.3-fold return on investment (2130+ per cent).** Not included in this calculation is the value of USAID buy-ins through HESN of \$2.15 million and independent competitive USAID sub-contracts of \$1.81 million.

Lab leverage' is a program performance indicator for the U.S. Global Development Lab that captures commitments of funding and in-kind resources from a range of external non-USAID partners investing in shared development goals when working jointly with the Lab on a partnership, program or activity. The Lab's leverage performance indicator includes: all cost-share contributions (from both public and private sector partners); all other contributions (from the private sector, the public sector, and other U.S. government agencies); and gifts (from foreign governments, private organizations, and individuals).

Highlighted Success Indicator: High-Impact Student Experiences

ConDev has been successful in providing high-impact student experiences by offering scholarships at Texas A&M and affiliated scholarship programs at Oregon State University and Columbia University; supporting student innovators; offering photojournalism grants focusing on conflict issues; providing internships abroad and in the U.S.; supporting Bush School Capstone courses; offering graduate/undergraduate academic courses; and involving Texas A&M students and student organizations in ConDev activities.

As a result of these programs and activities, students have developed skills and experience they will need as future professionals in global conflict and development. Our alumni have gone on to work for a wide range of organizations including USAID, as well as industry leaders such as Catholic Relief Services and World Vision. Students are ConDev's greatest asset, and perhaps our greatest hope as we work to expand our network of scholars and alleviate conflict around the world.

Graduate Student's research on ConDev issues, guided by ConDev staff in cooperation with other faculty, has provided the backbone for the advancement of our knowledge of the relationships of development and conflict. Important findings include evidence that only some kinds of foreign assistance reduce conflict, while most either has no effect or increases conflict. Slavery, food prices, and weather effects on crops have been found to be factors in conflict. The interaction of faculty outside of ConDev serving on committees with ConDev faculty and students has been an important way of expanding the community of conflict and development scholars.

Courses: Three courses were developed and currently offered on conflict and development, two in the department of Agricultural Economics and one in the Bush School. Together the courses cover the areas of environment, gender, climate change, foreign assistance, food security, development theory and all forms of capital in relation to conflict. AGEC 470/670 is based in the Bush School, cross-listed with Agricultural Economics. There is strong support from the Veteran's Service Office at Texas A&M University to develop the program into an academic major for development practitioners, including veterans and current military. An additional course in the School of Public Health is being developed to complete a three-college shared academic minor in conflict and development. The current courses are:

- **AGEC 420/620** (Spring Semesters):
"Food Security, Climate and Conflict" – 23 students
- **AGEC 408/608** (Fall Semesters):
"Economics of Foreign Intervention, Conflict and Development" – 40 students
- **AGEC 470/670** (1 Semester)
"Women, International Development and Environmental, Conflict" – 24 students

Graduate Students: Graduate students were supported for their course work and thesis research on issues related to conflict and development. Their research received awards and recognition in respective professional associations, and their eventual employment. A total of 10 graduate degrees were granted and ConDev currently supports 8 graduate students.

Student Grants: The endowed Student Media Grants Program (SMGP) has funded photojournalism projects for students worldwide. ConDev's Student Media Grants award **up to \$5,000** to current students interested in capturing conflict-related issues facing fragile and conflict-affected areas of the world through photography. This photojournalism grant is funded by the Howard G. Buffett Foundation Chair on Conflict and Development. ConDev also offered grants to the Bush School for Capstone courses and other academic scholarships. Both institutions leverage their mutual resources to conduct research related to conflict and development around the world and share results with key decision makers. The resulting 'Capstone Projects' provide teams of graduate students with the opportunity to work for real-world organizations during their final semester of study.

Student Innovators: ConDev co-sponsored innovation contests such as Aggies Invent (with the College of Engineering) to support students who created prototypes to resolve issues related to

international conflict, development, and social entrepreneurship. Approximately 120 students were involved in the Engineering workshops, and 40 young entrepreneurs participated in the workshop or competitions at the Bilingual Christian University of the Congo (Beni, North Kivu). Some students were selected to participate in The Innovation Marketplace, hosted by USAID's Global Development Lab at MIT in Boston. This was a competition showcasing the talent of students and young innovators who are using science, technology, innovation, and partnerships (STIP) to tackle global challenges.

