

第4章

現況資源アセスメント及び 将来予測

第4章 現況資源アセスメントおよび将来予測

4.1 まえがき

人口および家畜頭数の増加がもたらす水資源、土地資源、森林資源等への圧力は、自然環境のバランスが不安定な ASAL 地域において特に注意を払うべき課題である。調査対象地域に住んでいる人々は、PRA および RRA の結果を参照する限り自然環境の悪化を認識しているが、その一方では住民は食料・水の確保や家畜の病気等により緊急的な課題の解決に意を注ぐため、地域全体の環境問題に対しては受け身的になりがちである。

本章では、調査対象地域現況の資源を評価し、仮に施策やプロジェクトによる介入ならびに地域住民による行動がなかった場合の将来における地域資源賦存量変化の予測を行い、調査対象地域の将来像について検討を行う。現況資源のアセスメントおよび将来予測は、貴重な天然資源の管理を考慮した地域開発の枠組み作りに寄与し、調査対象地域における農村開発の方向を示すための一指針となる。

4.2 現況資源アセスメント

4.2.1 食料

食料の生産基盤である土地は、主として土壌浸食の進行により状況が悪化している。土壌浸食は、家畜の過放牧およびこれまでの人口増による薪炭、家屋への木材需要増に伴う草木の減少によって加速されている。Marigat、Ngambo および Eldume においては裸地が多く見られ、表土が風食されている。調査対象地域底部の肥沃な土壌地帯である沖積土壌地帯においても、ガリー浸食による被害が広がっている。

半乾燥地域に特有である不安定で少量の降雨は、調査対象地域の天水農業地区だけでなく灌漑農業地区においても干ばつ被害を頻繁にもたらしている。降雨不足は河川水の減少を引き起こすため、例えば 2000 年の干魃においては天水農業地区はもちろんのこと Kiserian 等一部の灌漑地区においても収穫皆無を引き起こした。住民は食料難に見舞われた時、主食のメイズの代わりに *Balanytes aegyptica* や *Boscia coriacea* といった常緑樹の種、Ginoy と呼ばれるバリンゴ湖に成育する藻類等を食したりする。また、政府より支給される緊急食料援助に大きく依存することとなる。

現在の調査対象地域人口と耕作面積を考慮し、穀類（メイズ、ミレット、ソルガム）の調査対象地域内での自給率を算定すると、以下に示すように 43%となる。なお、牧畜を主体とする人々の主食は家畜のミルク（乳が減少する乾期には血が加わる）であるため、実際の自給率は若干高いものと思われる。しかしながら、多くの住民の主食である穀類は食料援助を含めて域外からかなりの量が調達されている現状にある。このため、調査対象地域の農民は、食料確保のため灌漑農地を可能な限り拡大しようとしている。

$$\text{穀物自給率} = \frac{\text{穀物生産量}^*}{\text{人口} \times 1 \text{人あたり消費量}} = \frac{2,309,000 \text{ kg/年}}{54,202 \text{ 人} \times 100 \text{ kg/人}} = 43 \%$$

* メイズ(2,253t)、ミレット(42t)、ソルガム(14t) 資料編 I、TableI.3-3 参照。

4.2.2 水

調査対象地域の主要水源は、河川、湖、泉等の地表水である。深井戸や浅井戸により地下水を汲み上げることは可能であるが、深層地下水はフッ素を多く含有しているため水質上の問題がある。調査対象地域における地表水の特徴は以下の通りである。

- 年平均降雨量は約 600mm である。
- 年間蒸発散量は 2,000～2,200mm であり、降雨量の約 3 倍である。
- バリンゴ湖は調査対象地域最大の水源であるが、フッ素を多く含むため水質上飲料水には適さない。
- 灌漑用水は全て河川から取水され、バリンゴ湖からの直接取水はない。
- 主要河川の流出係数は、0.1 以下である。
- Molo、Arabal および Perkerra の 3 河川を除く河川は季節河川であり、かつパンなどに見られる地表集水は年間を通じて使用できない。

図 4.2.1 はバリンゴ湖の水位と集水域の降雨量の推移を示しているが、バリンゴ湖の水位は低下傾向にあることが判る。バリンゴ湖の水位は、1970～80 年代では集水域の降雨量にほぼ相関していたが、1990 年代になると降雨量は不足した 90 年代初頭から回復基調にあるにも係わらず、バリンゴ湖の水位は上昇せず低迷している。これは、主としてバリンゴ湖流域内の灌漑地区の拡大によるものであり、灌漑農業の進展はバリンゴ湖の水位低下を加速するものと考えられる。

過去の水資源調査結果に基づき、バリンゴ湖における現況水収支を算定すると次の通りである。すなわち、年間あたり流入量 318MCM に対し、水利用、蒸発量、浸透量から構成される年間あたり流出量は 358MCM と流出が流入を上回っている。

$$\begin{aligned} \text{湖への流入量} & : 230(\text{河川流入}) + 88.2(\text{湖への降雨}) = 318.2 \text{ MCM} \\ \text{水系からの流出量} & : 22.8(\text{取水}) + 308.7(\text{蒸発}) + 26.5(\text{地下浸透}) = 358.0 \text{ MCM} \end{aligned}$$

$$\text{水収支} = \frac{\text{水源 (流入量)}}{\text{取水量} + \text{蒸発散} + \text{浸透量}} = \frac{318.2 \text{ MCM}}{358.0 \text{ MCM}} = 89 \%$$

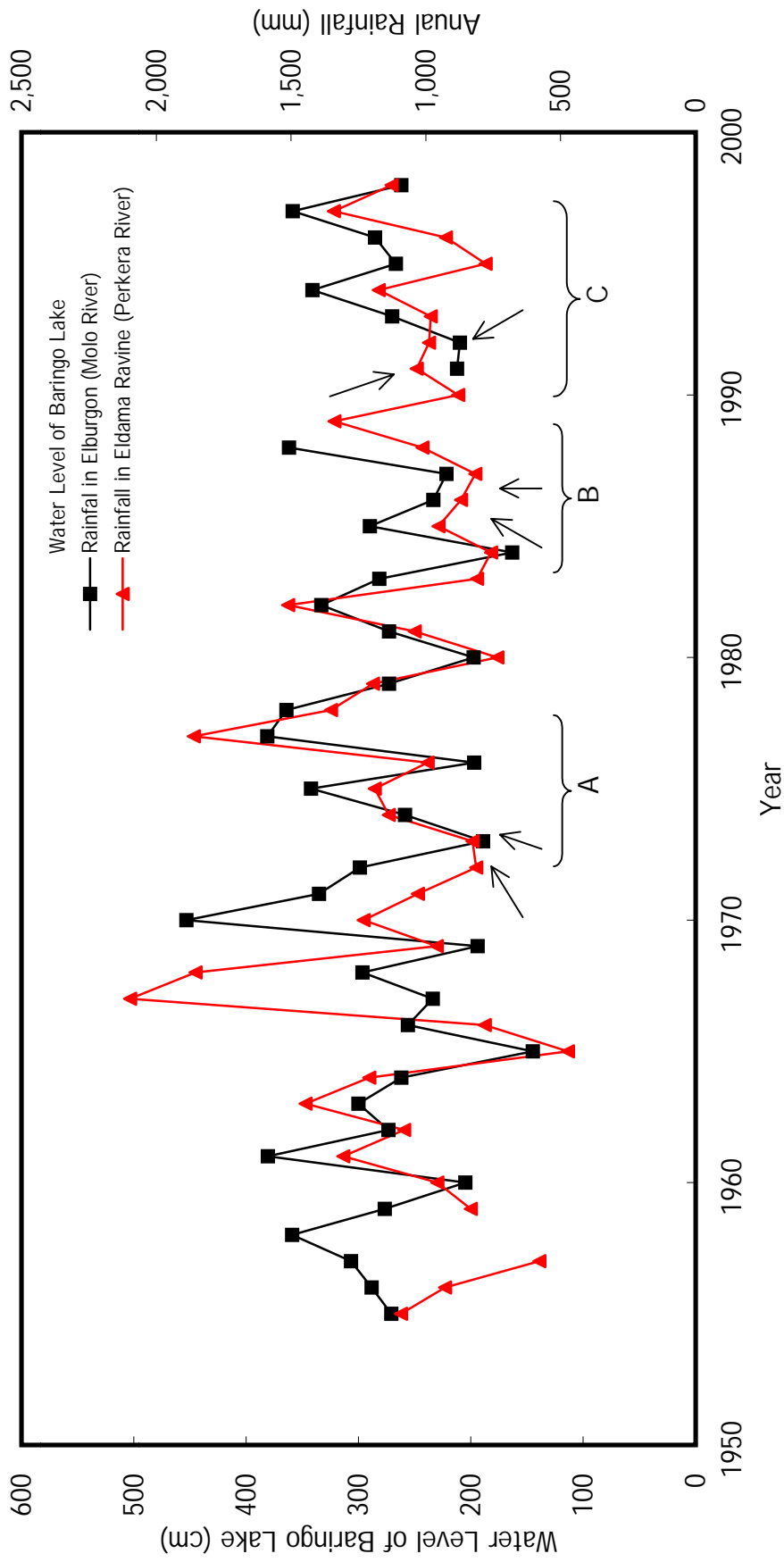


図 4.2.1 年間降雨量及びバリンゴ湖の水位変動
(データ出典: 環境・自然資源省)

4.2.3 飼料（草木）

調査対象地域が属するバリンゴ県は、山羊の頭数が多い点に特徴がある。バリンゴ県の1998年における山羊の頭数は約89万頭であり、リフトバレー州ではツルカナ県に次いで第2位である。一方、頭数密度で見ると、バリンゴ県の山羊の頭数密度は83頭/km²であり、これはツルカナ県の2.5倍に相当する（表4.2.1参照）。

調査対象地域の1998年における家畜頭数は、牛が62,000頭、山羊が230,000頭および羊が55,000頭であるが、調査対象地域の山羊の頭数はバリンゴ県総頭数の26%を占め、頭数密度においては188頭/km²とかなり高い値を示している。山羊は、草地の少ない地域においても灌木の新芽を食し、より過酷な環境においても飼養できる家畜であるが、生長点に達する前の草芽をも食べるため、草地の荒廃を促すこととなる。

表 4.2.1 山羊の県別頭数密度（1998年）

District	Area (km ²)	No. of Goats	Density (head/km ²)
Baringo	10,790	890,120	83
Marakwet	2,722	74,158	28
T/Nozia	2,468	17,500	8
U/Gishu	3,784	70,272	19
Nakuru	7,200	69,812	10
Laikipia	9,718	241,450	25
Narok	18,513	572,372	31
Turukana	64,048	2,062,500	33
Kericho	4,890	50,229	11
Kajiado	21,105	636,768	31
W/Pokot	5,076	256,948	51
Samburu	20,809	535,131	26
Nandi	2,745	23,625	9

出典：面積：Statistical Abstract 2000、頭数：リフトバレー州畜産局1998年年次報告

調査対象地域の放牧地は、最大に見積もった場合、地域総面積の約85%を占める104,530haである。調査対象地域の家畜の平均体重は牛が167kg、山羊および羊が30kgであり、これらはLivestock Union (LU)単位で各々0.53LU、および0.1LUと算定される。したがって、2000年の調査対象地域の家畜頭数は、牛が34,185LU（64,500頭）、山羊および羊が34,360LU（343,600頭）の合計68,545LUと算定される。

自然放牧地の飼養頭数率を0.5ha/LUと仮定すると、調査対象地域での飼養可能頭数は52,265LU（104,530ha×0.5LU）となる。この飼養可能頭数は、調査対象地域現況家畜頭数68,545LUを下回っており、現況においても既に過放牧状態であることが判る。実際に、調査対象地域東岸丘陵地の住民は、特に乾季においてバリンゴ県の県境を越えて放牧に出かけている。

$$\text{飼料自給率} = \frac{\text{地域で飼養可能な家畜頭数}}{\text{現況家畜頭数}} = \frac{52,265 \text{ (LU)}}{68,545 \text{ (LU)}} = 76 \%$$

4.2.4 森林

ケニアにおける燃料源の70%は木材である。木は農村で薪として料理や暖をとるために使用され、また市街地では炭の材料として使用される。調査対象地域においてはほとんどの住民が薪を使用しており、炭は Marigat や Kampi ya Samaki の市街地で僅かに使用されているのみである。薪の不足は、自然環境や農村社会の不安定をもたらし、牧畜や農業の営みにも影響を与えることとなる。

現況の薪の過不足状況を、ロケーション別に次図に示す。左の棒グラフは薪の消費量に対する地域全体の樹木再生量、右の棒グラフは薪の消費量に対する地域で採取可能な樹木再生量を示す。樹木の採取可能範囲は、地形図および現地調査による検討から約70%とした。調査対象地域の薪の過不足算定において、単位薪消費量および単位樹木再生量は表に示すとおり地域別に各々0.6~1.0 cum/人/年、0.5~0.8 cum/ha/年とした。

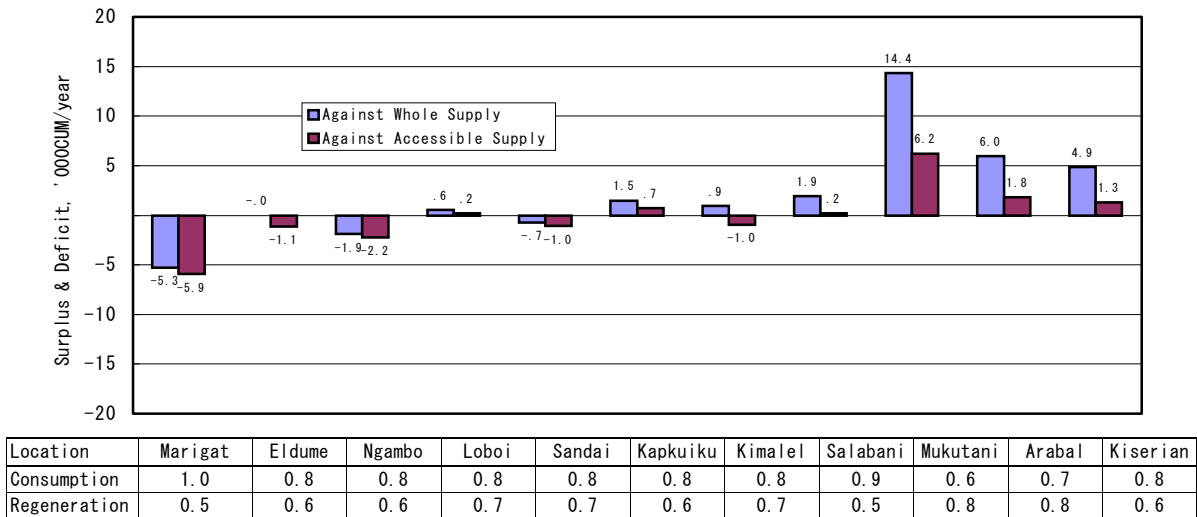


図 4.2.2 Location 別薪の過不足状況 (1999 年)

図に示されるとおり、Marigat 郡のほとんどのロケーションでは、薪消費量が樹木の再生量を上回っており、樹木再生に負荷がかかっている。一方、Mukutani、Arabal および Kiserian 等のロケーションが含まれる Mukitani 郡では、樹木の再生量が薪消費量を上回っている。なお、ロケーション別では樹木に余剰があっても、ロケーション内で局地的な薪の不足が報告されている。例えば、Salabani Location の Kampi ya Samaki 周辺地区では深刻な薪不足が報告されている。調査対象地域全体としての薪消費量と樹木再生量のバランスを計算すると以下に示すように僅かに不足を示す。

$$\text{森林需給: } \frac{\text{樹木再生量(採取可能範囲)}}{\text{薪消費量}} = \frac{44,650 \text{ m}^3}{45,477 \text{ m}^3} = 98 \%$$

4.3 将来予測

現況資源のアセスメントの結果、調査対象地域内で考えた場合、水、草、森林等のいずれの自然資源も再生産量以上に消費されている状況であることが判明した。消費量に対する再生産量の比率は水資源で 89%、草が 76%、そして薪は 98%である。このような状況下調査対象地域の年平均人口増加率は約 5.5%と高く、家畜も去勢等のコントロールなしでは現在の増加傾向が今後も続くものと予想される。

自然資源圧迫への基本要因である人口と家畜頭数を、仮に何の施策もとられなかった場合の伸びを予測し、また、人口増に伴い食糧確保のため灌漑農地が拡大され、2020 年までに利用可能な河川水を最大限灌漑用水に利用すると仮定して、調査対象地域の将来像を検討する。人口予測は、バリンゴ県の年齢別人口データを参照にコーホート分析を適用し、家畜頭数は最近年の増加率を参照して予測を行う（資料編表 L.2-4 参照）。各指標の予測値は次下表の通りである。

表 4.3.1 人口および人口関連指標の予測

年	2000	2005	2010	2020
人口	54,202	71,412	94,132	163,323
家畜頭数 (LU)	68,545	87,175	100,700	116,195
薪消費量 (m ³)	45,477	59,916	78,977	137,031
灌漑農地面積 (ha)	1,904	2,311	2,845	4,447
水利用量 (MCM)	22.8	33.5	47.5	88.9

