

Peanut Collaborative Research Support Program



Peanut CRSP
The University of Georgia
Georgia Experiment Station
Griffin, Georgia 30223-1797
U.S.A.

United States Agency for International Development

Grant No. DAN 4048-G-00-0041-00

**PEANUT
COLLABORATIVE RESEARCH
SUPPORT PROGRAM**

TRIP REPORT

**David G. Cummins
22 January - 1 February 1994
THAILAND**

**Supported by USAID Grant No. DAN-4048-G-00-0041-00
and the Participating U.S. Universities
and Host Country Institutions**

TRIP REPORT EXECUTIVE SUMMARY

DAVID G. CUMMINS

Thailand 22 Jan - 1 Feb 1994

Purpose of trip: To accompany the External Evaluation Panel and assist with logistics of their evaluation of the Peanut CRSP activities. Panel members were Drs. David Hsi, Bo Bengtsson, and Joseph Smartt. We were joined on 27 January by Dr. Dianne Janczewski, AID Program Manager for the Peanut CRSP. To meet with AID/Bangkok related to present and future CRSP activities.

Activities: Met with Department of Agriculture (DOA) and Kasetsart University collaborators in Bangkok (pathology, entomology, and food technology), visited the village near Chiang Mai that is site for processing technology outreach, met with Khon Kaen University and DOA collaborators in Khon Kaen (breeding, entomology, virus diseases, plant pathology, rhizobium, post harvest), and visited on-farm seed multiplication fields, a sheller-processor, and a DOA Extension Seed Center.

Observations: I have recorded a number of observations, but do not intend for these to effect the unbiased EEP evaluation.

- Training and enhancement of research capability has been good. The establishment of the Thailand Coordinated Peanut Improvement Program is exemplary.
- Research output is high, evidence of impact is present, and accelerated impact from information is expected.
- The Thai's have begun extending their experience and capability to the Region through workshops and training efforts. The government is committed to assisting the region but details are not worked out. The CRSP extension proposal should capitalize on this potential.
- The Peanut CRSP should seek ways, i.e. the AID supported U.S./Thailand Development Partnership, to enhance information flow and use.
- The Peanut CRSP should seek to expand efforts into countries neighboring Thailand (i.e. Cambodia) both jointly with Thailand and with directly with AID mission involvement in those countries.

The trip was successful for assisting the EEP in getting a good overview of the program and learning the potential of the crop and the Peanut CRSP Thailand and the S.E. Asia Region. I believe they were exposed to the successes, problems, and challenges in the Peanut CRSP activities in Thailand.

TRIP REPORT

DAVID G. CUMMINS

THAILAND 1-22/2-1/94

DETAILS OF TRIP

22-23 January

Depart GRIFFIN at 0800. Arrived airport at 0840. Departed gate for Portland at 1010; takeoff at 1058 due to heavy incoming and outgoing traffic. Arrived in Portland at 1230. Depart Portland at 1345. Arrived Tokyo at 1645. Depart for Bangkok at 1900 and arrive Bangkok at 0015 on 24 January (1200 on 23 Jan EST)

24 January

Drs. David Hsi, Bo Bengtsson, and Joseph Smartt (External Evaluation Panel) and David Cummins met at 0800 for breakfast and briefing on activities. Picked up by Department of Agriculture driver and met at DOA at 0900.

Welcomed by Mr. Sophon Sinthuprama, Director of the Field Crops Research Institute and Peanut CRSP coordinator. Commented on projects and collaboration.

- Breeding/Pathology DOA, KU, KKU, NCSU
- Entomology - DOA, KKU, NCSU
- Virus Diseases - KKU, UGA
- Utilization - KU, UGA

Comments by Dr. Montien Sompee, Director of the DOA, Field Crops Research Institute, Khon Kaen.

- Peanut CRSP has been a program of long involvement.
- Works actively with the Thailand Coordinated Peanut Improvement Program.
- Team works together well internally and with the U.S. collaborators.

Dr. Tharmmasak Sommartya, Department of Plant Pathology, Kasetsart University reported on collaborative research in peanut diseases. Primary work has been on leafspots, rust, and aspergillus. Discussed student support.

- Dr. Bengtsson asked question of how much CRSP support went to each B.S. student.
- Answer - Regular costs 80% government, 20% personal.
- 70% of special research problem cost is from CRSP or about \$400 per student.
- Joe Smartt - Are you interested in low cost disease control and epidemiology - Answer yes.
- Mr. Precha Surin, DOA Pathologist commented. Thailand costs of chemicals are high, so there is much interest in low cost control. A considerable portion of the pathology research of CRSP is in support of breeders to develop resistant varieties. Leafspots are most important disease in wet season and viruses in dry season.