The following ConDev teams were selected to take part in USAID's TechCon Innovation Marketplace in Boston in 2016:

- PhD student, Apryl Williams, presented "Digital Inequality & Communication Technology in DRC." Apryl was a ConDev intern in the Democratic Republic of the Congo (DRC) during the summer of 2015 and subsequently worked for the ConDev as a Research Associate during the summer of 2016.
- ConDev Grant winner Sharing the Land uses GIS & GPS technologies to mobilize community stakeholders to address land conflict, improve urban planning and develop as a transparent and effective land management system in eastern DRC.
- Aggies Madison Cooper, Isabel Hegedus, Joe Hall and Ben Hall developed a vegetable washing system to be piloted on one of ConDev's Guatemala projects this summer.
- Bush School grad Morten Wendelbo developed a model to improve resource allocation for natural disaster resilience.

Capstone Courses: ConDev has funded 13 Bush School Capstone courses and ConDev staff and faculty have participated in the guidance to the capstone student teams. Several of the teams have figured importantly in technical innovations undertaken by ConDev in conflict environments of Afghanistan and the DR Congo.

4. Financial Management

The office of Sponsored Research Services (SRS) at Texas A&M manages pre- and post-award functions of sponsored research contracts, including financial management of awards. The project administration team established a sponsored project account for this award and worked with ConDev's Principal Investigators, administrators, and business managers throughout the life of the award to manage and ensure compliance with the sponsor and The Texas A&M University System requirements.

Financial resources of the Conflict and Development Center included USAID funds of \$4.83 million (of the \$6.15 million originally planned) and \$ 8.66 million of cost share. Of the \$8.66 million cost share, \$5.56 million were reported in SF 425 forms submitted by Texas A&M University SRS and submitted with this report. An additional \$3.10 million of cost share was reported to USAID on Form SF 425 submitted by the Conflict and Development Foundation (CDF).

Also leverage to the \$13.49 million of core USAID HESN plus cost share, was provided by an additional \$93.67 million in projects managed by the Conflict and Development Foundation, \$0.43 million from World Bank, and \$0.35 million from MasterCard Foundation. Project resources were augmented by \$2.15 million in USAID buy-ins as of writing and \$1.81 million in separately competed USAID projects in Afghanistan. Program resources accounted here total \$111.90 million.

No issues in financial management emerged during the course of the project except for the shortfall in HESN funding, to which project management was alerted with sufficient time for remedial planning. The substantial cost share, USAID buy-ins, separately competed USAID projects, and leverage from CDF amply maintained funding and an exceedingly strong and diverse program over the period 2012 through 2018.

4.I Final Financial Report

A copy of our final financial report (SF 425) will be submitted by Texas A&M's Sponsored Research Services when all final activities using our core funds have been completed.

Please check the boxes below to confirm that the needed Financial Reporting has been completed:

- Final SF425 Form for CORE funds – OR (if buy-in funds are not kept separate)
- Final SF425 Form will be submitted for CORE and Buy-In funds when all final activities have been completed
- Email to AOR attesting no additional CORE cost obligations for award
- AOR memo on and remaining funding and deobligation plans if needed

5. Engagement with Partners

ConDev has developed strong partnerships by working across disciplines at Texas A&M University and continues to engage with departments, colleges, and centers to support research and academic programs that help mitigate conflict in conflict-affected areas of the world.

As proposed to USAID in 2012, ConDev is based in the TAMU College of Agriculture and Life Sciences, and initially included as partners: The TAMU Bush School, the School of Public Health, and AgriLife Research. When officially chartered by the TAMU Board of Regents in May 2014, additional internal partners were added, AgriLife Extension and the TAMU College of Liberal Arts. Additionally, cooperative projects have been carried out with the Colleges of Veterinary Medicine, GeoSciences, Business and Engineering. Most recently, ConDev has partnered with the Texas A&M University School of Law. These internal partners are presently strong participants and contributors to the ConDev mission.

