国総研セミナー・シリーズ
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JICA ・IFPRI 合同セミナー

「2020ビジョン」と援助

IFPRI 2020 ビジョンと JICA の協力の関わり

The IFPRI 2020 Vision and its Implications for JICA Cooperation

平成8年3月

国 際 協 力 事 業 団
国際協力総合研修所

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「国総研セミナー」とは……

国総研セミナーとは国際協力事業団国際協力総合研修所において行っているセミナーの略称で、国内外の有識者、援助関係者により、わが国の国際協力にかかわる関係者を対象に開発援助の現状、課題、展望等の情報を提供することを目的としています。

本出版物は、講師の了解を得て講演の要約をまとめたもので、編集の責任は国際協力総合研修所にあります。

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(2) Stable and Sustainable Management of Resources

Presentations David F. Nygaard
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(3) Agricultural Research and Its Extension

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ＪＩＣＡ・ＩＦＰＲＩ合同セミナー「２０２０ビジョン」と援助
ＩＦＰＲＩ２０２０ビジョンとＪＩＣＡの協力の関わり

概　要

国際協力事業団（ＪＩＣＡ）は国際食糧政策研究所（ＩＦＰＲＩ）と共催で、「南アジアとサハラ以南アフリカにおける食糧、貧困と環境」をテーマに１９９６年3月５日、国際総合研修所において、セミナーを開催した。このセミナーに引き続き翌3月６日、テーマを「ＩＦＰＲＩ２０２０ビジョンとＪＩＣＡの協力」と題したディスカッションをＪＩＣＡスタッフとＩＦＰＲＩ側の参加者間で実施した。ディスカッションは以下三つの議題で構成されており、その概要は以下の通り。

(1) 食糧自立

まず、ＩＦＰＲＩの Mark W. Rosegrant 研究員より中国における食糧事情についてワールド・ウォッチ・インスティテュートの Lester Brown 氏の予測と比較し、以下の通り発表があった。

Lester Brown 氏が数ヶ月前に発表した予測によれば、「２０３０年までには、中国は年間２億から３億トンの穀物輸入国に転じ、中国の大量の買い入れによって世界的な穀物価格の上昇が起こる」とのことである。これに反し、ＩＦＰＲＩが開発した食糧需給モデルを用いた予測は、Lester Brown 氏の予測と大きく異なる結果となった。

中国では、急速な所得の上昇と都市化に伴う嗜好の変化と多様化に伴い、人々は米や小麦より肉、乳製品、野菜、果物などをより多く摂るようになっている。従って、穀物の直接消費需要はそれ程増加せず、飼料用穀物の需要が増大することになる。一方食糧生産システムの経済改革の下での構造的変化は、農業経済にも影響を及ぼしたが、農業研究とインフラストラクチャーへの投資によって単位収量の増加がもたらされ、バイオテクノロジーによる収量増を含めれば、今後１５年間程度は継続した単収増が期待できる。このようなシナリオに従えば、中国の穀物輸入は、２０２０年に４０００万トン程ですむはずである。万一、中国の食糧生産が伸び悩み、環境の劣化による農地の流失が起こったとしても、世界の食糧市場に壊滅的影響を与えることはあり得ない。

次に、食糧自立を推進するためのプロジェクト実施について梅崎企画部地域第一課課長代理よりＪＩＣＡの経験が述べられた。インドネシアにおける三期１５年に

わたるアンブレラ協力からの教訓として総合的アプローチと長期的な協力を実施する必要性とともに、農業研究と普及の一体的推進の重要性、中央と地方の連携の必要性さらには、その活動において参加型開発、特にオーナー　シップの必要性が述べられた。また、斎藤農林水産開発調査部計画課長からは、プロジェクトの成功の理由として、インドネシア政府の食糧自立への強いコミットメントとリーダーシップの存在が指摘された。さらに、戦略的活動の重要性として、初期段階における米生産への集中的協力の実施、その目標達成後にターゲットを他の主食作物(マメ、イモ等)に移行させ、第３フェーズでは農村の生活水準向上を目標とした方法、つまりプロジェクトのターゲットを段階ごとに限定・集中させた成功例の紹介があった。

(2) 安定かつ持続的な自然資源管理

ＩＦＰＲＩの David F. Nygaard 部長より、ＩＦＰＲＩ２０２０ビジョンの一部に含まれている資源管理についてサブ・サハラアフリカ諸国における環境悪化危険地域の同定、肥料の使用に関する政策や過放牧の問題の重要性の指摘があった。また、資源劣化地域の存在及び状況が改善しているジンバブエでの水資源管理プロジェクトの紹介があり、この分野における資源に対する保護活動の可能性を示した。大塚ＩＦＰＲＩ研究員はウガンダ、ガーナ、インドネシア等での森林資源管理プロジェクトと土地所有問題に関する経験として、現地住民が森林を伐採する原因として以下の２点を述べた。１)食糧不足から起こる農業開発のための森林地帯伐採２)雇用機会の欠乏のために生じる森林伐採作業。この状況を引き起こす最大の原因は土地所有権が確立していない実態であり、森林地帯が住民に自由に解放されている現状が問題だと示唆した。よって、今後のＪＩＣＡにおける社会林業プロジェクトでは、アグロ・フォレストリーの強化、雇用機会の拡充が必要であるとし、また、ＦＡＯその他が推進する共有林(Communal forestory)プロジェクトや社会林業はどういう状況において成功を収めているのか等、実態分析調査をＪＩＣＡとＩＦＰＲＩの共同で実施してはどうかとの提案があった。

狩野林業水産開発協力部計画課課長は、ネパールのプロジェクト「村落振興・森林保全計画」を例に、住民参加型プロジェクトによる環境保全、資源管理の重要性について述べた。このプロジェクトは２年間の準備期間を通し、政府関係者及び地域住民の希望、ニーズを認識することができた。この情報を基にした活動では、初めに実験地域が設定され、この地域で得た経験を次の地域へと移行し活動地域を拡大していった。また、協力活動では、ＪＯＣＶの参加によりターゲットグループをコミュニティーレベルとインターコミュニティーレベルに分け実施した。このような、蓄積・参加型協力体制により、地域住民を最大限に動員することができ、プロジェクトが進行するにつれその経験が住民の自信となり、引いてはプロジェクトのサステイナビリティーに貢献したとＪＩＣＡプロジェクトの具体的成功例を述べ

た。また、加藤国際協力専門員から技術協力において学際的ノウハウを用いた人材を起用することの必要性、サブ・サハラ地域の農村の人口（労働力）吸収能力の限界、土地所有権に関わる援助の難しさについて問題提起があった。

ＩＦＰＲＩの Pistrup-Andersen 所長から、住民が実生活において、何故環境や資源を悪化させるような行動を取っているのかを理解しなければ、社会林業プロジェクトのサステイナビリティーは確保されず、この点でＪＩＣＡではどう対応しているのかと質問があった。この質問に対し狩野林開部計画課課長は、ネパールの人口増加が生活必需品である薪の需要を増やし、この結果森林伐採が起こり、資源が破壊されていると述べた。この状況を改善する手段として、ＪＩＣＡでは住民に対し環境に対する理解を得ることで協力体制を築くとしている。このネパールプロジェクト「村落振興・森林保全計画」について大塚ＩＦＰＲＩ研究員はネパールには主要な農業・工業開発が存在しないことが資源破壊を引き起こす要因であると述べた。

（3）農業研究と普及一体的推進

ＩＦＰＲＩ側が示す農業研究への投資の必要性について、司会進行を努めている土屋農林水産開発調査部次長より、研究は確かに大切だが、研究結果が実際、政策に反映されるようなシステムの形成が必要だと述べた。鷲見農業開発協力部農業技術協力課課長代理は我が国の研究実施と農業開発が一体となったキリマンジャロ・プロジェクトの活動を紹介した。具体例として活動実施に関しまず初めに、基礎研究をＫＡＤＰ／ＫＡＴＣセンターのモデル農場設備を用いて行い、その経験を活かし現場であるローアー・モシ潅漑地帯で適切なファーミングシステムの研究を実行した。このように、プロジェクト実施に関し、調査活動を行い拡充していくことにより、現地適応性のある耕作、農法、改善されたトレーニング・カリキュラム等の開発が可能になり、ひいては全国レベルでの普及の成功に大きな貢献を示すであろうと述べた。

この日本の協力について、ＩＦＰＲＩの David F. Nygaard 部長は、プロジェクト終了後の人的資源の確保と研究所の維持について質問した。この件について、鷲見農技協課長代理は、上記に示した活動の維持は開発途上国の現財政状況では非常に困難であると回答した。小野農林水産開発調査部部長は、現在ＪＩＣＡの活動は人造りのための技術協力に重点がおかれており、プロジェクト終了後、農業研究への資金援助が難しいという現状を述べ、今後この問題解決のためにＩＦＰＲＩ等他の研究機関や南々協力のスキームと密な関係を持ちたいとした。しかし、単なる研究費の確保及び投資額の増加のみでは有益な活動は望めないとの隆杉調査研究課長から指摘があった。その背景として、以前バングラデシュでの研究プロジェクトでは予算の大部分が施設や人件費に使用されており、実際の研究費はわずかであった。

結局、研究機関の充実を図るには、援助額の確保・増加のみでなく、組織・運営能力の向上が重要であることを述べた。

佐藤農業開発調査課長は、ＩＦＰＲＩの提案である低所得開発途上国の農業研究への投資の増加について、途上国における現在の経済的状況では、かなり困難な要求であると述べた。同じく大塚ＩＦＰＲＩ研究員はサブ・サハラアフリカ諸国における政府からの農業開発プロジェクトへの資金援助の困難な状況について、１９６０年代からのアジアでの開発経験、特に「緑の革命」への日本の技術協力の経験がサブ・サハラアフリカ諸国へ移行可能かどうか活発な意見交換が必要だと述べた。

これらの意見に対し、ＩＦＰＲＩの Pinstrup-Andersen 所長は、研究への投資は効率的な農業研究システムの確立を目指し、バランスの取れた予算の配分及び執行の目的で実行されるべきであると言及した。重要な課題として、これからの研究においてはオンファーム・リサーチ及び農民の参加が重要視されると述べ、再度農業研究投資への必要性を強調した。その実例として、アジア及びアフリカにおいて、農業研究への投資が高い経済収益率をもたらすことを示した。最後に、Pinstrup-Andersen ＩＦＰＲＩ所長は今後のＪＩＣＡとの協力について最も互いに有用と思われる次の２分野について述べた。１)住民の家計レベルでの資源管理への対応と行動を理解するための調査。この研究により、資源破壊をもたらす原因究明が可能になり、プロジェクトの活動計画を作成する際にこの情報が役に立つであろう。２)プロジェクト実施の背景となる政策に関する研究。プロジェクト進行には、それを導く政策の支援が不可欠である。よって、ＩＦＰＲＩが実施しているこの調査活動の有効利用が期待される。

これら上記に述べた分野及び他の協力活動について Pinstrup-Andersen ＩＦＰＲＩ所長は、今後も更なる強い協力をＪＩＣＡと保ちながら未来の農業開発プロジェクトに携わって行きたいと述べた。

以　上

The IFPRI 2020 Vision and its Implications for JICA Cooperation

Mr. Tsuchiya: It's time to start today's discussion. I want to focus on how we shall implement agricultural development assistance based on future projections for the supply/demand situation for food and our policy recommendations under the IFPRI 2020 Vision. After yesterday's discussion, all of the participants must have many things to add or many comments to give, because the discussion time yesterday was very limited. So, I hope for your active participation in today's discussion.

