Joint Meeting Notes:

Day 1, July 7, 2016:

Started at 8:40am: Introductions around the table.

8:48: Muniappan introduces himself and Integrated Pest Management Innovation Lab (IPM IL), formerly CRSP. Welcomes all attendees.

8:50: Muniappan introduces Karl Markgraf to give a short welcome and introduction of IPM. Markgraf talks about climate change bringing new pests and diseases. “If we are to survive as a species, food production is paramount.” He also talks about IPM employing tactics that are ecologically sound and helpful. Says that Virginia Tech is proud to be a part of this program and recounted some of the seminal moments in the lifetime of IPM IL (CRSP). Thanked Brady Deaton and John Bowman, the Technical Advisory Committee (TAC), the Principal Investigators (PI), and Muni, and the local organizers.

8:55: John Bowman thanks everyone for being here and dealing with our airports and delays. He’s worked with Muni all over the world but this is his first time on campus at Virginia Tech. He talks about getting out of DC and getting to see some nature, enjoying the campus, and that he will give more focused comments on Feed the Future the next day after listening to the PI presentations. Gives some basic information on Feed the Future: It was a presidential initiative that started back in 2010. They are now working on getting the initiative turned into an act of congress, which would be called the Food Security Act. “We’re almost there.” Talked about his commitment to the direction and purpose of the IPM IL projects. “The core of this initiative is high quality, credible research, from a premier land grant institution. We have to seek out researchable questions in the area of IPM.” Talked about some of the challenges of working in-country, getting meetings with mission staff in these countries, and how it’s his job to help us in these areas. USAID has over 90 projects in the research portfolio right now, most led by U.S. universities. The field offices can become overwhelmed by the amount of research in the country, so they’re trying to come up with models in which the different research projects funded from Washington can try and work together.

9:10: Muniappan thanks Bowman for giving us insight about D.C. office and for working with Muniappan in all the seven countries, helping him figure out what the people in-country wanted, how to work with them, and for visiting all the fields in these countries. And that we will be coming up with good solutions for the next four years. He then asks George Norton to introduce Brady Deaton.

9:11: Norton introduces Dr. Deaton, Chair of BIFAD, describing his current and former positions at the University of Missouri. He briefly mentions what the Board for International Food and Agricultural Development (BIFAD) is. “Brady is a true scholar, he’s a researcher, a teacher, an extension agent.” Deaton was a Peace Corps volunteer before he got his bachelor’s degree. Worked in Thailand and then got bachelor’s and master’s in Agricultural Economics and Diplomacy, before receiving a PhD in Agricultural Economics. He then worked in Food for Peace program. At one point, he was associate director of OIRED. “He’s a first rate expert in development policy. USAID is very fortunate to have Deaton chairing BIFAD.”

9:15: Deaton thanks Norton and says he is honored to be introduced by him, and that he was on Norton’s search committee at Virginia Tech. Emphasizes that their role has been reinforced by the Food Security Act that just passed the House yesterday. This takes the Feed the Future initiative and puts the label of legislation on it. BIFAD honored Muniappan two years ago with a distinguished researcher award and calls attention to the honor that Muniappan has brought to IPM. BIFAD is appointed by the President and is a seven-person group. BIFAD’s role is appointed by the White House to advise at the highest level what happens at USAID. After he became Chair in 2011, BIFAD has started taking the meetings out to the universities where the members are faculty. There will be a listening session exclusively for universities on August 2, 2016. “We are very interested in your thoughts about the student visa issues.” The Global Food Security Act, which passed the House July 6, BIFAD has been actively working on that issue from its formulation through meetings with key house and senate members for over a year up until the vote yesterday. They met with multiple critical committees. Since it was a presidential initiative, he’s confident that the act will be signed by the president and move forward. BIFAD represents universities, private sector, NGOs. Gains insight into what can move USAID forward in the most effective way. No one has an agenda. Last year he went to Tanzania with the iAgri program and then visited Ethiopia. Looks for opportunities to study particular issues, right now looking towards the vision for 2030. Creation of BIFAD due to Title 12 of an act in 1976, they have a legislative mandate requiring the president to pick the board and then they advise. “We’re all aware politically of where we are.” Obama administration has been supportive and aware of these issues, now BIFAD is looking forward and want to ensure that no matter which administration is in place, that they will move forward. In 2011 all U.S. Universities received from USAID over $300 million. In 2015, $561 million. Objective of halving the number of people in extreme poverty by 2030, with significant gains in nutrition, gender policy, and minimization of child growth stunting.

9:42am: Muniappan introduces Rosemary Blieszner to talk about Beyond Boundaries.

9:43: Blieszner explains the beginning of Beyond Boundaries: Envisioning Virginia Tech in 2047. She discusses goals and foundation of the program. Faculty-driven initiative with student representatives working on these areas. Looking at a generation from now, what life will be like, what Virginia Tech should and will be like. They expect more mobility and technology, a more heterogeneous campus. “VT-Shaped People.” Purpose-driven curriculum. Making sure students have a global perspective. Having students work with international corporations, interact more with international students and faculty.