In addition, ConDev has also formed strong partnerships with other non-profit, research, and academic institutions to conduct research and development work focusing on conflict issues such as conflict

mitigation, resolution, and post-conflict development. ConDev continues working with most of these entities.

Countries (34 total): At the outset ConDev planned external partnerships in Bangladesh, Indonesia, Iraq, South Sudan, and Myanmar, but to align partnerships more consistently with USAID mission objectives, partnerships were instead developed in the DR Congo, Ghana, Uganda, Rwanda, Nepal, El Salvador and Guatemala. Additionally, agencies in South Africa, South Korea and the DPRK cooperate with ConDev without USAID funding. Substantial programs are being carried out in all of these countries, except with the legal constraints on work in DPRK. Grant activities (15 Student Media Grants of \$5,000 each, 12 Transformative Solutions of \$25,000 each, and 11 Bush School Capstone courses of \$5,000 – \$10,000 each), have further extended geographic impact with grantees in Turkey, France, Greece, Nigeria, Benin, Ethiopia, Mali, Botswana, South Africa, Kenya, India, Bangladesh, UAE, Jordan, Trinidad, Nicaragua, Peru and Haiti.

Entities: ConDev contributions led to the establishment and expansion of five organizations now serving in international development capacities, including:

- **CDF-** <http://www.condevfoundation.org/> The Conflict and Development Foundation (CDF), a 501c3 corporation was formed as an implementing partner of ConDev to facilitate the receipt of donor funds and to expedite implementation as a private actor. CDF has received \$96.7 million since establishment of the Center, of which \$3.1 million (\$1.25 million HGBF match + \$1.85 million other SF 425) was reported as HESN/ConDev cost share. CDF employs ConDev/TAMU expertise through sub-agreements. The CDF Managing Fellow serves as Senior Advisor to ConDev. The ConDev Director serves as Chair of the CDF board of Directors. CDF/ConDev has implemented approximately 18 projects in the DR Congo, Rwanda and Ghana directed at conflict mitigation, and is initiating investment of \$30 million in gang, drug and violence mitigation in El Salvador.

AgriCorps- <https://agricorps.org/> ConDev contributed to the formation of AgriCorps, by involving the eventual founder, president and CEO of AgriCorps in early programs of ConDev in Iraq, Ghana and Liberia. ConDev has provided guidance to AgriCorps through its board (ConDev Director served as AgriCorps Board treasurer), by training AgriCorps and financially supporting AgriCorps activities. AgriCorps has developed a model of US youth engagement with youth in developing and fragile states, Ethiopia, Liberia and Ghana, helping rural youth to discover paths for leadership and enterprise in their home communities. AgriCorps was authorized as a program of the US Department of Agriculture in December, 2018.

- **WCR-** <https://worldcoffeeresearch.org/> World Coffee Research, a 501c5 industry association, was formed at Texas A&M largely as the result of the success of the USAID Rwanda PEARL and SPREAD projects, and the industry/academic network that was developed in those projects. The Center Director guided the establishment of the organization and serves as the only academic member of its 15-member board of directors, the others being from industry. ConDev resources support WCR research on the economics of small-holder coffee farming,

returns to research on coffee, and the role of coffee in conflict mitigation. ConDev staff lead the management and analysis of the agro-economic database generated by WCR's global coffee varietal trials. Improved coffee production technology is a potent instrument in reducing conflict.