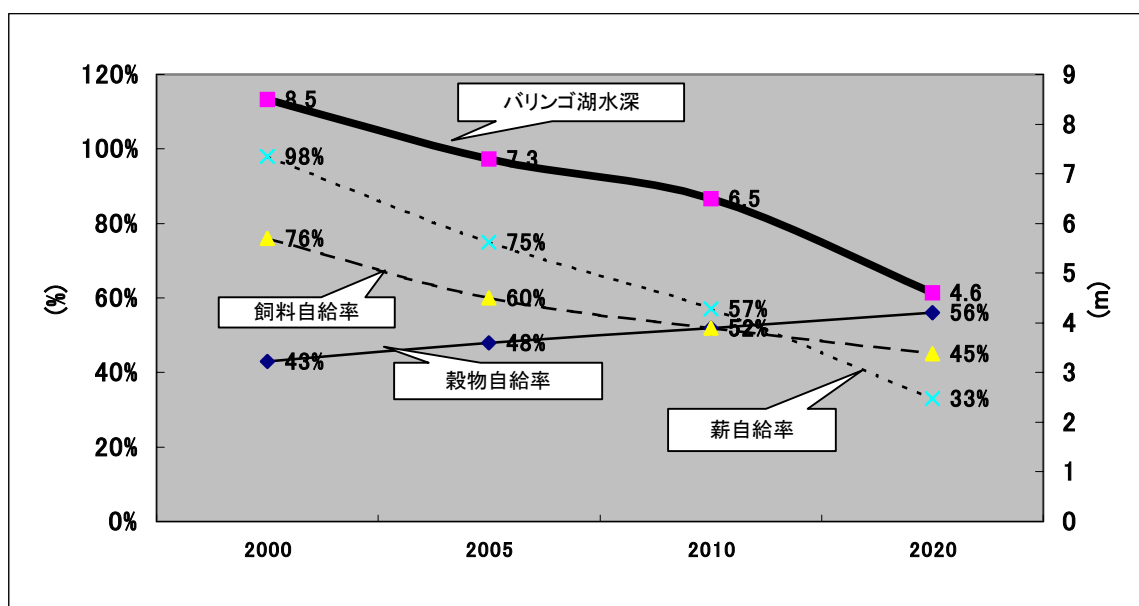


図 4.3.1 施策がない場合の資源の賦存量予測

上表に示されるように、2020 年までに高い人口増加率により人口は約 3 倍に達する。また、家畜頭数は約 1.7 倍となる。人口増大に伴い薪消費量は急激に増大し、水利用量

も増加する。このようにして、調査対象地域内での資源自給率は食料を除き激減する。食料については、利用可能な河川水を最大限に灌漑に用いた場合、56%の域内自給率となる。しかしながら、灌漑による多量の水消費のため、バリンゴ湖は2020年までに水深が約半分となることが予測される。

資源の甚大なる消費は、環境劣化をもたらす。薪の甚大な消費、家畜の過放牧は植生の劣化をもたらす。植生の劣化は土壌浸食の拡大を促すこととなり、そして土壌浸食の拡大はバリンゴ湖への土砂流入を促し、バリンゴ湖の水位の更なる低下をもたらす。また、農耕の可能な土地が制限され、家畜は小型化し、かつ調査対象地域で盛んな養蜂もその蜂蜜源が植生劣化により減少することから生計手段が不安定となる。

バリンゴ湖の将来予測によると、2020年までに水位は水利用の増大により現況の半分となる。また、土壌浸食による土砂流入等、最も厳しい要因を考えた場合、バリンゴ湖は将来的に干上がることも懸念される。バリンゴ湖は、内水面漁業や観光業によって地域経済に寄与する重要な地域資源であり、バリンゴ湖の環境劣化は地域経済に強い影響を与えることが予測される。

バリンゴ湖の水位低下は確実に漁獲高に影響する。それは過去にも地域で経験されている（第3章、3.2項参照）。近年バリンゴ湖の魚体の小型化も報告されており、すでに過剰な漁獲がなされていると考えられる。バリンゴ湖の水位低下とそれによる漁獲高の減少は、更なる過剰漁獲を促すこととなる。また、バリンゴ湖には毎年多くの観光客が訪れ、その観光収入は地域を潤している。County Councilのバリンゴ湖入場料収入は1999年に140万Ksh、バリンゴ湖畔のホテル、Lake Baringo Clubは同年に80万ドルの売り上げを記録している。バリンゴ湖の水位低下は、野生動物の生息環境を破壊し、その数を減少させることから観光ビジネスにも重大な影響を与えることとなる。

第 5 章

開発フレームワーク及び 実証調査事業

第5章 開発フレームワークおよび実証調査事業

5.1 開発フレームワークならびに総合プログラムの策定

5.1.1 トップダウンアプローチとボトムアップアプローチ

本調査で策定するマスタープランは、調査対象地域の住民の生活水準向上を目的とした農村開発計画である。本計画は調査対象地域内のコミュニティー、ケニア政府職員および関連するステークホルダーとともに策定する。本計画は地域住民の主体的な参加のもと策定するが、このボトムアップアプローチとともにトップダウンアプローチも合わせて採用する。トップダウンアプローチにより、調査対象地域を越えた広域で考えた場合の地域開発計画との整合をとれるとともに、かつ環境容量に配慮した調査対象地域の開発将来像を描くことが可能となる。

ボトムアップアプローチでは参加型のワークショップを通じてコミュニティーベースのプロジェクトが選択される。これらプロジェクトの遂行・達成により、現在、人々が直面している問題は解決されるであろう。しかしながら、その解決が不用意に近視眼的であったり、また地域的に限定されたものである可能性を否定できない。例えば、一例として限られた水資源の中で下流部への影響を考慮することなく実施される上流部での灌漑開発などが挙げられる。調査期間中に実施した種々のワークショップを通じて、調査団からの住民に対する介入がいくらかなされたものの、コミュニティーベースのプロジェクトをより広域的なバランスを考慮した上で再検討し、マスタープランの中に位置付けることが必要となる。

参加型ワークショップの傍ら、調査団は調査対象地域全域を眺めつつ、また関連する開発計画のレビューや過去のプロジェクトからの教訓を得てきた。これは、コミュニティーの境界を越える幅広い地域に関する理解を深める。また、調査団は第4章にて述べたように地域住民の持つ資源に関するアセスメントを実施し、介入がなされない場合の、これら資源の将来像の予測も行った。これらの試みは他地区とのバランスのとれた開発計画策定に資すると共に、調査対象地域の環境容量を規定するフレームを提示する。開発計画はこのフレームの中で策定する必要があるが、これはトップダウンアプローチの一部といえる。

上記のことを背景に本件調査では両面からのアプローチ（トップダウンとボトムアップ）を用いてマスタープランを策定する。図 5.1.1 は両者のアプローチとマスタープラン策定を概念的に示すものである。ボトムアップアプローチは、一例として図の右半分に示す PCM ワークショップで策定されたツリーの様式に示すことができる。一方、トップダウンアプローチは、図の左側に示されるように従来型のセクター別開発アプローチとして示される。このセクター別開発計画は、参加型ワークショップの結果も参照するが、さらに環境容量や他地区とのバランス等を考えた上で各専門分野からの見解を基礎として策定されるものである。そして、両アプローチの中で一致したプロジェクトやプログラムが緊急事業や短期開発計画の一部を構成することとなる。

5.1.2 知識の共有と地域資源管理

『知識・経験の住民との共有』ならびに『資源管理』は本開発計画を策定する上で極めて重要な位置を占める。調査団は RRA、PRA や PCM ワークショップを通じて住民と共同でプロジェクト策定を開始した。これは、セクター別開発計画を策定するにあたって、コミュニティの経験や知識を反映することが可能となることを意味する。一方、資源管理は調査対象地域が ASAL 地域に属することより、マスタープラン策定にあたってはクリティカルな条件ともなる。本件調査対象地域の資源は、その再生可能量と消費量が現状ではほぼバランスあるいは既に過剰消費の状態に陥っている。それ故、本マスタープランで策定する開発計画は資源の新たな開発や消費を伴うものではなく、資源の管理に基礎を置くものとする。すなわち、図 5.1.1 に示されるように、トップダウンアプローチとボトムアップアプローチの両者を繋ぐ点に知識と経験の共有が、また全体のフレームを規定するものとして資源管理がある。

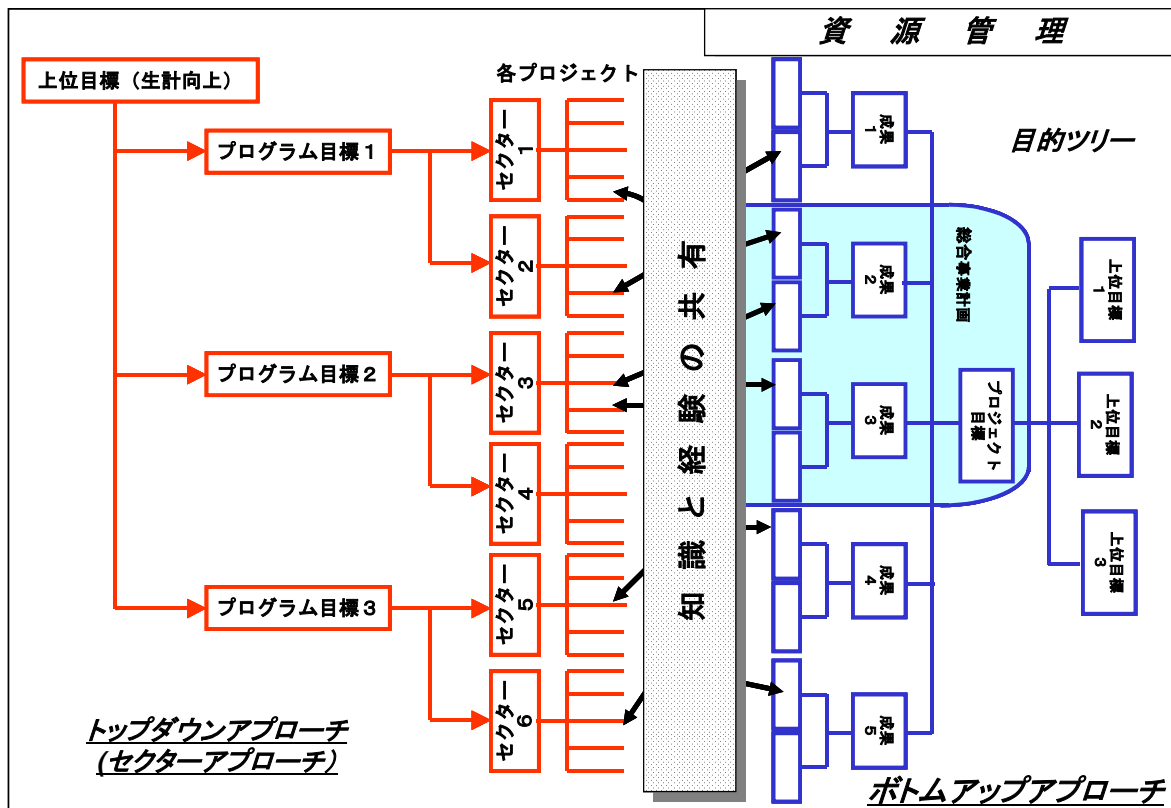


図 5.1.1 マスタープラン策定の概念図

5.1.3 各分野の総合

本マスタープランにおける各セクターの位置付けを図 5.1.2 に示す。マスタープランの基本となる三つの柱は、開発の最終目標である「生活の質の向上」を実現するための『生計向上』（農業、小規模産業および牧畜）、生計向上を実現するための地域住民の『能力向上』（農民組織・農民社会および人的資源開発）、そしてそれらの基礎となる行政システムによる『生活基盤』（保健衛生、農業・生活基盤、教育・訓練）の提供である。開発の中心となるのはあくまでも地域住民の『能力向上』であり、マスタープランの基本

条件となるのは「環境と資源管理」である。このような枠組みの下に各分野の開発計画の総合化を図る。

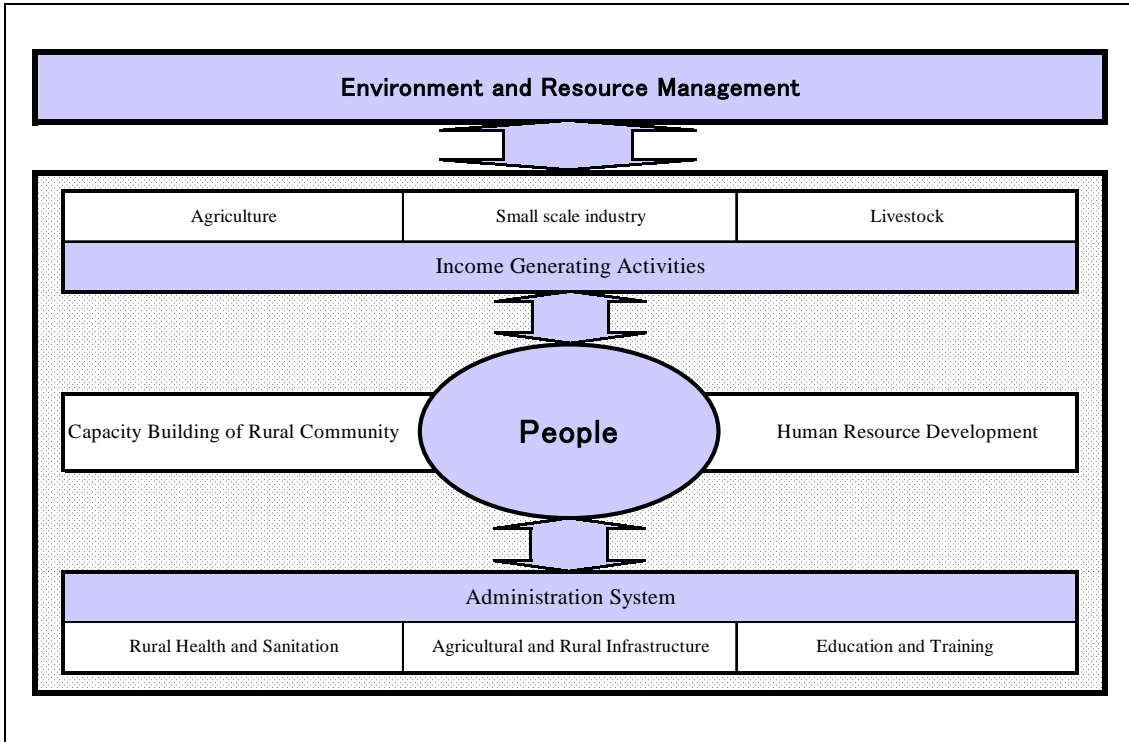


図 5.1.2 マスタープランにおける各セクターの位置付け

5.1.4 開発期間の設定

マスタープラン策定にあたっては短期、中期および長期からなる“時間フレーム”を規定する必要がある。緊急に実施する必要があるプロジェクトは、負の影響が生じない限り、通常、短期開発期間の中に高い優先度をもって位置付けられる。この意味に置いて、ワークショップで策定されたプロジェクトのほとんどは短期開発計画に相当する。本マスタープランでは短期を5年、中期を続く5年、そして長期をその次の10年と規定する。なお、これらの開発タームは順次実施されていくプロジェクトの結果をフィードバックしながらレビューする必要がある。

- 短期開発計画: 1年目から5年
- 中期開発計画: 6年目から10年目
- 長期開発計画: 11年目から20年目

5.1.5 暫定マスタープラン

調査団は、JICA 事前調査の PCM ワークショップで作成された問題分析・目的分析、従来型の調査や PRA ワークショップの結果、さらに中央レベルでのワークショップ、カウンターパートとの議論の結果を考慮して、暫定的な開発フレームワークを準備した。

そして、各地区で実施した PCM ワークショップの問題分析・目的分析を参考に、それを再整理したものが以下に示す図 5.1.3 である。この開発フレームワークでは、「半乾燥地域の村人の生活が向上する」という上位目標に対して、1)村人の所得が向上する（所得向上）、2)村人が適切な公共サービスを受けられる（BHN 確保）、3)貴重な環境と資源が保全される（環境保全）、4)行政組織が強化される（行政システム強化）、という 4 つのプログラム目標を設定している。