Focus on real-world projects. Created idea of "innovation hubs." Different discipline and domains where the university intersects. Integrated living and learning communities; to intersect with start-up companies; maker spaces for innovation; learning common places. Cultivate as much of an intersecting experience as they can. Global engagement hubs. How can we draw people to Virginia Tech as a destination for different topics and issues? Global living laboratory. Amer Fayad asks about working with InclusiveVT as a part of this effort. Blieszner answers that inclusivity and diversity permeates all destination areas and activities. Discusses interdisciplinary classes taught by groups of faculty. John Bowman asks about addressing youth in food security programming when looking towards 2030. Right now, there are a lot of displaced unemployed youth that would benefit through getting opportunities in food production. Asked about making sure students come out of undergraduate being able to read, write, speak well. Deaton offers his perspective that the interdisciplinary thrust reaffirms the best parts of a liberal arts education.

10:30-11:00am: Group photo and coffee break

11:00: Muniappan begins his presentation on the IPM Innovation Lab: Past, Present, and Future. Talks about past phases and countries. Then about IPM packages for different crops. Discusses the success of using coconut dust for seed production in India. Then talked about IPM IL developing the use of *Trichoderma* for plant protection and growth. Talks about eggplant and tomato grafting to fight wilt disease and using the same technique for fighting fusarium wilt in Naranjilla in Ecuador. Then talks about Papaya Mealybug and an IPM IL recommended parasitoid for use in India. However, India did not take the advice and the problem got worse. Finally, they introduced the parasitoid in India and from 100 organisms, they multiplied and from 2010 to 2011, the parasitoid reduced the mealybug. Impact was between $500 million to over $1 billion. Muniappan then discussed what we've done in fiscal year 2016: formed TAC, visited and met with mission officials, picked projects, had planning meetings. Showed all eight projects on a map and photos from some planning meetings. The major aspects of IPM IL: development of IPM packages for crops, monitoring and management of invasive species, long-term training, short-term training. What we plan to achieve: develop and disseminate IPM package for vegetable, fruit, rice, maize and chickpea; conduct symposia in national, regional, and international conferences; conduct specialized training such as Virus Diseases, *Trichoderma*, and others; survey plant parasitic nematodes in Cambodia. Talks about *Tuta absoluta* and the awareness workshops IPM IL has conducted and that it has planned for Cambodia in August, 2016. Then talked about *Parthenium* project that got permission to release two biocontrol agents in East Africa. Then talked about past project on groundnut leafminer and how it will be incorporated into invasive modeling project. Discusses witches' broom of longan in Vietnam and IPM IL effort to identify its causative agent. "We want to discover the cause before the end of this current phase. We are also working with Sorghum Millet innovation lab on a project to control pearl millet headminer in Niger. We also want to promote the use of Neem. Overview of the symposia we've conducted nationally, regionally, and internationally." John Bowman mentions that as researchers, everyone needs to think about the "so what" aspect of all this work, in terms of increasing food security, increasing farmer incomes. Short Heinrichs talks about giving more information on potential impact, estimates, etc. Norton says that at least five of the projects are conducting baseline surveys and trying to predict the economic impacts of our work. Muniappan says

that all of our components have the potential to completely eliminate the use of pesticides. Discussion focuses on impact assessment. Dely Gapasin talks about how pleased she is that we have modeling projects that include human movement.

11:50: Amer welcomes everyone, talks about the objectives of this meeting in bringing the Program Coordinating Committee and Technical Advisory Committee together. Encourages everyone to keep asking questions, the "so what?", the big picture. Talks about the PI Presentations after lunch, what should be discussed during the 30 minute presentations.

12:00-1:10: Lunch

1:10: Amer introduces PI presentations, starting with George Norton and the IPM IL Asia Vegetable and Mango project. Highlights the three countries, Nepal, Bangladesh, and Cambodia, and highlights the areas of work within each country. Discussed objectives of the program such as conducting adaptive research, diffusing IPM practices. Discussed progress to date and initial planning meetings. Also went over the different partners working with the project. Priority crops: Cambodia – head cabbage, tomato, cucumber, long bean, Chinese kale, chili peppers, sweet pepper, cauliflower, bittergourd, eggplant. Bangladesh: mango, eggplant, tomato, bittergourd, chili peppers, country bean; Nepal: tomatoes, cabbage, cauliflower, eggplant, onion, cucumber, bittergourd, okra. He talked about accomplishments in the field, experiments and other activities. Baseline surveys underway. Talked about how helpful Muniappan and Fayad have been with their proactivity. For challenges: fitting program into a tight budget; coordinating with many evolving complementary programs and projects; national political differences within Bangladesh which can reach into government and universities; remoteness of Nepalese research sites. Discussion of future plans: workshops in the region, adding younger people, training PhD students.

1:30: Question and answer: Srinivasan asked who is the target for the training in Cambodia for the short-term workshops. Norton answers that the workshops are for government personnel, NGOs, students. Srinivasan then asked why have the Tuta workshop in Cambodia, and Norton answered that since we know it is coming to Cambodia and will hit like a ton of bricks, it's important to prepare them. Muniappan added that we had those workshops in Nepal and Bangladesh in 2015 and that now it's there and they're more prepared. Srinivasan then said that we need to add PDA staff, who are government staff. Muniappan then mentioned that Tuta is in Nepal and Bangladesh, and asked Bowman if he would ask the missions for funds there. Bowman answered that he would politely ask the mission.

1:45: Amer introduced Ajay Jha, who is presenting on the Biodiversity and Climate Change in Nepal project. Starts with a presentation overview. Talks about background of Nepal, its biodiversity, and said that Nepal ranks 13th as climate vulnerable country. Discussed approach of looking at climate change

angle and also looking at connectivity between agriculture and biodiversity. Discussed what research questions the project would be looking at.