Mr. Tsuchiya: Now, I want to proceed into the first theme, that of "Food Self-Reliance or Food Security." We have received presentations from Dr. Andersen and also from Dr. Nygaard. So, I want to get additional comments from Dr. Rosegrant or Professor Otsuka. Can you open the discussion, Dr. Rosegrant?

(1) FOOD SELF-RELIANCE OR FOOD SECURITY

Dr. Rosegrant: I was wondering if you would be interested in perhaps a brief presentation on our assessment of the Chinese food situation, since we haven't dealt with that in detail, and I understand that's quite an important issue here.

I think a number of you are probably familiar with the debate that's been going on in the past several months on who will feed China. What are the prospects for the Chinese food situation for the next two or three decades? A lot of this debate has been initiated by Lester Brown, whom you are probably familiar with, who has argued that China could import as much as 200 to 300 million metric tons of cereals and grains by the year 2030, which is approximately two or three times the current world trade in cereals. Based on that, he argues, that in fact, the process of development in China could lead to devastating effects on world markets, very high increases in world prices for cereals, and a resulting increase in malnutrition and poverty in other developing countries.

The work that we've done at IFPRI on China, in which we have done detailed modeling, ends up giving a far different picture of the world and a far different picture of how China will influence future world food markets. I do want to emphasize that the work we did is in collaboration with Chinese scientists, in particular with Ji Kung Huang, who was a research fellow at IFPRI during the time the work was done, and who is now setting up an agricultural policy research group at the Chinese Academy of Agricultural Sciences in Beijing, and also with Scott Rozelle of Stanford University.

The results that I'm going to explain is the use of two related food supply-and-demand models. The first of these is a very detailed China grain and livestock model that was developed in collaboration with the two gentlemen I mentioned earlier. This model accounts for prices and incomes, and also accounts for the impact of urbanization and market development on the demand side for agricultural commodities, and incorporates prices, technology, agricultural investment, and environmental degradation trends, and institutional innovations on the supply side. So, it's a very comprehensive model.

The other model is the IFPRI Global Projections model, which we link with the Chinese model to look at the international impacts. David Nygaard presented that briefly yesterday so I won't describe that in any detail. But as you recall, that does cover about 35 regions and countries, including China, and 17 food commodities covering most food consumption.

So let's take just a very quick look at the prospects for the Chinese food economy. Total grain production in China in the early 1990s was approximately 385 to 390 million metric tons. So, that makes China the largest producer of cereals in the world. Grain that's used for direct food consumption by people took up the largest proportion; about 2/3 of total consumption in the early 1990s. Most of the rest of the grains went for animal feed. Animal feed accounted for about 20% of utilization, and that proportion is rapidly increasing.

The Chinese food economy is undergoing a series of quite fundamental changes. On the demand side, there is a rapid increase urbanization, changing tastes and preferences, and rapidly rising income. All of these factors contribute to a shift to more diversified diets with higher per capita consumption of meat, milk, fruit and vegetables, and other higher valued commodities and to lower direct per capita consumption of cereals. Thus, in China we see that the per capita consumption of rice is already falling, and rates of growth in per capita food consumption of wheat and other cereals is also declining, i.e. the rates of growth are declining. So, the dietary transition that's under way now reduces direct demand pressure on the basic staples, but increases the demand for coarse grains for feed.

We also see quite sharp transitions underway on the supply side. Much has been made of the institutional changes in Chinese agriculture in the early 1980s and later, and these did have a considerable impact on the agricultural economy. But, it must be remembered that historically, technology has been and still is the main engine for agricultural growth in China, and the technological base grew rapidly both during the pre-reform and post-reform periods. Investment, in particular, for building up a strong stock of research capital is, in a very significant way, responsible for the growth in production.

There has been considerable concern that the Chinese research system may be suffering from neglect after a decade of reform policies that in a sense decentralized some activities without providing adequate financial support. And in fact, real investment into the research system was stagnant from about 1983 to 1990. But now, in the early 1990s, there has been a resumption of growth in investment in both research and in irrigation.

Our estimate based on the recent trends is that research investments and other infrastructural investments are adequate for continued growth in food crop production, but at a smaller rate of growth than has been experienced in the recent past. We also believe that additional yield increases in farmer's fields

will be produced by conventional plant breeding, improvement in seed quality, and targeting of micro-environments so that there will be better production of specific varieties for specific environments, for perhaps the next decade or maybe 15 years. After the gains from conventional breeding begin to slow down, we should see further, additional incremental yield growth generated through conventional breeding combined with wide crosses or transgenic crosses or other types of tools that result from biotech.

The question is then, how do these different supply and demand transitions work out over time? We estimate that per capita food grain consumption in China hit its highest levels in the late 1980s and early 1990s. So, from a base year high of about 225 kilograms of per capita direct food consumption, food grain consumption per capita will fall to just over 200 kilograms per capita by 2020. So, there is an actual decline in direct food use. In contrast, the per capita demand for red meat is forecast to increase by about two-and-a-half times between now and 2020. So it is more than doubling. This projected rise in meat demand will also put pressure on aggregate feed grain demand and raise the proportion of feed grain in total utilization from about 20% to nearly 40%. So, by 2020, you'll be approaching half of grain use being for animal feed.

This next chart then shows how these different transitions work out in practice (Appendix 1). As you can see, the blue line is total grain production, the red bar is demand (and that's both food and feed demand), and the green bar represents net trade, in this case, imports, since it's below the line.

As you can see, we're projecting an increase in total demand to about 595 million metric tons by the year 2020 over on this red line here. That's equivalent to an annual growth rate of about 1.5% per year. But, the base line projections also show that grain production will continue to grow, although as I mentioned, at fairly slow rates. We project that the area planted to grains will decline slightly, but that this will be offset by the yield gains that I described earlier, with the result that you'll reach about 550 million metric tons of production by

the year 2020. As a result, you can see that by the next century, you'll be at about 40 million metric tons of grain imports, with it then reaching about 43 or 44 million by the year 2020.

So, the picture we see then in China is an increase in grain imports compared to historical levels, but not to the extraordinarily high levels that have been mentioned by some observers. If we do a number of alternative simulations and sensitivity analyses, the results indicates that to reach grain import levels in excess of 100 million tons, it would require drastic long-term declines in agricultural investments, particularly in research, or an increase of many times in the rate of environmental degradation. And most importantly, if you want to predict or to reach a forecast of high imports, you must also postulate a complete failure by the Chinese government, and by Chinese farmers and consumers, to respond to the changing incentives that come into play as import levels and food prices rise. Given its commitment to relatively low imports, the government of China will almost certainly develop a set of countervailing policy responses if imports do begin to grow rapidly. In fact, in the past year, as grain prices have risen in response to the short term tightening of grain supplies, we've already seen that government policy makers have responded with commitments of considerably greater investments in agricultural research and in irrigation. If grain prices continue to increase in the short run, farmers will also move land back into grains and will increase input levels to boost yields.

That's the China side of the story. What about China's impact on the global food economy? I'll just very quickly run through some alternative results. These results use IFPRI's impact model. This overhead here (Appendix 2) shows a number of alternative simulations of the situation in China. We have three different levels of gross domestic product growth rates, from 4.5% up to 9.6%, from a fairly modest level to a very high level, to be sustained over a 30-year projection period. We also model what we call "trend environmental degradation", and then a doubling, or a 100% increase, in trend degradation. That's defined in terms of the number of hectares of land affected by salinization,

erosion, and waterlogging. As you can see, at a very low growth level of 4.5%, and at the current trend level, in other words, following what's been happening over the last 30 years in environmental degradation, there will be imports of about 25 million metric tons.

Then you could also look at what could be considered a worst case scenario for world markets, in other words, the scenario that provides the greatest demand and the most pressure on world food markets. With very high growth rates combined with very rapid environmental degradation, we can project that there could be as much as 119 million metric tons of cereal imports by 2020 (Appendix 3).

Now is that a disaster? Does that actually bankrupt the world cereal markets, or can that in fact be handled by the volume of grains available on world markets? The next slide shows (Appendix 2), again for the lowest and the highest growth rates for these scenarios, the projected world prices in U.S. dollars per metric ton under these alternative scenarios. This first column is the baseline, that's in 1990, for real world price levels. The next two columns are for a 4.5% growth rate trend and severe degradation, and here again are the projected world prices. And finally, you have the very rapid growth rate of 9.6%, along with severe degradation. As you can see, China does have real impacts on world markets. They're a big enough country. They can have some effect. But, you can also see that even under this very severe and very large import scenario, the price increases are not devastating. Wheat prices in 2020 would be about 14% higher than they were in 1990, and price increases for other cereals would be even lower. I might also mention that livestock commodities, which I don't show here, also showed modest increases in prices, on the order of 8 to 10%; not really large price increases. So, these results show that China has significant impacts but not the kinds of devastating impacts that some observers have mentioned.

To sum up, China is already a significant player in world food markets

and it's likely to become increasingly important, but China does not represent a major threat to world food supplies. There's considerable flexibility remaining in the supply response both in China and in potential grain exporters in the world. So, if anything, the evolution of China into a consistent grain importing country would benefit grain exporters without causing serious price dislocations. Thank you.

Mr. Tsuchiya: Thank you Dr. Rosegrant. I understand, Dr. Rosegrant's comments, which strongly suggest the possibility of self-reliance in food supply in China. Anyway, the discussion underlines the necessity for us to take action from now on to solve the projected problems, especially in Sub-Saharan Africa and South Asia.

In relating to there underlying points, Mr. Ono pointed out the importance of a comprehensive approach with a longer time perspective in the field of agricultural development assistance. I would now like some members from the JICA side to introduce our experience with comprehensive assistance for food self-reliance. How about Ms. Umezaki?

Ms. Umezaki: I would like to introduce JICA's experience with comprehensive cooperation for food self-reliance. Unfortunately, this experience is not in Sub-Saharan Africa or South Asian countries.

Today, I'd like to make a brief presentation about the Third Umbrella Cooperation in the Republic of Indonesia. Before I talk about the cooperation itself, let me review the related conditions in Indonesia, especially in the agricultural sector. First of all, it is well known that Indonesia has been making an effort to create a diversified economy, and that the structure of production has now changed. Under these circumstances, agriculture has been the historically dominant industry in Indonesia, and is still a major source of labor absorption. As of now, slightly more than 50% of labor is absorbed in agricultural sectors. It is significant that Indonesia is a major exporting country for estate crops such

as palm oil, coffee, coconuts, and rubber.

