Award Category: Lifetime Achievement

Type of Nomination: Individual

Nominee Name of Individual or Group: George W. Norton
Nominee Title (if applicable): Professor
Nominee Affiliation (if applicable): Virginia Tech University

Improving economic benefits related to IPM adoption: Checked
Reducing potential human health risks: Checked
Minimizing adverse environmental effects: Checked

Brief Summary of Nominee's or Program's Accomplishments (500 words or less):

The international contributions of Professor George Norton to IPM research and outreach are unparalleled. From his base at Virginia Tech University over the past 32 years, this modest man has made ground-breaking research contributions while also enabling the accomplishments of scores of IPM scientists and practitioners through his program leadership. An agricultural economist, Prof. Norton has measured the economic impact of IPM research and outreach programs, identifying the traits that make IPM successful. But his greatest personal impact has doubtless been by enabling IPM practitioners around the world. The IPM Innovation Lab (formerly the IPM Collaborative Research Support Program, funded by the U.S. Agency for International Development) has since 1993 supported collaborative research and outreach in over 14 countries. Some indicators of his international accomplishments:

- Lead author of all five IPM Innovation Lab grant proposals worth $63.2 million that supported scores of IPM projects ($56 million going to projects directed by cooperating entomologists, agronomists, plant pathologists, nematologists, and weed scientists)
- Countries worked in: Bangladesh, India, Nepal, the Philippines, Vietnam, Niger, Ghana, Mali, Uganda, Ecuador, Guatemala, Jamaica, Dominican Republic, Uruguay, United States
  - Significant national budget support for IPM generated in the Philippines, Bangladesh, and Ecuador.
- Crops: apple, cassava, chickpea (garbanzo), eggplant, groundnut (peanut) onion, papaya, potato, rice, shallots, soybean, sunflower, sweet gourd, sweet corn, tobacco.
- Pests:
  - Insects- papaya mealybug, eggplant shoot & fruit borer, fruit fly, Andean potato borer, chickpea pod borer
  - Diseases – potato late blight, eggplant bacterial wilt
  - Weeds – purple nutsedge (cyperous rotundras)
- IPM economists he trained: 22 MS and 6 PhD students from 14 countries wrote IPM theses.

In his own discipline, Prof. Norton is internationally known for expertise in measuring the economic benefits of research and outreach. His book, Science under Scarcity (jointly authored with Julian Alston and Phil Pardey) has been cited over 1000 times on Google Scholar. IPM programs have been the focus of most of his empirical research into measuring program impacts. While the benefits of IPM to farmers have been well-documented, Prof. Norton's research has shown how IPM can help consumers who benefit when IPM is widely adopted so that it increases crop output, lowering prices and making food more affordable to consumers. His research has also identified traits of successful IPM programs that achieve high levels of farmer adoption. He pioneered the measurement of economic impacts of both IPM extension programs and the health and environmental effects of pesticides and IPM practices. His U.S.-based research identified the impacts of IPM Extension programs, helping to justify additional USDA support. In his home state of Virginia, George showed how adopting IPM practices in tobacco, peanut and soybean could not only add to growers' net income and improve rural environmental quality, but also benefit consumers by lowering food bills. Some metrics of his accomplishments in research include:

- Book editor, Globalizing IPM: A Participatory Research Process, Blackwell, 2005.
- 24 journal articles authored on IPM topics

- 20 book chapters authored on IPM topics
- 28 students advised for MS and PhD degrees on IPM economics.

Describe the goals of the program being nominated; why was the program conducted? What condition does this activity address? (250 words or less):

Professor Norton has worked to expand the international scope of IPM by 1) designing successful IPM programs, 2) evaluating their economic impacts, 3) institutionalizing IPM research and outreach programs in individual nations, and 4) training future generations of IPM practitioners. The principles of successful IPM program design have been built into the past five IPM Innovation Lab (CRSP) programs in over 14 countries. Those principles, summarized in the book, Globalizing IPM: A Participatory Research Process (2005), include interdisciplinary teams, participatory research that engages farmers, understanding farmer attitudes, and explicit measurement and communication of health & environmental impacts (in addition to monetary ones). Prof. Norton has pioneered the measurement of economic impacts of IPM in both research and outreach programs. His 1988 article in Journal of Economic Entomology remains the only comprehensive study of economic impacts of U.S. IPM extension programs. He subsequently evaluated the impact of IPM research programs in a 2006 article in Agricultural Economics. He further pioneered measurement of the environmental value of IPM technologies (in Ecuador, Philippines, and USA) as well as the economics effects of pesticides and pesticide resistance. Through projects under the IPM Innovation Lab (CRSP), he has helped to institutionalize IPM practices at the agricultural ministries of Ecuador, Bangladesh, and the Philippines, as well as other nations.

Describe the level of integration across pests, systems and/or disciplines that was involved. (250 words or less):

In his modest, low-key fashion, George Norton is a true integrator of teams. Over three decades, he has assembled and encouraged scores of scientists, IPM practitioners, and students through a series of projects, through the IPM Innovation Lab as well as USDA and US Environmental Protection Agency. Here are a few indicators of what he has accomplished:

1. 14 nations where he has worked on IPM projects:
   a. Sustained work in: India (2009-14), the Philippines (1994-2008), Bangladesh (1998-2014), Nepal (2008-14), and Ecuador (1997-2003, 2011, 2013), United States (1982-now)
   b. Also: Vietnam, Niger, Ghana, Mali, Senegal, Guatemala, Jamaica, Dominican Republic, Uganda, Uruguay
2. Pests involved
   a. Insects- papaya mealybug, eggplant shoot & fruit borer, fruit fly, Andean potato borer, chickpea pod borer, millet head miner
   b. Diseases – potato late blight, eggplant bacterial wilt
   c. Weeds –purple nutsedge (cyperous rotundras)
3. Crops: apple, cassava, chickpea (garbanzo), eggplant, groundnut (peanut) onion, papaya, potato, rice, shallots, soybean, sunflower, sweet corn, sweet gourd, tobacco, tomato
4. Disciplines involved: Primarily economics (Prof. Norton's field), but close coordination with agronomy, entomology, plant pathology, nematology, anthropology, and weed science. Publication in journals across a wide range of economic and pest science disciplines.