2:00: Question and answer. Asked about if Chitwan region is part of Feed the Future region. Also asked about if four years is enough time to measure biodiversity. Jha answers that one of the bigger challenges of this project is that they can't do everything. They will look at pollinators, pests, insects, weeds, and all their students have different research projects relating to biodiversity and climate change.

2:15: Tri Mai presents on the Vietnam Exportable Fruits IPM.

2:35: Question and answer. Gapasin asks that, since this is a new project, where are the IPM packages coming from. Mai answered that they are doing surveys and testing efficacy of different things. Srinivasan says that Witches' Broom in longan is caused by virus according to Chinese papers. Muniappan had it tested by Bob Gilbertson and Naidu Rayapati who could not find any phytoplasma or viruses, and that many people don't accept the Chinese publication. Gapasin and Norton talk about how they will create IPM packages for mango because it is new for Vietnam and for Norton's project. Currently the role of eriophyid mites being examined. Mai says they have studied mango IPM from the Philippines.

2:45: Fayad introduced Buyung Hadi for his presentation on the Rice IPM in Cambodia. Starts with Cambodian rice production key facts and figures. 90% of cultivated land used for rice production. 44% household income from rice production. Rice provides 70% of daily caloric supply. 74% of rice in Cambodia is rainfed, unusual for an Asian country. Challenges for growing rice: pests and diseases, which cause 25% yield loss. From 2006 to 2010, pesticide import increased by 285 times. Not all used on rice, but still a very worrisome statistic. Labels are often in Chinese so they don't know how much to use, they just guess. Discussed objectives: developing IPM packages, empowering rice value chain actors, develop effective communication, and provide information to support policy reform. This year they are taking a rice survey to see what the problems are. Also on-farm research. Progress and partnerships. Contract signed in March, also forum on biocontrol registration, then had inaugural meeting in April. In May, a post-doc in innovation systems was hired. In June, impact assessment and pesticide questionnaires developed in collaboration with George Norton. Protocol developed for first season's field experiment. Site selection. One PhD Cambodian student started at Nagoya University, three recruited for MSc at RUA. Right now RUA is looking for a space for rice. July, training for rice health survey portfolio; discussion with EU-rice project to bring Trichogramma cards to Cambodia; start rice health survey, impact assessment, and pesticide KAP survey. Hadi says that they will do a nematode survey – Muniappan said that we are sending Dr. Eisenback from Virginia Tech, so Hadi will collaborate with them. Hadi mentions the news of army worm outbreaks in Cambodia. Wants to create an IPM card – talks about a particular pest, with a visual, identification to management options. You can put a hole on the edge of the card and farmers can put them on a keychain to raise awareness of the pest and

management. Muniappan asks if *Trichogramma* will work on army worm. Hadi thinks it is drought driven.

3:09: Q&A. Srinivasan follows up on army worm incidents. He says *Trichogramma* can be used, but the problem is that the army worm as migrated from the forest due to deforestation. Muniappan says there are different species of army worm. (Later Muniappan found that *Trichogramma* does not parasitize army worm eggs as they are covered by a thick mass of hairs). Discussion moved to difficulty of biocontrol registration in Cambodia. Hadi says that there may be something in the political machine slowing some things down. John Bowman asks if the project is under-funded.

3:30-3:50: Coffee break

3:50: Wondi began his Parthenium presentation, talking about previous phases of the project, showing photos of the rearing facilities, discussing bioagents. Also discussed challenges of rearing bioagents, such as the fact that it is labor intensive, and Parthenium is harmful to people. Discusses the questions "What happens to the bioagent when the host is eradicated?" Answer: the agent never eradicates its host but controls it. Mentioned invitation from FAO to make a presentation in Algeria about Parthenium.

4:05:Question and answer. : Tadele asked about natural enemies of the bioagents. Jha asked about native plant displacement from Parthenium. Glen Hartman asked about staff salary, because of the high turnover at the rearing facilities.

4:18: Amer introduces Tadele to present on the rice, chickpea and maize IPM in East Africa. Starts with project goals: improve food security; increase income; improve health of resource-poor farmers. How? Reduce crop losses and pesticide use; disseminate IPM packages; build capacity. Target countries are Kenya, Tanzania, and Ethiopia. In Kenya: Nakuru, Bomet; Tanzania: Morogoro, Tanga; Ethiopia: Hawassa, Bako, Debrezeit. Human capacity building: training farmers, researchers, students, extension agents. Diagram of partners. Project planning meetings on April 7-8, 2016. ID'd different pests and IPM components. Activities implemented in the last three months. Push-pull technology. Recruited five PhD students, two field assistants, three temporary consultants. In the process of sub-awarding to national partners. Major long-term plans after September 2016. Operational setbacks: project approved in April 2016, crop season started March 2016. Tanzania didn't catch up with 2016 crop season. Kenya late planting moisture stress. Ethiopia ok on season. Delay in sub-award to local partners. Vehicles/motor rentals: consumes budget/inconvenient.