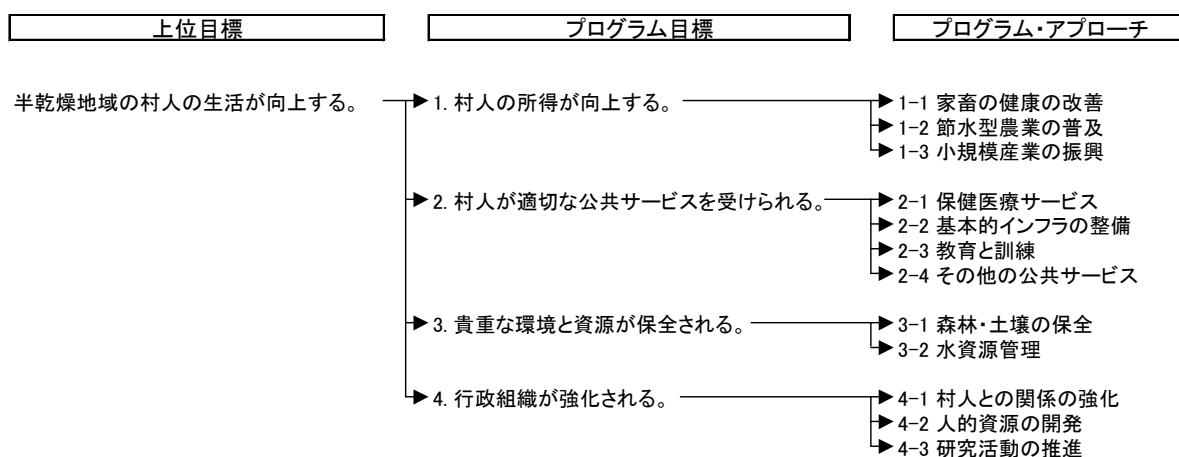


図 5.1.3 半乾燥地開発フレームワーク

本調査においては、上記の開発フレームワークの下、第 1 段階としてトップダウンアプローチおよびボトムアップアプローチの両者を組み合わせて暫定マスタープランを策定する。そして、その暫定計画の短期プログラムの中から幾つかの小規模事業を選択して実証調査事業として実施する。実証調査事業の目的は、暫定開発計画策定時における開発戦略／アプローチ、適正技術、実施組織等の仮定を、実際の事業実施を通して検討することにある。実際の事業の実施を通して得られる有用な教訓とともにこれら仮定を評価の上、暫定マスタープランにフィードバックして最終マスタープランを策定する。図 5.1.4 はマスタープラン策定方法の流れを示すものである。

図 5.1.5 に暫定マスタープランを示す。横軸に調査対象地域のクラスターを、また縦軸に短期、中期、長期といった時間フレームをとり、各々の地区と開発期間に対して想定される開発プロジェクトやプログラムを配置している。PCM ワークショップで提案された、例えば家畜改善やパン（ため池）の改修などは当初の 5 年間である短期開発期間に位置される。また、改良かまどはワークショップでは提案されなかったものの、地域の環境状況を考慮の上、調査団主体にて組み込んだプログラムである。

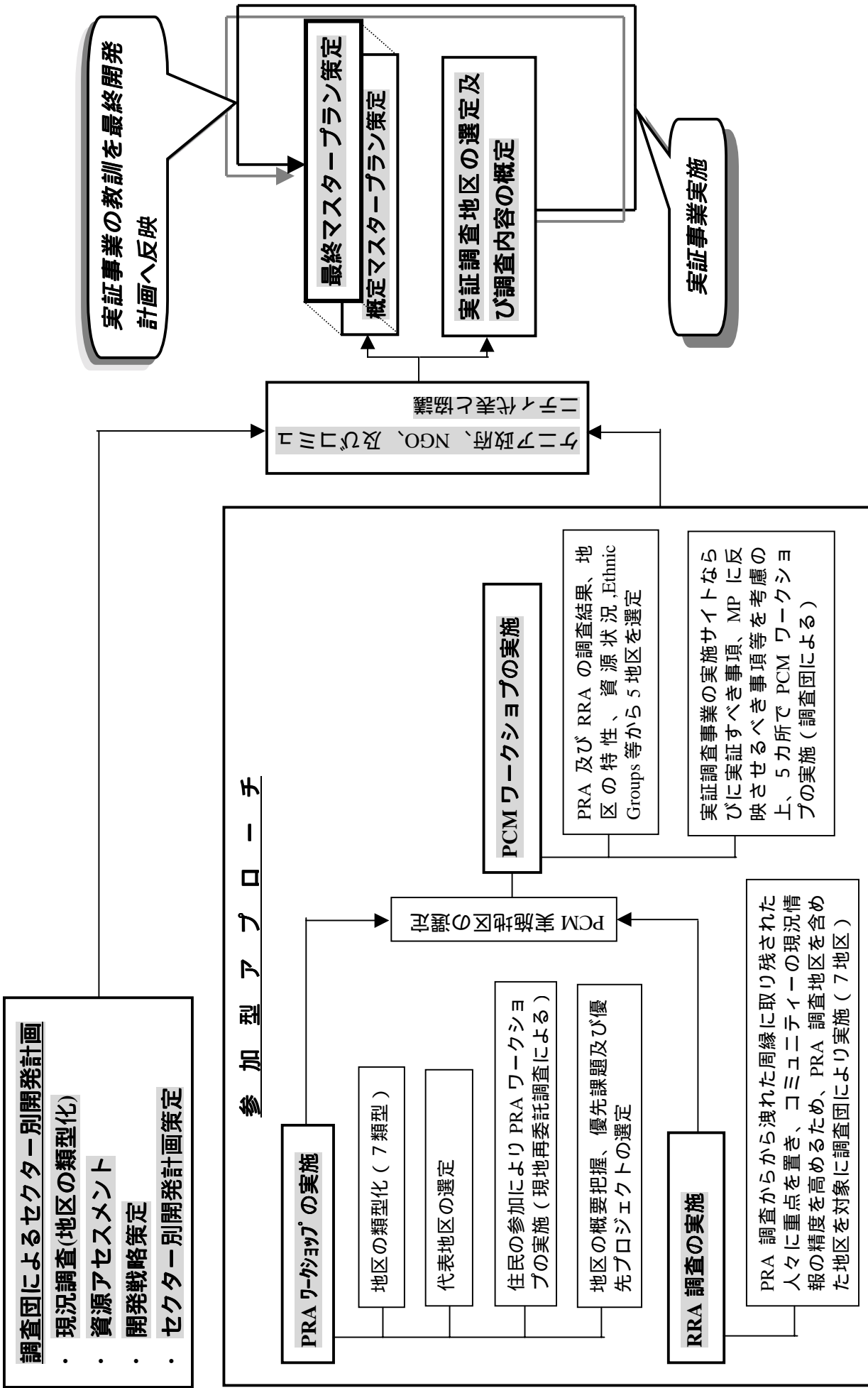


図 5.1.4 マスタープラン概念の手順

クラスター	A		C		D		F		G	
ローション	Margat		Salabani		Sandai/Lohoi/Kapukukui		Kserian / Mukutani		Arabai	
特徴	コスモポリタン、商業地		湿地帯、農業地帯		湿地帯、農業地帯		伝統的牧畜生活		牧畜中心、新規入植地	
地形										

生活水準の向上

	短期計画	中期計画	長期計画
短期計画 蜂蜜容器改善 皮革マーケティング 侵食土壌のリハビリ 上水供給事業(既存設備利用)	KARIRCCの強化 Margat Veterinary Officeの強化 家畜優良種雄スキーム 皮革マーケティング Margatヘルスセンターの強化 MYP支援(道具改良) 改良カマドの導入 屋敷地内植林 電化普及	牧草地改善 手工芸振興 侵食土壌リハビリ 電話設置	天水農業の改善 家畜衛生改善 蜂蜜容器改善 早期教育開始(幼稚園)の支援 侵食土壌のリハビリ 道路の改良
中期計画 天水農業改善 牧草地開発 社会林業 放牧地のリハビリ 家畜衛生改善 家畜優良種雄スキームの普及 蜂蜜ワックス利用(準備) 改良カマドの導入 侵食土壌のリハビリ	牧草地開発 社会林業 放牧地のリハビリ 家畜衛生改善 家畜優良種雄スキームの普及 ダチョウ農場 改良カマドの導入 屋敷地内植林 流域保全関連機関の強化 水管理組織の強化 飲料水の供給	灌漑農業の改善 牧草地開発 社会林業 放牧地のリハビリ 家畜衛生改善 家畜優良種雄スキームの普及 蜂蜜ワックス利用(準備) 改良カマドの普及 ハン集水域の保全 流域保全関連機関の強化 水管理組織の強化 電化普及	社会林業 放牧地のリハビリ 家畜衛生改善 家畜優良種雄スキームの普及 蜂蜜ワックス利用(準備) ハン集水域の保全 個人小規模牧草地の設立
長期計画 家畜マーケティング ハン集水域の保全 集水域の資源アセスメント	食肉加工施設の設置 ハン集水域の保全 集水域の資源アセスメント 飲料水の供給	家畜マーケティング 個人小規模牧草地の設立 集水域の資源アセスメント 道路の改良 電化普及	灌漑農業の改善 天水農業の改善 牧草地開発 社会林業 放牧地のリハビリ 家畜マーケティング 改良カマドの導入 個人小規模牧草地の設立 電化普及 電話設置

図 5.1.5 地域区分別暫定マスタープラン

5.2 実証調査事業

5.2.1 実証調査事業の選定

図 5.2.1 に実証調査事業選定の過程を示す。図の上半分には RRA や PRA、PCM といった一連の参加型アプローチから提案された事業を示す。そして、図の下半分には暫定マスタープランで作成された開発事業のうち、短期開発期間（当初の 5 年間）に位置するものを示す。すなわち実証調査事業は RRA や PRA、また PCM ワークショップの結果提案された優先事業を踏まえ、暫定マスタープランとの整合性を検討したうえで選択されることとなる。選択した実証調査事業を以下に、またそれらの詳細を図 5.2.2 に示す。

- 1) Kampi ya Samaki & Salabani: 改良カマドの普及と小規模産業振興(蜂蜜、手工芸品、ティラピアフライの販売)
- 2) Sandai: 共有資源の管理(参加型灌漑管理+畜産改善)
- 3) Arabal: 食糧の確保(畜産改善+天水農業改善)
- 4) Rugus: パン(溜池)の改修
- 5) Marigat Health Center: 流行性および風土性疾患に対する監視、情報、支援システムの整備
- 6) Marigat Youth Polytechnic の強化(木工技術クラスの強化)
- 7) 先行地区事例視察学習
- 8) Upper Mukutani: 地区村落給水(2001 年 6 月に追加)

5.2.2 実証調査事業のデザイン、実施、モニタリングおよび評価

実証調査事業は、コミュニティーのリーダー住民とのワークショップを繰り返しながら進めていった。住民主体のプロジェクトでは、予め詳細にプロジェクトをデザインしブループリントを作ってしまうことは難しいため、実施段階における高い柔軟性が要求される。したがって、住民主体のプロジェクトでは、デザイン、実施、モニタリングおよび評価は、プロジェクトサイクルのそれぞれ独立した段階ではなく、繰り返しながら行う一つのプロセスと考えた方が判りやすいが、ここでは実証調査期間の 4 段階として整理する。

第一段階（1999 年 8 月～1999 年 10 月）

RRA ツール、関係者分析、問題分析、目的分析およびアプローチの優先度付けによる実証調査事業の選定

第二段階（2000 年 3 月～2000 年 5 月）

プロジェクト・デザイン（PDM と実施計画表の策定）

第三段階（2000 年 6 月～2001 年 2 月）

モニタリングと中間時評価

第四段階（2001年9月）

実証期間終了時の終了時評価

実証調査事業の実施期間中に、改良かまどや天水農業改善のコンポーネントは当初計画された実証地区から、他の地区へと拡大していった。先行地区事例視察学習と呼ばれたスタディーツアールと、インターロケーションモニタリングと呼ばれた調査対象地域内の参加型モニタリングが、このような拡大や人々の能力向上に貢献したものと考えられる。

5.2.3 実証調査事業の評価

実証調査事業の評価にあたっては、第1に事業実施の全容を概観するために当初想定の実施工程と実際の実施行程を整理する。次に、各実証調査事業の成果を評価するとともに、各事業の「方法」と「限界」を考察する。そして、最後に農村総合開発プログラムとしての実証調査事業の総体評価を実施する。これらの評価を通じて、実証調査事業より学んだ教訓をとりまとめ、今後の展望として整理し、マスタープランに反映させる。また、各実証調査事業に共通する幾つかの留意事項を抽出し、ASAL 開発における計画時および実施時における留意事項としてとりまとめる。

1) 実施工程

実証調査事業の実施期間は、2000年3月から2001年9月までの19ヶ月間であった。実証調査事業の開始は、調査対象地域周辺の治安問題により当初予定より1ヶ月遅れとなった。そして各実証調査事業の実施工程は、各事業地区の状況に応じて当初の調査団の想定から多少の変更を伴った。実証調査事業は地域住民主体の事業であり、村落の受益者が事業のイニシアチブを取ることが期待された。それゆえ、調査団により想定された当初の実施工程は、調査団が住民主体の事業に参加するための足がかりという意義があり、それ以上のものではない。実施工程の主な変更は以下のとおりであり、詳細は図5.2.3に示す。

改良カマド導入と小規模産業振興 (Kampi ya Samaki and Salabani)

- 業者の契約不履行により小規模ビジネスの拠点となる多目的ビルの完工が約10ヶ月遅れた。このため小規模ビジネスの開始も遅れ、調査団と受益者である女性グループはビル完成のために追加投資を行わなければならなかった。
- 2001年8月までに多目的ビルの3部屋は小規模ビジネスが開始できるまでに完成していたが、女性グループは多目的ビルの受益者負担分を捻出するための基金集めに長期の努力を要し、これがビジネス開始遅延の一因となった。
- 改良カマドの普及は予想よりも早く始まった。Kitui 県への成功事例視察やインターロケーションモニタリング活動が早期のかまど普及に貢献した。

共有資源の管理：参加型灌漑管理 (Sandai)

- 灌漑水路の改修工事は雨季の始まりを考慮して早期に開始された。しかしながら、

工事に先立つ住民との協議が短期間であったため、調査団と住民間で事業費負担の考え方に対する様々な誤解が生じた。

- 灌漑水路の改修に続く分水工の設置は、住民の負担費用支払いに応じて実施した。このことは工事の遅れに繋がったが、住民の灌漑水路改修に対する支払いの不履行などの事態を考慮してとられた。

畜産改善: (Sandai and Arabal)

- ツエツエ蠅ネットや草刈鎌等の畜産改善道具は受益住民の負担費用が集まらなかったため、供与がなされていない。

食糧の確保: 天水農業改善 (Arabal: Partalo)

- 天水農業改善技術はインターロケーションモニタリングと郡事務所職員の積極的な活動を通じて当初の事業地区から他地区へと普及した(実証調査事業の期間内に、本事業が他地区へ普及することは想定されていなかった)。

パン(溜池)の改修 (Rugus)

- パンの改修作業は当初の想定よりも約 9 ヶ月と大幅に遅れた。この理由には、厳しい旱魃が男達を食糧の確保に集中させた点、パンの浚渫土が予想以上に硬質であった点、また Pokot 族が牧草地を求めて Il Chamus の領域に侵入し、部族抗争へと発展し工事が中断した点などが挙げられる。

2) 実証調査事業の評価

実証調査事業の評価は以下の 3 側面から行う。すなわち、1)効率性、目標達成度、妥当性、自立発展性といった側面から評価を行う従来型評価、2)実証調査事業の計画段階から実施段階を通じて得られた各事業の「方法: how」と「限界: limit」の確認、そして3)面的統合アプローチの実証としての評価、である。この面的統合アプローチの実証としての評価とは、全実証調査事業を暫定マスタープランのミニ版として考えた場合の妥当性や実行可能性の評価である。

- 実証調査事業のアウトプットとインパクトを検討する従来型の評価
- 実証調査事業の計画段階から実施までの過程を通じて得られた事業実施の「方法」と「限界」の確認
- 面的統合アプローチとしての実証調査事業の評価

各実証調査事業ごとの評価要約は、各事業ごとに表 5.2.3～表 5.2.12 に示す。表は以下の項目から整理されているが、項目 3～6 は主に従来的な評価に関わる部分である。項目 7 の住民の能力向上および項目 8 のインパクトとアウトカムは、事業の達成目標として明記されていないが、社会開発的要素を持つ事業においては最も期待されている点である。項目 2 は実証すべき主題であり、それに対する結果が項目 9 に記されている。また、項目 10 の今後の展望は、実証調査事業の計画段階から実施までの過程を通じて得られた事業実施の「方法」と「限界」についてとりまとめたものである。

1. 背景(background)
2. 実証すべき主題(Subject to Verify)
3. 投入(Input)
4. 実施過程(Implementation Process)
5. アウトプット(Output:計画段階で期待されていた/プログラムされていた)
6. 評価(Evaluation:1-5の点数による相対評価)
7. 能力向上(Capacity Building)
8. インパクトとアウトカム(Impact and Outcome:計画段階で期待されていなかった/プログラムされていなかった)
9. 実証主題に対する結果(Verification Result)
10. 今後の展望(Way Forward)

2.1) 実証調査事業のアウトプットとインパクトを検討する従来型の評価

各実証調査事業の成果は、設定された指標により測定し、効率性、目標達成度、妥当性および自立発展性の面から各事業横断的に評価する。これら5項目は、各実証調査事業のプロジェクトデザインマトリックス(PDM)の概括により説明される。下表は評価項目の要約であり、各項目の説明を以下に付記する。

表 5.2.1 評価5項目とPDMの関係

事業の要約	評価5項目				
	効率性	目標達成度	妥当性	自立発展性	インパクト
上位目標					
プロジェクト目標					
成果					
投入					

効率性： 「投入」がどれだけ効率的に「成果」に転換されたか

目標達成度： 「プロジェクト目標」が達成されたか、「成果」がその達成にどれだけ貢献したか

妥当性： 「成果」、「プロジェクト目標」、「上位目標」は評価時においても目標として意味があるか

自立発展性： 援助終了後、被援助国の機関・組織がどれだけプロジェクトの正の効果を持続することができるか

インパクト： プロジェクトを実施した結果、どの様な正・負の変化が直接・間接に現れたか

評価は、インパクトを除いて、5を最高値として1から5の点数で行った(インパクトについては、表5.2.3～表5.2.12に記述している)。点数については、3が計画時点で設定された当初目標値程度が発現している状態である。また、自立発展性に関しては、