Dr. Turnjit Satayavirut, Principal Investigator for the Insect Management Project, DOA, Bangkok reported on her research. Goal of research is insect control through integrated pest management/sustainable agriculture principles. Assisted by Mr. Pisit Sepsawasdi (retired) and Mrs. Srisamoru Pitaksa. Screening lines for resistance. Testing neem tree products and Bacillus thuringensis as biocontrols. Conduct demonstration trials at several locations, and farmer education meetings to assist in technology transfer. Slides of insects that damage peanut were shown.

- Dr. Hsi - Can you give a list of activities?
- These are in the progress reports that were passed out to you.
- Dr. Bengtsson - Have you done problem definition at farmer level?
- Surveys have been conducted
- Dr. Smartt - Have you studied the nature of resistance, whether anatomical, morphological, or chemical? Is there a visual means to select germplasm?
- Support has not been sufficient for nature of resistance studies.
- Dr. Sathorn Sirisingh (former DOA PI) stated that peanut can tolerate at least 33% defoliation and not have yield reduction.
- Dr. Turnjit - Low yielding lines are often tolerant to insects, high yielding lines susceptible.

Adjourned for lunch.

Reconvened at the Kasetsart University Department of Product Development at 1430.

Dr. Chintana Oupadissakoon former Food Technology project PI reviewed history of Peanut CRSP in the department beginning in 1983 and Dr. Penkwan Chompreeda reviewed present program. Reviewed Development of Products such as peanut flour supplemented chicken patties, peanut flour supplemented wheat noodles (began in 1986 with Dr. Penkwan's 7 months at UGA, industry produced, market tested, tested in school lunch program; 10% protein in wheat noodle, 15% in enriched noodle), and single screw extruder at a food factory has been used in product development. Training has included 15 B.S. students (1 year special problem and training in research techniques, and 16 M.S. students. The Peanut CRSP enabled strengthening of department to offer M.S. in 1988 and will offer Ph.D. program in about 1996.

Technology transfer - 1992 FAO-CRSP-KU Regional Workshop on grain legumes. Peanut processing workshop for food industry (70 people, 1/2 industry). In 1994 will provide training to 8 Indo - Chinese and 2 Thai participants for 6 weeks in April-May. Technology transfer of roasted and ground roasted peanut in North Thai village housewives and will begin similar work in Northeast this year.

Future for 1995-2000 stated.

- Develop Center for Training on Storage and Utilization of Peanut.
- Cooperate with DOA Extension Department to transfer technology to villages.
- Research will concentrate on nutritious foods and non-food products.
- Dr. Bengtsson - Impressive list of accomplishments. Have you considered patents?
Takes two years to get patent, and have focused much time on product improvement more than on new-patentable products.
- Dr. Bengtsson - you stated training is most important and will be most important part of program. Is research complete.
No, but can train neighboring country personnel as well as Thai.
- Dr. Bengtsson - what are you doing to promote sustainability of department?
Without CRSP - a Center for Peanut Development and Training Center. With CRSP - Expand training to Indo China, higher technology research focused on industry

linkages, Ph.D. training, and short-term training Georgia.

- Dr. Smartt - Commented that to develop training centers for Thailand and Region, then have to maintain a critical mass of faculty.

Departed for Chiang Mai at 1735 and arrived at 1900. Circled airport for 20 Minutes waiting for Princess to depart - presented diplomas at Chiang Mai University graduation. Stayed at Pronping Tower Hotel.

25 January

Visit to Huay - Bong - Nua Village 90 KM northeast of Chiang Mai to see technology transfer site. Picked up at 0900 by DOA driver. Went to the University for lecturer (former student that worked with villagers on the project) and traveled to village.

- Women have not processed peanut for about two months. Their own production was limited due to drought. Sold crop for higher prices than they could process and sell. Peanut too high price to buy at market and process than resell.
- Grow peanut in rotation with pepper - pepper does not grow well without peanut (N supply).
- Women afraid we were coming to take equipment provided by project.
- Bo Bengtsson - what is greatest problem other than water in production? Insects.
- Bo Bengtsson - what did you learn most by project? Marketing.

Lunch at small restaurant at market in town where peanut products were marketed. Departed at 1300, arrived hotel at 1430. Checked out, visited wet market, departed at 1730 for Bangkok, arrived at 1840.