4:38: Q&A: John Bowman asked about sandwich students. Tadele says they're full-time students at local universities and can say they earned their degrees under the IPM IL program. Muniappan asked if they're collaborating with the Chickpea Innovation Lab at UC Davis. Tadele says no, and Muniappan says

that he should contact that group. Gapasin asked about collaboration with IRRI. Tadele says not yet. Hadi says that most of their staff is in Burundi but they just started someone in Tanzania and he will put them in touch. Heinrichs asked about another rice problem, and Tadele says that in terms of prioritizing, it is not in top five. Heinrichs asked about economic impact of push-pull. Tadele says that *icipe* has done assessments and that over 100,000 farmers have already adopted it and they're tracking it. Muniappan asked if they have NPV. Tadele says it's hard to import into Ethiopia. Discussion of mobile apps: rice doctor, maize doctor. Hadi explains app and says it has not been transferred to Africa. Collaboration between Hadi and Tefera.

Break for evening reception at the University Club.

Day 2, July 8, 2016:

8:30am: Heinrichs introduces John Cardina to present on the East Africa Vegetable IPM. Cardina discussed overall goals, such as working on gender issue and focusing on target crops: Ethiopia: tomato, onion, cabbage; Kenya: tomato, cabbage, French bean; Tanzania: tomato, onion, cabbage – based on meetings with project participants in April 2016. Working in Feed the Future focus areas, targeted certain places in each country. Started with baseline survey to determine priority pests; develop, implement, and scale up IPM technologies; develop and transfer IPM strategies; implement an ecologically-based approach. Discussed the gender aspect. Desired outcomes: regional IPM community of practice: conference calls, accurate timely information, multi-disciplinary group of hub and spoke participants, standard speakerphones/laptops with software (Skype, Whatsapp). In August they will start a pest diagnostic workshop. Seedling production workshop in September to avoid planting infected seeds. Good entrepreneurial opportunity to go into production of high quality seedlings. Focus on use of WhatsApp as a way for growers to send an image of plant with a problem, or a weed, and have Real IPM in Kenya then send them out to exports if they can't diagnose it. Progress to date: initial meeting with co-PIs and participants and drafted IPM package. Sub-contracts finalized; project work plans developed at each site; baseline survey developed by George Norton; baseline survey initiated in Kenya, Ethiopia; website in development; identified two of four graduate students; preliminary research on IPM technologies. Discussed future activities: complete baseline survey; follow-up survey will take place in year four; research on identified IPM technologies; transfer and scale up IPM strategies using participatory on-farm ag research; develop complete IPM packages. Challenges: need better communication, feedback, responsiveness; budget delay implications still unclear; better technology to maintain connection; better integration of NGOs, e.g. KAVES, TAHA; unique challenges for working in each country.

8:50: Heinrichs starts Cardina's Q&A. Srinivasan asks about an organization, but Cardina and collaborator Norton explains that it now goes by another name and is already their collaborator.

Gapasin asks about IPM packages. Muniappan asks about tomato grafting to overcome bacterial wilt in Kenya and about coordination between iAgri and IPM IL, which needs improvement. He also asked about participation of Ohio State entomologists. Fayad asks about rouging, and Cardina says it is part of their strategy. Bowman discusses how for this project, and for all projects, we want to get embedded with organizations in country working with farmers that are already in these programs. Cardina talks about having a good meeting with the country representatives in Kenya and how these people can bring farmers to a meeting. He's less sure with Tanzania. Muniappan asked about collaboration between Cardina's project and Tadele's project. Cardina said they have been collaborating, and Tadele added that at the moment, there is a baseline survey going on between the two. Bowman asks about the apps Tadele and Cardina are using. Right now, they're not the same app, but they should be.

9:09: Heinrichs introduces Abhijin Adiga of the Biocomplexity Institute to present the invasive species modeling for south American tomato leafminer and groundnut leafminer project. Adiga starts by stating the modeling is an important part of IPM. He mentioned Mersie's use of Climex modeling in his Parthenium project. Abhijin says the project is unique because they are using big data analysis to extract patterns from the data. Objectives are to develop models for predicting the spread of the South American tomato leafminer and groundnut leafminer over next five, 10, 15 years. Project and team: scientists, modelers, statisticians, economists. Gave a quick overview of damage by Tuta and the establishment around the world. Overview of preventative measures. Suspected pathways of spread: natural means; human-mediated pathways; production; travel of migratory worker population. Gave background on groundnut leafminer: native to Asia, reported in Africa. There is a need to confirm whether there are two species involved in Africa or a species misidentification. Then they will model spread of GLM in Africa. Previous modeling has not taken into account human movement, does not have short-term prediction or causality. Challenges: lack of information, modeling frameworks, computational power. Proposed modeling framework: more complex models to not only model spreads but to also figure out most effective prevention and mitigation strategies. In long-term, will add computational perspective to modeling: optimal placement of traps; optimal quarantining; implementing trade embargos, farm-level interventions, etc. Approach: interaction of models. Current work: four meetings, waiting on two subawards, literature survey, data collection, training one postdoc, one PhD in Senegal, one undergraduate NDSSL student. In the future, they'll train one more postdoc, three PhD students across the teams, and a few undergraduates starting fall. Workshop proposed with Indian collaborators. Objective: If Tuta hits North America, how will it spread? Economic impact. Working with USAID missions.

9:45: Q&A: Srinivasan discusses how to identify if there are one or two groundnut species in Africa. Gapasin asks about collecting data and if there are enough partners to collect all this data for BI with $1 million in three-and-a-half years. Abhijin says that they have collaborators in the different regions, and that it's not about collecting data everywhere but using data from a few regions and using that data to create models to expand their zones of coverage.