Apart from agriculture and other industries, it can also be pointed out that the population of Indonesia continues to grow, and in response to the increased incomes of people, the consumption patterns for food have changed recently. But, it can be pointed out that agricultural productivity in Indonesia is still at a very low level, and so far it has been hard to see any increase in agricultural productivity in Indonesia. On the basis of these agricultural conditions in Indonesia, we can identify the diverse needs for cooperation in the field of agriculture.

Here, I also would like to point out the characteristics of the administration related to the agricultural sector in Indonesia. The first thing is that there are so many related ministries and agencies that it is complicated for Indonesia itself and also for donor countries, including Japan, to make efforts towards agricultural development for the future. The second point is the process for policy making and decision making. It can be said that policies are made through a top-down process. The third point is characteristic of agricultural administration in Indonesia. This is the significant gap between central and local levels of administrative capabilities; the gaps between central administration and local administration.

At the same time, if we look at international conditions, we can point out the impact of the GATT-Uruguay Agreement. In response to this agreement, Indonesia is being pushed to open its domestic market to agricultural products from foreign countries. On the basis of these conditions in agriculture and related sectors in Indonesia, the Indonesian government announced its development policy for the agricultural sector under the sixth national development plans. The main points that are brought out in the plans are, first of all, that attention is paid to the geographical distribution of development. It is recognized that so far the benefits of development have been uneven, and that people living in out-lying areas have not been able to enjoy much benefits from development. In this

context, Japanese attention is being given to development, in the eastern provinces. The next point of the development plan is that public investments should be made with the purpose of promoting private incentives. And finally, the plan says that government expenditures should focus on social and economic infrastructure, and regional and human development. These are the surrounding and related conditions on which Third Umbrella Cooperation relies.

Next, I would like to introduce the experience of JICA's cooperation in Indonesia. In foot, before we started into the Third Umbrella Cooperation, we had two previous experiences with umbrella cooperation, that is, with a very comprehensive cooperation approach. The First Umbrella Cooperation started in 1980 with a five-year cooperation period. This cooperation began with the target of promoting rice production. And this cooperation was highly evaluated as having made a contribution to the increase of rice production in Indonesia. The Second Umbrella Cooperation started in 1986, also with a five-year cooperation period. For this time, the focus shifted from rice production to the production of major food crops, including soy beans, potatoes, and so on. This cooperation was also highly evaluated by the Indonesian side, and on the basis of those experiences, the Indonesian government proposed a new implementation of the umbrella type cooperation. Of course, the Third Umbrella Cooperation must follow the situation in Indonesia that I mentioned at the beginning of my presentation.

Under the Third Umbrella Cooperation, we have identified improvement of the standard of living of farmers as the overall goal. Later, I would like to explain the design of the cooperation a little bit more. But, before that explanation, I would like to state the three principles that JICA set forth for the Third Umbrella Cooperation. The first principle is that the Third Umbrella Cooperation should be a regional development approach. This means that umbrella cooperation should cope with the diverse conditions in Indonesia. Of course, regional conditions are diversified naturally, physically, socially, and culturally. So, we must pay attention to these diverse conditions in Indonesia at

regional levels. The second principle is that we have to pay attention to the establishment of technological transfer systems from central to regional, or to the community level. I mentioned that there is a very big gap between the central level of administration and the regional level of administration. In this sense, we consider that establishing a system transfer from the central level to the regional level is very important for the Third Umbrella Cooperation. The third principle is strengthening management functions. In other words, the Third Umbrella Cooperation should focus on institution building in the agricultural administration in Indonesia.

Now, I'd like to proceed to an explanation of the design of the Third Umbrella Cooperation itself. As I mentioned, the overall goal of the Third Umbrella Cooperation is improvement of the standard of living of farmers. In order to contribute to this overall goal, we set up three strategies. The first one is improvement of farming productivity, efficiency ,and sustainability. The second strategy is to increase the quantity and quality of farm production and diversification. And the third strategy is to add value to farmer's farm products. Through these strategies, we expect that an improvement of the standard of living for farmers, as the overall goal, can be obtained.

In order to achieve this overall goal, we think that a comprehensive approach is indispensable. We identified eight activity components under the overall goal, along with the three strategies. The first activity component is human resource and system development at the central and local government levels to improve planning and administrative capabilities. The second is improvement in research capabilities to support the development of appropriate production technologies. The third is the development of an agricultural extension system in order to improve farm management, to promote diversification in agricultural production. The fourth is the development of irrigation and drainage facilities and the improvement of water resources management systems. The fifth is the development of a system for the effective promotion of agricultural credit. The sixth is the development and strengthening of the activities of farmers'

organizations. The seventh is the development of post-harvest activities to add value to farm products. The eighth, the last component, is the improvement of rural infrastructure, including rural roads and drinking water facilities.

Here, I should say that these eight activity components reach from research activities at the central level to extension work at the farmer's level. These activities follow our strategies, and also follow the principles for the Third Umbrella Cooperation.

Another important aspect of the Third Umbrella Cooperation is the linkage between the central and the regional levels. This should depend on regional base development. In this sense, we selected four model areas in Indonesia. I think you have a map of Indonesia (Appendix 4). On this map, there are four regions that are shadowed. The first one is West Java. The second one is South Kalimantan. The third one is East Nusa Tenggara. And the last one is South Sulawesi. Each region represents an unique agro-ecosystem in Indonesia. In detail, South Sulawesi represents an irrigated area, West Java represents a highland region, South Kalimantan represents a swamp area, and East Nusa Tenggara is a rain-fed region. We thought that the results of research and development activities at the central level should be explored and applied to each different agro-ecosystem in Indonesia. At the same time, it is very important for us to identify the actual development needs from activities in those agro-ecosystem model areas.

As for the inputs from the Japanese side based on this Third Umbrella Cooperation, we combined many kinds of cooperation schemes, including technical cooperation under JICA programs, and at the same time, financial assistance from OECF and grants of financial assistance mainly from the Ministry of Foreign Affairs. These need to be carefully designed and combined for the purpose of contributing to the goal of the Third Umbrella Cooperation.

But, we should not forget that a ownership of the Third Umbrella

Cooperation is given to the Indonesian side. This program itself is not under Japanese ownership. It is very important to encourage the Indonesian government to participate in this Third Umbrella Cooperation with a sense of ownership. At the same time, in this context, we would like to pay attention to development assistance in agriculture by other donor agencies including multilateral organization like the World Bank or other bilateral donor agencies.

The present situation of the Third Umbrella Cooperation is just in the initial stage. It started in 1995, and in order to make an overall plan for this Third Umbrella Cooperation, a development study was started in 1996. That concludes our presentation of the Third Umbrella Cooperation in Indonesia. Thank you very much.

Mr. Tsuchiya: Thank you, Ms. Umezaki. Now, we come to the discussion session. But, we face with a severe shortage of time, so I would like to get very brief comments from one or two persons. Mr. Saito?

Mr. Saito: Thank you, Mr. Chairperson. May I just comment on a small point relating to the IFPRI 2020 Vision, because this is the time and place to discuss the possibilities for the future implementation of the 2020 Vision. In the case of umbrella cooperation in Indonesia, it's kind of an exceptional case, or an exceptional experience for us, the Japanese side, because the scale of cooperation is fairly large, and although, it's almost completely limited within the agricultural sector, the area is very wide. As for the duration of the cooperation, we can count it as starting in 1980, with the first stage of umbrella cooperation. Thus we cannot implement this type of cooperation all over the world.

But I think this is a kind of success story for Japanese international cooperation, and there are several reasons for this. One is the strong leadership of the Indonesian government, because under the First Umbrella Cooperation, the target was to attain self-sufficiency in rice. So, it was a very important policy matter. Thus, the Indonesian government made a strong resolution to

attain self-sufficiency in rice. The target was reached in 1984 if my memory is correct. After that, in the second phase of umbrella cooperation, they wanted to widen the area of cooperation to include other main crops, meaning soy beans, potatoes, and so on. They were able to broaden the target gradually. This is the second point I'd like to mention. At first, rice production only, and then after that, soy beans, potatoes, etc. were covered. So, the first two periods of umbrella cooperation and the first two phases of umbrella cooperation focused on growth of crop production. So, I think it's very important to target this.

The Third Umbrella Cooperation is a bit different. After attaining some sorts of crop targets, they are now trying to widen the scope of cooperation to the improvement of lives for rural farmers and rural communities. This is a very important point. At the first stage, that is, the target should be limited, or should be concentrated. After that, we can widen the target gradually. This kind of gradual approach is very important. Also, from the Japanese side, we were able to concentrate our input on crop production, especially for rice in the first phase. This kind of concentration is very important for the success of international cooperation. This is one point that I would like to make.

Relating to the IFPRI 2020 Vision, you stressed the importance of the government's role. In that sense, Indonesia has had fairly strong central government. That is also one reason for the success. So, now, in the third stage of umbrella cooperation, we will try to widen the area to include the function of the local government. This is also a kind of gradualism, which is also very important.

In the other area of the IFPRI 2020 Vision, in the first two phases, we concentrated on crop production. In that sense, investment for the improvement of rural communities or rural people's life standards was a relatively weak area of cooperation. So, in the third phase, we will try to focus on that. We can count this in the second area, where you say we must invest more in poor people. Thus, in the third stage of the umbrella cooperation, we will try to concentrate

on that point. I think it's very important to widen the target gradually.

So, at this point, I suggest that we should not do too much at one time. We should try to make steady steps to achieve the target. That's my suggestion for this crucial area. Thank you.

Mr. Tsuchiya: Thank you Mr. Saito. Now, I want to move on to the second theme, "Stable and Sustainable Management of Resources." Yesterday, we had a presentation from Dr. Rosegrant, and also one from our JICA side. But, I heard Dr. Nygaard has a lot of knowledge about deforestation and other issues relating to this theme. Can I have your comments?

(2) STABLE AND SUSTAINABLE MANAGEMENT

Dr. Nygaard: Thank you, Mr. Chairman. Let me just briefly follow up on a couple of things that came out of a workshop that IFPRI organized as part of its 2020 Vision, to try to identify problem areas in resource degradation, not only in forestry, and look at that in particular with respect to Sub-Saharan Africa, which I was touching on yesterday. The point I would like to make about that workshop is that it identified a number of what we called "hot spots", areas where degradation is occurring. Things need to happen right now to deal with them, and I'll come back and mention a couple of those examples. But, I thought the other part of that workshop that was interesting is what we call some bright spots, of which there are examples throughout the world, particularly in Sub-Saharan Africa, where resource degradation has been reversed or stopped. I think that sometimes this process becomes negative, and we worry about destruction, and we don't take a chance to look at success stories and build on those. In the case of Africa, there were lots of concerns, for example, about the mining of soils, about African soils being low in nutrients in the first place, and nutrients being a problem. Dr. Pinstrup-Andersen mentioned the importance of fertilizer policies with respect to Africa being very different from what they would be, say, with respect to Southeast Asia.

