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Progress Report - April 1970
Harvard-Thailand Rice Fortification Project
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Appendix 2
CSD-2170 (Rev. 5)
PN-AAC-292

In February 1970 Dr. Stanley Gershoff and Dr. Robert McGandy went to Thailand to review the progress of Phase III and initiate preparations for Phase IV of the Harvard-Thailand Rice Fortification Project. As previously reported, the rate of progress attained, the cooperation of the Thai officials and technicians, and the attitudes of the people in the experimental villages have been so good that we are very pleased with the development of this study.

In January feeding of the rice fortification grains (RFG) was started in the Pilot Villages. The villages have been treated in the following ways:

1. Raw Control - no intervention except for surveys.
2. Placebo Control - day-care center & placebo RFG.
3. Restricted Treatment - day-care center & RFG containing thiamine, vitamin A and ferric phosphate.
4. Full treatment - day-care center & RFG containing thiamine, vitamin A, ferric phosphate, lysine and threonine.

The day care-centers have been very well received. They are not places providing only custodial care. They are being operated more like nursery schools. Although the day-care centers do not provide food, they may have a nutritional effect because it appears that lunches being brought to the center may be better than the children would receive at home if they ate without observation by children from other families. We are excited by the possible health value of the day-care centers and shall carefully look at their impact on our study to determine whether it will be necessary

to put a fifth group in Phase IV, villages receiving the full RFG but no day-care center.

Before the feeding of the RFG was started the pre-school children of the villages were given a clinical examination as previously described, had a hand-wrist X-ray taken, had a fecal parasite examination made, and had blood and urine samples taken for hemoglobin, hematocrit and urinary thiamine and creatinine analyses. Some of the data of these examinations are summarized below.

It can be seen from the two charts that heights and weights of the village children are considerably below the 50th percentile of the Iowa standards. From an assortment of available Thai studies we have put together some height and weight means of middle class Bangkok children. Growth in the villages appears considerably poorer than in this Bangkok group. It can also be seen that head circumferences of the Chiang Mai village children are much smaller than of Iowa children of the same ages. We plan on having all of the hand-wrist x-rays evaluated by an expert here in Boston. However, the evaluation of the x-rays obtained by the Professor of Radiology in Chiang Mai indicates that 26% of the children examined showed delayed bone growth compared to American standards. Mean hemoglobin and hematocrit values in the children examined appeared normal. This is probably related to the fact that intestinal parasites were detected in only about 10% of them.

The RFG feeders which were constructed are working satisfactorily and the millers have been very cooperative. We have representatives of the Division of Nutrition of the Thai Ministry of Health in each village each day to make sure that the RFG is being added properly to the rice as it is milled. Records of the total amount of rice milled daily in each

mill and the amount of RFG used support their reports that the addition of RFG to the rice is proceeding as desired. Analyses of the village rice, treated and untreated with RFG are being made for total protein, lysine, and threonine, at the laboratories of the Division of Nutrition in Bangkok.

We have been very pleased with the cooperation we have received from the radiologists, parasitologists, and the provincial health officers in Chiang-Mai. They have assured us that they would be able to continue to satisfy our needs even if we do the entire full field study in the Chiang-Mai area. Because of this and because we wish to minimize our future logistic problems, we have decided to alter our original plans and do all of Phase IV in the Chiang Mai area.

A resurvey of the four villages is scheduled for June, 1970. In August we shall evaluate the entire pilot study and make definite plans for the full field study of Phase IV. To expedite matters we are currently looking for about 20 more villages suitable for this study. We shall try to locate the additional personnel needed for Phase IV but we shall not hire anybody until our contract has been extended. We shall probably have additional feeders made since they are custom built and we do not want to run the risk of holding up Phase IV because they are not available.

In August, assuming that the pilot study remains satisfactory, we shall make definite plans for building day-care centers, hiring personnel, buying equipment, and obtaining the cooperation of the village officials and millers. This would enable us to start Phase IV in January of 1971.

Our experiences to date have clearly shown the advantages of doing pilot studies before launching into full field studies. Although we have been working under what we believe must be ideal conditions, enough minor problems have arisen so that if Phase IV was being done now instead

of Phase III we would be less satisfied than we are. Fortunately, all of these problems have been minor and will be corrected before Phase IV begins. The following are examples of these difficulties.

Having finally gotten the Ajinomoto Co. to prepare a RFG which looked like rice, cooked like rice and did not alter the taste of rice, we were unable for almost two months to import it into Thailand because there is a law against importing rice and the customs department had to be convinced that it was not rice.

We have had problems in the field with the RFG, particularly the RFG containing the amino acids. Under the environmental conditions in which they must be stored they tend to cake. The Ajinomoto Co. was appraised of this and we expect a more satisfactory RFG to be available in Thailand next month.

We do want to do some animal studies with the new RFG to make sure that the biological activity of the supplement is not lost to any major extent in cooking.

We felt that some of the methods for taking the anthropometric measurements needed improvement. For instance, the board used for obtaining reclining lengths had too much play in it and weights were being measured to the nearest 0.5 kilo rather than to 0.1.