9:50: Mandy Wilson begins Portal Presentation. Agenda: Origins of portal, IL portal workflows, demonstration, closing remarks, questions. Hierarchy of the problem: we have this program IPM IL and it's big and has multiple PIs who are heads of projects, some have subprojects. Having a central repository where data can be exchanged essential for doing good science. IPM reports data to USAID, some of it will go to open DDL. This year released version 1 of the portal. Travel matrix, trip reports, technical workplans, semiannual reporting, open data/DDL reporting. Future enhancements: funding/RFAs, open data/DDL direct submission. Showed IL Portal Dashboard. Travel reporting workflow: PIs submit travel plans -> used to create travel matrix -> PIs submit travel requests -> PIs submit trip reports. The matric and trip reports go to USAID. Technical workplans: "this is what we plan to do in the coming fiscal year." Semiannual reports: "this is what we did." Open data/DDL: response to president's open data initiative. Development Data Library (DDL) – USAID's repository of research data. Additional features: administrative infrastructure, publications repository with API, ability to configure system. Wilson then did a demonstration of the portal, from registration to login, data reporting, travel matrices, user information. Portal configured for USAID and IPM, but customizable workflow makes it adaptable for other Innovation Labs.

10:30:Question and Answer: Gapasin asked if we had a previous portal. Muniappan answers that we did not. She also asked if there are security worries using it in developing countries. Wilson answers that it is not because they need a login and there are security measures in place. Hadi added that he uses it well from the Philippines. Hadi asked about adding accounts and changing your travel matrix after submitted. Muniappan answered that as long as there is justification and it's under budget, it's okay. Tadele asks about changing dates on trips. Wilson says he might have to contact IPM to change it. Or you can cancel the original one and submit a new one.

10:45: Coffee break

10:53: Georgina Bingham from Vestergaard Food Security presents on netting technology. Company expanding portfolio to include horticultural crops. Wants to see if her products can assist in any of our products. Vestergaard is a for-profit company, but is a business focused on corporate social responsibility. Focus is making high quality low cost products for developing countries. Not only measuring profit, also measuring impact in countries. Known for producing bed nets, water filters, zerofly food security portfolio for crop netting. Company looks at innovative business models for sustainable development. "Zerofly Products are innovative new tools for food security, aimed for outdoor use, with UV stabilizers and controlled insecticide/chemical migration." Netting can be outdoors for one year, low residue risk, desirable safety profile, laboratory efficacy, field studies. Also looking at mango sleeves, lasts six months, incorporates insecticide pre and post-harvest. Installed from small young fruit to protect fruit while growing all the way to export/consumer store. Traps to protect seedlings. Screenhouse and greenhouse protection.

11:10:Question and Answer: Tadele asks about migration of insecticides from bag to grains. Bingham says there is but it's an amount below all maximum standards. Tadele asks about disposing of the nets in terms of creating waste. Bingham said there is a study that shows that once the insecticide runs out, people will use it for a table cloth or fencing or fuel for brick kilns.

11:15: Breakout meetings.

Technical Advisory Committee meeting –

Muniappan starts the meeting by calling to elect a chair. Lawrence Datnoff moves to elect Dely Gapasin. Hartman seconds it, but Gapasin declines because she is not 100% healthy. Srinivasan Ramasamy counters that it doesn't need 100% healthy, and Datnoff says that she's 100% sharp. Datnoff says they will work with her, but Gapasin says she will work with whoever is elected. Glen Hartman moves to elect Susan Capalbo because she's not here. Gapasin insists on backing off, says she chaired one phase and she knows what it takes and she is sure she is not "100% viable." Hartman asks Srinivasan if he is interested because he is closest to the projects and works on vegetables. Datnoff agrees and Gapasin also adds that the focus is vegetables. Muniappan says we have two projects on vegetables, one on grains, and one on fruits.

Datnoff asks Muniappan to explain the role of the chair and the role of the committee. Muniappan: it is to review the recommendations of the Program Coordinating Committee (PIs). All the workplans from the PIs will be reviewed by the PCC, and approved by the TAC. Now that the TAC has approved the proposals, the job becomes easier. Muniappan adds that we plan to take the members of the TAC to at least one work site to get some exposure and feedback. USAID usually creates an external evaluation panel on the fourth year to evaluate the program. Muniappan hopes the TAC will do the same thing, give recommendations to the management entity. John Bowman explains that process further, and says that while the evaluation will be year four, that we should explain to them what the job entails now. Muniappan says the job will mostly be approving the workplans between August to September to be implemented on October 1st. Bowman mentions that at UC Davis, the TAC is given the option to mentor a specific project and do one field trip per year to see the sites. Muniappan says that we will be open depending on member schedule and interest. Gapasin asks if we have a preference of where the chair is located, USA versus abroad. Muniappan explains that the role of the chair is mostly that he communicates with the chair and the chair communicates with the rest. Gapasin talks about how it was with the external evaluation panel, and Muniappan explains some of the differences. Muniappan says that in the past, USAID said they wouldn't pay attention to the report, and the chair of the group didn't send it. The group discusses having a report, and Bowman says that USAID will read the report. Muniappan says he got this idea from other innovation labs, and he would like the report. Datnoff says that as long as everyone will help him, he will be the chair. Hartman asks if they meet annually and Muniappan confirms this. He says we will preferably have that meeting in the host country so the TAC can also see the work going on. Hartman asks if the TAC deals with the budgets, and Muniappan says we already allocated funds. Hartman asks about what if they think the budget needs to be changed, and Muniappan and Bowman said that that will be considered.