A second point that was given a lot of priority was the stocking rates of livestock, overgrazing, and modernization within the livestock sector, bringing about high concentration of animal numbers and having a very strong negative effect on those areas.

On the other hand, if I could just mention briefly a couple of bright spots, although there are several examples on both sides, there are some excellent examples of water management in Zimbabwe that have been very effective at improving water use efficiency and avoiding some of the negative effects.

There have also been some substantial success stories in the highland areas with respect to maize production, again on a sustainable basis, again reversing some negative trends that had been observed earlier. So, I think there are positive lessons that one can learn in this process as well.

Mr. Tsuchiya: Thank you. Yes?

Dr. Otsuka: IFPRI has just started a couple of major projects in natural resource management. Since we have just started, we are not in a position to make a presentation about the results. But, I am actually organizing the project on tree resource management and land tenure in selected areas of Africa and Asia, covering Uganda, Ghana, Malawi, Nepal, Indonesia and Vietnam. My impression is that people really cut down trees without regard for the future or the impacts on the environment and so on. There are two direct causes for deforestation. One is shortage of food. Many of the poor farmers do not have enough land to cultivate, so they just cut down trees and then cultivate the land. And another thing is lack of employment opportunities. They don't have a place to work outside of agriculture or outside of forestry, similarly in the case of range land. One of the questions is about land tenure; who owns the land, who owns the forest areas? My observation is that forest area or range land is basically open access. Everybody can go there and then cut down trees, plant food crops and so on.

The real question is what should be done? JICA, I think, has focused on rehabilitation projects through the social forestry project and so on. That's very important. But, at the same time, one of the key strategies to reverse this trend is to intensify agriculture. That provides more food. That provides more employment opportunities. So, that is a key. There is no inconsistency between what Dr. Pinstrup-Andersen presented about the importance of research, and the preservation of natural resources and so on.

And with respect to the project, there are two things we have to think about. One is, more emphasis on the development of agroforestry, including tree crop production and many other things. That is a very weak area. But, unless we strengthen the research on agroforestry, deforestation, it cannot be reversed.

Another important issue related to the rehabilitation project is the validity of communal forestry projects. FAO supports communal forestry projects as do CIDA, DANIDA, and JICA, as well. I have heard a lot of failure stories. But, at the same time, it is also true that there are some success stories. The real question, I think, is under what conditions social forestry projects are successful. That must be explored jointly by collaboration with JICA. Thank you very much.

Mr. Tsuchiya: Thank you, Professor Otsuka. Mr. Kano, could you explain our experience in Nepal, keeping Mr. Otsuka's comments in mind?

Mr. Kano: Thank you Mr. Chairman. Based on some of the comments by Professor Otsuka, I'd like to have an opportunity to present one of JICA's activities. In order to have an effective visual presentation, I'd like to use OHPs.

Here, I'd like to show you one of our projects for which the objective is to improve the natural environment and land productivity (Appendix 5). JICA is implementing various forms of technical cooperation, and my department, the Forestry and Fisheries Development Cooperating Department is carrying out 22

project-type technical cooperation in the field of forestry. At this time, I'd like to briefly present one of the forest and watershed conservation projects being carried out in Nepal. The title of the project is "Community Development and Forest Watershed Conservation Project in Nepal."

This project was initiated from 1994 with a five-year cooperation period, and the objective of the project is shown as follows: to improve the natural environment and land productivity, particularly, with an emphasis on stopping the depletion of forests and other natural resources, and to expand the areas of greenery in the hill areas of Kaski and Parbat districts.

Before starting my presentation, I'd like to show you pictures of the project site for your convenience. As Mr. Ono, Managing Director of the Agriculture, Forestry, Fisheries Development Study Department mentioned at yesterday's symposium, in Nepal, farmers' holdings of farmland are quite small; more than 40% of their hold less than 0.5 hectare. Low production, food shortage, poverty, insufficient education, poor sanitation, and others, are all highly associated, resulting in a vicious circle. He stressed that the vicious circle from shortage of food production to population increase environmental destruction, and poverty is the main issue to be tackled.

Nepal has an estimated forest area of approximately 6.2 million hectares at present. But, it's said to be losing forests at a rate of 80,000 to 90,000 hectares per year, supposedly due to the collection of firewood for domestic use and collection of fodder trees to feed livestock as well as grazing in the forest. The hilly areas, like this, have long seen active farming to support a large population. The subsequent deterioration of forests in the area is highly conspicuous, resulting in frequent flooding, which poses a danger in terms of the erosion of fertile land and a reduction in soil productivity.

The project area is located near Pokhara 200 kilometers west of Kathmandu. The Kaski and Parbat districts were selected.

This picture shows typical conditions at the project site. You can see the highly utilized terrace fields. Some soil erosion can be observed between the terrace field and forest area. The mountain hillside supplies the trees for firewood and fodder and also contributes to natural conservation.

This picture shows that the forest has been reclaimed due to the increase in population, causing the critical soil erosion. In the lower locations, a severe gully was formed causing the loss of fertile land. This shows that proper reclamation and land conservation are essential for environmental conservation. These are the target people in the project. This is the weir which was constructed by the villagers. Such weirs would be one of the fruits of cooperation for the target group to construct it the project is appraised for implementation.

So, this is the situation in which our project is being carried out. Where we are engaged in forestry cooperation, all villagers are quite poor under severe environmental conditions. In the past of our forestry cooperation for other countries, we instructed the farmers to plant trees. Through the farmers know that planting trees is quite important to conserve the environment, we recognize they also have to make a living. They have to obtain enough food for their short-term necessities. Accordingly, farmers burn down trees and make fields for their own maize or other crops.

Based on the above experience, a modified project concept was formulate this project. The participation of the villagers is quite essential to carry out cooperation. We carried out a two-year preparatory cooperation period before starting the cooperation proper. During this period, we continued to have discussions not only with the Nepal officials but also with the villagers. It was quite, quite laborious work, but, we finally gained an idea of how the project should be implemented. We grasped the hopes or needs of the villagers.

The methodology of the project is to organize an exemplary community development activity by extending technical cooperation with the expectation of

implementing the same approach to other areas (Appendix 5). It also has a limitation, because all activities are carried out at the incentive of the Nepal villagers. The Japanese side only supports their activities.

First, we try to organize an exemplary community development activity. Once one exemplary or model is performed successfully, this model can possibly be implemented in other areas. This is one of our ideas.

To stop the depletion of forests is given a top priority. The overall approach, the so-called package approach which the JICA scheme uses, was concentrated on this project (Appendix 6). Project-type technical cooperation, which is generally extended for five years, is a combined form of cooperation consisting of three different technical cooperation components. One component is the dispatch of Japanese experts. In this project, three to four long-term experts and ten to fifteen short-term experts are dispatched. The second component is the supply of equipment and materials. 1.0 to 1.5 million U.S. dollars would be the estimate for this project. And the third component is accepting trainees or acceptance of Nepal technicians for study in Japan. Ten to fifteen Nepal technicians are invited to Japan for training. This project-type technical cooperation setup would be viewed as the coordinating body for all project activities, in other words, as the headquarters.

A two-year development study scheme is carried out simultaneously to draw up an integrated watershed management plan through a socio-economic baseline survey and land utilization plan. The development study supplies the basic information related to the project. Cooperation activity at the community level is implemented through Japan overseas cooperation volunteers (JOCV) and the local NGO team. In this project, ten monitor and promoter teams (M/P team) are formed to carry out exact implementation of the cooperation. During five years of the cooperation period, 250 wards in total would be covered by the cooperation. This project-type cooperation setup is defined as the headquarters, while actual activities will be carried out through the ten monitor and promoter teams.

To make it easier to understand, I'd like to describe the administrative structure of Nepal (Appendix 7). Nepal consists of 75 districts. In this project, we cover 2 districts, the Kaski district and Parbat district. There are a total of 54 villages in Kaski district, and 50 villages in Parbat district. The smallest administrative unit is called a ward. Generally, each village consists of 9 wards, and one ward consists of about 100 households. As I said, this project covers 250 wards belonging to the two districts covered by the ten monitor and promoter teams during the cooperation period.

The activities which are implemented by the target group will be classified into two levels (Appendix 8). One is the community level and the other one is the inter-community level. At each level, there are various activities such as (1) community infrastructure construction, (2) forest/watershed conservation, and (3) income generation activity. At the inter-community level, (1) the inter-community infrastructure for (2) forest/watershed conservation is included.

Here, I'd like to show the outline for technical cooperation (Appendix 9). As I said, the owner of the project is the Nepal side, not the JICA side. What all the JICA teams do is to assist thorn in their own sustainable development. One of the activities is organizing through guidance and coordination. And the second one is planning and approval of sub-projects. Sub-projects are small activities that are discussed at the ward level. The information dissemination, micro baseline survey, sub-project formulation, quick appraisal, and cost benefit analysis are carried out by the headquarters.

And finally, preparation of sub-projects, sub-project implementation, design, technical assistance, and sometimes, institutional development of user groups will also be assisted through the technical cooperation. Some equipment and materials which are necessary to carry out the activities will be supplied by JICA.

As for the actual results of cooperation based on the initiative of the farmers, the following types of activity will be the content of sub-projects: these are

prevention of deforestation stream works (This means construction of weirs), hillside works, river wall works, introduction of reformed furnaces, construction of walkways, and construction of suspension bridges (Appendix 10).

This project was initiated in 1994, so some projects are still under discussion at present, and some are now being undertaken by the monitor and promotion teams. It is reported that in Nepal, the soil loss ratio in a non-forest is four to ten times higher than the soil loss ratio in a forest. Under the project, various activities executed through the participation of the villagers to retard soil erosion will be expected to contribute to the improvement of the natural environment and land productivity.

In conclusion, the scale of our cooperation is not that large, but the accumulation of and trials in such small activities will bring the people, or villagers, to have confidence in sustainable development and also lead to the protection of fertile farmland. Thank you very much for your attention.

Mr. Tsuchiya: Thank you, Mr. Kano. Mr. Kano mentioned the importance of resident involvement or resident participation in the formulation or operation of projects. The same thing may be pointed out in the field of water management. May I have some comments from Mr. Kato?

Mr. Kato: Thank you very much. I want to comment on three points. The first one is that the Asian experience is not that applicable to the Sub-Saharan area. But, we can recognize the needs which can be put on interdisciplinary know-how and inter-ministerial knowledge. This point should be raised in future projects. Among the JICA staff, we have people with sufficient experiences and knowledge, like Mr. Kano. He was responsible for the agriculture development sector, but he is now responsible for forestry development. The problem is at the inter-ministerial level. We have to determine and agree on which ministry is responsible for the overall project. This is the first one point.

Now for the second one, Professor Otsuka emphasized the importance of the creation of employment in the rural areas. But already, in a recently published report submitted by the Sahel Club, the chairman emphasized the creation of employment both in rural areas and in other areas. This is because the Sub-Saharan area cannot absorb the total population coming from the rural areas. But absorption into the urban areas could hold back the rapid degradation of the desert area. We have already discussed this point.

