

The Royal Project's Highland Development Research Programme

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The first decade

Agricultural research was the start of the Royal Project, and we believe that it has truly yielded sustainable highland development. It is at the heart of a motto of His Majesty the King's, which we have had since the start: "Because we are encroaching into unknown areas we must conduct research to find the answer". We are still doing just that. We base our work on our research findings, and we premise our research mainly on producing quality as well as quantity for the market. We also depend on networking. This is very important for the Royal Project because we ask as many people to work for us as are willing to do so. Our developments have aimed at preserving our natural resources and the environment. We always pioneer new items, new issues and new products.

In 1969, when the Royal Project started, conditions in the hills were not like today. There were few roads, and those that did exist were usually unusable during the rainy season. The hill tribes were very poor and they needed help badly. Incomes were very low, even for opium poppy farmers: as His Majesty the King had discovered, the farmers got a very low income from the poppy- the price of opium would increase many-fold later in the distribution process. When we started, our main objectives were to stop opium cultivation, to help the hill tribes, to reduce the destruction of natural resources, to conserve the soil, to make proper use of the land and to prevent encroachment on the forest. Now we are producing cash crops for the benefit of the Thai economy.

His Majesty the King's advice indicated the seriousness of the problem at the time. The first piece of advice was 'cut red tape'. In government circles, there is a lot of red tape, running all over. His Majesty would state many times that we should be able to cut through the red tape and get things done. As His Majesty also advised, we helped the hill-tribe people so they could help themselves, meaning that they could proceed as good citizens of the country. Lastly, we did this without asking for thanks, because, as the King says, we should be willing to 'do a thankless task'.

At the start of the first decade, as I mentioned, the highlands were under-developed and had few roads. Often, we had to walk to project sites. In 1971, Taiwan offered its help with fruit-tree cultivation, which the King thought could help keep the hill tribe people stay in one place. In 1973, Taiwan also started to give us financial aid. Towards the end of the decade we found out that the U.S. Department of Agriculture Research Service was willing to help by giving money for research and about 80 projects were done over thirteen years between 1973 and 1986. Most crops produced for the market now were developed by research projects conducted at that time.

One of the important studies on medicinal plants in 1979 showed a very up-to-date experimental design which I would like to present to you. First, we examined 45 medicinal plants to find ones which were mentioned in pharmacopeias, could be used for manufacturing pharmaceuticals, which were currently imported and, preferably, had a secondary application as a food crop. Then we analyzed the market by reviewing existing wholesalers, retailers and food stores, to find out how big the markets were and what qualities they were looking for, like essential oil content.

Then we conducted cultural pre-trials, which allowed us to short-list seven crops with the desired economic and cultural properties, including turmeric, coriander and digitalis. We went back into these in more detail in order to work out the optimum cultural practice and to assess the quality of the medicinal extract. We recommended three crops: Cassumunar and Coriander as supplemental crops, and *Curcuma Domestica*, the source of the turmeric rhizome, as an excellent prospect. We found that this would return \$US7,700-9,700 per hectare after production costs, far higher than the return from opium.

The second decade

In this decade, we started to run out of money for research and so we concentrated mainly on extending our research results to the development centres. Consequently there was not much research until 1992 when we became the Royal Project Foundation. At this point we were given annual funding by the government and so our work on research came back to life again.

The third decade

Our third decade runs from 2001 to 2010, so we are about half way through. We now have five-year research work plans. Our current plan includes

- Increasing production efficiency and quality of major crop-groups including vegetables, fruit-trees and flowers
- Improving quality and quantity of livestock and fishery
- Managing production costs, marketing and other management issues
- Conserving and rehabilitating natural resources, e.g. soil, water and forest
- Developing research into social systems, education, health and local tribal cultures

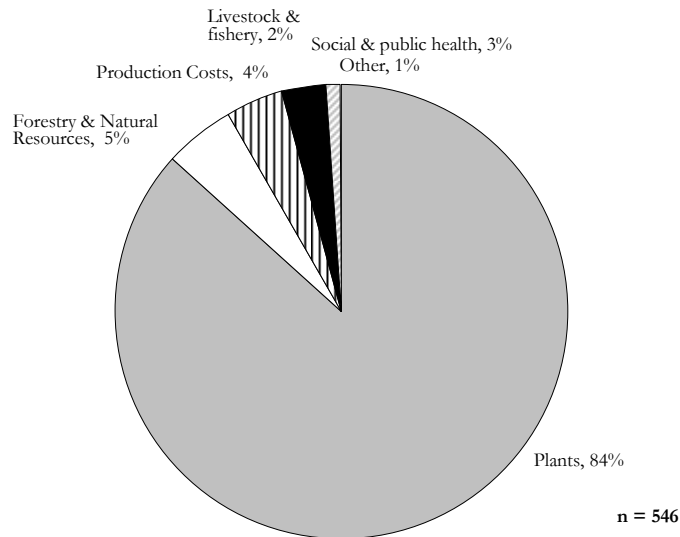
You can see that our research also covers social and educational systems, so that we can work in this area too, but in these areas we are not so well developed.