26 January

Departed Maruay Hotel at 630 for airport, departed at 0730 for Khon Kaen and arrived Khon Kaen at 0815. Checked in at Kosa Hotel.

0930 convened at DOA Khon Kaen Field Crops Research Center for overview of the research program.

Dr. Sanun Jogloy (Khon Kaen University Breeder, PI collaborator with Dr. Tom Isleib at NCSU) presented an overview of peanut production in the area.

- Peanut produced by small-scale farmers.
- Grown along river banks, upland, and in upper and lower level rice paddys. 70% rainfed production areas, 30% irrigated.
- Potential for expansion - Paddy fields after rice on residual moisture. Paddy before rice.
- Usually hand weed, some herbicides.
- Problem with lack of dormancy in Spanish-type varieties.
- Average yield of 1.2 tons/ha. Low because of droughts in rainfed area, low soil fertility, diseases, weeds, insects.
- David Hsi - Taiwan breeders are developing dormancy in Spanish-type varieties, should obtain germplasm.
- Joe Smartt - Do you select for different soil types. Yes.
- Bo Bengtsson - Three varieties released, one accepted by farmers, why? Two varieties are large seeded, require higher fertility than farmers will presently use. Must train in production practices for large seeded variety.
- Bo Bengtsson - Donor wants to see yield increase when support variety development. Yield data shows about 10% increase in ten years.
- Joe Smartt - Maintaining yields on soils that are losing fertility is an accomplishment.
- Sanun Jogloy - when soil fertility improves due to peanut production or fertilizer, farmers then shift to higher value crops, vegetable seeds, pepper, etc. Peanut then shifts to poorer sorts.
- Bo Bengtsson - Asked why just begun last year breeding for high N fixation? (Not sure of answer).

Dr. Sopone Wongkaew reported on virus/pathology research at KKU. The CRSP program has expanded contact with world scientific community. Improved research techniques. Recently published 4,000 copies of disease identification guide at request of Thai DOA Extension Department. Co-authored recent ICRISAT/CRSP disease

identification guide. At KKU trained 12 undergraduates, 2 M.S. (just begun M.S. program), and 4 research assistants employed. Future plans are to emphasize training of scientists in neighboring countries, conduct more basic research for N.E. Region, and conduct applied research for farmers in N.E. Region.

- Bo Bengtsson - you have a good relationship with ICRISAT, if ICRISAT funds decrease, what role could you play in taking over some of ICRISAT's role in Region? Answered by Dr. Aran Patanothai, KKU Agronomist. Thailand has expressed a mandate to help in development of S.E. Asia region, particularly in Burma, Laos, Cambodia, Vietnam. Not decided what will be the extent of the mandate. ICRISAT has contacts in region, but can use help of Thailand and Peanut CRSP to assist in work in region. Thailand capable scientifically. IARC's going to ecozone concept and exploring how to work with strong national programs to serve ecozone.
- Bo Bengtsson - what areas can you help with? Aran - Breeding, discussed with Dr. Nigam, ICRISAT breeder. Strong in virology. Can contribute in microbiology; nutrient recycling and N production in cropping systems. Strong in farming systems.
- Joe Smartt - Do you see yourself working in adaptive research by using materials from IARC's? Aran - Varieties developed at IARC's do not always perform well here. Need to screen segregating materials in region, which we can do.
- David Hsi - Commented on value of Thailand serving a regional training center. Aran - There is need for training of scientists from Laos, Cambodia, etc.
- Bo Bengtsson - The Technical Advisory Committee for the IARC's (TAC) has said that the IARC's should not have mandate crops, but be ecosystem focused. Some centers would cease to exist.
- Bo Bengtsson - Sometime ICRISAT may give center to India, concentrate on Africa. TAC says centers should focus on strategic research, germplasm, sustainable research (whatever that means).
- Aran Patanothai - We are just talking about how we can be a regional contributor, not yet thinking of being a regional center. Someone above us makes that decision.

Dr. Manochai Keerati - Kasikorn, Insect Management Project PI at Khon Kaen University discussed his contribution to insect

management research, cooperative with DOA and NCSU and Philippines. Biocontrols among items discussed.