評価 3 は現状の成果が維持される程度という評点であり、4 は多少の外部投入を持って発展していく、5 はほぼ外部投入がなくとも自立発展が期待できるという評点である。

下表に各実証調査事業の評価結果を示すが、自立発展性が高いと評価される事業は、改良かまど、天水農業改善および畜産改善（種山羊導入）である。これらの事業は ASAL 地域に広く普及することが期待されるとともに、事業開始に際してのいわばエントリープログラムともなりうる。他方、ディップ（家畜薬浴槽）改良、パンの改修、および参加型灌漑管理の自立発展性は低いと評価した。

表 5.2.2 実証事業評価一覧表

実証調査事業	効率性	目標達成度	妥当性	自立発展性	備考
改良かまど	5	5	5	4	
天水農業改善	4	5	5	5	
畜産改善 (種山羊導入)	A4 S2	A4 S3	A4 S2	A4 S2	A: Arabal S: Sandai
畜産改善 (ディップ改良)	A2 S2	A2 S2	A2 S2	A2 S2	A: Arabal S: Sandai
パンの改修	3	2	4	2	
参加型灌漑管理	4	4	4	2	
節水農業	2	4	3	3	
小規模産業振興	2	N.A.	N.A.	N.A.	工事遅延
村落給水	3	3	4	3	
MYP	3	4	4	3	
MHC	4	4	4	3	

ディップについては、乾季に人々が彼らの居住区から遠方へ牧畜に出かける ASAL のような地域では、乾季にディップを利用する家畜が減少し、薬液の購入が困難になる。このような状況下ではディップの運営は財務的に自立できなくなる。パンの改修についても同様の理由で住民による継続的な維持管理は困難と考えられ、外部からの定期的な支援がパンの機能維持に必要と考えられる。人々は生存のために活動を多様化させ、男達はパンの浚渫時期である乾季に遠方へ牧畜に出かけてしまう。

Sandai の参加型灌漑管理については、効率性および目標達成度の観点からは事業は成功していると言える。しかしながら、人々の援助依存症がこの地区では強く見られ、施設の維持管理に関しても初期投資に適用されるのと同様のコストシェアリングへの期待が見られる（例えば、水路内の土砂浚渫などは日常の維持管理のいわばツケに相当するが、コストシェアリングを期待する）。このような地区で自立発展性を高めるためには、援助側の援助方針転換が第 1 に必要となる。

2.2) 実証調査事業の計画段階から実施までの過程を通じて得られた事業実施の“方法”と“限界”の確認

実証調査事業であるという立場から、過程の評価において“どうして”それが起こったのかを分析することは非常に重要である。実証調査事業の実施によって学んだ“どう

して”は、暫定マスタープランをより現実的な最終マスタープランに改訂するための鍵となる。このような観点を踏まえ、各実証調査事業について実証すべき主題を設定し、各実証調査事業の適応性や更なる普及のための“方法：how”と“限界：limit”を確認した結果を表 5.2.3～表 5.2.12 の“実証主題に対する結果”と“今後の展望”にとりまとめている。この評価における各実証調査事業の主な事項を下記に要約する。

改良カマド (Kampi ya Samaki → 全調査対象地域)

改良かまどの普及においてかまど作りのあり方が、“調査団／ケニア政府と共に”から“彼ら自身で”に移行した。このことは、プログラムの自立発展性を示してはいるものの、その一方で普及を一切停止した 2000 年 11 月以降のカマド普及はペースダウンしている。したがって、より広範なカマドの普及のためには、ドナー／ケニア政府による最低限の普及活動が必要であると思われる。

天水農業改善 (Arabal(Partaló) → Chemelongion, Kapkune)

天水農業改善事業は不規則にかつ集中して降る雨水を集水するため、そのシステムが大規模になるにつれ、システムの上流部と下流部で配水の不公平が拡大する。降雨によっては、上流側の圃場では洪水が発生し、また逆に下流側の圃場では水が到達していない、といった状況が発生する。よって、実証調査事業で試みた 4ha 程度はパイロットとしては望ましいが、その後の普及はさらに少規模（例えば 5～6 人による 4～5ha）、あるいは地形が許せば個人ベースでの普及を図るべきである。

畜産改善：種山羊の導入 (Arabal, Sandai)

種山羊 1 頭の値段は在来種の 2～3 頭に相当する。すなわち個人での種山羊購入が可能であることから、このプログラムは個人ベースへと移行しがちである。それゆえ、集団をベースとしたプログラムは、パイロットとして実施するか、あるいは種山羊を個人で購入できない貧困層や女性グループを対象として実施することが望ましい。なお、個人ベースでの普及が進んだとしても、種山羊選定における技術的助言や種山羊搬送などは政府／ドナーが支援すべきである。

畜産改善：ディップ改良 (Arabal, Sandai)

ディッピングシステムは、家畜が草地を求めて広範囲に移動する地域では持続させることは困難である。Arabal や Sandai では、地域に存在している家畜の約 1 割が毎月のディッピングを行えば財務的に持続可能となるが、乾期には放牧の範囲が広がるためディッピング頭数が減少し、その結果収入が減少し薬液の購入が不可能となる。このような状況下では、ディッピングシステムよりも家畜と共に移動が可能なハンドプレイヤーがより適応可能である。

参加型灌漑管理＋節水農業 (Sandai)

本実証調査事業地区には多くのドナーから援助が入っており、そのことが住民に援助症候群を引き起こしている。このような地区では、コミュニティの動機付けやイニシアチブを引き出すために、事業の開始前に事業費の一部をコミュニティのコミットメント

として積み立てる、あるいはコスト負担を段階的に導入していくなどの対応が必要である。

パンの改修 (Rugus)

半乾燥地域では、生存のための活動の多様化が人々の関心の中心である。また、パン土砂の浚渫に望ましい乾期には、家畜を追って遠方まで放牧を行うため、パン周辺に男性が少なくなる。過度の一般化は避けるべきであるが、このような条件下では、コミュニティによる定期的なパンの維持管理作業を持続させるのは非常に困難である。それゆえ、持続的なパンの維持管理を図るためには、例えば Food for Work などによる外部者の定期的な介入が必要となる。

小規模産業振興 (Kampi ya Samaki)

年間を通じて不確かな降雨といった ASAL 地域での所得向上活動においては、一定水準の所得を確保するために所得源の多様化が必要である。例えば、乾期が厳しい場合、アカシアに依存する蜂蜜産業が打撃を受けるが、そのような場合はバリンゴ湖に依存する魚フライ販売によって生き延びることができる。また、ケニア政府は、ビジネス計画や簿記会計のトレーニングおよび支援活動を、集中的によりは継続的に投入することが必要である。

村落給水 (Upper Mukutani)

農村部では、人々は現金を用意せず家畜として彼らの資産を保持している。農村部においては現金の量とそのフローが極めて限られている。それゆえ、施設の維持管理費用は、人々が水汲みを行う度に小額の費用の支払いを要求するより、年に1~2回、山羊1頭分を当てるなどの費用徴収を行うべきである。

Marigat Youth Polytechnic

他の職業訓練学校と同様、生徒の授業料のみで学校を維持していくことは困難である。スポンサーシップ、基金設立、補助金および所得創出活動などが職業訓練学校を財務的に自立させるために必要である。中でも、所得創出活動の一環として、木工コースなどで作成する椅子、机などの製品を自ら販売して財務状況を安定させることが必要といえる。

Marigat Health Center

保健衛生普及活動と水源開発事業の効果的実施のため、水資源省との共同活動が必要である。また、かまど普及に合わせた PHC 普及も女性の健康向上に寄与する。その他、財務的自立を確保するためには、診療台やレストラン検査代の一部を自前で管理できるよう財政面での改革が必要である。

2.3) 面的統合アプローチの実証

実証調査事業は、基本的には地域別暫定マスタープランの中から、短期で緊急性が高く、かつインプットの比較的小さなプロジェクトを選んで、面的に戦略的に組み合わせ

たものである。すなわち、『所得向上』、『BHN 確保』、『環境保全』、『行政システム強化』をプログラム目標とし、半乾燥地である調査対象地域の「村人の生活が向上する」ことを上位目標とする、幅広いプロジェクト群から成り立っている。以下に、実証調査事業として選定されたプロジェクトの属する分野を示すが、ほぼすべての分野をカバーしていることから、農村総合開発を意図するマスタープランのいわばミニ版ともいえる。

- 1) 農民社会／農民組織／ジェンダー
各実証調査事業の住民組織強化
- 2) 行政システム
先行地区事例視察、RRA、PRA、PCM に関するトレーニング
- 3) 人的資源開発
Marigat Youth Polytechnic の強化
- 4) 農業
天水農業改善、参加型灌漑管理、節水農業
- 5) 畜産
畜産改善(種山羊導入)、ディップ改良
- 6) 小規模産業振興
養蜂、魚フライ販売、ハンドクラフト
- 7) 環境
改良かまど普及、土壌保全(天水農業改善)
- 8) 保健衛生
Marigat Health Center の強化
- 9) 農村生活基盤
村落給水(Upper Mukutani、Rugus)

以上のように実証調査事業を面的、戦略的に組み合わせたこと(面的統合アプローチ)、言い換えれば地域別暫定マスタープランのミニ版を実施したことの評価を、いまの時点で行うことは難しいが、根本的に障害となるであろうような問題、あるいは負の影響などは、現時点では把握されていない。

先行地区事例視察学習やインターロケーションモニタリングは、複数の異なるアプローチのプロジェクトを面的に展開している地域で実施することによって、新しい考えや技術の普及に特に効果があることがわかった。当初は実証調査事業に関係していなかった村人たちが、実証調査事業を見ることで学び、改良かまどや天水農業改善を自ら導入するなどの例が見られた。面的統合アプローチでは、実証調査事業の直接の受益者だけでなく、調査対象地域全体の住民が参加し、受益者となるのが容易になる。すなわち、実証調査事業という点ではなく、地域全体という面が対象となる。

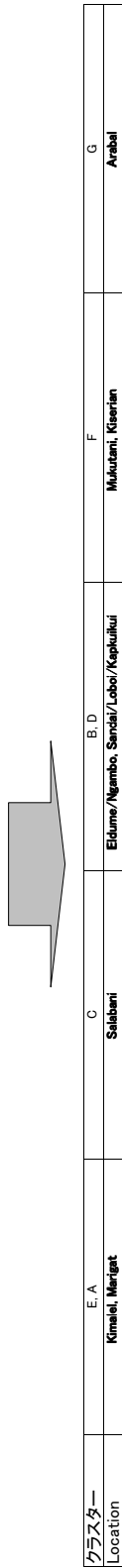
面的統合アプローチのもう一つの大きな利点は、透明性、アカウントビリティの確保と、比較を可能にすることによる客観性の担保である。本調査では、畜産の改善とディップの管理コンポーネントが Arabal と Sandai の二地区に導入されたが、両地区の実績の違いは、調査団は勿論、実証調査事業の直接の受益者にも、郡・県・中央の行政担当

者にも明らかであった。

また、郡レベルのワーキング・コミッティーでは、全ての部門の行政担当者が一堂に会して、定期的にも実証調査事業について議論することが可能であった。さらに、インターロケーションモニタリングやワークショップでは、様々なロケーションから参加した村人たちが、実証調査事業の進捗や運営、リーダーシップ、現金負担などの共通の話題について、意見を交換することができた。これも面的に多くのプロジェクト実施した結果といえる。

最後に、面的統合アプローチの一番の利点をあげるとすれば、比較的小さなインプットで多様性が確保できるということであろう。それは、多様性が生き残り戦略となっている半乾燥地において、特に重要な点である。一つのことに固執することが死を意味する半乾燥地においては、村人を一つの活動に集中させようとするのは、彼らの規範に反することになる。一方、計画者の立場から言えば、半乾燥地のような条件の不安定な地域では、必ず成功するプロジェクトを選定することも非常に難しい。面的統合アプローチは、一つ一つのプロジェクトではなく、プログラム全体としての成功の確率を高めることのできるアプローチとして、半乾燥地において特に有効と考えられる。

調査地域の類型化



クラスター Location	E. A Kimali, Marigat	C Selebani	B. D Elduma/Ngumbo, Sandai/Lobi/Kapukuiki	F Mkutani, Kiserian	G Arabal
FRRA 現金収入源 日記事項	日曜日、農業、牧畜、商業(肉屋、レストラン等)、炭焼き、養蜂 コレラ発生、既存water tapあり	牧畜、養蜂、農業 コレラ発生、薪採りに12km遠方に行く(地域最大)	牧畜、農業、養蜂、日曜日、教師 コレラ発生、畜舎敷大、畜舎口跡	牧畜、農業、漁業、養蜂、アロエ穫り コレラ発生、畜舎敷大	牧畜、農業、養蜂、アロエ穫り コレラ発生、畜舎敷大
	PRR 優待事業 上下供給事業(既存設備利用) Kemogiu小学校の改善 灌漑システムの建設 Water Tankの建設	井戸の建設 Loturoシステムの拡大	取水堰の建設(灌漑事業) Ilinge rua 診療所の建設完了 Kamaeehシステムの建設 診療所の建設	Ngatook川の灌漑利用 道路の改善	Arusin Panの拡大 Arabal川からの導水
POM 全場 中心問題 優先プロジェクト 成果	Kampi Turukana Kampi Turukanaの村人は十分なお金がない 0)村人は売石などの品物を良く売ることができない 2)手に職が付く 1-1)活動の組織化がなされる 1-2)村人は十分な安い手を得る 1-3)村人は様々な種類の品物を作れる 1-4)村人は品質の良い品物を作れる	Kamsi ya Samaki Kamsi ya Samakiの人々の生活水準が低い 1)人々は売れない牛を売りに入れることができる 2)人々は十分な収入を得ることができる 1-1)水源を管理する 1-2)水質処理を行う 2-1)魚を有利に販売できる 2-2)漁獲量の確保がなされる 2-3)精製がよい建設で売れる	Sandai/Lobi/Kapukuiki Sandai/Lobi/Kapukuikiの村人は食糧が足りない 1)穀物が良くなる 2)畜舎が健康である 1-1)灌漑を行う 1-2)農産物を得る 1-3)病虫害防除等の畜舎改善 1-4)良質な穀物保存 2-1)畜舎の病気を予防	Rugus Rugusの人々は十分な飲み水が得られない 1)人と畜舎用別々の長く使えるバシダム 2)人々は売れない飲み水が得られる 1-1)長く使えるバシダムを建設 1-2)畜舎ごとの水櫃を分ける	Arabal Arabalの人々は収入が少なく 1)畜舎の向上 2)豚糞の減少 1-1)畜舎の健康改善 1-2)畜舎販売価格の向上 1-3)畜舎の生産性向上 2-1)飲料水の品質改善 2-2)アエ、蚊の駆逐 2-2)ヘルスサービスが定期的に受けられる

参加型アプローチ

- プログラムアプローチ**
- ・生計向上
 - ・農業
 - ・小規模産業
 - ・能力向上
 - ・農村社会・雇員組織
 - ・行政システム
 - ・人的資源開発
 - ・生活基盤
 - ・環境
 - ・保健衛生
 - ・農業・農村生活基盤

マスタープラン (短期計画)	KARI-RRRCの強化 Marigat Veterinary Officeの強化 畜舎改良推進スキーム 改革マーケティング 養蜂容器改善 Marigat Youth Polytechnicの強化 Marigat Youth Polytechnicの強化(建設改善) 上下供給事業(既存設備利用) 改良カマドの導入 農牧地内植林 浸食土壌のリハビリ 電化普及	養蜂容器改善 手工芸振興 カルチャーセンター設置 改良カマドの導入 集排水(既設改善) 浸食土壌のリハビリ 飲料水の供給 電化普及	海産物改善 土地登記 畜舎飼育改善 牧草地開発 養蜂容器改善 手工芸振興 改革マーケティング 浸食土壌のリハビリ 電話設置	天水農業の改善 早期教育開始(幼稚園)の支援 飲料水の供給 バシダム(既設)への活用 バシダムの土壌改善への活用 中心の集水堰の建設	天水農業の改善 養蜂容器改善 早期教育開始(幼稚園)の支援 浸食土壌のリハビリ 道路の改善	食糧の確保(畜産の改善+天水農業改善)
実施事業	Marigat Youth Polytechnicの強化 流行性及び風土性疾患に対する監視、情報、支援システムの整備 (Marigat Health Centre) 近傍の成功事例複製	改良カマドの普及+小規模産業振興 共有資源のコミュニティ管理(PIM+畜産改善)	共有資源のコミュニティ管理(PIM+畜産改善)	Panの改修(小学校を中心媒介して)	食糧の確保(畜産の改善+天水農業改善)	