And also there is a third point. Professor Otsuka told us about land tenure. That is a very delicate problem to solve. From my experience in the African region, at the middle of a tropical forest, we were able to identify who was the owner of the area. At a certain point in time, the owner was the state. On another occasion, we may be able to identify who is the owner of the land. This is also true in the middle of a desert area. But, we have to exercise caution in intervention in this matter because, for example, before land reclamation, we ware not able to even vaguely identify the owner of the land. But, after the construction of the project, many, many people came forward to insist on the ownership of that land, if the land was profitable. The local counterpart, in turn, recommended that we retreat from the front site to the back site because there was a danger of being killed. That's why if we make any proposals to the government of the recipient country regarding land tenure, we have to stay away from the front sites. That is the third point. Thank you very much.

Mr. Tsuchiya: Thank you, Mr. Kato. May I ask for any explanation or comments from IFPRI side?

Dr. Pinstrup-Andersen: Just a quick question if I may to Mr. Kano. There's a lot of evidence to suggest that when it comes to what households do to the natural resources and to their land and their water, and what they do make sense to them that they're rational in what they do given the constraints they operate within. Therefore, in order for a project like this to be successful, it seems to me that you have to identify the reasons why they are doing things that are

adverse to the natural resources, and then get rid of those reasons. Could you tell us little bit about why these households and communities are doing what they are doing? Why are they cutting down the forest and eroding the land, and how are you going to remove those constraints or those reasons? Because otherwise, as soon as you go home, they will go back and do what they did before. (laughter)

Mr. Kano: Well, there is really a long history of how the people's conditions are getting worse by cutting down those trees. But, I think one of the reasons is increased population, which would be the big factor. The reason why people reclaim such hillside areas is because people also use trees for firewood and also use them for feed materials. Thus, increased population is the biggest reason for such environmental degradation. Do I need to add a little bit more?

Dr. Pinstrup-Andersen: If the reasons are excessive population and cutting down trees for firewood, how is the project going to address those two questions?

Mr. Kano: Well, we do not have an exact solution as to how we can reduce the degradation of the environment. As far as the people living at those places, we cannot move them, and also we cannot decrease the population. We try to consider ways in which, as far as conditions would be bearable, we can motivate persons to utilize the farmland or forest areas, and not to degrade the environment. This is the point about which we are trying to achieve cooperation by construction of weirs or and other projects. The people in that area make a living by getting some trees or by getting some animal meat, or sometimes by cultivating fruit trees, etc. So, in the future, we would like to approach this more comprehensively, including not only forestry but also other sectors, or include some social welfare.

Dr. Otsuka: I think the case of Nepal represents an interesting case to see what will happen if there is no intensification of agriculture. Nepal is one of the countries where a major green revolution did not take place. The rice yield

has been stagnant, or even declining over time, and farm size is very small. Then, what can people do under increasing population pressure? Just go to the forest and cut down trees. And also as Mr. Kato said, there is also a lack of development of industrial sectors in Nepal. So, that cannot absorb any farm population. These are the problems which we confront with the issues of forestry resource management and irrigation. Thank you.

Mr. Tsuchiya: Thank you. Now, I want to move on to the final theme "agricultural research and its extension." In yesterday's discussion, participants from IFPRI stressed the importance of increasing research investments. I suppose such a position is based on an understanding of the past good performance of agricultural research investment. But, Mr. Norman E. Borlaug, the Nobel Prize winner, expressed very strong frustration about such performance at the Workshop 95 for developing African agriculture. He pointed out that there are many, many research results that could possibly be utilized for production increases. But such results are not utilized that much. And he stressed that the researchers should insist policy makers to establish a system for the use of research results. There are some differences in opinion about the evaluation of performance of research investment. Can I have some comments about agricultural research and extension work in the Sub-Sahara? Mr. Nygaard?

Dr. Nygaard: Mr. Chairman, in the interests of time, perhaps, I'm very interested in the Kilimanjaro case that you have in front of us. Perhaps it would be easier if you went ahead with that and gave us a chance to ask some questions about that to get at these issues.

(3) AGRICULTURAL RESEARCH AND ITS EXTENSION

Mr. Sumi: I would like to briefly introduce the Kilimanjaro agricultural development program cooperated by the Japanese government. You have a paper in front of you. It is just one page of explanation with a map and table (Appendix 11). So, I would like to introduce this to you from the viewpoint of research

and extension in this project. Maybe, this is one of the successful projects by JICA. It was also referred yesterday. Maybe, you already know this, but this has a long history of Japanese assistance. Perhaps, it would be best if I read through this one page.

Japanese ODA for agriculture development in the Kilimanjaro region, Tanzania, has a long history starting with a development study in the early 1970s. Up until now, technical cooperation on irrigated agriculture, mainly on paddy fields, has continued without any break. It has been well combined with financial assistance for construction of irrigation facilities and a central building (KADP/ KATC Center) with a demonstration farm. Please take a look at the last page of the table (Appendix 12). Thus, many schemes by JICA such as development survey, grant aid, technical cooperation of the project type, and loan projects by another organization, OECF - have been combined well. Development itself and technical cooperation have been carried out for about 20 years. The double lined column describes project-type cooperation. We have already finished two stages of cooperation, and are now at the beginning of the third stage. Now, will you please return to the first page? (Appendix 11)

I tried to divide the stages of research and extension within the cooperation into three stages. At first, we incorporated to establish basic research at the demonstration farm at the Center to be applied in the irrigated Lower Moshi area. The Lower Moshi area is an area developed by the loan cooperation, about 2,300 hectares of irrigated land. Then, the second stage would be on-farm research to establish an appropriate farming system for the Lower Moshi area, not in the demonstration or experimental farm, but by implementing on-farm research. And the last stage will involve further research for techniques adaptable in other regions in Tanzania with feedback from training and extension activities at the Center. This third stage is equal to the third project-type cooperation, which is named the Kilimanjaro Agricultural Training Center Project. Right now, it's a center for the training of people. So anyway, research activities have been extended gradually to the on-farm level and on-farm in other regions also.

Thirdly, I want to explain the achievements of the second stage. We believe that the goals of the second stage have been reached. Rice production in the Lower Moshi area reached 6.5 tons/hectare with a selected variety of IR54 and with suitable cultivation techniques in agronomy, machinery operation, and water management, etc. Additionally, what is important is that this cultivation system is being adopted in the areas around the upper stream of the Lower Moshi area, outside of the project area, developed without any help from the government or from the Project. With no financial assistance from the government, farmers developed it by themselves by applying the techniques from the project site.

This situation created some water shortage problems in the project site because farmers are taking water out at the upper stream. But, I think this is a wonderful fact that encouraged us concerning the adaptability of the developed techniques at least to other areas where are similar situations in Kilimanjaro.

We think the second stage of research and extension around the project area have finished. At present, the third stage of technical cooperation is now being implemented; the training project. The requirements for research and extension at the present stage are as follows.

The present stage of Japanese technical cooperation is to extend the fine results at the Lower Moshi area in the Kilimanjaro region to the other regions in Tanzania. In the Phase III Project (KATC), we will try to develop the Center as a national center for agricultural training of government officials, extension workers and key farmers all over the country. But as the natural, economic and social conditions in Kilimanjaro are not common to the other regions, the research activities at the Center should be further extended to cope with the specific conditions in different parts of the country.

Presently, the following are considered to be effective means to attain this. First, integrated study of regional conditions for agriculture and farming system, as also referred to in yesterday's seminar. Secondly, follow-up and feedback

from the trainees at the Center, especially about practical on-farm level problems. And thirdly, we also need cooperation from other research institutions, IFPRI maybe, and extension agencies in the country.

So, the tasks of the Center now will be continuous research into adaptable cultivation and farming techniques, improvement of the training curriculum and its contents, and further research into better farming systems based on the results and feedback from those activities. Thank you.

Mr. Tsuchiya: Yes, Mr. Kato?

Mr. Kato: Thank you very much. In addition to what Mr. Sumi told us, I want to mention two points of supplemental explanation of the Kilimanjaro project. This project is a typical high-input/high-output model. This is one point. I don't think this model could be applied to all African regions. But, it's one approach because at the World Bank it is all the middle input and output.

The second point is this. The most important point of this project is the quality of the work. I have circulated two photos. The first one is a red one showing ordinary construction works supervised by expatriate people. The green one shows higher quality. That's why I was requested to give an explanation of how to construct things with such a level of quality. This is a subject we will have to study in the future. Thank you very much.

Dr. Nygaard: I have two questions on research and support. What has been the experience? This has been carried out over an impressively long period, and perhaps you have some experience in that regard. One of the problems that we've had and that development projects have had in Africa generally has been the inability to keep good trained people. In some cases, people trained by a Project often have come back but not stayed, and I would be interested in hearing the experience you've had with respect to human resource development in that regard. And secondly, as you noted from comments that were made yesterday,

one of the issues is research staff in Africa not having enough support to do good research. The people are in place, but they lack funds to do any research themselves. And I think Tanzania has been a particular case in point that has been weak in this regard. What's been the experience of this project in terms of maintaining an adequate research facility to do what you want to do? Is it a situation in which this is entirely from donor funds, or has the government begun to participate in this process and pick up some of the recurrent costs of running the project?

Mr. Tsuchiya: Mr. Sumi?

Mr. Sumi: Presently, concerning human resources, we have a problem in the operation of the project because of an adjustment program and, selection of an adjustment program. The government has tried to cut the number of officials, also the budget for research and everything. Not only in Tanzania, but also some other countries, the problem of counterpart personnel for Japanese experts is a very big problem every time. And also, the local costs for operation of the project, especially research projects, is a very big problem for us, too. We try to persuade them to prepare those human resources and funds themselves, but it is a kind of dilemma. Since they are poor, they don't have any money. The government is also poor. But if we do not cooperate on that condition, they will become even more poor; there will be no government service. So it's a very big problem; both human resources and funds. But at the first stage of any project, we try to supply a larger portion of the local cost, and then try to decrease the portion from the Japanese side to foster sustainable operation on their own. That's my impression about the situation for human resources.

Mr. Ono: Thank you for replying to Dr. Nygaard's comment. I'd like to have additional comments regarding sustainable development of projects. JICA is facing with the issue of how to terminate projects, and how to transfer those technologies to developing country after termination. Each Phase of the Kilimanjaro agricultural development project five consecutive years. So, the

project is to be continued for three or four phases. Based on my own opinion, if we could have another follow-up budget to support research activities after termination, it would be easier to transfer those terminated projects to developing countries. At this moment, JICA concentrates on human resources development as a technical assistance, but we cannot directly subsidize those research budgets in developing countries. After termination of a project, we have to ask for budget allocations by another donor or the recipient government. We are still going to consider how to transfer those projects smoothly to maintain sustainability. We would like to explore the possibilities for collaboration with your research work and our south-to-south collaboration scheme.

Mr. Tsuchiya: Thank you, Mr. Ono. Yes, Mr. Takasugi?