Economic appraisal of research

A team from the Applied Economics Faculty of Kasetsart University conducted an appraisal of the Royal Project Foundation's research from 1991-2003, and were able to assess 546 projects that we have done. During this time, most of the projects have been on developing agricultural plants or improving their suitability for cultivation- 84% of the projects considered (see chart below).

ROYAL PROJECT RESEARCH PROJECTS 1991-2003

PROJECT TYPE



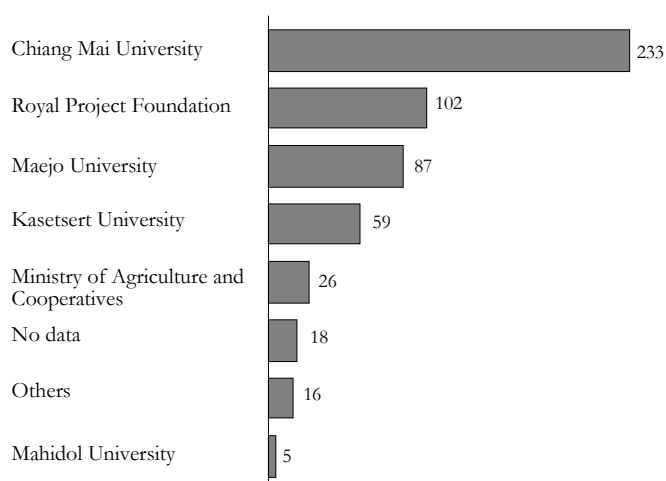
As you can see from the expenditures on these projects (below) most of the work was done on flowers, fruit-trees, herbs and vegetables, with plant protection also being very important.

Area	Budget
Fruit tress	411
Flowers	277
Plant protection	233
Herbs	181
Vegetables	173
Forest & natural resources	77
Other	76
Social & cultural	66
Post-harvest	53
Field crops	38
Processing	31
Livestock and fishery	27
Soil & plant nutrients	13
Marketing costs	13
Management	10
TOTAL	1,678

Table 1: Royal Project Research Expenditures, 1991-2003, US Dollars, Thousands

Who actually does this research? The largest provider is Chiang Mai University, who did 233 of the projects in the period. The Royal Project Foundation, Kasetsert University and Maejo University are also major providers of research.

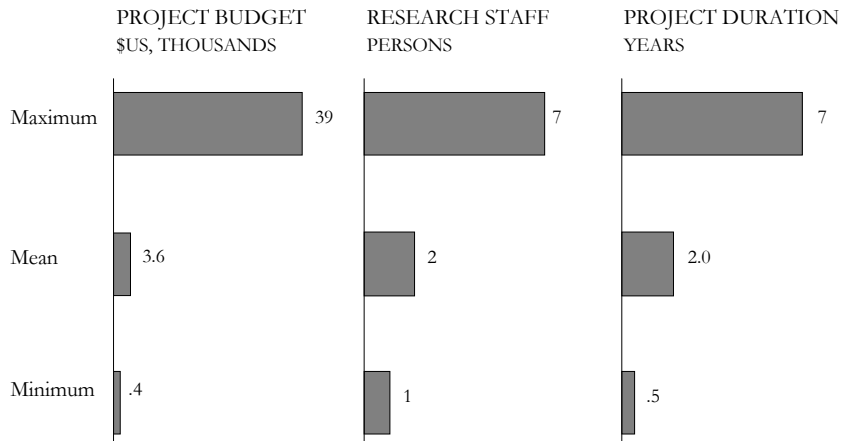
ROYAL PROJECT RESEARCH PROVIDERS NO. OF PROJECTS



Some research is done for the Royal Project by the Ministry of Agriculture and Cooperatives, by Mahidol University, and by a number of smaller providers, who did fewer than four projects during the period.