注記: 下線部分は実証事業に結びつく部分。地域の保健衛生問題は、Marigat Health Centreの強化が最も効果的であるため、同センターの強化を実証事業として採用。また、実証事業活動を通して人々の能力向上に寄与するため、近傍の成功事例複製を企画した。

図5.2.1 実証調査事業策定のプロセス

Activity	Year 2000							Year 2001							Remark						
	2	3	4	5	6	7	8	9	10	11	12	1	2	3		4	5	6	7	8	9
	Rainfall																				
6. Food Security: Rain-fed Agriculture (Arabal Partalo - Chemelongion - Kapkun)															<ul style="list-style-type: none"> Rain water harvesting technique was extended from the original site to the other areas through inter-location monitoring and active Division officers. It was not even expected that the extension started during the verification period. 						
Plan																					
Actual																					
Facilitation																					
Operation & Maintenance																					
7. Rehabilitation of Pan (Rugus)															<ul style="list-style-type: none"> Rehabilitation work was much delayed due to: Severe drought. forced men to go far looking for food. Soil was much harder to dig than expected. Pokot invasion suspended the implementation. Water tank was complementarily constructed at Rugus Primary School for pupils and nearby villagers. 						
Plan																					
Actual																					
Facilitation																					
Operation & Maintenance																					
8. Strengthening of Marigat Youth Polytechnic															<ul style="list-style-type: none"> Carpentry trainer was employed longer than planned because it took longer time to put the renovated carpentry class with provided equipment into track. 						
Plan																					
Actual																					
Facilitation																					
Operation & Maintenance																					
9. Strengthening of Marigat Health Center															<ul style="list-style-type: none"> Procurement of equipment was delayed little because official procedure took time. 						
Plan																					
Actual																					
Facilitation																					
Operation & Maintenance																					
10. Rural Water Supply (Upper Mukutani)															<ul style="list-style-type: none"> Construction was a bit delayed due to heavy rain and appurtenant work was added. 						
Plan																					
Actual																					
Facilitation																					
Operation & Maintenance																					
11. Learning from Best Practices															<ul style="list-style-type: none"> Schedule for visiting three different sites were put together into one trip schedule. 						
Plan																					
Actual																					
12. Inter-location Monitoring															<ul style="list-style-type: none"> This activity was not initially planned. 						
Actual																					

□ : Study Tour
□ : Training

図5.2.3 実証調査事業の実施工程

表 5.2.3 改良カマドの導入 (Kampi ya Samaki → 全調査対象地域)

<p>1. Background <i>Firewood available in the Study area is becoming scarce and scarce, and the time women need to fetch keeps on getting longer and longer. Environmental degradation is being worsened due to the increasing pressure of firewood associated with population growth, and this situation makes women difficult to do income generating activities as well. To conserve precious natural resources (trees) as well as to spare enough time to do income generating activities for women, an energy and cooking time saving Jiko is envisaged.</i></p>														
<p>2. Subject to Verify <i>1. To examine if the improved Jiko could well be adapted in ASAL area and then could save firewood, which in turn contributes to sustainable environmental conservation. 2. To examine if the improved Jiko could reduce time of fetching firewood and cooking, thereby creating more time that the users could spend for income generating activities.</i></p>														
<p>3. Input <i>1. Anthill soil, stones, cow dung, and water that are all locally available materials. 2. Technical assistance of how to make the Jiko and its dissemination (one GOK home economics officer with transportation).</i></p>														
<p>4. Implementation Process <i>1. Three local women were initially trained as the Jiko expert, and then merry-go-around scheme (alternate construction by the members of 3-5 with an assistance of the Jiko expert) was introduced to promote the improved Jiko. 2. Training local women invited community members' jealousy, thereby the expert became regarded as a member or an agent of JICA. Community members in Kyamp ya Samaki area ended up in total dependency on the Jiko expert to construct. This gave overburden on the expert, so that she finally stopped working as the expert. 3. Merry-go-around scheme did not well work in some areas either because some members did not collect even the local material of soil and stone available just around her house, rather waiting for the group members to assist. 4. Taking into account above situation, just grouped construction or individual based promotion was more focused in association with inter-location monitoring that is a very workable mean to motivate women to construct the Jiko. 5. Full sized Jiko (3'x4') could not be accommodated in small houses where most of poor people reside (full size Jiko required a kitchen house to be installed). Therefore, small sized Jiko (2 fireplaces) became focused in order to diffuse into poorer people.</i></p>														
<p>5. Output (originally expected/programmed) <i>1. Jikos constructed in the Study area as of September 15, 2001 are: 26 in Kyampi ya Samaki (originally targeted area), and 61 in other areas as a result of extension through inter-location monitoring. Out of the total 87, 73 are still well functioning. 2. The Jiko can save firewood by 63% as compared to the conventional 3-stones Jiko (average of 83 samples), and can reduce the cooking time from 90 to 40 minutes for supper and 60 to 30 minutes for breakfast as an average. The saved time is mostly spared to take rest and in some cases invested in farm work and income generating activities.</i></p>														
<p>6. Evaluation (in a rating of 1-5)</p> <table border="1"> <tr> <td>1) Efficiency</td> <td>5</td> <td><i>Input is very small that is locally available material only with a technical assistance, while the output is very high and diffusion can also be done with minimal support by GOK.</i></td> </tr> <tr> <td>2) Effectiveness</td> <td>5</td> <td><i>The Jiko conserves 63% firewood and reduces cooking time to at least half.</i></td> </tr> <tr> <td>3) Relevance</td> <td>5</td> <td><i>The Jiko greatly contributes environmental conservation, as well as release women's burden thereby women become able to spare the saved time to do productive works.</i></td> </tr> <tr> <td>4) Sustainability</td> <td>4</td> <td><i>Though normal condition ensures the sustainability of the Jiko, water scarcity area would have difficulty to maintain the Jiko, thereby giving "4" to the sustainability (maintenance should be done once in every one or two weeks and it requires about 3-5 litter water).</i></td> </tr> </table>			1) Efficiency	5	<i>Input is very small that is locally available material only with a technical assistance, while the output is very high and diffusion can also be done with minimal support by GOK.</i>	2) Effectiveness	5	<i>The Jiko conserves 63% firewood and reduces cooking time to at least half.</i>	3) Relevance	5	<i>The Jiko greatly contributes environmental conservation, as well as release women's burden thereby women become able to spare the saved time to do productive works.</i>	4) Sustainability	4	<i>Though normal condition ensures the sustainability of the Jiko, water scarcity area would have difficulty to maintain the Jiko, thereby giving "4" to the sustainability (maintenance should be done once in every one or two weeks and it requires about 3-5 litter water).</i>
1) Efficiency	5	<i>Input is very small that is locally available material only with a technical assistance, while the output is very high and diffusion can also be done with minimal support by GOK.</i>												
2) Effectiveness	5	<i>The Jiko conserves 63% firewood and reduces cooking time to at least half.</i>												
3) Relevance	5	<i>The Jiko greatly contributes environmental conservation, as well as release women's burden thereby women become able to spare the saved time to do productive works.</i>												
4) Sustainability	4	<i>Though normal condition ensures the sustainability of the Jiko, water scarcity area would have difficulty to maintain the Jiko, thereby giving "4" to the sustainability (maintenance should be done once in every one or two weeks and it requires about 3-5 litter water).</i>												
<p>7. Capacity Building <i>Those below are, though indirectly, attributable to capacity building for the women who use the Jiko; 1. Thanks to the saved time, the women have become able to talk more with their spouses and children, making their relations better as well as contributing to establishing her status in the household. 2. Children now can reach school in time because the mother can feed them earlier thanks to the fast cooking (some children had sometimes been late for school), releasing indebted feeling to the school.</i></p>														

8. Impact and Outcome (others than originally expected/programmed)

1. Women who use 3-stones Jiko usually suffer from back pain, but now the back-pain has mostly disappeared after the introduction of the Jiko, especially for women with big body-size.
2. Clean water became mostly available because the water can be boiled at the same time of cooking meals, contributing to easy promotion of hygienic practices.
3. Chicken and goats are no longer messing the food that are cooked at higher place than 3-stones and placed on back-top of the Jiko.
4. No child turns over food because the food is placed on the Jiko. Security for children is now kept so that the mothers feel very happy and also elder children can help mother in cooking in much safer situation.
5. The Jiko gives good appetite because the charcoal, after cooking ugali at the center, can be put to the sides so that vegetable and tea/water remain hot.

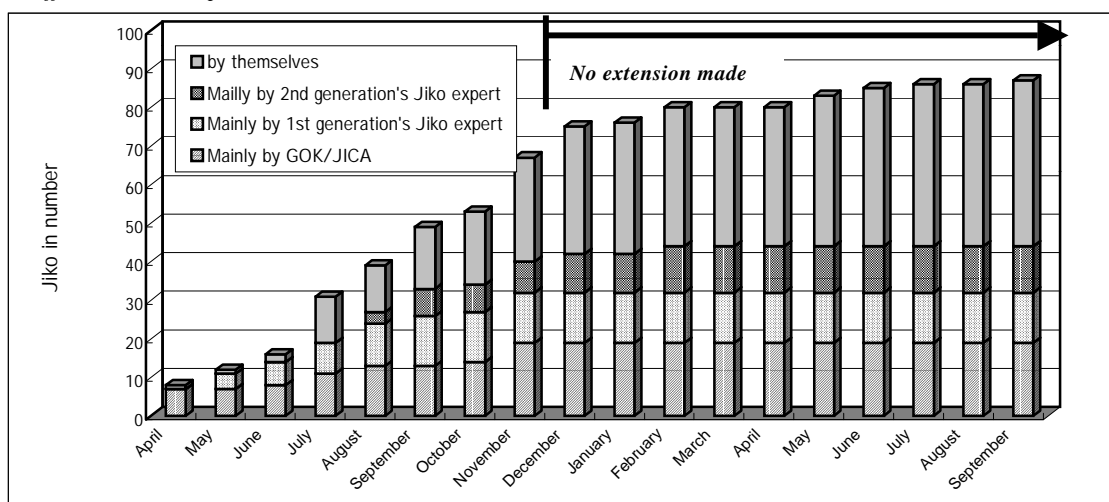
9. Verification Result

1. The improved Jiko has been well adapted in the Study area, as a total of 87 Jikos has been constructed with a minimal assistance from GOK and JICA Team. The Jiko can save firewood by 63% as compared to the conventional 3-stones Jiko (average of 83 samples), thereby it was proved that it contributes to sustainable environmental conservation.
2. However, as the full sized Jiko requires kitchen house separate from living house, poor people who live in a hut-house wherein kitchen is together accommodated have difficulty to install the Jiko. Therefore, a small sized Jiko (2 fire places; see photo) which could be installed in a hut-house should be promoted for poor people.
3. The Jiko can reduce cooking time from 90 to 40 minutes for supper and 60 to 30 minutes for breakfast as an average. The saved time is, at present, mostly spent to take rest and talk to spouses and children. Some women, though still several numbers only, invested the saved time in their farm work and businesses.



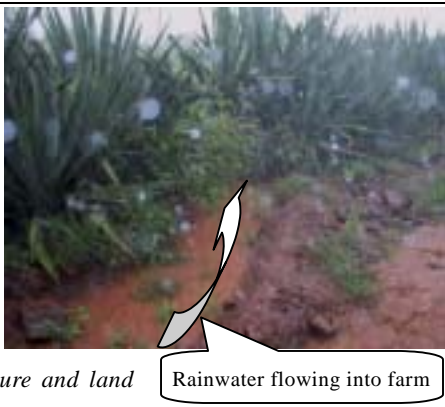
10. Way Forward

1. Expansion of Jiko beyond the originally programmed area, which is Kampi ya Samaki, had started as early as June thanks to the inter-location monitoring tour. The major construction manner has shifted to “by themselves”, which means Jiko is constructed without any presence of GOK/JICA or Jiko expert. Though this shows, to a certain extent, self-sustainability of the program, the fact that the dissemination after November, 2000 has very slowed down as shown below implies still a minimal support by GOK/Donors to further extend the program; namely, extension services as well as technical advices by a home economics officer with transportation.



2. To further diffuse the Jiko, flexibility rather than sticking on training Jiko expert or merry-go-around scheme, should always be pursued. Here, a guide is: 1) a demonstration be done as the first stage; 2) some time after the demonstration, GOK/donors shall visit the villages again to facilitate several ordinary women to form a group and then construct the Jiko by themselves; 3) in line with regular monitoring to avoid technical error, neighboring villages be also visited to further diffuse the Jiko, and 4) in parallel with those above, new version of Jiko, two fireplaces Jiko, should be tried in order to further expand to poorer households.

表 5.2.4 : 天水農業改善 (Partalo → Chemelongion and Kapkune)

<p>1. Background <i>Severe drought occurs once every ten to fifteen years in the Study Area and emergency relief food has been chronic. Land has also been deteriorated without soil and water conservation, limiting the vegetations to secure food for human and livestock. In hilly Arabal location, people have been trying to crop with only rainwater and have got harvest once or twice in five years. It is considered that technique of rain water harvesting could stabilize the rain-fed agriculture, which in turn results in securing food, and soil and water conservation.</i></p>														
<p>2. Subject to Verify <i>To examine if rainwater harvesting technique can stabilize the rain-fed agriculture and be easily disseminated into the different communities in the area.</i></p>														
<p>3. Input 1. <i>Seeds and pesticides (drought resistance maize, millet, pigeon peas etc.): 43,180Ksh (Partalo: 9acre, Chemelongion: 10acre, Kapkun: 10acre) (100% borne by community)</i> 2. <i>Labor: 300 man-day in each site</i></p>														
<p>4. Implementation Process 1. <i>Training of farmers on construction of on-farm water harvesting structures was conducted in April 2000.</i> 2. <i>Introduction of crop husbandry technology with quality seeds and operation and maintenance of the water harvesting structures was carried out in April 2000.</i> 3. <i>Survey works were done by the Study Team in April 2000.</i> 4. <i>Study Tour to Machakos and Kitui with 18 Partalo villagers was conducted in May 2000.</i> 5. <i>A large run-off discharge destroyed diversion and lateral channels as well as some Fanya Juu embankment (Partalo). Installment of brush dams in run-off streams and other soil conservation works were made.</i> 6. <i>Severe prolonged drought disturbed construction of the structure and land preparation works.</i> 7. <i>Pests of wild animals and diseases damaged the crops.</i> 8. <i>The verification project was expanded to other two sites of Chemelongion and Kapukun according to community request. People knew about the project in Partalo through inter-location monitoring and information of divisional officers.</i></p>														
<p>5. Output (originally expected/programmed) 1. <i>Crop yield with rainwater harvesting technique increased by 2.4times as compared to the maize yield without the project as an average in Chemelongion, with applying quality seeds and diversified crops like pigeon pea, green gram and cowpea.</i> 2. <i>Food security is improved because the stabilized rain-fed agriculture increased crop production.</i> 3. <i>The rainwater harvesting structure promote soil and water conservation by nature especially in case of construction of Fanya Juu terraces.</i></p>														
<p>6. Evaluation (in a rating of 1-5)</p> <table border="1"> <tr> <td>1) Efficiency</td> <td>4</td> <td><i>Crop yield improved with small inputs from outside. The entire earthwork for rainwater harvesting were done by community themselves with the technical advice of GOK officers.</i></td> </tr> <tr> <td>2) Effectiveness</td> <td>5</td> <td><i>Crop yield increased by 2.4times as compared to the maize yield without rainwater harvesting as an average in Chemelongion. Also cropping was diversified as growing pigeon pea, green gram and cowpea. The rainwater harvesting technique is proved to be very effective.</i></td> </tr> <tr> <td>3) Relevance</td> <td>5</td> <td><i>The rainwater harvesting is needed in the area where irrigation is not available. Utilizing rainwater is the only way of improving farming especially in the hilly side to secure and diversify the opportunity of getting food in ASAL.</i></td> </tr> <tr> <td>4) Sustainability</td> <td>5</td> <td><i>The rainwater harvesting technique has been extended in almost whole Partalo community and other communities of Chemelongion and Kapukun. This program is very promising and manageable by community.</i></td> </tr> </table>			1) Efficiency	4	<i>Crop yield improved with small inputs from outside. The entire earthwork for rainwater harvesting were done by community themselves with the technical advice of GOK officers.</i>	2) Effectiveness	5	<i>Crop yield increased by 2.4times as compared to the maize yield without rainwater harvesting as an average in Chemelongion. Also cropping was diversified as growing pigeon pea, green gram and cowpea. The rainwater harvesting technique is proved to be very effective.</i>	3) Relevance	5	<i>The rainwater harvesting is needed in the area where irrigation is not available. Utilizing rainwater is the only way of improving farming especially in the hilly side to secure and diversify the opportunity of getting food in ASAL.</i>	4) Sustainability	5	<i>The rainwater harvesting technique has been extended in almost whole Partalo community and other communities of Chemelongion and Kapukun. This program is very promising and manageable by community.</i>
1) Efficiency	4	<i>Crop yield improved with small inputs from outside. The entire earthwork for rainwater harvesting were done by community themselves with the technical advice of GOK officers.</i>												
2) Effectiveness	5	<i>Crop yield increased by 2.4times as compared to the maize yield without rainwater harvesting as an average in Chemelongion. Also cropping was diversified as growing pigeon pea, green gram and cowpea. The rainwater harvesting technique is proved to be very effective.</i>												
3) Relevance	5	<i>The rainwater harvesting is needed in the area where irrigation is not available. Utilizing rainwater is the only way of improving farming especially in the hilly side to secure and diversify the opportunity of getting food in ASAL.</i>												
4) Sustainability	5	<i>The rainwater harvesting technique has been extended in almost whole Partalo community and other communities of Chemelongion and Kapukun. This program is very promising and manageable by community.</i>												
<p>7. Capacity Building 1. <i>At the beginning, Partalo community could not understand the labor supply without payment. The Study Team repeatedly explained about the cost sharing system until the community understood. It was the process of bringing about sense of ownership for Partalo community.</i> 2. <i>After the people of two villages showed their interest in the rainwater harvesting, a series of study tour among the concerned people was carried out to exchange the knowledge and experiences. Through this activity, people in Partalo proudly explained their experiences and knowledge, which was a process of capacity building of Partalo people.</i></p>														

8. Impact and Outcome(others than originally expected/programmed)

1. Concerning negative impact, owner of the women group's plot in Partalo asked the group to return the land by next year. Therefore the women group has to acquire other land. Benefit of the project raised the issue of communal land, which is not registered as private property.
2. Through inter-location monitoring, villagers in Chemelongion in Arabal and Kapkun in Kimalel were interested in the rainwater harvesting technique and requested GOK officers to introduce the same technique in their areas. With the technical assistance from the GOK officers, the villagers in the above two villages applied the technique and got good harvest.