Mr. Takasugi: Thank you very much, Mr. Chairman. I think Dr. Nygaard made a very good point about how we can maintain research facilities and also sustain research activities. I think this is very important. The IFPRI side also recommended in the 2020 Vision initiative that national agricultural research expenditures to be raised at least to 1%. I think the problem is not quite so simple. For example, 1 million U.S. dollars are allocated to one institute this year. If we increase the budget by 20%, say in the next year, to 1.2 million dollars to that institute, I don‘t think that will mean any improvement because I have an experience in this area.

I worked in a research project in Bangladesh for three years. I observed that the director spent only 1,000 dollars per year to purchase research journals and books. Almost nothing. One thousand per year. But at the same time, 1 million dollars or 2 million dollars were spent on work including the facilities and so on, which did not seem that important. Or they are sometimes reluctant to draw up a MOU, memorandum of understanding, with other related research institutes and extension institutes for collaboration, because of a lack of leadership at the institute. Also, they sometimes kept the vacant post, for professors or researchers for four or five years.

So, the important thing is not only to raise the budget of the research institutes but also to strengthen the institutional and administrative capacity of the institutes. I think this is a part of the answer to Dr. Nygaard, and this point should also have been incorporated in your IFPRI recommendation, where it was unfortunately lacking. That is my opinion.

Mr. Tsuchiya: Thank you, Mr. Takasugi. Professor Otsuka?

Dr. Otsuka: In connection to the issue of staff and expenditures, I think it is very instructive to recall the situation in Asia, around 1960. People were just totally desperate, particularly for agricultural specialists and about the future of food problems in Asia. Population was increasing at a very high rate, and yield was very stagnant everywhere. All the research stations were understaffed and underfunded, even non-existent in certain countries. But somehow, the initiatives of a number of parties triggered a change which produced further modifications in the 1970s and 80s. One of the key issues, which was not discussed yesterday or even today, is what should be done in Sub-Saharan Africa? We now know clearly that there will be a severe problem of food shortage in Sub-Saharan Africa if current trends continue. But, we did not discuss what should be done. And to simplify my argument, I think the real issue is whether we should try to transfer Asian green revolution-type technology to Africa, or if Africa should do something else because the environment in Africa is different from Asia.

Which strategies should we take? I would say that Asia has totally failed in the development of less favorable areas. The green revolution took place only in favorable areas. And in Africa, the favorable areas are quite limited. We may have to create the irrigating conditions and so on. If we agree that the green revolution should be reproduced or created in Africa, I think Japanese scientists could make a great contribution. We have good knowledge, and JICA also has valuable experiences in helping the green revolution to take place. So I think this kind of question should have been discussed more fully, or in the future, we should try to think further about this issue. I think this is the central

issue of development in relation to Japan's foreign aid. Thank you very much.

Mr. Tsuchiya: Thank you, Professor Otsuka. I would like to have one or two brief comments.

Mr. Sato: One comment. Just an introduction of an example from Sub-Saharan Africa about research funds. I used to be a project coordinator of a university project in Kenya in the early 1990s. The problem at that time was a shortage of research funds. The government budget was decreasing in line with the structural adjustment program by the IMF and World Bank. And the government functions were being restructured. Along with this restructuring, the government budget was also decreasing. And the budget for our university was also decreasing. I remember only 1% of the government budget was used for the research budget. Seventy percent of the budget was used for personnel expenditures such as for the salaries of researchers, lecturers, and professors. So, as you pointed out yesterday, developing countries must increase their national agricultural research expenditures. I agree with that point. But, it is very difficult in reality. They told us that they can live without research, but they cannot live without salary. (laughter) That's my comment.

Mr. Tsuchiya: Final comment. Yes, Mr. Saito?

Mr. Saito: Thank you, Mr. Chairman. Just to respond to Professor Otsuka's comment on the green revolution, in my point of view, the green revolution in Asia has been successful. Of course, it has been successful mainly in favored areas, but the main point is that even within the favored areas, the purpose has been achieved. So, we don't think that the green revolution in less favored areas has been unsuccessful. This is one point.

There is one other thing. The African possibilities for the green revolution technology of Asia is a very important point to discuss. But, from the point of the locality of the continent, I don't think it's possible or it's a good argument

to pass the Asian experience directly to Africa. Thank you.

Mr. Tsuchiya: Thank you, Mr. Saito. Now, it's time to close today's discussion. I'd like to ask Dr. Pinstrup-Andersen to make wrap-up comments at this stage.

Dr. Pinstrup-Andersen: Thank you very much. Let me first thank Mr. Takasugi for the comment that you just made. You are absolutely correct. What we are trying to say in the 2020 Vision is that there are certain areas where the public sector should be strengthened. And managing agricultural research institutions is one of those areas, but I don't think we made that explicit point, which we definitely should have. We will do it in our next version, and I thank you for that.

I want to come back to the point that if you don't pay a salary to the researchers, no research will get done. Of course that's true, but on the other hand, having a whole bunch of researchers sitting around with nothing to do any research with is probably a waste of money. And I would rather spend that money on educating small children, or giving people access to primary health care. So, it seems to me that we have to have well-functioning agricultural research systems that have some balance in budget allocations towards salaries as well as to what it takes to do research. One of the illustrations of how for wrong this allocation can go is when we go to an African country, and we say to the agricultural researchers, not only do you have to do research but you also have to involve the farmer. You have to include the farmer in your research. You have to do on-farm research. You have to set the priorities on the basis of what's out there. But we are not going to give you any way of getting out to the farmer. You can walk, but you can't make it back the same day. I am being a little obnoxious here, but I think you get my point.

So, I think we need to sort out how we can be most helpful to national research institutions. And by the way, the economic rates of return, the economic payoff in agricultural research in Sub-Saharan Africa is very, very high. All of

the studies that we've looked at that have estimated rates of return show very high rates. It's not limited to Asia. It happens in Africa as well.

Let me finish, Mr. Chairman, with an observation. This is now my third visit to JICA during the last three-and-a half years, and I continue to be very impressed by the excellent work that this organization does in and for developing countries. I think the kinds of projects that you are undertaking are extremely important, and you are doing an outstanding job. You know that, but I wanted you to know that I also know that.

It seems to me that the way IFPRI can be most helpful to you is by assisting you in two ways. First, we put a lot of emphasis on understanding household behavior. Why do households do what they do? Why do they tear down the environment? Why do they not do what we think they ought to do? Why do they cut down the trees when obviously that results in degradation of the land? We spend a lot of effort trying to understand why they do what they do, and to try to identify ways in which we can change those factors that result in these kinds of behaviors. It seems to me that the results from that kind of work would be very helpful to you as you design and implement a project. This is because probably in most cases, you don't have time to actually study behavior to the extent that we do because you have to get on with the project.

The second area where I think we can be helpful is to better understand the policy environment within which your projects have to operate. It's well known to all of us that if the policy environment is inappropriate, the projects will fail. Of course if the projects are inappropriate, good policy is not going to get the job done. So, the interaction between policy and project, it seems to me, is very important. And again this is where we do a lot of our work.

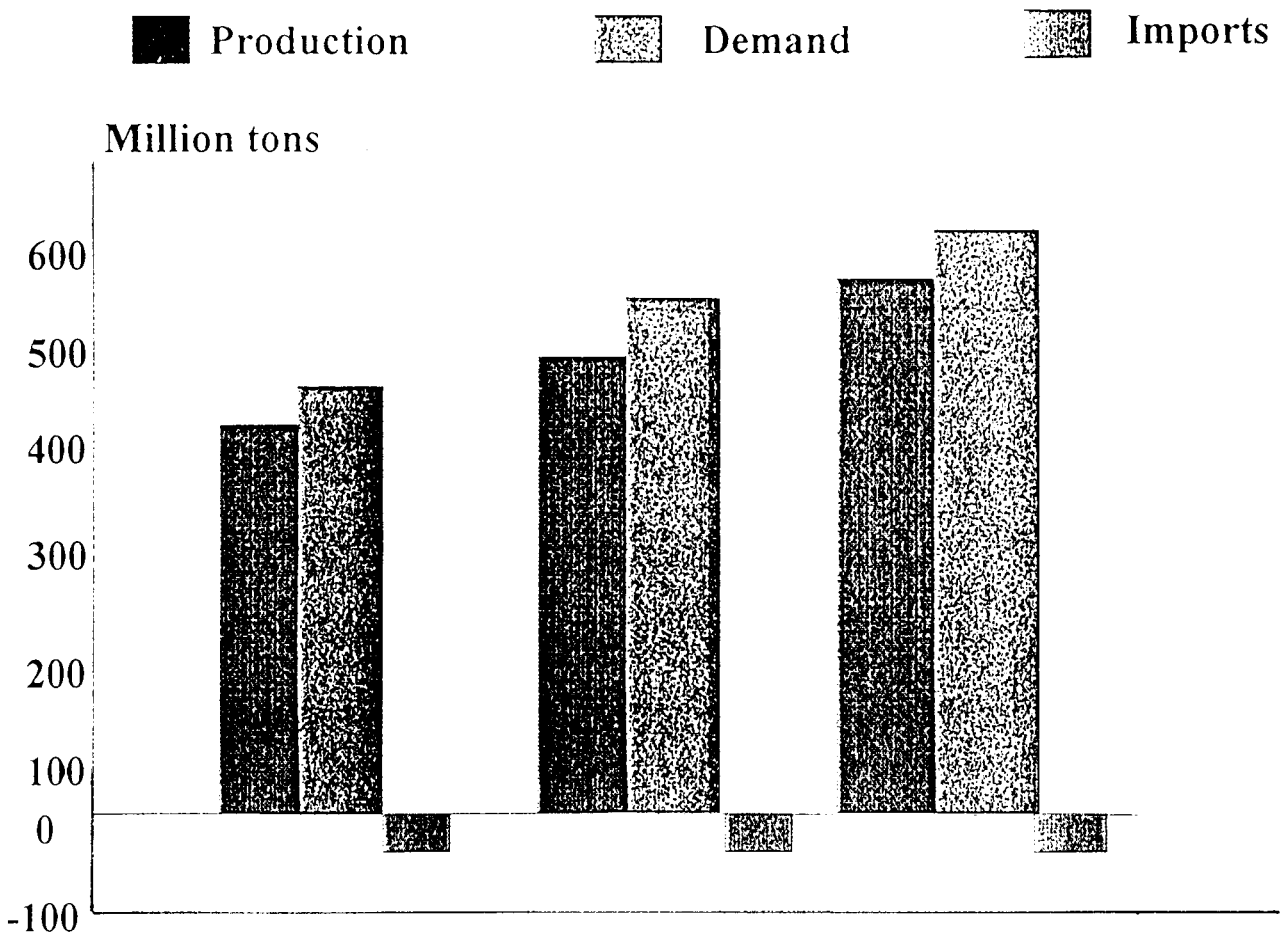
I made the same comments in earlier visits and I hope we can look for ways of strengthening our collaboration. We are collaborating with JICA in several field sites. I hope we can do even more in the future. Thank you for

arranging this meeting. It's been very illustrative and very useful for us from IFPRI.