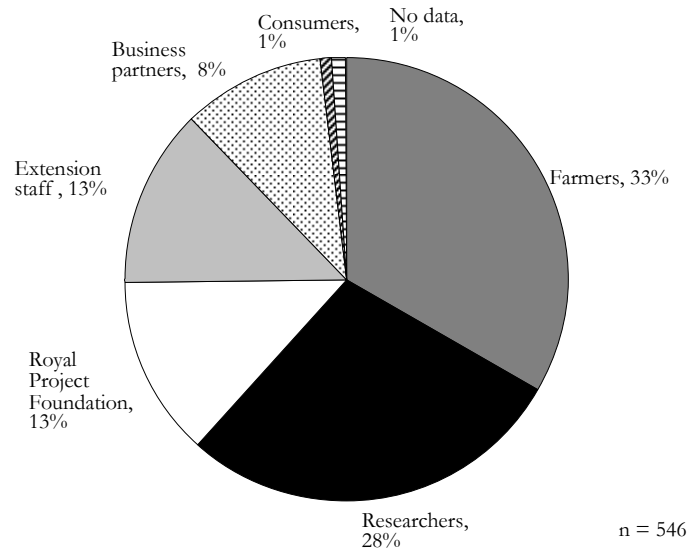
The study also looked at the resources used by the research projects in the period. The budget of a project ranged between \$400 and \$39,000, with the average being \$3,600. The number of staff ranged between 1 and 7, the average being 2 members of staff. The duration of a research project ranged between half a year and 7 years, with the average being 2.

RESOURCES USED IN ROYAL PROJECT RESEARCH PROJECTS



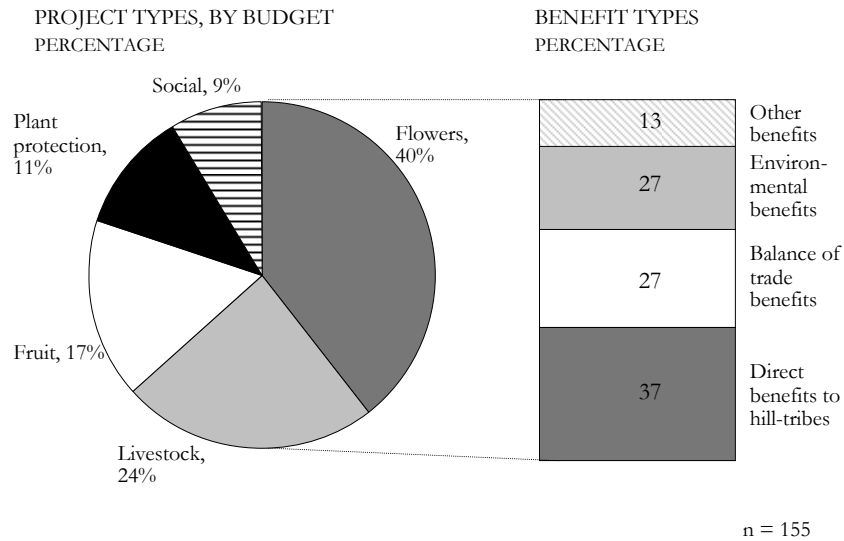
Although hill-tribe families will be the ultimate beneficiaries of all of our research, the immediate beneficiaries can be others, for example, the Royal Project or extension workers. We found that farmers were the immediate beneficiaries of about 33% of our projects, researchers about 28% and the Royal Project about 13%.

IMMEDIATE BENEFICIARIES OF RESEARCH PROJECTS



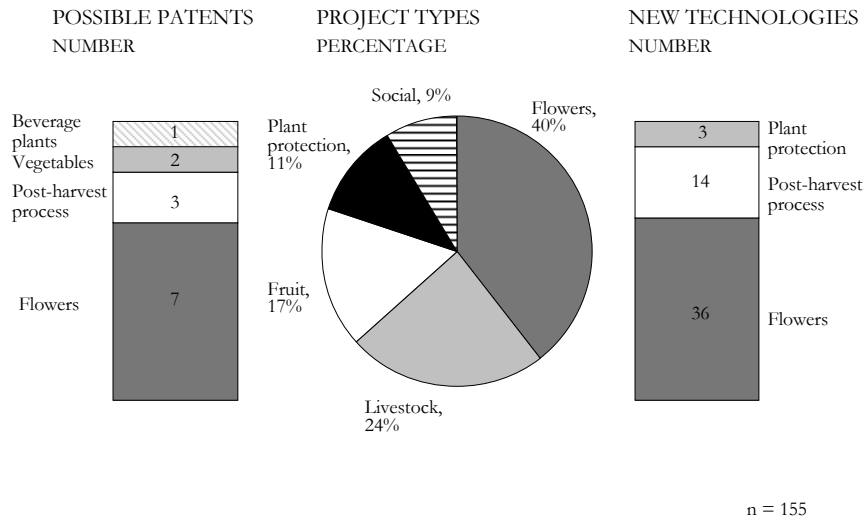
Our team was able to do deeper analysis of 155 of our research projects, analyzing the kinds of *ultimate* benefits that they yielded, and also their potential for patents. Most of the benefits of the projects were direct benefits to hill-tribes- 37% of the total. Environmental benefits and balance-of-trade benefits (from import substitution) were second-most common, at 27% (see below).