We did not have a satisfactory method for recording and retrieving data. We have developed a clinical data sheet which we are having printed which will permit all data collected to be put on IBM cards. Arrangements have been made in Bangkok for the necessary card punching.

The possibility of developing a program for measuring the effect of nutrition programs on mental development in pre-school children in conjunction with Phase IV has been explored. We met with Dr. Chira Sritasawan, the head of the Chiang Mai mental hospital, and found that he not only was interested

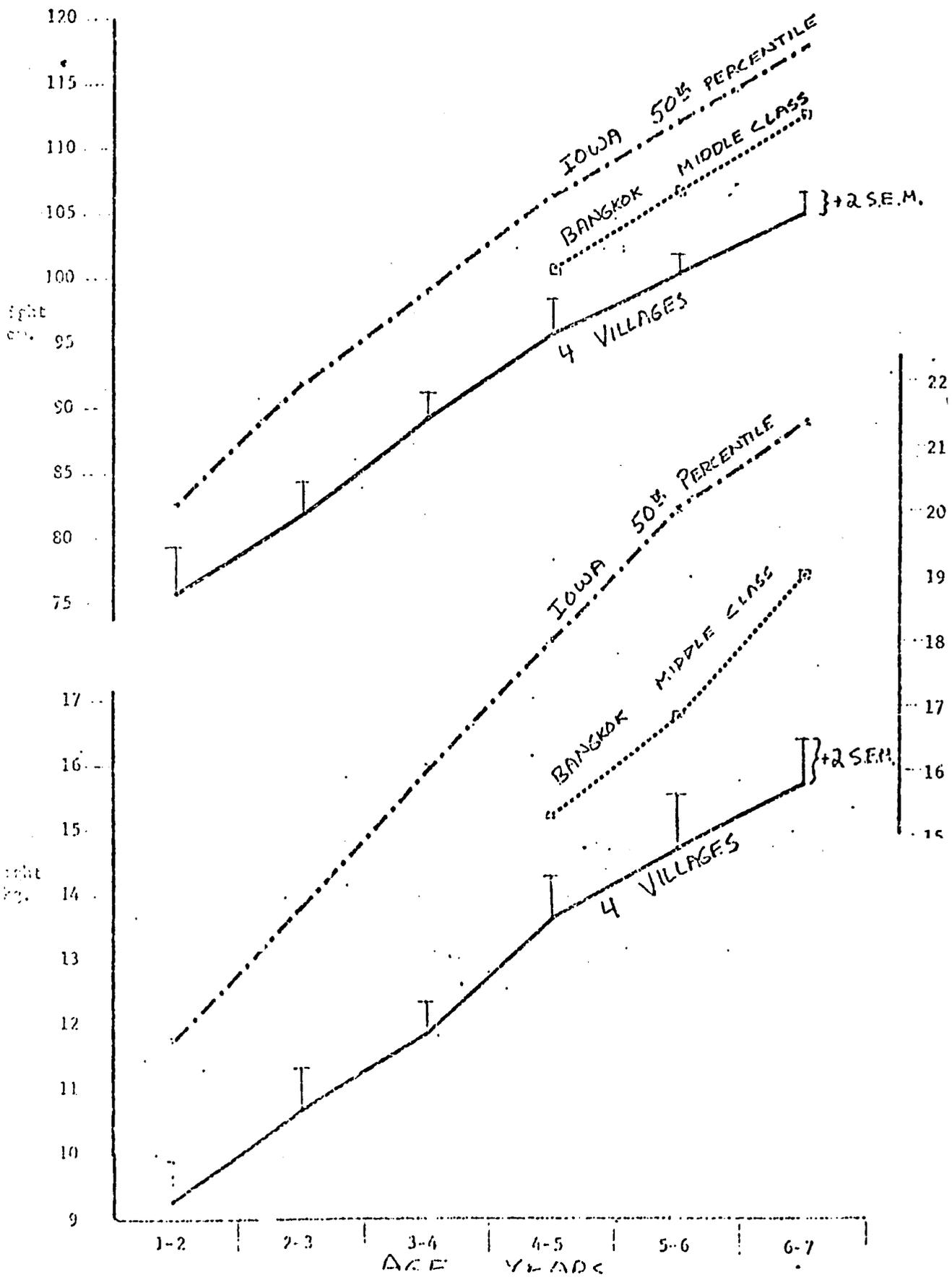
in such a study, but that last year he and his associates had done some testing of village children. We were all agreed that the first priorities in such a program should be the development of suitable methodology for use on rural Thai pre-schoolers.

Dr. Chira informed us that he had 4 psychologists on his staff who were interested in such a program and that last year a dozen medical students from the Chiang Mai medical school had approached him for programs for their elective time.