Datnoff asked about projects that seem too ambitious. Bowman says it's not their fault since we accepted their proposals, but if it looks like we're setting them up for failure, we need to reevaluate that. Datnoff mentions Norton's project in Asia as seeming impossible to do in four years. Bowman responds that since this is their first look and that if the TAC sees something that looks too complicated or not well set up, this is the time to say it. Gapasin says that we need to remember that in the case of Norton's project, it's a continuation of earlier phases of the project; that we've been in Bangladesh for 15 years. She then mentions Cardina, that he needs to be aware of the previous work that's been done so that we don't have repeats. Bowman asks if everyone has seen the RFA, and everyone affirms that they have. Muniappan and the TAC says that they are already familiar with that from going through the concept notes and guidelines given from IPM IL. Hartman mentions that besides Gapasin, they don't have as much of a history with the projects. Datnoff says that's why it's important to have Gapasin because she has institutional memory and has been on for a while. Bowman reminds the group that most of these projects are completely new except for the vegetable projects in Asia and Africa and the Parthenium. Muniappan says for the Asia vegetable project, we've worked 10 years in Nepal, 15 in Bangladesh, and five years in Cambodia. For Africa, Tanzania and Kenya we've had for 10 years, Ethiopia is new for us in terms of vegetables.

Srinivasan mentions that the selection of stakeholders is quite important. He says that in Africa, the problem is the organizations there have a lot of turnover and not a lot of commitment to the programs. Muniappan says that before the concept notes, he and John met with all these organizations to involve them. Now our task is to make sure this project PI and coordinators do their work. Muniappan talks about how in the proposals certain entomologists are proposed but then different ones show up. Hartman asks why Ohio State wants four U.S. graduate students. Muniappan says they can do whatever they want but we need to make sure the people being paid are doing the work. Gapasin brings up that IPM IL does very interesting work and that the work done in the projects need to be made available locally in the countries.

Muniappan elaborates some of the challenges and discussed grafting, and that we need to identify where the disease is and only graft it there. Srinivasan talks about the multiple benefits to grafting. Muniappan agrees that we need to look into all these things. Muniappan told a story that in Uganda he came across in one of the presentations that they were grafting but yield was going down, and when he asked why, they just said "because you told us to graft." There was a graft incompatibility and none of them knew about it. Gapasin says we need to focus on technology transfer. Bowman says that these are still research projects, although they are hybrid because there will be some scaling, but that we don't ask these researchers to hit high scaling numbers. But they have to make the connection to potential scaling entities, like the value-chain projects. Srinivasan asks for clarification if this is adaptive research. Srinivasan says that this program has been running for a long time and we need to shift from adaptive research to technology transfer. Muniappan gives an example using *Trichoderma*, how it is not IPM IL technology but we picked it up and promoted it and it is catching up. We recently found Real IPM picked it up and are using it with our East Africa project. Gapasin and Srinivasan say the technologies won't just automatically get picked up, we need to create a chain that will allow it to get picked up by NGOs and private sector. Muniappan talks about *Trichoderma* value chain effort in Nepal, finding a company, setting up a workshop, and then training the agrovets about the bio-products as well. Gapasin says that this shows that IPM IL was doing something and that we need to set these things up within our projects. And that it varies from country to country.

Datnoff said that some of the proposals look like we have too many problems. Muniappan says that these problems always come up when we are working with the developing countries; this is why we're trying to help them. Srinivasan says that, for example, in Cambodia, different organizations don't communicate. It might be better to give different organizations the lead on different aspects of the project. Bowman says the workshops are a good start but we need to get beyond workshops and that the key in Cambodia is engaging with PDA which makes GDA happy. Muniappan says we are conducting most of our research in the farmer's fields. Bowman says that when our project disappears, we need to make sure that our actions keep going. Muniappan gives out a diagram explaining the history of IPM and trying to introduce aspects of that into developing countries. Gapasin says that the products need to be mass produced and that we need to promote small business, and Muniappan agrees and says that we are promoting small business. He gives the example of taking some Nepalese on a trip and showed them how coconut pith is done in Southern India, now they are doing it. Muniappan is trying to get a similar trip with Bangladesh. Bowman raises concerns of how to get coconut pith to Siem Reap in Cambodia, which is not on the coast. Muniappan explains the slow acceptance of IPM technologies in developing countries.

Srinivasan talks about needing to collaborate not only within our own projects, but also with projects by other organizations in country. Srinnivasan and Muniappan discuss the pros and cons of disseminating these technologies through the public vs. private sector. Muniappan gives an example that in Ecuador they had people counting *Trichoderma* spores and not even knowing why. Bowman says that we need to simplify things: projects should work exclusively with farmers affiliated with USAID because that's more than enough. He's worried we'll be led to farmers by organizations like KALRO and they'll lead us all over the map. Muniappan offers to send a report to the TAC once every couple months, a brief update. Srinivasan says that in Cambodia, the AVRDC are developing a pest identification app. Lawrence Datnoff confirmed as Chair. TAC will complete a report about the projects from this meeting.

Program Coordinating Committee –

Fayad opens and calls for nominating a chair of the committee. Wondi Mersie nominates George Norton. Norton elected with no opposition. Fayad runs through agenda. Norton as the chair takes the floor.