- **EcoExist-** <http://www.ecoexistproject.org/> EcoExist is funded through CDF and focuses on human-elephant conflict, this was established in coordination with ConDev. The three co-PIs of EcoExist are TAMU faculty, and the ConDev director supervises economics research in the project. The research based in the Okavango Delta of Botswana seeks solutions to the deadly competition of human and elephant communities for food resources in the environmentally fragile region. ConDev extended research to the Okavango headwaters in Angola, seeking to avert eventual harm to the delta that might result from economic activity in Angolan highlands.
- **CPC-** <http://condevcenter.org/cpc/> The Congo Peace Center was formed by ConDev with funds provided by HGBF, and some of its programs have been supported by HESN. An early HESN contribution for example was support to a Bush School Capstone class that conducted two projects on-location at the CPC headquarters in Butembo, North Kivu, on child soldier reintegration and family nutrition. The CPC is recognized by government statute, and is led by an influential Congolese social scientist and sometimes high-level government official. It has operations in North Kivu and Kinshasa, built around 4 programs: (1) Local dialogue for issue identification and resolution, (2) economic development initiatives (especially as relevant to the dialogues), (3) raising the voices of Congolese scholars (through a \$1.2 million endowed research program), and (4) National policy engagement (drawing on the first 3 processes). All four programs are ongoing, but with (2) and (3) most active at present.
- Land Alliance <https://www.devex.com/organizations/land-alliance-inc-52080>. The Land Solutions Group of the Trimble Corporation was an original partner to Texas A&M in the proposal to USAID for the Center on Conflict and Development. In 2013, principals of the Trimble Land Solutions Group joined with ConDev to fund the start-up of the Land Alliance, led by Dr. Jolyne Sanjak, with \$20 K from the Howard G. Buffett Foundation Endowed Chair. The Mission of the Land Alliance is “to enable the prosperity of people and places by advancing learning and practice to achieve land tenure security and the efficient, inclusive and sustainable use of land and natural resources.” The Land Alliance then developed cooperatively with the Trimble Land solutions Group, and independently of ConDev. The Land Alliance is now independent of the Trimble group, and affiliated with Devex.

Other key partners (excluding HESN universities) bound by management ties, funding, memoranda of understanding, or joint projects include:

- Virunga Alliance – M&E of Hydro-Electrification on Virunga Pk., DRC
- Trimble Global Solutions – No-till technology & farm mapping, Ghana
- Catholic Relief Services – Bukavu coffee and North Kivu survey, DRC
- FHI 360 – Kandahar renewable energy, Jawzjan petro eng, Afghanistan

- Korean Rural Development Administration – Young rice farmers, Ghana Korea Rural
- Community Corp. – Young rice farmers, Ghana
- 4-H Ghana – Youth leaders and entrepreneurs, Ghana
- Catholic University of Graben – Congo Peace Center & others, DR Congo
- Bilingual Christian University of Beni – Sharing the land, DRC
- Kinshasa School of Public Health – Curriculum and accreditation, DRC
- Makerere, Kyambogo & Mbarra Universities – Oil & environment, Uganda
- Alianza Agroindustrial y Artesanal Rural – ALIAR, Guatemala
- Semilla Nueva – Quality protein maize and violence, Guatemala
- Food for the Poor – Urban hydroponic gardening & gangs, El Salvador
- International Junior Master Gardener and A&M Garden Club – “Learn, Grow, Eat, Go!”, inclusion, stress and violence, Guatemala
- Latin American Faculty of Social Science (FLACSO) – Conflict, food security and migration, Guatemala
- Central American University – Youth migration & development, El Salvador
- Missouri University of Science and Technology & Peace Corps Reserve – Child stunting in marginalized communities, Guatemala
- Olympic Committee of ES – Sports and gang violence, El Salvador
- San Carlos University – Drivers of conflict, multiple sites. Guatemala
- Latin American Faculty of Social Science (FLACSO) – Youth violence prevention, El Salvador
- Shelter the Homeless International – Conflict drivers in Ciudad Delgado and women’s entrepreneurship, El Salvador
- Texas A&M University's School of Public Health – TextIt messaging for adolescent mothers and breastfeeding, El Salvador
- Columbia University SIPA, Picker Institute, Political Science – Cooperative research, teaching, endowed fellowships and development assistance.
- University of Texas, Crowdsourcing for War-to-Peace Transitions.