- David Hsi - Interested in research on biocontrol, important in IPM. Also commented on research in U.S. to put Bacillus thuringensis gene into peanut to provide insect control.
- Joe Smartt - Are there genetic factors that give a range or multiple resistance to insects? Yes. The line NCAC 343 has broad base resistance.
- Bo Bengtsson - What is one most important insect? Answer, Subterranean ant.
- Aran - Ant is location specific. More in new fields. Do not know how to control. Trapping with coconut and other baits is expensive. Effective chemical now banned. Leaf miner and leaf hopper are wide spread, difficult to control. Farmer's need training in IPM. Longterm plan is to introduce genetic resistance; virus vector insects should have emphasis in future.

Lunch 1230-1400 at Boat Restaurant

Dr. Banyong Toomsan, KKU, discussed rhizobium research. Had CRSP support from 1982-85, IDRC - 1982-88, and from EC 1990-93. The main objective in Phases I and II were to find ways to increase groundnut yield through the use of Bradyrhizobium technology. The objectives of the Phase III were to quantify the amount of N fixed by peanut and to measure the residual N effect of peanut on succeeding crops. Peanut best crop compared to soybean, cowpea, and mungbean for increasing corn yields in rotations. About two times yield of corn in corn/peanut compared to corn/soybean rotation. Need to return peanut tops to soil to get full benefit of N to soil, which can return 60-80 kg N to sort.

- Joe Smartt - May be best to select varieties that are better N fixers, than to select better rhizobia because of difficulty in shifting soil populations of rhizobia with inoculation of seed.
- Aran - Farmers know benefit of growing legumes, often will give land without rent to produce legume.
- Aran discussed proposed future program as presented in summary book; research on how to do technology transfer, regional role in assisting neighboring countries, continue needed research. Seed production is a problem; present seed production system not suitable for peanut.
- Bo Bengtsson - CRSP is research, what about emphasis on

technology transfer? Aran - We need to do research on how to transfer technology, i.e. seed production and distribution, test village models; link processor and producer in seed distribution.

27 January

Went to airport at 0745 to pickup Dr. Dianne Janczewski, AID Program Manager for Peanut CRSP. Departed at 0900 to visit peanut sheller at Kalasin.

Sommat Wiriyayuttama, Managing Director, Nam Heng Huad Co., LTD. He visited farmer/business man in Albany, GA, Mr. Joe Marshall who considered establishing a large production farm at Kalasin. Government would not guarantee protection from imported peanut, so did not continue. Normally handles 5,000 tons of peanut per year. Shells and sends to Bangkok and other markets. Produces 2 tons per day of ground-roasted peanut (amount per year?). Sells 20 tons for seed. He can play an important role in area to stabilize market for farmers.

Lunch at Lake Restaurant

In afternoon, visited a farm area of contract producer's of breeders seed for DOA. Saw fields of Khon Kaen 4 variety.

Also visited a family in town that is a cottage scale producer of ground-roasted peanut. Using KKV equipment, sheller, cleaner, roaster, mill. Worked in Saudi Arabia to obtain funds for equipment.

28 January

0830 visit to Seed Center, at Khon Kaen, Seed Division, DOAE, ministry of Agriculture and Cooperatives.

Center produces soybean, rice, peanut seed. Center's produce about 10% of seed (certified) of the 12,000 tons of seed needed by farmers each year. Rest farmer produced.

1030 Returned to Field Crops Research Center for final discussions on program review.

Dianne Janczewski - Do not yet know the future of USAID in Thailand. The AID office of agriculture is pleased with the Peanut CRSP and wants to continue Peanut CRSP in some form.

David Hsi reviewed process that EEP is engaged in that will determine value of past efforts of the Peanut CRSP and be a part of the basis in preparing a program extension proposal.

Bo Bengtsson - presented some reactions from experience as a donor and experience in developing country agriculture.

- Aid programs have political and technical considerations.
- Most research programs could continue for several years, can justify long-term programs. From donor point of view, what are outputs after 10 years. How can Thailand contribute to financial support of the research?
- From the donor "eyes" have slight feeling that there are too many and too broad a set of objectives. Need to sharpen objectives.
 - Focus could be on training if need of government.
 - Most organizations have difficulty in supplying operational funds, donor funds could support practical research.
 - Determine which problems are researchable, some developmental problems are not researchable.
 - Look at questions raised by International Conference on Sustainability or biodiversity problems and try to attract other donors to support needed research that you can do.

Joe Smartt - Appreciate welcome received in Thailand. New exposure to Thai culture and peanut production.