Ajay Jha requests to add the agenda of how we can know the technical understanding of each PI between programs so that work is not duplicated and that where possible PIs can provide helpful information. Norton agrees we should start with that. Heinrichs states that each project is on the website and Fayad confirms. Fayad then brings up that each separate project might be starting their own websites; also requests they submit information to us for newsletters, etc. Jha notes that they already have a website; the website is an easy place for program specifics and also a way to find out what happens in country.

Fayad notes that perhaps we can put links to each project website and that we have been trying to put on our website different meetings and conferences; he further explains that we cannot provide technical help but can help with content and USAID colors. John Cardina notes that he has to follow OSU colors though; Fayad says it is strongly suggested but not required to use USAID colors; suggests that

Cardina discuss options with the OSU branding people. Norton notes that he has no people to do this; Heinrichs asks if there is an easy program and mentions wordpress; Fayad suggested to George that he have a student work on this; George says he has not had the best experience in the past having a student do that kind of work; Fayad says that wordpress it would be easy for him to use.
Jha redirects conversation back to that IPM IL should be one collaborative group but that the Biodiveristy team doesn't know what the rest of the IPM IL is doing; he wants to know how the ME will help. Fayad says we will do our best to coordinate the programs and make each group aware of travel or Jha says to send out a note or put on the website all the contact information for the different PIs or external collaborators; Mandy Wilson suggested you could place that on the portal. Norton requested guidance that none of the PIs end up putting information out that should not be public; perhaps Stephanie Parker could help with this?

Norton moves on to discussing the annual meeting. He says in old CRSP used to have an annual meeting and that they had conference calls once or twice in the year of all the PIs to discuss plans and so forth; suggests we reinstate such conference call. Fayad says that maybe we could use WebEx to put a big group together and brings up that it is good to have other meetings around the same time as other big meetings such as APS or ESA etc. Norton segues into what kinds of meeting and professional conferences there are that we could combine with our joint meeting of TAC and PCC next year.

Fayad brings up that the projects should be having planning meetings and some group project planning meetings; traditionally these meetings will shift between different countries. Jha says they like to having meetings outside the U.S. Norton notes that Muniappan has done a good job in the past of rotating these meetings to difference conferences or countries; states it is good to plan at least a year or two in advance on these so you can budget or request support from ME. Norton asks if there is a PI listserv; Fayad says he will look into it.

Norton moves on to the Technical Workplans. Fayad says they are due by July 15th as we have to send to John Bowman by July 31st and the ME needs at least two weeks to review this. Explains that this should be uploaded through the portal. Mersie asked if the travel plan should be included with the workplan; Amer goes on to explain that this time we want the travel plans to be submitted through the portal this year; then explains how the system works and getting approvals from USAID.

Fayad discusses the semi-annual report dates; notes that it used to be once a year and it is now done semi- annually; notes the dates Oct 1 – Mar 31 reporting period then Apr 1 – Sept 30; the PIs should be submitting again 15 days after the end date (Apr 15 and Oct 15) so the ME has another 15 days to review before submitting to USAID. Norton starts talking about indicators; how sometimes it comes out well timing wise for these reports and sometimes they done. Amer notes that these are delegated by USAID and that sometimes they are changed at the last minute and that is frustrating but to please do your best to get them done.

Norton asks if anyone has questions on the portal; no one asked. He goes back to the annual meeting and where it should be. He moves on to the workshops. Fayad says that we should look at working with CG centers in other countries in various countries; Norton explains that right now the ME is able to fund a lot of workshops, which could stop as money becomes tighter. Workshops should be specialized, on things like neem, Trichoderma, impact assessment, virus/disease workshops. Norton says they don't just have to be regional, these can be global workshops.

Norton moves back to invoicing. I asked that we get invoices monthly in an ideal situation; it is important to get the invoices in.

Fayad brings up TraiNet and that students and short term trainees must come through TraiNet on the J-1 visas.

Norton moves onto communication; encourages everyone to discuss news items with Parker or if any items end up in the media related to your project then let the ME know; Norton explains how Parker is doing a really great job and is able to take the scientific information and put it accurately into a report, doesn't distort what you said and gets the point. Heinrichs encourages everyone to get on the VT news emails; also said to get on the list of Globalplantprotectionnews.com.

Norton asked about a drop box for pictures; Fayad said this has been discussed; Jha asks Wilson about going through the portal and finding a way to upload and then divide them by country; Wilson said she would look into this possibility; John Cardina says isn't there a situation about having pictures of people on the website if they don't want that; general consensus there are regulations around this.

Heinrichs says we need to supply emails of all PI coordinators; post this somewhere; Fayad said we used to have a directory on the website maybe we could do that again

Norton concludes meeting for lunch.

12:30-1:30: Lunch

1:30: Management entity presents on some important dates and information for the program coordinating committee. Fayad talked about reporting deadlines, semi-annual reporting, and indicators. Parker talked about creating websites, following Feed the Future style guidelines, logos, and PowerPoint templates. Parker also discussed success stories and reporting impacts, and thinking about these things while out in the field. Making sure to take good, horizontal photos, and get quotes when available. Also, she told the PIs to send project materials for the ICE conference where IPM will have a booth.