6. Reporting and Certifications

6.1 Data

Please check the boxes below to confirm that the needed Data Reporting has been completed:

- Submit to AOR list of all datasets created and their access status
- AOR memo confirming that datasets have been registered to the DDL

6.2 Publications

Please check the boxes below to confirm that the needed Publication Reporting has been completed:

- Submit to AOR list of all publications and public documents created and their access status
- AOR memo confirming that publications and public documents have been uploaded to the DEC

Scientific publications and seminars: <https://www.condevcenter.org/Research/Publications>

- 1 book chapter
- 1 monograph
- 19 peer reviewed articles
- 29 conference proceedings
- 38 ConDev reports
- 10 policy briefs for US Government
- 49 ConDev presentations

6.3 Equipment

No equipment (materials over \$5,000) was purchased under this award. Supplies costing less than \$5,000 will be kept for use in our university.

Please check the boxes below to confirm that the needed Equipment Reporting has been completed:

- Submit to AOR list of all equipment purchased during the award and a plan for its disposing.
- AO memo confirming that all equipment under the award has been properly disposed.

6.4 Environmental Review

The Center on Conflict and Development's work plan was reviewed by the U.S. Global Development Lab's Bureau Environmental Officer (BEO) for potential environmental impacts and received a categorical exclusion for each included activity pursuant to 22 CFR 216.2(c)(2).

One of ConDev's programs in Guatemala required an Initial Environmental Examination. Below are details:

LAB/DI/HESN AID-OAA-A-13-00003

Environmental Threshold Decision

ENVIRONMENTAL THRESHOLD DECISION

Region: Guatemala

Activity Title: Enhancing Livelihood and Incomes of Rural Women through Postharvest Technology

Conflict and Development at Texas A&M

Project Number: AIDOAAA1300003

Life of Project: October 2014 – October 2015

Life of Project Funding: \$25,000

IEE Prepared by: USAID/Higher Education Solutions Network, in coordination with ConDev

Date Prepared: September 30, 2014

A copy of the 2016 EMME Report is attached. A Final Environmental Monitoring Report was submitted as part of the program's final report, and is copied below:

ATTACHMENT 5. GMP & WASTE DISPOSAL

Packaging fresh vegetables using Modified Atmosphere Packages (MAP) in ALIAR/ Santo Tomas/CODEPSA processing center

Introduction of Modified Atmosphere Packaging (MAP) in fruit and vegetable packing centers. This project promotes the use of specially designed, porous Xtend(R) brand bags (US patent #6190710), that control the environment surrounding vegetables, control humidity, and lengthen the shelf life of vegetables. These bags do not require an injection of gas. Therefore, the use of packaging material for the food processing activity will not have a significant adverse impact on the environment. Proper operation of the facility, implementation of quality control measures, and appropriate disposal of food and inorganic wastes will minimize the overall environmental impact.

IEE or EA Condition	Mitigation	Monitoring	Timing and Responsible Parties
Adequate food safety and quality control procedures.	<p>Facilities will continue to have strict quality control and sanitation measures in practice, since they must meet international export standards.</p> <p>Facilities will follow adequate procedures for washing, packing, and cooling vegetables. All fruits and vegetables will be properly pre-washed to remove any contaminants such as pesticide residues, and chemical or biological fertilizers prior to packaging.</p>	<p>Facility Managers and Supervisors will keep constantly observing and monitoring disposal of waste materials, adequate washing of vegetables to remove contaminants, and compliance with strict quality control procedures.</p> <p>Health inspectors from the Ministry of Public Health will continue to visit these facilities periodically to ensure compliance of sanitary/health practices.</p>	<p>Facility Managers and Supervisors are responsible for mitigation and monitoring.</p> <p>Official health inspectors are responsible for monitoring.</p> <p>The Technical Director and ConDev's Project Manager will continue to provide environmental reports in ConDev's semi-annual and annual reports for the duration of the TS-MAP project.</p>