9. Verification Result

Not only the farmer beneficiaries of the verification project site in Partalo, but also almost all farmers around the project site have participated in construction of the structures and learned the rainwater harvesting technique. The technique was expanded rapidly around the project site within Partalo. The technique was also extended to other villages long away from Partalo, namely Chemelongion and Kapkun, both of which are remote from Partalo. The technique had good impact to the people. The effect of the rainwater harvesting was proved to be positive with trials of two-year verification in the three sites. From these facts, it can be said that the rainwater harvesting is effective in stabilizing rain-fed agriculture and could be practiced in and over the Study Area, where irrigation is not available.

10. Way Forward

1. Technical assistance to community by GOK officers especially in surveying catchment area, layout of farm and supervising will be needed to extend the rainwater harvesting technique.
2. Technique for rainwater harvesting should be transferred to other GOK agricultural officers to further extension of the rain-fed agriculture beyond the Study Area.
3. Though the farming can be practiced as a group, the size of the water harvesting system should not be too big. As the system becomes bigger, there will be more disparity between upper part and lower part of the farm in allocation of water collected from the catchment area. Area would be better not more than 10 acres, though it will depend on the conditions of the site.



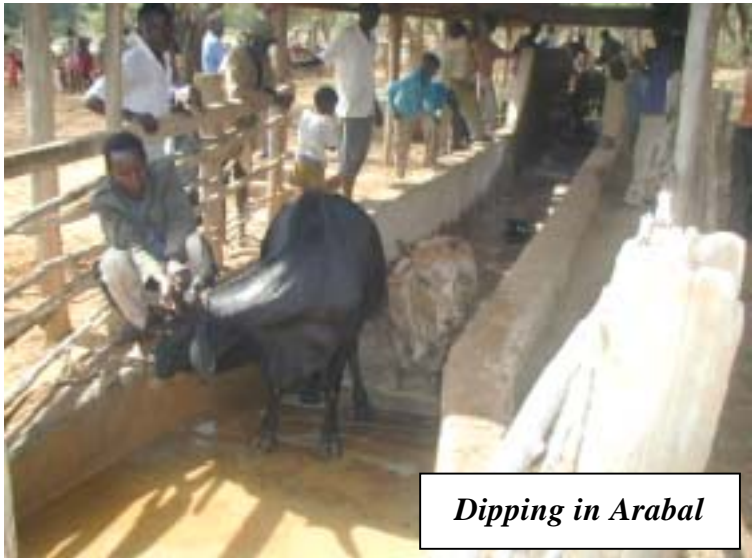
Maize grown in the rain-fed farm

表 5.2.5 畜産改善: 種山羊導入 (Sandai&Arabal)

<p>1. Background <i>The Study area is the second largest goat rearing area in the Rift Valley province. The value of goat meat is greater as it is the preferred meat than beef. Goats have been the domestic companions of man since primitive times but the species as a whole has been neglected. As a result of uncontrolled breeding and inbreeding, the size of the goats has become small and is getting smaller and smaller if this situation remained same as the practiced to date. Therefore, the critical areas of development should include the genetic improvement of the goats accompanied with adequate health control measures, suitable feed resources development, and proper management practices for the animals.</i></p>																				
<p>2. Subject to Verify</p> <ol style="list-style-type: none"> To find out if farmers, given minimum start-up inputs from donors, can carry out goat genetic improvement by cross breeding with an improved buck. To find out the applicability and sustainability of the program through carrying out the program in two different locations, Arabal and Sandai, the former being pastoral hilly area and the latter being more or less agricultural oriented area. 																				
<p>3. Input (30 % of the cost below born by the community except training)</p> <table border="1"> <thead> <tr> <th>Sandai Location</th> <th>Arabal Location</th> </tr> </thead> <tbody> <tr> <td>5 bucks (total 7,750 Ksh) Transportation of the Bucks (2,000 Ksh) 2 castrators (total 12,600 Ksh) 5 choppers (total 32,400 Ksh) Training (improved breeding + record keeping)</td> <td>5 bucks (total 7,750 Ksh) Transportation of the Bucks (2,500 Ksh) 2 castrators (total 12,600 Ksh) 2 choppers (total 12,960 Ksh) Training (improved breeding + record keeping)</td> </tr> </tbody> </table>			Sandai Location	Arabal Location	5 bucks (total 7,750 Ksh) Transportation of the Bucks (2,000 Ksh) 2 castrators (total 12,600 Ksh) 5 choppers (total 32,400 Ksh) Training (improved breeding + record keeping)	5 bucks (total 7,750 Ksh) Transportation of the Bucks (2,500 Ksh) 2 castrators (total 12,600 Ksh) 2 choppers (total 12,960 Ksh) Training (improved breeding + record keeping)														
Sandai Location	Arabal Location																			
5 bucks (total 7,750 Ksh) Transportation of the Bucks (2,000 Ksh) 2 castrators (total 12,600 Ksh) 5 choppers (total 32,400 Ksh) Training (improved breeding + record keeping)	5 bucks (total 7,750 Ksh) Transportation of the Bucks (2,500 Ksh) 2 castrators (total 12,600 Ksh) 2 choppers (total 12,960 Ksh) Training (improved breeding + record keeping)																			
<p>4. Implementation Process</p> <table border="1"> <thead> <tr> <th>Sandai Location</th> <th>Arabal Location</th> </tr> </thead> <tbody> <tr> <td> <ol style="list-style-type: none"> 5 breeding groups with a total 50 members were formed in early June, 2000. 5 bucks were purchased in Kimose and delivered to the groups on June 12, 2000 (the groups' due, 2,925 Ksh, was not settled on time and finally they paid at the end of August 2000 after several times negotiations). The bucks started mating in August 2000, and to date the bucks have mated about 50 does (record keeping is very poor). Castration started in July 2000, and 120 he-goats were castrated in the following few months. Then, no authentic records of the castration and even the fee collected became available. To date, death of 2 improved bucks has taken place. </td> <td> <ol style="list-style-type: none"> 5 breeding groups with a total 36 members were formed in early June, 2000. 5 bucks were purchased in Kimose and delivered to the groups on June 13, 2000 (the groups' due, 3,075 Ksh, was paid on the same day as agreed with the Study Team). The bucks started mating in August 2000, and to date the bucks have mated 115 does (record keeping is very good). Castration started in October 2000, and 9 bulls and 317 he-goats have been done as of September 2001. The record including the fee collection is kept well. To date, all the 5 bucks are very well, however death of 5 crossbred kids has taken place. </td> </tr> </tbody> </table>			Sandai Location	Arabal Location	<ol style="list-style-type: none"> 5 breeding groups with a total 50 members were formed in early June, 2000. 5 bucks were purchased in Kimose and delivered to the groups on June 12, 2000 (the groups' due, 2,925 Ksh, was not settled on time and finally they paid at the end of August 2000 after several times negotiations). The bucks started mating in August 2000, and to date the bucks have mated about 50 does (record keeping is very poor). Castration started in July 2000, and 120 he-goats were castrated in the following few months. Then, no authentic records of the castration and even the fee collected became available. To date, death of 2 improved bucks has taken place. 	<ol style="list-style-type: none"> 5 breeding groups with a total 36 members were formed in early June, 2000. 5 bucks were purchased in Kimose and delivered to the groups on June 13, 2000 (the groups' due, 3,075 Ksh, was paid on the same day as agreed with the Study Team). The bucks started mating in August 2000, and to date the bucks have mated 115 does (record keeping is very good). Castration started in October 2000, and 9 bulls and 317 he-goats have been done as of September 2001. The record including the fee collection is kept well. To date, all the 5 bucks are very well, however death of 5 crossbred kids has taken place. 														
Sandai Location	Arabal Location																			
<ol style="list-style-type: none"> 5 breeding groups with a total 50 members were formed in early June, 2000. 5 bucks were purchased in Kimose and delivered to the groups on June 12, 2000 (the groups' due, 2,925 Ksh, was not settled on time and finally they paid at the end of August 2000 after several times negotiations). The bucks started mating in August 2000, and to date the bucks have mated about 50 does (record keeping is very poor). Castration started in July 2000, and 120 he-goats were castrated in the following few months. Then, no authentic records of the castration and even the fee collected became available. To date, death of 2 improved bucks has taken place. 	<ol style="list-style-type: none"> 5 breeding groups with a total 36 members were formed in early June, 2000. 5 bucks were purchased in Kimose and delivered to the groups on June 13, 2000 (the groups' due, 3,075 Ksh, was paid on the same day as agreed with the Study Team). The bucks started mating in August 2000, and to date the bucks have mated 115 does (record keeping is very good). Castration started in October 2000, and 9 bulls and 317 he-goats have been done as of September 2001. The record including the fee collection is kept well. To date, all the 5 bucks are very well, however death of 5 crossbred kids has taken place. 																			
<p>5. Output (originally expected/programmed)</p> <table border="1"> <thead> <tr> <th>Item</th> <th>Sandai</th> <th>Arabal</th> </tr> </thead> <tbody> <tr> <td>Crossbred offspring:</td> <td>24 born and 22 expected</td> <td>43 born and 72 expected.</td> </tr> <tr> <td>Offspring died:</td> <td>No record</td> <td>5 offspring</td> </tr> <tr> <td>Improved-buck died:</td> <td>2 bucks</td> <td>No buck died</td> </tr> <tr> <td>Increase in birth weight:</td> <td>1.8 kg to 3.0 kg (average)</td> <td>1.8 kg to 3.0 kg (average)</td> </tr> <tr> <td>Castrated livestock:</td> <td>at least 120 he-goats</td> <td>317 he-goats and 9 bulls</td> </tr> </tbody> </table>			Item	Sandai	Arabal	Crossbred offspring:	24 born and 22 expected	43 born and 72 expected.	Offspring died:	No record	5 offspring	Improved-buck died:	2 bucks	No buck died	Increase in birth weight:	1.8 kg to 3.0 kg (average)	1.8 kg to 3.0 kg (average)	Castrated livestock:	at least 120 he-goats	317 he-goats and 9 bulls
Item	Sandai	Arabal																		
Crossbred offspring:	24 born and 22 expected	43 born and 72 expected.																		
Offspring died:	No record	5 offspring																		
Improved-buck died:	2 bucks	No buck died																		
Increase in birth weight:	1.8 kg to 3.0 kg (average)	1.8 kg to 3.0 kg (average)																		
Castrated livestock:	at least 120 he-goats	317 he-goats and 9 bulls																		



6. Evaluation (in a rating of 1-5)																																							
Aspect	Sandai	Arabal	Description																																				
1) Efficiency	2	4	In Sandai, 2 improved bucks died mainly because of poor management thereby 2 is given, while Arabal recorded high performance.																																				
2) Effectiveness	3	4	Though 2 improved goats died in Sandai, the cross bred kids were proved genetically improved (the weight increased to 1.6 times of local ones). Therefore, 3 given in Sandai and 4 in Arabal.																																				
3) Relevance	2	4	Sandai area is more or less agriculture oriented, therefore the groups did not give much keen interest to take due care of the bucks except two female custodians. In Arabal, goats rearing is very important since the area is dominated by hills with little farms.																																				
4) Sustainability	2	4	Taking into account the fact that 2 out of 5 bucks died in Sandai, the area as a whole may not well sustain the program. In Arabal, the high performance ensures high sustainability.																																				
7. Capacity Building																																							
There are 2 female custodians out of the five in Sandai (no female custodian in Arabal). Their performance is very good as compared to male custodians as shown below, thereby they became very proud as well as self-confident.																																							
<table border="1"> <thead> <tr> <th>Sex</th> <th>Name</th> <th>Start Mating</th> <th>No of kids</th> <th>Expecting kid</th> <th>No of kids dead</th> </tr> </thead> <tbody> <tr> <td>Female</td> <td>I. Kiploman</td> <td>August</td> <td>21</td> <td>10</td> <td>0</td> </tr> <tr> <td>Female</td> <td>E. Katero</td> <td>-do-</td> <td>1</td> <td>12</td> <td>0</td> </tr> <tr> <td>Male</td> <td>D. Chepkuto</td> <td>-do-</td> <td>2</td> <td>0</td> <td>Buck died</td> </tr> <tr> <td>Male</td> <td>C. Rotich</td> <td>-do-</td> <td>0</td> <td>0</td> <td>Buck died</td> </tr> <tr> <td>Male</td> <td>D. Kibon</td> <td>-do-</td> <td>0</td> <td>0</td> <td>No libido</td> </tr> </tbody> </table>				Sex	Name	Start Mating	No of kids	Expecting kid	No of kids dead	Female	I. Kiploman	August	21	10	0	Female	E. Katero	-do-	1	12	0	Male	D. Chepkuto	-do-	2	0	Buck died	Male	C. Rotich	-do-	0	0	Buck died	Male	D. Kibon	-do-	0	0	No libido
Sex	Name	Start Mating	No of kids	Expecting kid	No of kids dead																																		
Female	I. Kiploman	August	21	10	0																																		
Female	E. Katero	-do-	1	12	0																																		
Male	D. Chepkuto	-do-	2	0	Buck died																																		
Male	C. Rotich	-do-	0	0	Buck died																																		
Male	D. Kibon	-do-	0	0	No libido																																		
8. Impact and Outcome (others than originally expected)																																							
Motivated by the improved offspring in weight, 10 farmers in Arabal went to Kimose and purchased total 13 improved goats mostly at their own expense at the end of September 2000. The price was 2,200 Ksh per head, which is much higher than the originally purchased one of 1,550 Ksh, but the farmers raised almost all the fund by their own initiative.																																							
9. Verification Result																																							
<ol style="list-style-type: none"> 1. Arabal showed a much better result than Sandai. In Arabal, no bucks died, while in Sandai two bucks died and one other became ineffective (low libido) due to poor management (no de-worming done in Sandai). Despite greater poverty in Arabal (no good agricultural land), they made very effort including de-worming to fully utilize the development opportunity – buck improvement by cross breeding. The hilly area, preferable for goat rearing, also helped the buck improvement program in Arabal. 2. The fact that Sandai farmers are more or less agriculture-oriented giving first priority to crop has hindered their breed management. Also, the swamp areas in lowland Sandai that are used traditionally as all-season grazing area for both cattle and goats have often negatively affected the animal health. 3. In summary, it can be said that the both farmers can carry out goat genetic improvement by cross breeding. However, the output depends very much on the area's situation. In general, the more pastoral area would have better result and the more agricultural oriented area would have less performance. Also, swampy area, though it is a nice grazing land, would raise the animal mortality due to the contagious situation unless animal health care should be well taken. 4. People's attitude toward development is also one of the keys to success. Arabal area has been less blessed with development opportunities, while Sandai area much more blessed with those in the history. Sandai people apparently showed dependency syndrome on the course of the program while Arabal people were very keen to fully utilize the development opportunities. Cost sharing for bucks is just one example; Arabal custodians settled their due (30%) before the delivery of the bucks while the Sandai custodians were so reluctant to pay that the Team had to negotiate more than 10 times even if they are much wealthier than the ones in Arabal. Thus, the people's attitude greatly influences the result. 																																							
10. Way Forward																																							
<ol style="list-style-type: none"> 1. Arabal can be expected to develop to be an important improved goat breeding area, while Sandai, until a significant attitude change for the better is effected, will not develop as the breeding area. 2. The Chief of Arabal introduced "transect approach" to allocate the 5 bucks. The Arabal location was divided into five areas by its natural and social conditions, and then each area got one improved buck. This approach is very useful and should be applied in cases of doing similar project. 3. As Arabal farmers bought additional bucks individually, the program may tend to be individual basis in its nature. Taking into the buck price, 1500 to 2200 Ksh per head which is about 2 to 3 local goats selling price, many farmers seem to be affordable to buy individually. Therefore, the group based scheme tried in this verification may be preferable as a pilot and also for poor people who cannot afford to buy the buck individually. However, even if individual basis prevailed, technical advice of selecting bucks and its transportation of the buck should be assisted by the program. 																																							