1:50: John Bowman gives presentation on Feed the Future. Talks about the different divisions and areas of research and what he is responsible for. Showed a research division staff organizational chart. Then he discussed some of the key results they reported on for fiscal year 2015. Looked at five program areas – big push for climate resilient cereals. Climate resiliency as a "hot new topic" that research and industry will have to adhere to. Another of the five program areas is legumes. There is program for research on advanced approaches to combat pests and diseases. Big story for them is Bt eggplant. Bowman leads nutrition and safe foods which include horticulture, aquaculture, and livestock. Major accomplishment commercial adoption of tomato and eggplant in East and Southern Africa. Number five is program for sustainable intensification, which includes IPM IL. Major accomplishment: Africa Rising, drought tolerant maize. Capacity building is an integral part of FtF Innovation Labs. In one year, FtF training 105 graduate students from 32 countries. Technology scaling team – office of agricultural research and policy. Marketing group interested in making connections with private sector, commercialization. Challenges of

implementing programs: personnel changes, funding, mission engagement/relevance, too many small research projects that are not collaborating, five-year PAD development, new ILs under development. What's hot in the future: resiliency, both climate resiliency and also resiliency in people against shocks; climate smart agriculture. We need to think about how to spin our activities as climate-smart IPM. Impact analysis, impact pathways will get a lot more attention in the next five years. Big push to work primarily in mission zones of influence. Try to integrate with mission value chain projects. Collaborate with other labs, research investments. Improved communication with missions and Washington. Focus on researchable issues, impact on sustainable intensification. Website (needs hotlinks on VT main website). All websites now have to be approved by government agency before they can be out in cyberspace. All subaward websites should be linked to ours so that the agency won't have to approve it because it will be "part of ours."

2:45 Discussion. Adoption of Bt eggplant in Bangladesh: issues with yield, possible issue of acceptance of transgenics. A lot of negative press of GMOs in Bangladesh. Ramasamy presents concern that if Bt eggplant is planted too much, eventually pest will develop resistance.

3:15: Muniappan opens the floor for a general discussion. Cardina asks about some challenges brought up by Bowman in relation to his project: do the mission value chain projects want to work with us? Bowman replied that we need to make the approach, but if they're not receptive, then he needs to know about it but we may have to work on separate tracks. Muniappan wonders about collaboration between Cardina's project and the Horticulture Innovation Lab on their seedling workshop and netting. Discussion on netting presented by Georgina Bingham, using them for trials. Hadi asked about Bingham's presentation, saying that the only applicable technology to rice is the bag. Muniappan asked about the insecticide in the bag, and if it works in all countries and if it's toxic to people handling it. Discussion of the efficacy of the insecticide inside the bags and the amount of it. Rat-repellant treated bag is interesting to Hadi. Talking about the Center of Excellence at RUA in Cambodia. Norton says they already have research plots at RUA and have started. Manny Reyes is leaving the Asia Vegetable project, discussion of where his money should go. He wanted to use it to buy nets, or give it to Kansas State, Norton wants to give it to in-country partners. Mersie asked for guidance when it comes to approaching the missions, and about turnover. Adiga asked a question regarding the modeling, can we liberate any of the data from the other USAID Innovation Labs or other available sources? Bowman said the missions would be more likely to have this information, along with the value chain projects. Discussion on collaboration between Innovation Labs – Gapasin asked why does Bowman have to force it, why doesn't it happen more naturally, with more Innovation Lab initiative? Norton says that it can cost to do these collaborations, different ILs have different interests, so you have a lot of give and take. Zara Shortt asked about the Virginia Tech tax specialist trying to tax sub-awardees traveling to the U.S. and we pay their salary, then all their salary and travel expenses/per diem are taxable.

4:30: Final wrap up and words. Bowman says he's glad he was able to come to this meeting and share this time with us, get to know us all better, and be here at this first exchange. Having almost the full board here was great too, appreciates their comments. "Brady Deaton being here was very special, I

think he will appreciate being asked to participate in this." Question: do you like being informed of the Feed the Future kind of stuff? Datnoff: Yes because he didn't know about a lot of it before. Big problem: in the next four years to try and get this better integration with the missions and the value chain projects. Bowman said: "It may be the hardest thing you have to do, and I'll have to spend time helping you with it, because the system must look kind of daunting, how do you navigate in my world? Some countries, this kind of relationship building will be much easier than others. For the modeling project who wants information from different countries, I don't know if I can help you with that too much, but if you show me and you present to Muni the kind of questions you want answered to feed into your model, we'll have to find a way to get the information to you. But for some of the stuff you may have to find it on the web or make inquiries with agricultural bureau statistics in country. There's only so much I can help on that micro-level stuff, but I'm not gonna leave you totally in the dark. If you get extreme blockage and you can't do your work, I need to know about that to help you. Thanks again for your attention, for coming very long distances to be here, it's been great and we're off and running! The U.S. government giveth, and sometimes they want to taketh. And congratulations to all of you for winning your respective proposals."

Muni: "On the behalf of the IPM IL I want to thank all the four TAC members and the eight PIs, six of them coming from outside and two from Virginia Tech, and also my colleagues at the M.E. and Dr. John Bowman, and originally he was planning to take personal leave and he cancelled it because he wanted to attend this meeting, and we want to thank him for his personal sacrifice. I want to especially thank our international participants, Tadele, Srini, Buyung, and Tri. Thank you very much it was a very productive meeting and we will have a lot to show in the next meeting."