IEE or EA Condition	Mitigation	Monitoring	Timing and Responsible Parties
Proper disposal of waste materials.	Facilities will follow adequate procedures for disposing of organic and non-organic waste. Packaging and other inorganic wastes will be disposed of in accordance with local requirements and not dumped on or off-site illegally. Food wastes and spoiled products shall be disposed of in accordance with local requirements and not packaged for sale.	Facility Managers and Supervisors will keep constantly observing and monitoring disposal of waste materials, adequate washing of vegetables to remove contaminants, and compliance with strict quality control procedures. Health inspectors from the Ministry of Public Health will continue to visit these facilities periodically to ensure compliance of sanitary/health practices.	Facility Managers and Supervisors are responsible for mitigation and monitoring. Official health inspectors are responsible for monitoring. The Technical Director and ConDev's Project Manager will continue to provide environmental reports in ConDev's semi-annual and annual reports for the duration of the TS-MAP project.

Please check the boxes below to confirm that the needed Environmental Review Reporting has been completed:

Submit to AOR list of all IEEs or EMMPs that were created and their status
 AOR memo confirming that all required environmental monitoring efforts have been met

7. USAID Engagement

During FY2014-FY2018, ConDev implemented the following buy-ins from USAID Missions/Bureaus/Independent Offices, which have now concluded:

- In August 2016, Dr. Brian Colwell of the TAMU SPH, along with consultants from the UCLA-DRC Research Program, completed their data analysis and released their final evaluation of the Kinshasa School of Public Health (KSPH). The evaluation, which was funded through a buy-in from the USAID/DRC Mission in Kinshasa, aimed to determine how effectively the KSPH has utilized the support it has received from USAID over time, and to determine the extent to which the support has contributed to helping the school fulfill its mandate as a training and research institution. During February 2017, Dr. Colwell traveled to the DRC and presented his final results to the USAID Mission in Kinshasa.

DEC link: https://pdf.usaid.gov/pdf_docs/PA00MN8Z.pdf

- In late 2015, ConDev received a buy-in from the USAID Mission in Afghanistan to lead an evaluation of the country's proposed development of a Strategic Grain Reserve (SGR). The TAMU team visited Kabul twice during FY16. The key research question was: Would an SGR improve grain markets in Afghanistan? ConDev determined that an SGR would not stabilize Afghanistan's wheat market and should not be pursued. Instead, we suggested creating only an emergency reserve of one month's supply for the food insecure population of Afghanistan, which would be a 70 percent reduction from the envisioned SGR. These findings were reported to USAID through [the team's final report](#) in March 2016. We hope this finding will help the Government of Afghanistan avoid spending hundreds of millions of dollars and potentially destabilizing the country's wheat market. During the current reporting period, ConDev researchers have continued to analyze the data collected on agricultural markets in Afghanistan with the goal of producing additional knowledge that will be passed on to USAID and published in a peer-reviewed journal. DEC link: https://pdf.usaid.gov/pdf_docs/PBAAF354.pdf
- In 2014, ConDev received a buy-in from the USAID Africa Bureau to assess the effect of school violence, defined as bullying, on academic achievement in Botswana, Ghana, and South Africa. The data contains information for fourth and eighth graders. For this research, ConDev had three goals in mind: (a) Identify and quantify a causal effect of bullying on academic performance (b) Identify other demographic and economic covariates that influence academic performance (c) Provide possible policy recommendations that would mediate the effect of bullying in enhancing academic performance. Our findings indicate that for all grade levels, bullying has a significant detrimental effect for all subjects. Other demographic and economic covariates have different significant effects which vary by grade level, subject, and country. As a result, a general policy recommendation is ineffective, but rather we recommend policies that address different key issues in each situation. In all cases, the effect of bullying needs to be addressed according to how different demographic groups respond to bullying.

DEC link: https://pdf.usaid.gov/pdf_docs/PBAAE489.pdf

While core programming has completed, ConDev remains available to USAID operating units to conduct activities within scope through buy-ins. The following buy-ins are actively being implemented beyond the core programming under this cooperative agreement. Upon conclusion of these and any future buy-ins, a buy-in report will be submitted detailing each buy-in.