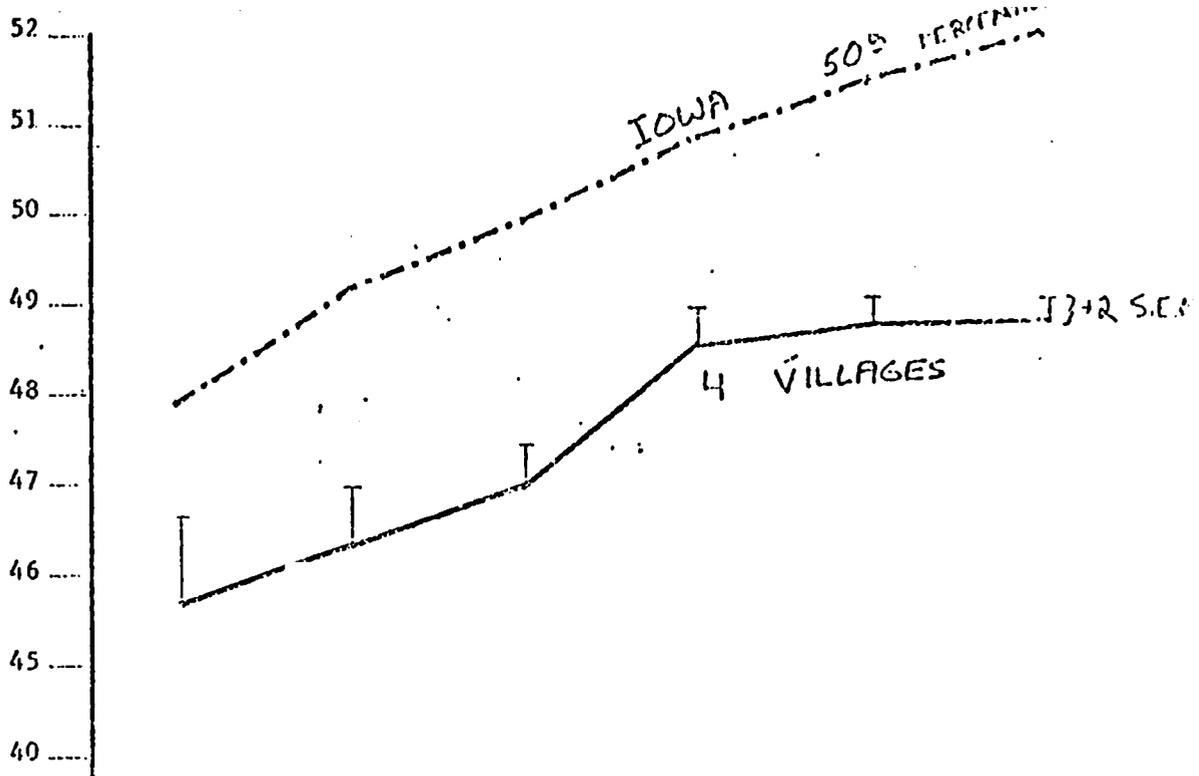
We believe that if funds are available we should arrange to send consultants from the United States to initiate a program with Dr. Chira. This summer, when Dr. Gershoff returns to Thailand, would be a good time to do this.

We feel strongly that in developing methodology for measuring mental development of Thai village children care should be taken not to upset the experimental objectives of Phase IV. The testing of methodology should be worked out in villages not included in Phase IV and at some later date the effects of the Phase IV program on mental development can be evaluated.

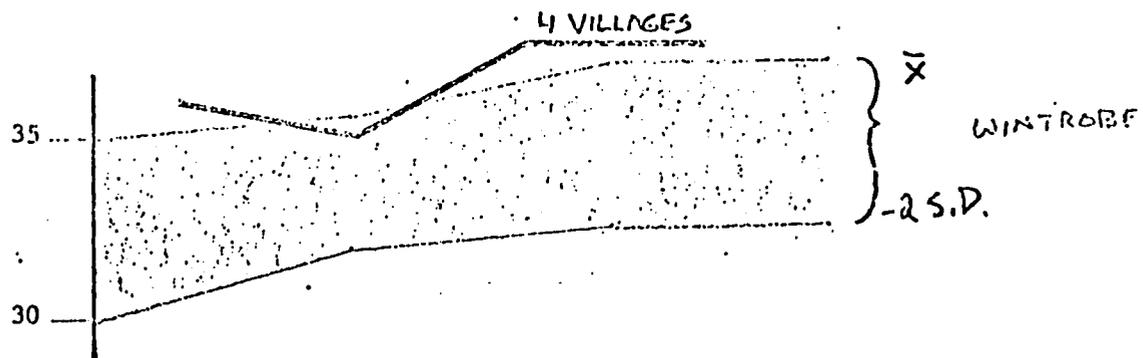
In writing of the Harvard-Thailand Rice Fortification Project, it should be pointed out that its success has been primarily due to the marvelous cooperation and ability of Dr. Amorn Nendasuta, director of the Division of Nutrition of the Thai Department of Health and his extremely able associate, Mr. Uthai Pitsolyabutra. Their enthusiasm and interest in developing nutrition programs in Thailand has made Thailand an outstanding place to do collaborative research in nutrition.



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