Mr. Tsuchiya: Thank you, Doctor, for your very impressive wrap-up.

Mr. Ono: Dr. Andersen, thank you very much for your comment for wrapping up this morning meeting. And thank you very much for participating my colleagues from JICA. JICA and IFPRI have different functions. However, yesterday's session and today's morning session were very fruitful for us in implementing agricultural development projects for developing countries. Particularly, we are a little bit lacking when it comes to the long term basic direction for food and agricultural assistance under the food supply-and-demand situation relating to population and the environment. So, as Dr. Andersen stated, we would like to have a close contact with that type of research and human resource development work in developing countries for the future. Thank you very much for your participation in this morning's meeting.

資　　料



Baseline grain imports projections, 2000-2020, China

Appendix 2

WORLD PRICES IN REAL US$/MT - ALTERNATIVE SCENARIOS FOR GROWTH IN CHINA

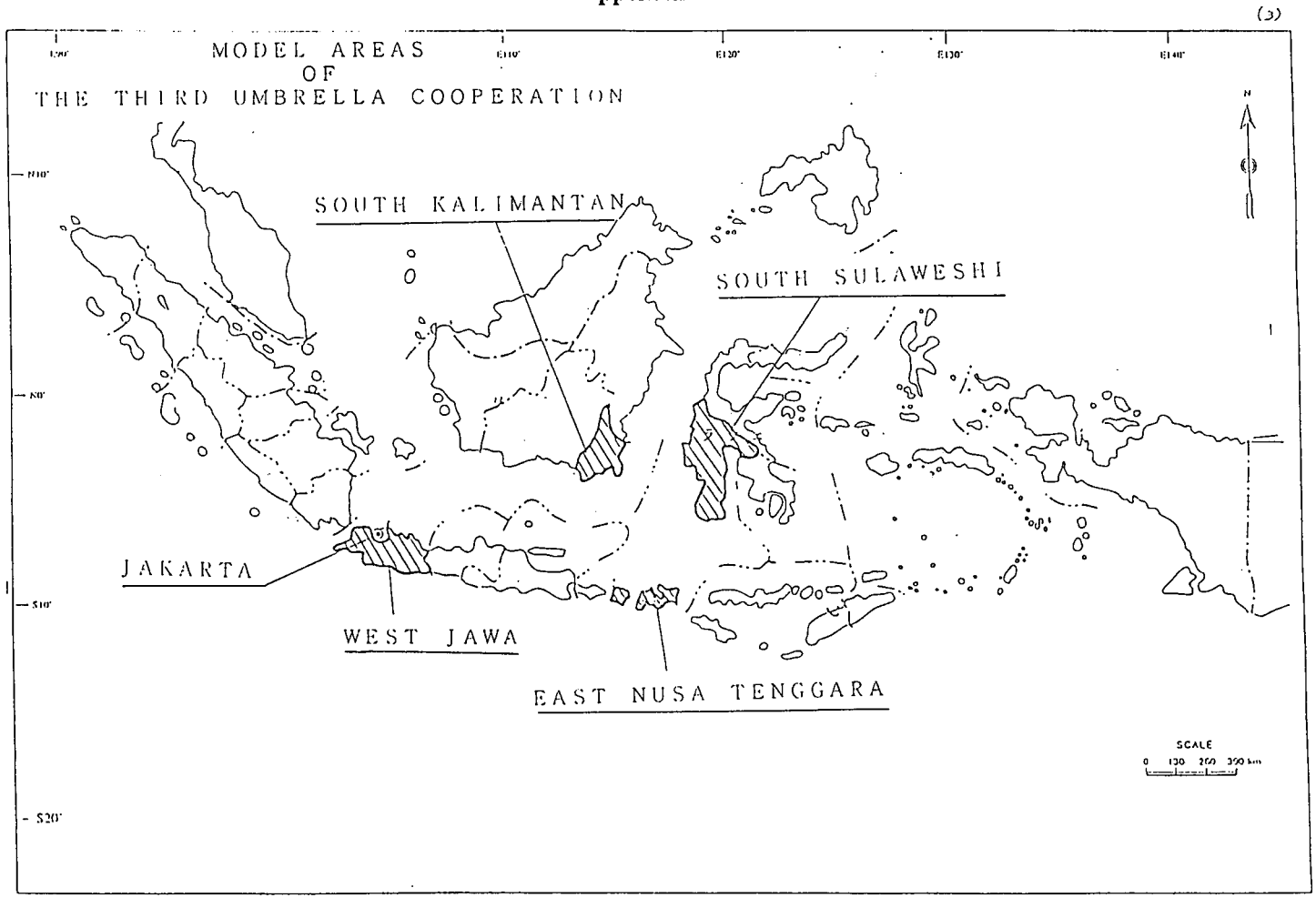
		GDP GROWTH			
		4.5%		9.6%	
	1990 Base	Trend Deg. 2020	Severe Deg. 2020	Trend Deg. 2020	Severe Deg. 2020
Wheat	156	132	142	165	178
Rice	231	186	202	196	215
Maize	109	84	92	108	119
Other Grains	89	66	69	78	82

Appendix 3

CHINA CEREAL IMPORTS - PROJECTED IN 2020

GDP Growth Rates	Trend Degradation	100% Increase in Trend Degradation
	(MILLION MT)	
4.5%	25	70
7.0%	45	87
9.6%	76	119

Appendix 4


(3)
MODEL AREAS
OF
THE THIRD UMBRELLA COOPERATION
SOUTH KALIMANTAN
SOUTH SULAWESHI
JAKARTA
WEST JAWA
EAST NUSA TENGGARA
SCALE

Community Development and Forest/Watershed Conservation Project in NEPAL

1. Objective

To improve the natural environment and land productivity,

particularly ,

- to stop the depletion of forests and other natural resources,

and

- to expand the areas of greenery in the Hill areas of Kaski and Parbad Districts

2. Methodology

Organizing an exemplary community development activities,

particularly ,

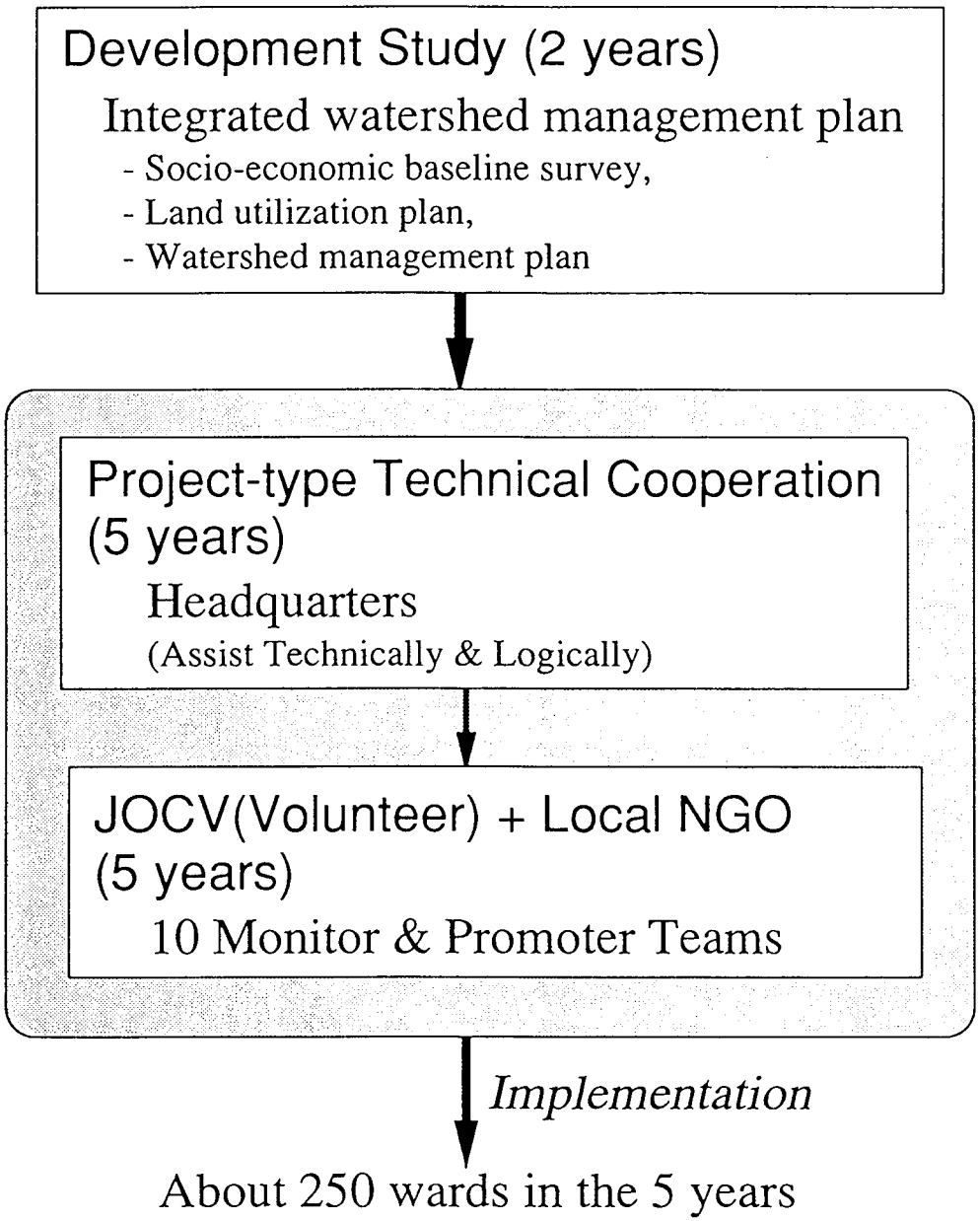
- to stop the depletion of forests and other natural resources,

and

- to expand the areas of greenery in the Hill areas of Kaski and Parbad Districts