表 5.2.6 畜産改善: デイップ改善 (Sandai&Arabal)

<p>1. Background <i>The Study area is blessed with large number of livestock; 62,000 cattle, 230,000 goats, and 55,000 sheep. One of the critical areas of this livestock sector development should be adequate health control measures because tick-borne diseases are taking a great toll of livestock population. Dipping system can be seen at many paces over the Study area, serving the livestock's health control and improvement. However, very often observed are just dormant or already abandoned dipping systems.</i></p>					
<p>2. Subject to Verify</p> <ol style="list-style-type: none"> 1. <i>To examine if farmers can manage a dip system sustainably after receiving very minimal start-up inputs and training from donors.</i> 2. <i>To find out any differences in trying the sustainable operation of the dip through carrying out the program in two different locations; Arabal and Sandai.</i> 					
<p>3. Input</p> <table border="1"> <thead> <tr> <th>Sandai Location</th> <th>Arabal Location</th> </tr> </thead> <tbody> <tr> <td>1 Pump set (37,749 Ksh) 1 Hand sprayer (12,200 ksh) Training (dip management + leadership)</td> <td>1 Pump set (37,749 Ksh) 1 Hand sprayer (12,200 ksh) Training (dip management + leadership)</td> </tr> </tbody> </table>		Sandai Location	Arabal Location	1 Pump set (37,749 Ksh) 1 Hand sprayer (12,200 ksh) Training (dip management + leadership)	1 Pump set (37,749 Ksh) 1 Hand sprayer (12,200 ksh) Training (dip management + leadership)
Sandai Location	Arabal Location				
1 Pump set (37,749 Ksh) 1 Hand sprayer (12,200 ksh) Training (dip management + leadership)	1 Pump set (37,749 Ksh) 1 Hand sprayer (12,200 ksh) Training (dip management + leadership)				
<p>4. Implementation Process</p> <table border="1"> <thead> <tr> <th>Sandai Location</th> <th>Arabal Location</th> </tr> </thead> <tbody> <tr> <td> <ol style="list-style-type: none"> 1. <i>There was a poorly performing dip committee in place before the verification project started. The community was asked to elect a new one. But this took very long time – due to power politics in the community; the Chief kept on postponing the elections.</i> 2. <i>Water in the dip sump was replaced even before the verification project started. The community hired a water bowzer that ferried water from Marigat at the cost of 9,250 Ksh.</i> 3. <i>Acaricides was managed on July 4, 2000 in an opaque way from an institution.</i> 4. <i>Dipping done fortnightly since July 2000, but it has not been accurately recorded despite the repeated advice by the Team.</i> 5. <i>Committee meeting not held in most of the cases.</i> </td> <td> <ol style="list-style-type: none"> 1. <i>A very active dip committee was elected in May 2000, facilitated by the Team.</i> 2. <i>Removal of dip spent was done on May 14 2000 which was a heavy exercise as the dip had been out of use for a long time. The spent was pumped out using the new water pump. Community participated in removing the soil, stones and wood in the dip sump.</i> 3. <i>Acaricides was purchased on July 13 2000 with a loan of 30,000 by the Team (total cost 42,000 Ksh).</i> 4. <i>Since July 2000, dipping has been done weekly and until September 2001, 2,747 cattle and 2,964 shoats have been dipped.</i> 5. <i>Committee meeting held regularly and monthly.</i> </td> </tr> </tbody> </table>		Sandai Location	Arabal Location	<ol style="list-style-type: none"> 1. <i>There was a poorly performing dip committee in place before the verification project started. The community was asked to elect a new one. But this took very long time – due to power politics in the community; the Chief kept on postponing the elections.</i> 2. <i>Water in the dip sump was replaced even before the verification project started. The community hired a water bowzer that ferried water from Marigat at the cost of 9,250 Ksh.</i> 3. <i>Acaricides was managed on July 4, 2000 in an opaque way from an institution.</i> 4. <i>Dipping done fortnightly since July 2000, but it has not been accurately recorded despite the repeated advice by the Team.</i> 5. <i>Committee meeting not held in most of the cases.</i> 	<ol style="list-style-type: none"> 1. <i>A very active dip committee was elected in May 2000, facilitated by the Team.</i> 2. <i>Removal of dip spent was done on May 14 2000 which was a heavy exercise as the dip had been out of use for a long time. The spent was pumped out using the new water pump. Community participated in removing the soil, stones and wood in the dip sump.</i> 3. <i>Acaricides was purchased on July 13 2000 with a loan of 30,000 by the Team (total cost 42,000 Ksh).</i> 4. <i>Since July 2000, dipping has been done weekly and until September 2001, 2,747 cattle and 2,964 shoats have been dipped.</i> 5. <i>Committee meeting held regularly and monthly.</i>
Sandai Location	Arabal Location				
<ol style="list-style-type: none"> 1. <i>There was a poorly performing dip committee in place before the verification project started. The community was asked to elect a new one. But this took very long time – due to power politics in the community; the Chief kept on postponing the elections.</i> 2. <i>Water in the dip sump was replaced even before the verification project started. The community hired a water bowzer that ferried water from Marigat at the cost of 9,250 Ksh.</i> 3. <i>Acaricides was managed on July 4, 2000 in an opaque way from an institution.</i> 4. <i>Dipping done fortnightly since July 2000, but it has not been accurately recorded despite the repeated advice by the Team.</i> 5. <i>Committee meeting not held in most of the cases.</i> 	<ol style="list-style-type: none"> 1. <i>A very active dip committee was elected in May 2000, facilitated by the Team.</i> 2. <i>Removal of dip spent was done on May 14 2000 which was a heavy exercise as the dip had been out of use for a long time. The spent was pumped out using the new water pump. Community participated in removing the soil, stones and wood in the dip sump.</i> 3. <i>Acaricides was purchased on July 13 2000 with a loan of 30,000 by the Team (total cost 42,000 Ksh).</i> 4. <i>Since July 2000, dipping has been done weekly and until September 2001, 2,747 cattle and 2,964 shoats have been dipped.</i> 5. <i>Committee meeting held regularly and monthly.</i> 				
<p>5. Output (originally expected/programmed)</p> <table border="1"> <thead> <tr> <th>Item: No. of dipped livestock</th> </tr> </thead> <tbody> <tr> <td> <p>Sandai: <i>Not recorded despite periodical advice by the Team. However it is estimated at about 300 cattle and almost same or little more number of shoats per month.</i></p> <p>Arabal: <i>2,747 cattle and 2,964 shoats from July 2000 to September 2001 (about 230 cattle and 250 shoats per month)</i></p> </td> </tr> </tbody> </table>		Item: No. of dipped livestock	<p>Sandai: <i>Not recorded despite periodical advice by the Team. However it is estimated at about 300 cattle and almost same or little more number of shoats per month.</i></p> <p>Arabal: <i>2,747 cattle and 2,964 shoats from July 2000 to September 2001 (about 230 cattle and 250 shoats per month)</i></p>		
Item: No. of dipped livestock					
<p>Sandai: <i>Not recorded despite periodical advice by the Team. However it is estimated at about 300 cattle and almost same or little more number of shoats per month.</i></p> <p>Arabal: <i>2,747 cattle and 2,964 shoats from July 2000 to September 2001 (about 230 cattle and 250 shoats per month)</i></p>					
<div style="text-align: right;">  <p>Dipping in Arabal</p> </div>					

6. Evaluation (in a rating of 1-5)													
Aspect	Sandai	Arabal	Description										
1) Efficiency	2	2	Though input required for re-activating the dip system was small, the number of the dipped livestock was not big either taking into consideration the total livestock number in both areas; 4,500 cattle and 17,500 shoats in Sandai and 4,000 cattle and 20,000 shoats in Arabal.										
2) Effectiveness	2	2	Though the dip solution of Acaricides works very well, livestock brought to the dip was not many, thereby the effectiveness is not high.										
3) Relevance	2	2	Though dipping is effective, it is very difficult to bring animals to the dip especially during dry season since they are herded far away. Hand sprayer may be applicable under this condition.										
4) Sustainability	2	2	To sustain dip at the present fee of 10 Ksh/cattle and 2 Ksh/shoat, considerable number of cattle, say 300 cattle and 500 shoats, have to be kept on dipping monthly. It is difficult to sustain these number.										
7. Capacity Building													
Record keeping has been well done in Arabal, through which the secretary and the treasurer have cultivated the capacity in accounting and general administration.													
8. Impact and Outcome (others than originally expected)													
Not observed.													
9. Verification Result													
1. To sustain the dip with the present fee of 10 Ksh/cattle and 2 Ksh/shoat, at least the number of livestock shown in the table below should be dipped monthly (raising the fee cannot get villagers consensus).													
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Cattle</th> <th>Shoat (goat and sheep)</th> </tr> </thead> <tbody> <tr> <td>405</td> <td>0</td> </tr> <tr> <td>400</td> <td>25</td> </tr> <tr> <td>350</td> <td>275</td> </tr> <tr> <td>300</td> <td>525</td> </tr> </tbody> </table>				Cattle	Shoat (goat and sheep)	405	0	400	25	350	275	300	525
Cattle	Shoat (goat and sheep)												
405	0												
400	25												
350	275												
300	525												
2. Though Arabal dip committee has been operating very transparently with their utmost effort, they have received only about 200 cattle and 50 to 100 shoats during dry season. This is because the villagers have to take their herd to farer places during dry season, sometimes to as far as Laikipia, to seek for animal food. This situation makes it very difficult to sustain the dip system, and they have already failed to pay back the loan (30,000 Ksh) provided by the Team.													
3. In Sandai, the livestock is not moving so much because there are nearby swampy areas where animal are grazed. It seems that the dip system has been operating better than the one in Arabal. However, record keeping including dipping fee collection has not been transparent, thus the opaque management of the dip committee would greatly hinder the sustainable operation. Also, estimated dipping number of about 300 cattle with probably same or little more number of shoat is still not enough to financially sustain the dip.													
4. Why they do not bring many livestock to the dip, despite the large number in those areas (see table below) and despite the fact that they are mostly aware of the animal health, may be very much related to the less cash availability in the rural areas. Literally and actually, they regard their livestock as their savings rather than practicing actual cash saving in a bank account. Commercial bank is not acceptable for rural people due to the distance and the minimum depositing system(3,000-5,000Ksh for commercial bank). Therefore, cash flowing and also the availability in rural areas are very much limited, thus making it difficult to avail dipping fee at any time. This must be contributing to the less sustainability of the dipping system.													
Reference: Estimated livestock number in the Areas													
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Location</th> <th>Cattle</th> <th>Shoat</th> </tr> </thead> <tbody> <tr> <td>Sandai</td> <td>4,500</td> <td>17,500</td> </tr> <tr> <td>Arabal</td> <td>4,000</td> <td>20,000</td> </tr> </tbody> </table>				Location	Cattle	Shoat	Sandai	4,500	17,500	Arabal	4,000	20,000	
Location	Cattle	Shoat											
Sandai	4,500	17,500											
Arabal	4,000	20,000											
10. Way Forward													
1. In both cases, the program indicated that the dipping system is very difficult to be sustainably operated. Though generalization cannot be done, it could be at least said that the dipping system located at a place where livestock moves in a wide range seeking for fodder is very difficult to be sustained. Therefore, handspray rather than dipping system, which moves together with the livestock, may well be adapted in that situation.													
2. In Sandai, the Location Development Committee, supreme committee in the Location, should work as the advisory committee to the existing dip committee in order to improve the opaque management. The dip committee should basically function as the executing committee but not as the decision making body.													

表 5.2.7 パン(溜池)の改修 (Rugus)

<p>1. Background Excavation of the Pan has ever been implemented in and over the Study Area with the assistance of NGOs/GOK to alternate the source of safe drinking water (Groundwater along the Rift Valley does not suite for domestic purpose due to high fluoride content). It is, however, observed that most of the pans have been left silted up without any maintenance, instead of that, new pans have been repeatedly constructed.</p>	
<p>2. Subject to Verify To examine whether the pan could be sustainably maintained by the community beneficiaries rather than investing in new pan elsewhere.</p>	
<p>3. Input</p> <ol style="list-style-type: none"> 1. Materials (cement, wood, wire etc.) required for Pan rehabilitation: 47,570Ksh (10% borne by community) 2. Three days renting of bulldozer: 80,000Ksh (10% borne by community) 3. Materials (cement, wood, wire etc.) for water tank: 62,580Ksh (10% borne by community) 4. Transportation of materials: 33,000Ksh (10% borne by community) 5. Skilled labor: 20,000Ksh (10% borne by community) 6. Tools for earthwork (wheelbarrow, mattock, Jembe etc.): 23,220Ksh (Grant by the Study Team) 7. Unskilled Labor: 660 man-date (59,400Ksh) (100% borne by community) 	
<p>4. Implementation Process</p> <ol style="list-style-type: none"> 1. Desilting of Lekiricha Pan for 0.5 - 1.0 m depth with 60 – 70 m diameter was initially planned to do by manual work from the viewpoint of establishing sustainable maintenance. But after trial, the community and Study Team agreed to use heavy machinery with 90% subsidy to the community because the soil was too compacted to dig by manual. Desilting operation by bulldozer was completed in three days in the middle of Apr. 2000. 2. Excavation of silt trap of 10m x 10m with max depth 1.5m by bulldozer was completed at the same time of desilting operation. 3. 400m fencing around the pan and silt trap with thorn bush and Rapai plant was done by the community. Community decided to fence off the pan and silt trap with locally available resource and completed in one months (Jun. 2000) 4. Outlet with filter, well and watering place for animals by community labor and skilled worker. It took about eight months (from Jul. 2000 to Feb. 2001) longer time than expected to complete due to low turnout of community members for earthwork and disturbance by ethnic conflict. 5. Grass planting on pan embankment by community women was done during rainy season in Aug. 2000, but the grass withered during dry season. 6. Tree planting in the catchment area was agreed to be undertaken by the District Forestry Office, but it has not been done. 7. Roof catchment water tank with 15 cum at Rugus Primary School was constructed as to support non-beneficiaries of Lekiricha Pan and 100 pupils of Rugus Primary School. Water tank was completed in two months (Oct. and Nov. 2000) by the community and skilled worker. 8. Pan maintenance group was established with 13 committee members and the beneficiaries of four villages. 	
<p>5. Output (originally expected/programmed)</p> <ol style="list-style-type: none"> 1. By Sept. 2001, rehabilitation of Lekiricha Pan was completed except for tree planting in the catchment. 2. Retention of water in the pan extended from two (2) months to more than four (4) months throughout a year and people can now fetch water even from the silt trap. 3. Pan committee was not active and the leadership was taken over by the location Chief. 4. The installed filter/well is effective. Through the filter, water becomes transparent and content of colon bacilli reduced much. However, water level of the well gets low as the water level of the pan lowers, making it difficult to fetch water from the well. Although the filter/well is effective, people do not drink the water from the well because they say water smells and tastes strange and there even occurred a rumor that their ethnic opponent poisoned the water. The smell could be attributable to concrete dust in the well and it is expected to disappear after rotations of water. 5. Water tank was completed in November 2000 and well functioning. It serves 100 pupils of Rugus Primary School as well as nearby residents. 	