Describe the team building process; how did the program being nominated get partners involved? Education and awareness are essential in an IPM program. (250 words or less):

Prof. Norton has assembled teams of researchers and practitioners through both personal outreach and public solicitations. The IPM Innovation Lab and its predecessor Collaborative Research Support Program (CRSP) gathered a network of U.S. university researchers each collaborating with IPM research programs outside the USA. The current group includes Clemson, Michigan State, Ohio State, Penn State, UC Davis, and Virginia Tech, with projects led by entomologists, plant pathologists, anthropologists, economists, and geneticists. Many of their international partnerships were built from scoping visits to national agricultural research institutes or from the ties of international graduate students at U.S. universities. Participatory research in developing countries has been a hallmark of the IPM Innovation Lab approach, meaning extensive on-farm research/demonstration projects to understand what works well and what does not from the farmer perspective.

Prof. Norton has worked domestically in the USA on two types of IPM projects: Ones intended to diffuse IPM and ones designed to measure IPM impacts. In Virginia, Pennsylvania and New York, he has worked with entomologists and agronomists on diffusion of IPM in apples, peanut, sweet corn, and tobacco. With researchers in those states and in Michigan, he has studied cost-effective ways to measure IPM adoption and associated impacts.

Prof Norton has advised more than two dozen graduate students who completed theses on economic issues related to IPM, including economic benefits, poverty impacts, the value of environmental impacts, and methods for cost-effectively scaling up adoption of IPM by farmers. These "team members" have spread to research units world-wide.

What outcome describes the greatest success of the program?:

The successful institutionalization of research-based IPM programs in Ecuador, Bangladesh, the Philippines, and other countries is the single, most important outcome of the IPM Innovation Lab (née IPM CRSP), and by extension, of George Norton's leadership. The IPM Innovation Lab has involved ten U.S. universities over its 21 years, and it has collaborated with dozens of IPM programs in developing countries.

An important contributor toward building support for IPM internationally has been the improved ability to measure the benefits in economic terms, not just direct farmer profit, but also cost savings to consumers, and health & environmental benefits to the citizenry as a whole. Being able to paint a picture that integrates the range of economic and environmental net benefits of IPM practices in numerous countries has enabled IPM programs in many countries to garner support. As noted above, the IPM Innovation Lab program has documented reduced pesticide use and raised incomes of limited resource farmers in Bangladesh, Ecuador, Nepal, India, the Philippines, and Uganda.

Provide evidence of change in knowledge, behavior or condition as a result of the program/individual. (250 words or less):

George Norton's IPM activities have effected change via: 1) improved knowledge of the economic benefits of IPM, 2) documented impacts of IPM creating safer, more prosperous farmers, and 3) increased public support for IPM programs in the USA and elsewhere.

He has contributed to knowledge about how to measure IPM's economic impacts in two areas. First, he has shown how to include benefits to consumers when IPM lowers production costs and food prices drop. Second, he has measured the economic value of environmental and health impacts that result when IPM practices replace indiscriminate pesticide-based control. These methods have been documented in several of his 24 articles and 20 book chapters about economics of IPM.

The IPM Innovation Lab has documented reduced pesticide use and raised incomes of limited resource farmers in Bangladesh, Ecuador, Nepal, India, the Philippines, and Uganda, among others. Those impacts were by no means George Norton's alone; they were achieved by thousands of people. But Prof. Norton played an essential enabling role both in building IPM-oriented agricultural research & outreach institutions and in documenting the impacts.

If increased funding is evidence of impact, that speaks well of the $56 million of USAID funding following the first round of IPM CRSP (Innovation Lab) support. The same would be true of increased support of IPM programs by the national governments of the Philippines, Bangladesh, and Ecuador, following IPM projects led by Prof. Norton.

Who or what should receive the most credit for the success of this program?

George Norton would be the first to insist that the successes of the IPM Innovation Lab and his various U.S. domestic collaborative IPM projects are owed to many. Clearly, they are. It seems entirely counterintuitive to suggest that their accomplishments hinged on someone who is not even a pest scientist. But for three decades, this modest man has orchestrated the efforts of many accomplished IPM researchers through major collaborative

projects. He has been lead author on all five proposals to USAID for IPM CRSP (now Innovation Lab) support, and he has chaired the technical committee for the IPM Innovation Lab/CRSP since its inception in 1993. Two special traits have marked his impact. First, he has maintained focus on institution-building, participatory research, multidisciplinary respect, and training the next generation of IPM scientists and practitioners. Second, he has built the economic tools to measure the impacts of IPM research and outreach in ways that show consumer and environmental benefits that were hitherto ignored in economic analyses. The combined effect of his leadership has been to design IPM projects with a high probability of success and to garner public financial support that enables more IPM projects to go forward.

If selected, suggested Citation for Award Certificate (40 words or less):

For leadership in building successful, international IPM research programs, for contributions to measuring economic and environmental impacts of IPM, and for thereby improving the lives of poor farmers around the world, George Norton merits the IPM Lifetime Achievement Award.