- **Research on School Safety and Learning Outcomes in Africa:** In 2017 ConDev received a buy in USAID Africa Bureau to assess the effect of school safety on academic achievement. The dataset employed in this study relied upon three of USAID's EdData projects: Early Grade Reading Assessment (EGRA), Early Grade Mathematics Assessments (EGMA), and Snapshot of School Management Effectiveness (SSME). The new study encompassing schools of Tanzania, Zambia and Rwanda reveals that school safety significantly affects the learning outcomes of second, fourth, and sixth graders. This data generated evidence has the potential to effect USAID programing. The research also highlighted that there is a limited amount of literature available on the determinants

of academic performance in low-income countries. In order to better evaluate performance more standardized measurement tools are needed. Experimental approaches, such as longitudinal surveys, will allow for a greater collection of data and further demonstrate the effects of policies on educational outcomes.

- ConDev is also completing its second collaboration with the Africa Bureau's Office of Sustainable Development, Education Division on issues of safe learning environments. The new study encompassing schools in Tanzania, Zambia and Rwanda reveals that school safety significantly affects the learning outcomes of second, fourth, and sixth graders. This data-generated evidence has the potential to inform USAID programming and data collection efforts.
- Collaboration with USAID/Mexico Mission on **Crime Prevention and Violence Trend Research**. ConDev is collaborating with USAID/Mexico to conduct two programs:
 - A multi-year **learning activity** of municipal crime and violence prevention efforts. The purpose of the learning activity is to support local stakeholders' capacity to examine the contribution of multi-sectoral municipal violence prevention strategies and local system-strengthening efforts for sustainable reductions in crime and violence rates. The lessons learned from this investigation will be used to adapt policies and programming. Additionally, this learning activity will provide an understanding of crime and violence trends in Mexico as well as their drivers. *Note: this activity was later replaced with a new activity at the request of USAID/Mexico to conduct a performance evaluation of a Mission program in the crime and violence prevention portfolio.*
 - ConDev currently is working with USAID Mexico through a multi-year buy-in to conduct an impact evaluation of **focused deterrence** interventions in three municipalities of the northern states of Mexico. The activity ConDev is evaluating will adapt the principles of focused deterrence to prevent violence in Chihuahua, Juarez, and Monterrey.
- **Maize flour fortification**, a \$10,000 buy-in from the USAID Global Health Bureau to the Bush School to support a Capstone research project. This study assessed the feasibility and impact of government legislation in Kenya and Tanzania which require maize flour processors to fortify their product to improve human health. Much of the industry is in the hands of small-scale processors, but there are some large-scale firms as well. This legislation may tend to favor large processors, and could cause rural unrest if small processors, that are easily accessed by rural farmers, are put out of business. The study was performed by a team of graduate students and led by a faculty member. The results are expected to provide policy guidance regarding food fortification.
- **Research Study on the Civil Operations and Revolutionary Development Support (CORDS) Program buy-in**. USAID, through the U.S. Global Development Lab, has identified a need for more knowledge on the operations and leadership function of USAID during the Vietnam War, specifically in the implementation of the “hearts and minds” initiative known as the Civil Operations and Revolutionary Development Support program – or CORDS. CORDS, one of the most successful US government interventions in conflict, was marked by interagency coordination and (while funded) significant successes in achieving its

objectives. Through executing an intensive research program and producing a comprehensive report based on the findings, ConDev is assisting with USAID's objective to learn more about the successes and failures of the CORDS program from a development perspective and whole-of-government approach. The purpose of which will help to identify replicable components for future structure, programming and Mission decisions. The CORDS program focused on stabilization and development in Vietnam during armed conflict and is therefore highly relevant to the current mission of the USAID/HESN Center on Conflict and Development at Texas A&M University.

8. Other information and Appendices

Additional information about ConDev's work is available on our website: <http://condevccenter.org/>