- Absence of closed season can provide epidemiological problems in insects and diseases.
- Interested in question of technology and information transfer. Often stops with researcher. Need experimental backing for recommendations.
- Need estimation of economic effects of pests and pathogens. Yield loss estimates are often lacking, i.e. leafspots can reduce yields 50%. May have information, not implying that you do not.
- Noted low plant populations yesterday. Since seed increase, maybe trying to maximize per plant yields. Are there research results on agronomic factors?
- Need to consider sustainability of productions.

Aran Patanothai responded to comments.

- We have conducted agronomic research but not part of CRSP.
- Research benefit to farmers is often measured by yield increase on national basis; and if looking at 10 year

yields there is little difference. I question, did we help farmer? Yes. If visit north, peanut was grown in more productive lowlands. Displaced by sugarcane. Peanut went to marginal soils with lower productive capacity, so yield maintenance on lower productive soils is an impact. Yields on good soils; can reach 3 tons/ha, but much of production on marginal lands.

- Farming systems research program is successful in helping extension to adapt general recommendations to specific areas. Farmers can help researchers to focus research on priority problems. Extension service must help do on-farm research.
- Universities need to work with DOA for division of research duties - "adapted vs basic" research. Better utilize limited resources.
- The division of duties of DOA and universities in CRSP/IDRC supported Coordinated Peanut Improvement Program is a classic example of an integrated crop research program.
- Would like to see more government support for research. If you look at Thailand as a whole, funds are being increased for industrial research and not much to agriculture.
- Without donor support, cannot sustain present level of research. Want to continue using expertise of peanut team. Can focus donor project to keep in line with donor requirements. Total program is not a donor driven effort, but based on country needs.
- Not clear yet of cooperative role with ICRISAT in Regional program.
- It takes time to make and measure research impacts, impacts do not come quickly.
- In general lack of basic research to solve farmer problems, and lack of understanding of farmer problems.

Bo Bengtsson - Donor's are concerned with outputs. IARC's have same problem. Argued with SAREC Board that with much research it takes 10-20 years to have measurable impacts.

Bo Bengtsson - If develop regional program, need to determine areas where ahead of region, ability vs. politics. Why peanut? Strong in research capability.

After dinner at the hotel, the EEP and David Cummins visited with Dianne Janczewski, who made the following observations on the future opportunities for Peanut CRSP.

- Look for opportunities in Eastern Europe.
- Link with NGO's where possible.
- Consider environmental questions.
- InterCRSP activities are important
- Regional emphasis in Thailand may be important.
- Albania Mission developing.
- \$13 million may be available for response to Missions.
- AID must complete reorganization by March 31 on no 1994 dollars.
- Consider Latin America.
- Sustainability and biodiversity issues important.
- Niger - InterCRSP program still wanted by Mission, looking for funds.
- Link programs with SANREM CRSP.
- Focus on contribution of peanut on rice production.

Departed Khon Kaen at 1600 and arrived in Bangkok at 1650.

29 January

The EEP members and David Cummins met at 0840 in hotel. EEP made some observations and asked for some clarification or assurance that observations were based on facts.

1. When visited Product Development Department at KU we heard good description of activities, impressive list of accomplishments, consumer acceptance of products measured. Seemed to be textbook approach with little analytical thinking - so what did not always appear to be asked? Where to go from here.
2. At Khon Kaen visited sheller that wants to add processing. Could link with University. More food technology effort could be shifted to Khon Kaen University to develop this involvement.

3. EEP got some negative feeling from women processors at Chiang Mai. They have equipment, but do not seem to know how to make more use of it.
4. Commitment of KU food Scientists seems to be to training.
5. Referred to Tommy Nakayama's comment in the 10 year Anniversary Program last year. He said that in beginning the CRSP had a socio-economic component that was eliminated for funding reasons. It was "to develop and understanding of land, labor, management, capital, and role of sexes as related to production and utilization and relationships of peanut to other crops in the cropping system". This objective may be timely for the Peanut CRSP in Thailand.
6. A major accomplishment of the CRSP is the Thailand Coordinated Peanut Improvement Program.
7. Pathology and entomology programs support breeding for resistance. Has enough been done in understanding epidemiological problems, i.e. with leafspot as peanut grown more nearly year-round.
8. How can the CRSP be strategic? Should all people do something in breeding for example?
9. Longterm prospects in Thailand. Is there need for funding for travel for scientific contacts? Is there need for operational funds to conduct research? Is training too academic? Research should focus on fewer problems.
10. If Thailand develops a Center for Excellence for Peanut Technology in Southeast Asia, could CRSP provide (would AID approve) funds to Thailand and let them work out contacts without CRSP MOUs in various countries?
11. From strategy standpoint, can we say that continued support necessary to maintain growth. Thai government may not be able to completely take over support.
12. Should not call regional program a center of excellence, implies paternalistic approach. Let Thai's do program, which would be cost effective.
13. Should funding be limited, how would CRSP distribute funding among DOA, KU, KKU?
14. In vision for CRSP, origin of peanut is in Latin America, so could see Thailand cooperation in Latin America. Intellectual property right will be growing problem in