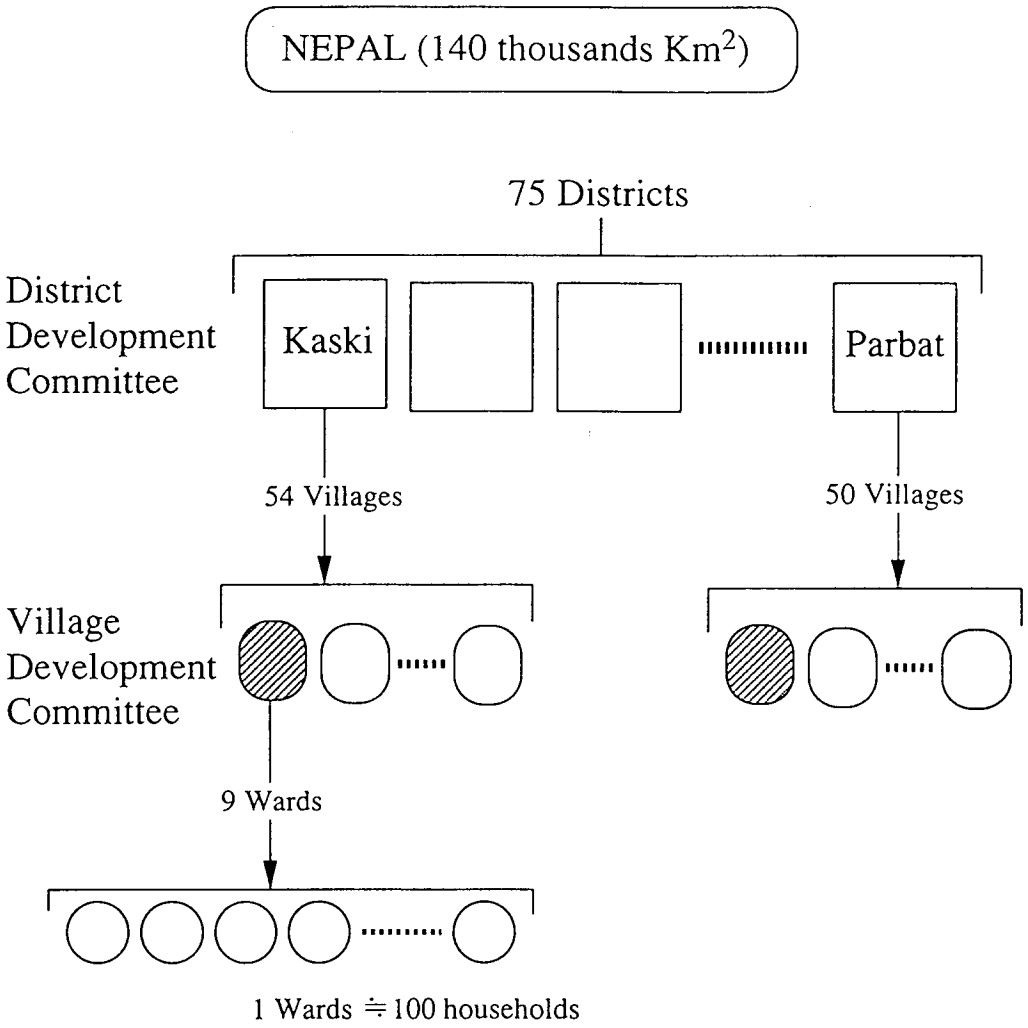
3. Overall Approach

Package approach with JICA's various schemes



Appendix 7

Administrative Strucuture



10 Monitor &Promoter Teams

4. Activity implemented by the target group

A. Community level

(1) Community infrastructure

(2) Forest/Watershed conservation

(3) Income generation

B. Inter-community level

(1) Inter-community infrastructure

(2) Forest/Watershed conservation
(Large scale watershed)

Appendix 9

Technical Assistance

1) Organization
   - Guidance
   - Coordination

2) Planning and Approval of Sub-projects
   - Information Dissemination
   - Micro Baseline Survey
   - Sub-project Formulation
   - Quick Appraisal
   - Cost Benefit Analysis

3) Preparation for Sub-project Implementation
   - Design
   - Technical Assistance
   - Institutional Development of Users Group

Logistical Assistance

1) Equipment

2) Material

Appendix 10

Reforestation

Stream Works

Hillside Works

River Wall Works

Introduction of Reformed Furnace

Construction of Walkway

Construction of Suspension Bridze

Appendix 11

AGRICULTURAL DEVELOPMENT IN KILIMANJARO, TANZANIA (by Y.Sumi, JICA)

1.History of Japanese Assistance

Japanese ODA for agricultural development in Kilimanjaro region, Tanzania, has a long history, starting from a development study in the early 1970s. And, until now, technical cooperation on irrigated agriculture (mainly on paddy) has been continued without any intervals. It was well combined with the ~~the~~ financial assistance for construction of irrigation facilities and a central building (KADP/KATC Center) with a demonstration farm. (Table 1)

2.Stages of Research & Extension

The final target of the Japanese assistance is to contribute to the agricultural development in Tanzania, focusing on irrigated rice cultivation. For this time-needing objective, research & extension activities have been done during the cooperation, which can be devided into three stages.

1) Basic research at the demonstration farm to be applied for the irrigated lower-Moshi area
2) On-farm research to eatablish an appropriate farming system for the lower-Moshi area
3) Further research for adoptable techniques in the other regions in Tanzania, with feed-backs from training & extension activities at the Center

3.Attainment of the Second Stage

We believe that the second stage has been attained. The rice production at lower-Moshi area reached 6.5 tons/ha with a selected variety IR54 and the suitable cultivation techniques on agronomy, machinery operation and water management etc.. Additionally, this cultivation system are being applied at the areas around the upper stream of lower-Moshi area, which was developed without any help from the government nor from the Project.

This condition created some water-shortage problems in the Project site itself, because of the water taking at the upper stream. But this is also a wounderful fact that encourages us about the adoptability of the developed cultivation techniques in the other areas in Kilimanjaro.

4.Requirements for Research & Extension at the Present Stage

The present stage of the Japanese technical cooperation is to extend the fine results at lower-Moshi area in Kilimanjaro region to the other regions in Tanzania. The Phase III Project (KATC) tries to develop the Center as a national center for agricultural training of government officials, extension workers and key farmers all over the country.

But, as the natural, economic and social conditions in Kilimanjaro are not common to the other regions, the research activities at the Center should be further extended to cope with the specific conditions in different parts of the country.

Presently, the followings are considered to be effective.

1) Integrated study on regional conditions for agriculture and the farming system
2) Follow-up of and feed-back from the trainees (especially on practical / on-farm problems)
3) Cooperation with the other research institutions & extension agencies

The task of the Center would be a continuous research for adoptable cultivation and farming techniques, improvement of training curriculum and the contents, and the further research for the better farming systems based on the result and feed-back from those activities.

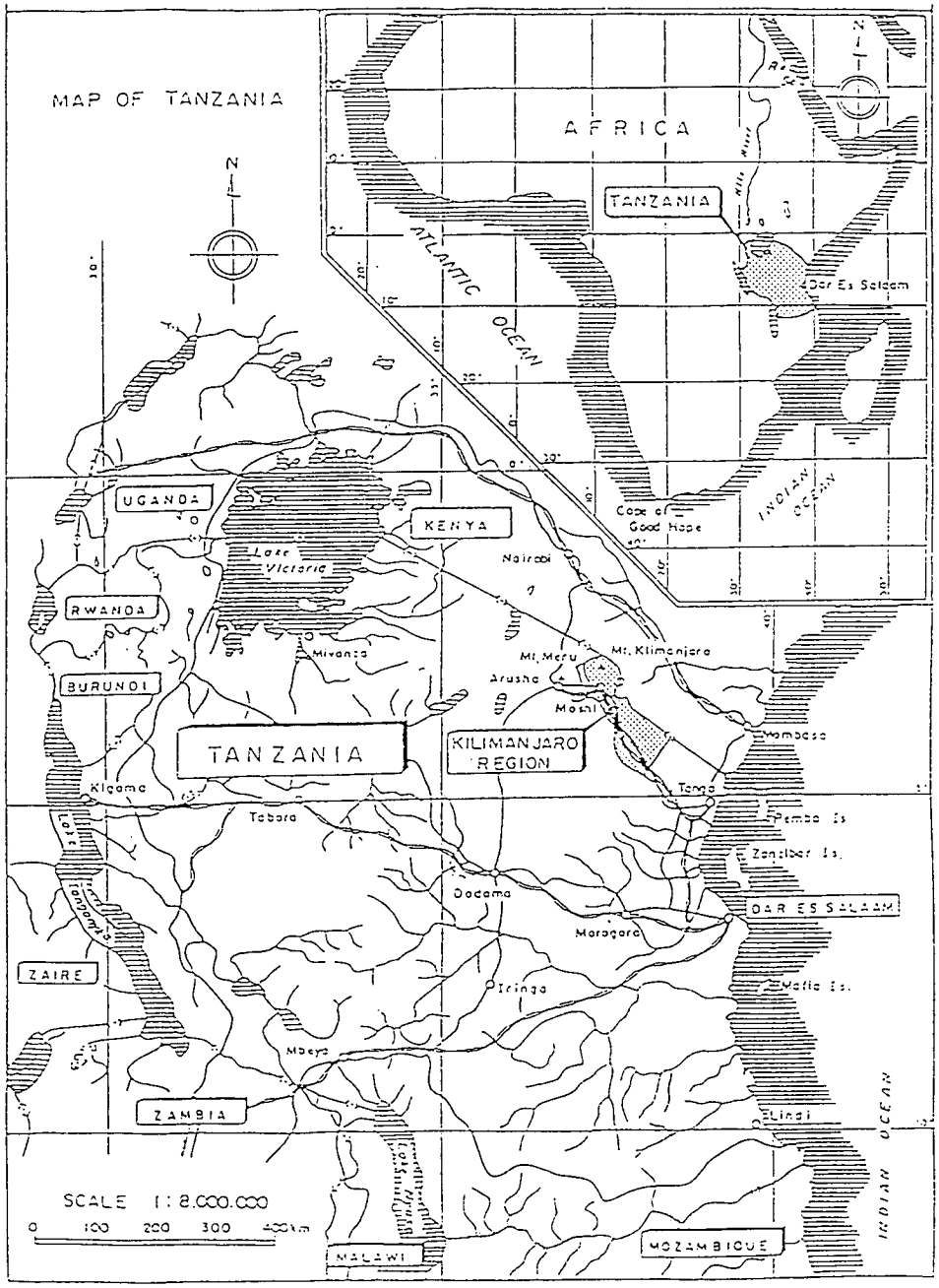
Appendix 12

Table 1: Major Projects with Japanese ODA under the Kilimanjaro Region Agricultural Development Program

Year of Assistance	Project	Content of Assistance
1974-1978	Formation of Kilimanjaro Integrated Development Plan	Dispatch of experts & study team
1978-1986	1st Pro-Gikyo: Kilimanjaro Agricultural Development Center (KADC) Project	Comprehensive technical cooperation
1979-1980	Feasibility Stydy for Lower Moshi Area Agricultural Development Project	Dispatch of study team
1979-1981	Construction of KADC facilities	Grant financial aid
1982-1984	Feasibility Study for Mkomazi Valley Area Irrigation Development Project	Dispatch of study team
1982-1987	Execution of Lower Moshi Area Agricultural Development Project (Land improvement with irrigation & drainage of 2,300ha)	Yen loan
1986-1993	2nd Pro-Gikyo:Kilimanjaro Agricultural Development Project	Comprehensive technical cooperation
1987	Improvement of post-harvest facilities in Kilimanjaro region	Grant financial aid
1987-1988	Execution of Ndung Agricultural Development Project (a component of Mkomazi Valley Project) (Land improvement with irrigation & drainage of 680ha)	Grant financial aid
1993-Present	Follow up of the 2nd Pro-Gikyo	Dispatch of experts
1994-Present	3rd Pro-Gikyo:Kilimanjaro Agricultural Training Center (KATC) Project	Comprehensive technical cooperation

Appendix 13

Fig. 1: Kilimanjaro Region, Tanzania



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