ULTIMATE BENEFITS OF RESEARCH PROJECTS



These projects developed a number of new technologies and had several patent opportunities. The 151 projects yielded 53 new technologies, 36 related to the growing of flowers, 14 to post-harvest process and 3 to plant protection. They developed a total of 13 new technologies: 7 in flowers, 3 in post-harvest process, 2 in vegetable-growing and one relating to plants suitable for making beverages.

TECHNOLOGY DEVELOPMENT AND PATENT OPPORTUNITIES



Case studies of Royal Project Research

An example of research done in this period, which yielded new technology, is a study done on the chrysanthemum. Cut flowers are a very good opium replacement crop, and chrysanthemums are considered a 'product champion' by the Royal Project Foundation. However, they have some cultivation problems: they need longer night-times than we have here in Thailand for ideal growth; they are vulnerable to rust diseases and they are prone to incorrect stem and strain preparation. Our researchers developed a new strain of chrysanthemum that required less night-time and was more disease-resistant. This increased chrysanthemum production by 70%, and reduced import costs and patent fees. The Internal Rate of Return of this project was estimated at 59%

Another example is our study on improving planting material for strawberries. Strawberries are well-suited to the highlands, have a large market both domestically and for export, and can be sold fresh or processed. The income earned is much higher than opium. The problem that we had was that the runners do not propagate well in plastic bags. Our researchers developed tall plastic containers for runner propagation and developed a procedure of mixing organic material in with the soil in the containers. We

found that this increased the cash yield from growing strawberries from \$560 per hectare to \$3,300 per hectare.

However, research also has to focus on non-market commodities, such as natural resources like forests. This is just as important to the Royal Project as producing plants, flowers and vegetables for agricultural markets.

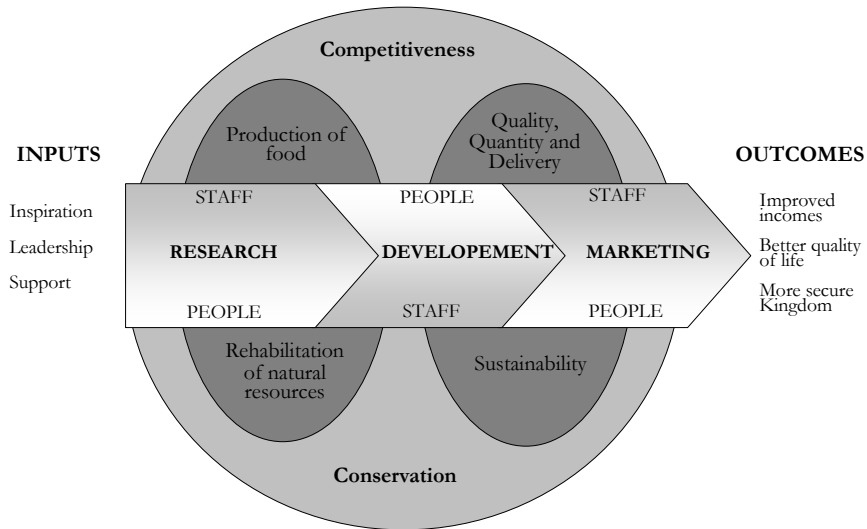
The Royal Project's Research Plan

In order to improve our efficiency in research, we have developed a nine-point plan, as follows

- Improve efficiency and effectiveness of research investment
- Accelerate value-added activities from research output
- Enhance provision of non-market commodities
- Assess suitability of newly discovered technology before dissemination
- Continue to emphasize marketing and distribution
- Establish a clearer system for formulating research proposals and allocating budget
- Improve the accreditation of new technology through intellectual property-right registration
- Promote mechanisms for research-evaluation
- Improve research databases

In all of our research, we like to say that the Royal Project runs two value-chains together together: making things to sell in the market and looking after the environment and natural resources.

ROYAL PROJECT PARALLEL VALUE CHAIN



By doing this we can produce both competitiveness, and sustainability.

Conclusion

The Royal Project's research into opium-substitute crops has been one of the most important enablers of the sustainable development of the Thai highlands. In order to make the results of implementing this research sustainable, the research program was broadened to address natural resource rehabilitation, social and educational improvement, public health and tribal culture.

This thirty-six year program of work has lead to the following achievements

- Many-fold increases in the incomes of hill-tribe people
- Total elimination of opium from project areas, such that opium can now only be found in very small isolated plots close to or on the border

- Creation of unity and cooperation from many government, local and international organizations, the most important being the hill-tribe people themselves
- Transformation of the hill-tribes from slash-and-burn cultivators to principle actors in the management and preservation of the forest
- Development and continuous improvement of highland crops, as demonstrated by the research projects on strawberries and chrysanthemum

These achievements, which have been recognized by many international awards and organizations, were made under the leadership and with the vision of His Majesty the King.