germplasm exchange. NGO's argue against the IARC's in that they get priority use of germplasm. According to new agreements, FAO will make decisions on germplasm movement. Can become problem to CRSP.

Joe Smartt departed at 2345 on 29 January.

David Hsi departed at 1500 on 30 January.

Bo Bengtsson departed at 1100 on 31 January.

31 January

David Cummins and Dianne Janczewski visited USAID Mission at 1000 for an appointment with Peter Deinken, Technical Resources.

While waiting for 1000 appointment, I visited with 0915 Mr. Det in the Program Office. Det was my host in AID/Bangkok in October 1980 when I was visiting Thailand on the Peanut CRSP planning Grant. We traveled to Khon Kaen at that time. AID was desirous of the Peanut CRSP locating in Thailand to support the use of peanut in a crop diversification program of the bilateral N.E. Rainfed Development Project. The visit resulted in Thailand being selective as a host country for the Peanut CRSP.

Det discussed with me the proposed project of AID/Bangkok, the United States/Thailand Development Partnership. Some projects have been funded as bridge projects, prior to approval of the project. The program links a U.S. and a Thai University to provide backup to a U.S. and a Thai business to promote a joint venture. Seed money of \$200,000 will be provided to support the effort. I have materials to help in developing a proposal.

Peter Deinken discussed with Dianne and me the various aspects of present programs and the future of AID/Bangkok. There will be no more bilateral funds after 1995 and projects will liquidate pipeline funds in 1996/97. The Mission may become a Regional Mission with Regional and priority centrally funded projects remaining in the Mission. Bilateral projects are now focused on environmental and HIV/AIDS problems. East Asia Regional concept developed one year ago.

- The Mission has rated the three CRSPs active in Thailand as number one priority; Peanut, Pond Dynamics/Aquaculture, and Soil Management. CRSP accomplishments should be applicable to Cambodia and other neighboring countries. Local no longer means only Thailand.
- From a tactical standpoint in developing CRSP directions, we should take into consideration the position of Thailand in the Region; develop regional linkages, and use present information to extend into other countries.

- Related to question if we can fund Thailand to assist in Regional activities: CRSPs are global, consider fit into total program; may get resistance from Regional Bureau if build in funds in Thailand to help Cambodia; would have CRSP effort in Cambodia with little mission contact. Potential funding for Cambodia is ten times that of residual funding in Thailand.
- Thai mission closeout strategy is transitional and the strategy is to look for U.S./Thai developmental linkage, and institutional linkage i.e. CRSPs or science grants.
- Cambodia will be in drivers seat in region. Need to determine how to communicate CRSP (and other) information into Cambodia. Centrally funded programs will not become significant programs for bilateral assistance; it would cloud the water if write activities into Thailand program to do extension in Thailand (need some more formal Cambodia linkage to take advantage of CRSP presence).
- There is a sense of imminent change in the Region. AID funds are going to Eastern Europe and the NIS, so there will be less funds for S.E. Asia. Change in embargos will cause slightly more AID presence, probably slower development in Laos than Vietnam.
- Now in Cambodia on big scale. There is no infrastructure, needs are basic. Market prices are at work. Built roads to get refugees back into Cambodia, settled lands, there is much logging activity, demand for goods, rice exported from Cambodia to Thailand. Thailand is a consumer economy that can help in Region as they link with the marketing apparatus.
- Peanut CRSP could focus on being technology linkage in system in production, handling, processing, and marketing. Should be an information channel for markets, equipment (U.S. produced). Develop private sector linkage.
- We should keep an eye on Program Strategy for Cambodia; Dianne can assist in this matter.

Lunch with Dianne and Det. Returned to Kasetsart University in afternoon with Dianne to meet with the Product Development Department staff and planned for her visit to Chiang Mai outreach site. Returned to hotel.

01 February

Departed for airport at 0715, checked in at 0800, departed Bangkok at 1000; arrived in Griffin at 2030.