Lekiricha Pan after Desilting

Communal Work for Outlet





6. Evaluation (in a rating of 1-5)		
1) Efficiency	3	Rehabilitated Pan was immediately used when the rainy season came, though the earthwork by community took longer time than expected.
2) Effectiveness	2	Although the pan can retain water longer than before the rehabilitation, the output was still lower than the beneficiaries' original expectation, leading to discouraging them to pay the cash contribution.
3) Relevance	4	Although the pan dries up during dry season, there are no other options in this area than excavating pan for supplement safe water since the groundwater contains much fluoride and the nearby rivers are seasonal. Therefore the relevance of the project is judged to be high.
4) Sustainability	2	Although the pan is very much needed as a BHN in this high fluoride content area, it is very difficult to sustain the regular maintenance of Pan without regular input from outside. This is because the people have to diversify their activities under ASAL condition, leaving pan unattended especially during dry season that is suitable for desiltation.
7. Capacity Building		
The community by their own initiative started digging a channel to divert water from Mukutani River to utilize the pan more effectively. It can be said that the community was motivated for further improvement of the pan by seeing the rehabilitated Lekiricha Pan. People learned how to use tools such as wheelbarrow and folk jembe during the rehabilitation work and they look more confident in achieving the digging work.		
8. Impact and Outcome (other than originally expected/programmed)		
<ol style="list-style-type: none"> Output lower than their original expectation may have both positive and negative impacts. In case of Rugus, people showed positive attitude to further improve the pan by their own initiative, namely diverting seasonal river water into the pan. On the other hand the lower output might become a factor to discourage people to take further action for development. With respect to negative impact, the community refused to pay cash contribution. The reason, they said, was that the output was less than their expectation (water smelt and taste strange). However it might be a strategy to reason their nonpayment. Arrangement for cash contribution without any payment until the end might have retained their dependency. 		
9. Verification Result		
<ol style="list-style-type: none"> Though the rehabilitation was once completed, maintenance work by community has not been done and silting is again proceeding. This is because men have to take their animals far away during dry season, which is the most suitable time for desilting. Accordingly, the pan committee lost its function because they were busy looking for their own food. People here have to be engaged in various activities such as animal herding, farming, fishing hunting etc. for their survival. It is therefore evaluated that the sustainable maintenance of the pan by the community in such diversified nature seems very difficult. Water tank can be an alternative water source with much less maintenance where there are wide roofs available for collecting rainfall. 		
10. Way Forward		
<ol style="list-style-type: none"> Though we could see the positive attitude of the people toward the improvement of the pan, diversified activities of the people for survival will still dominate their interest. It is, therefore, difficult to sustain the regular maintenance of Pan by community themselves under Semi-Arid conditions, though it should not be over generalized. Therefore periodical intervention such as food for work or cost-sharing on heavy machinery by GOK/Donor will be needed for the sustainable maintenance of the pan. Health promotion in association with water project will be necessary for better communication with community and for better understanding on safe water. For example of the smell of filtered water, health staff can support the community to understand the effectiveness of the filter/well in longer term. Women had important role during the implementation in such a way of contributing labor. Women had worked for fencing and grass planting and even for earthwork, which basically should be men's work. Gender issues should, therefore, be coordinated in the community-based project. As the water tank is functioning well, this facility can be installed where the wide roof to catch enough rainwater is available. 		
		Outlet Well: Pan Water is filtered

表 5.2.8 参加型灌溉管理 + 節水農業 (Sandai)

<p>1. Background Sandai community has developed an irrigation system of 700 acres with the assistance of GOK. However, irrigation efficiency is low because of high seepage losses, poor maintenance of water channels and lack of sound water allocation and distribution. It is considered that improvement of the irrigation water management will enable to increase irrigation efficiency leading to increase of agricultural production.</p>	
<p>2. Subject to Verify To examine if the community can sustainably rehabilitate, operate and maintain the irrigation system without GOK/Donors' periodical intervention. To examine if the land leveling practice as on-farm water management can be built in the irrigation system to contribute to water saving in a plot and thereby making it possible to distribute water into wider areas.</p>	
<p>3. Input</p> <ol style="list-style-type: none"> 1. Materials for canal lining (cements, wood, equipment for concrete mixing etc.): 270,490Ksh (30% borne by community) 2. Materials for diversion boxes (steel gates, cements, wood, ballast etc.): 260,715Ksh (30% borne by community) 3. Skilled Labor for canal and diversion boxes: 141,400Ksh (30% borne by community) 4. Transportation for canal and diversion boxes: 448,000Ksh (30% borne by community) 5. Tools for canal and diversion boxes (mattock, jembe, wheelbarrow etc.): 43,720Ksh (Grant by the Study Team) 6. Unskilled Labor for canal and diversion boxes: 1,480 man-date: 133,200Ksh (100% borne by community) 7. Land leveler and operator: pilot 9 acres: 47,140Ksh (30% borne by beneficiaries) 8. Seeds for water saved agriculture: 1,680Ksh (100% borne by beneficiaries) 	
<p>4. Implementation Process</p> <ol style="list-style-type: none"> 1. Masonry lining of main canal for 300m from intake was done (See right photo). Though the lining work was progressed on time, community participation in manual labor decreased day by day. Misunderstanding between community and GOK/JICA Study Team on community's cash contribution and labor participation led to delay of community's payment. 2. Six diversion boxes with gates were planned to install in the main and secondary canal. Diversion boxes were installed after the completion of the canal lining, according to the community's performance of cash contribution. Installment schedule of cash contribution was made, but the community could not follow the schedule with some excuses such as school fee, drought, etc. 3. Land leveling for water saved agriculture was operated to the seven selected farmers. Though land leveling was implemented on time, severe prolonged drought delayed the cropping. 4. Study tour for NIB Perkerra irrigation scheme was conducted as part of water management training. 	 <p>Canal Lining of 300m</p>
<p>5. Output (originally expected/programmed)</p> <ol style="list-style-type: none"> 1. Canal lining of 300m was completed in August 2001. 2. Three diversion boxes out of six were installed by November 2001. Remaining three gates have been stored in the Divisional Office in Marigat because of poor cash contribution of the community. 3. 17%(56,000Ksh) of cash contribution has been completed. Remaining due for the community is about 280,000Ksh. 4. In 2001, with the increase of irrigation efficiency and rotational irrigation, 90% of the irrigation farmers got sufficient water as compared to planned target of 60%. 5. Crop area for cash crops such as tomatoes and watermelons were increased and French beans were newly introduced in 2001. 6. Land leveling increased on-farm irrigation efficiency by about 50% as compared to the irrigation hours without land leveling (average of five sample farmers). 7. Land leveling increased the crop yield by 30 % as compared to the yield without leveling (average of five sample farmers). 8. The irrigation area expanded around the leveled farms. 	 <p>Diversion Box</p>  <p>Farm after Land Leveling</p>

6. Evaluation (in a rating of 1-5)		
1) Efficiency	4 (2)	<ul style="list-style-type: none"> • Construction work was completed on time and could catch up with the first rainy season when people started cropping. Also utilizing locally available materials minimized the construction cost. • As for land leveling, its cost including transportation was high because only large scaled machinery was available, though the operation was effectively implemented.
2) Effectiveness	4 (4)	<ul style="list-style-type: none"> • About 90% of the farmers got enough water against the planned target of 60%, and they now feel more confident to take even risks to try new crops such as French beans and tomatoes. • The land leveling practice was also effectively implemented and contributed to yield increase, saving irrigation water thereby expanding irrigated area.
3) Relevance	4 (3)	<ul style="list-style-type: none"> • Sandai irrigation scheme was one of the few irrigation schemes in the Study Area and improvement of irrigation efficiency without exploiting new water source under scarce water resource in ASAL was relevant as a development approach. • Land leveling is an effective method to save irrigation water, but the shortage of available machinery constrained the approach.
4) Sustainability	2 (3)	<ul style="list-style-type: none"> • In spite of high effectiveness of the project, farmers' organization and institutional reform in this community is extremely challenging and requires considerable time and patience since dependency has deeply rooted in this community. Therefore, while the efficiency, effectiveness and validity of the project are considered to be high, sustainability should be rated as poor. It is probably very difficult to sustain the irrigation system by the community without periodical rehabilitation assistance. • As for land leveling practice, it is still difficult to build-in the whole irrigation system unless the implementation cost is reduced.
7. Capacity Building		
<p>1. Although the project was successful in terms of efficiency and effectiveness, there is not significant evidence about people's capacity building. People's attitude of dependency still remains and most of the community members are reluctant for the cash contribution (only 17% of total due has been collected.). However, it was observed that the Chief of Sandai location showed positive attitude and discretion in organizing community and one beneficiary of land leveling expressed on his future vision not to depend on donors. Except for few community members, they might have learnt little from the project.</p> <p>2. There was another small irrigation system on the other side of the river, left out from the project. However the people on the other side rehabilitated the canal by their own initiative. Project could bring a significant disparity in the community, but also it may bring stimulant to the people.</p>		
8. Impact and Outcome (others than originally expected/programmed)		
Project triggered latent leadership conflicts as a negative impact, particularly with regard to a contract with a community member who owned a vehicle for materials transport. Employment created by projects can be a seed of community internal conflicts over benefits.		
9. Verification Result		
Although the project was effective, people's dependency still seems remaining, e.g. at the first week of canal lining work, 80 to 100 people joined the earthwork and the number decreased to 10 after they knew there was no payment for the work from the Study Team. Finally 6 youths remained but in fact the contractors who were hired by the Study Team were unwillingly giving them pocket money. The approach by Donors to count community labor as their part of cash contribution may have promoted the dependency, diminishing their sense of ownership. Rushing implementation bound to the administrative/budgeting condition may also have curtailed people's initiative. Unless otherwise GOK/Donors change their approach to the community and vice versa, sustainable participatory irrigation management, including the rehabilitation, is very difficult due to the deep-rooted dependency replenished in the long history of external assistances (Their behavior of getting assistances from donors is even sophisticated.).		
10. Way Forward		
<p>1. For the subsidy arrangement, community should be involved in cost estimation and budgeting from the initial stage and be given notification for the project cost at the earliest stage.</p> <p>2. A certain part of project cost may be required as the community's commitment prior to the project commencement, so that they drive their initiative and motivation.</p>		

表 5.2.9 小規模産業振興 (Kampi ya Samaki)

<p>1. Background <i>Kampi ya Samaki is a place blessed with high potential of business including tourism and fish. People in this area are highly diversified with different ethnic groups and different businesses. Women here have been engaged in small-scale businesses to supplement their household income.</i></p>														
<p>2. Subject to Verify 1. <i>To examine if women could utilize, through a group activity, their resources (tourists, fish, honey, handicrafts) to generate income sustainably.</i> 2. <i>To examine if capacity building of women could be realized through the preparation of multi-purpose building and business, so that their various own development activities go on in dynamic way and continuously.</i></p>														
<p>3. Input 1. <i>Allotment of 1,000m² plot from Baringo County Council (Ksh3,200 including site planning, land survey, inspection and provision of certificate, 100% of cost borne by the women's group)</i> 2. <i>Multi-purpose building of 210 m², six rooms and a kitchen (Ksh1,350,000 (10% of cost, Ksh135,000, borne by the women's group) + Ksh207,915 for the extra cost (Ksh4,010 borne by the women's group))</i> 3. <i>Electricity wiring, Ksh87,000 (10% of cost, Ksh8,700, borne by the women's group)</i> 4. <i>Toilet, Ksh65,000 (10% of cost, Ksh6,500) borne by the women's group)</i> 5. <i>Utensils, honey bottles, labels and beehives for business (100% of cost, Ksh30,198, borne by the women's group)</i> 6. <i>Leadership trainings (leadership, general management and election), technical trainings (handicraft, honey and fish processing), and business trainings (financial management, business skill and budget planning)</i> 7. <i>Study tour for handicraft marketing to Nairobi and Mogotio</i> <i>Note: The women's group had finished all the repayment of Ksh184,408 (Ksh460/woman) to JICA and Ksh3,200 for land acquirement. They were during the course of fund raising of about Ksh400/woman for business operation)</i></p>														
<p>4. Implementation Process 1. <i>United women's group of 401 members was organized for the construction of multi-purpose building and business operation.</i> 2. <i>The building construction was completed in the end of September 2001, delayed for ten months from the initial plan because the contractor did not execute the contract due to price escalation of materials and opaque management of money. Finishing work of rear three rooms was carried out under the control of women's group, rather than contract base between JICA and contractor.</i> 3. <i>Series of trainings and study tour were provided on time and utensils and materials for business operation were also purchased as planned.</i> 4. <i>Business start delayed due to the construction delay and size of the building was too big to start with. Business finally started with a handicrafts & honey shop in September 2001.</i> 5. <i>At the initial stage of business operation, stock of handicrafts and honey were limited. The climate condition was the factor to have limited the resources of honey and plant materials for handicrafts.</i></p>														
<p>5. Output (originally expected/programmed) 1. <i>Existing 18 small women's groups were united to form Lake Baringo Muungano Women Self-help Group with 401 members.</i> 2. <i>Building (see photo) and toilet construction were completed by September 2001. Fencing, tree/flower planting under preparation (initiated by women's group).</i> 3. <i>Women acquired skills in honey/fish processing, handicraft making, business management, etc.</i> 4. <i>Two baskets, four bangles, two belts, three necklaces and one chair were sold in two weeks.</i> 5. <i>38 bottles of honey were sold in two weeks.</i> 6. <i>Restaurant not yet open.</i></p>														
														
<p>6. Evaluation (in a rating of 1-5)</p> <table border="1"> <tr> <td>1) Efficiency</td> <td>2</td> <td><i>Building construction delayed 10 months since the contractor did not execute the contract due to price escalation of materials and opaque management of money. It resulted in postponement of business commencement. Efficiency for the building construction is evaluated to be poor. As for business promotion, data is not enough to evaluate the efficiency at this moment.</i></td> </tr> <tr> <td>2) Effectiveness</td> <td>N.A.</td> <td><i>Due to delay in building construction and commencement of business, realized sales of handicrafts and honey were limited. Certain income for members was not recognized yet. Effectiveness is not available to evaluate at this moment.</i></td> </tr> <tr> <td>3) Relevance</td> <td>N.A.</td> <td><i>Relevance is not available to evaluate at this moment.</i></td> </tr> <tr> <td>4) Sustainability</td> <td>N.A.</td> <td><i>It is too early to evaluate sustainability at this moment. However, women's group, especially committee was strengthened and intention to continue their business utilizing multi-purpose building and further expansion has shown up.</i></td> </tr> </table>			1) Efficiency	2	<i>Building construction delayed 10 months since the contractor did not execute the contract due to price escalation of materials and opaque management of money. It resulted in postponement of business commencement. Efficiency for the building construction is evaluated to be poor. As for business promotion, data is not enough to evaluate the efficiency at this moment.</i>	2) Effectiveness	N.A.	<i>Due to delay in building construction and commencement of business, realized sales of handicrafts and honey were limited. Certain income for members was not recognized yet. Effectiveness is not available to evaluate at this moment.</i>	3) Relevance	N.A.	<i>Relevance is not available to evaluate at this moment.</i>	4) Sustainability	N.A.	<i>It is too early to evaluate sustainability at this moment. However, women's group, especially committee was strengthened and intention to continue their business utilizing multi-purpose building and further expansion has shown up.</i>
1) Efficiency	2	<i>Building construction delayed 10 months since the contractor did not execute the contract due to price escalation of materials and opaque management of money. It resulted in postponement of business commencement. Efficiency for the building construction is evaluated to be poor. As for business promotion, data is not enough to evaluate the efficiency at this moment.</i>												
2) Effectiveness	N.A.	<i>Due to delay in building construction and commencement of business, realized sales of handicrafts and honey were limited. Certain income for members was not recognized yet. Effectiveness is not available to evaluate at this moment.</i>												
3) Relevance	N.A.	<i>Relevance is not available to evaluate at this moment.</i>												
4) Sustainability	N.A.	<i>It is too early to evaluate sustainability at this moment. However, women's group, especially committee was strengthened and intention to continue their business utilizing multi-purpose building and further expansion has shown up.</i>												

7. Capacity Building

1. *Committee members had cultivated strong leadership through great number of meetings (61 meetings (32 committee and 29 general meetings) during 19 months since the women's group was organized) and activities required for fund raising, plot acquirement, building preparation, business planning, procurement of materials for business operation, etc. Especially, great change was observed for the leadership of the chairlady; compared with the inaugural speech in 1999, her voice and attitude had full of confidence during the recent general meetings and workshops after experienced all above.*



2. *Members of women's group have become more self-assured and were able to initiate own activities. For example, the chairlady of the group sent her husband to a tourist hotel in Kampi ya Samaki to market bottled honey, some of the members were preparing tree/flower seedlings to plant in the building plot, and fund raising for business preparation and fencing was completed. These activities were all initiated by the women's group.*

3. *Members of the women's group learned to trust, cooperate and unite in a group and with different ethnic groups. Basically women in the area used to form a women's group within the same ethnic group, but through the activities of verification project, they decided to work as one united group rather than the separated groups to keep equal balance among members.*

8. Impact and Outcome (others than expected/programmed)

1. *Women were encouraged to discuss and visualize their future development plan such as extension of their plot and management of petrol station. They are eager to continue their own development activities.*

2. *The project attracted other groups outside of the area to have similar projects or to have linkage with the Muungano women's group. For example, some women from outside of the area had visited the handicraft shop and showed interest to market their handicrafts, or beekeeping groups from other location requested divisional officers to sell their honey to the women's group. Future possibility of networking among different communities was recognized.*

3. *Concerning about negative impact, husbands of some members did not prefer to have wife engaged in time-consuming activities and complained. It might bring domestic problems.*

9. Verification Result

1. *Availability of resources to generate income, such as honey and fish, fluctuate depending on the natural condition, especially precipitation of the year. During the drought year honey production becomes low while fish production increases. On the other hand, honey production recovers in the following year if there is enough rain, while fish production becomes low due to over catch of the previous year. In ASAL areas, income generating activities should be diversified to secure certain level of income and stabilize livelihood, rather than concentrating on one business even though it has high potential of development.*

2. *Preparation process of the venue (multi-purpose building in case of this project) has strengthened, united and activated women's group and they gained self-confidence.*

10. Way Forward

1. *Continuous rather than intensive, but ad hoc support/training is required from GOK side, especially in skills of business planning, record keeping and accounting. Training courses provided during the verification period had some effect for business preparation, but additional support at the right timing helps them remember and practice the obtained knowledge. Women's group is expected to look for outside market for their products, especially bottled honey, with the assistance of GOK.*


2. *Women's group is expected to complete electricity connection and operate restaurant, as well as the continuous sales of bottled honey and handicrafts.*

3. *For future implementation of such project, small scale is preferable to start with, and scale of input could be enlarged step-by-step in accordance with the group capacity. In such way, benefit, though it's small, could be realized from the earlier stage and it would facilitate the group to continue their activities.*

4. *Contract for building construction was made between the contractor and Study Team, but women were involved only for the selection of contractor, and the contractor did not listen to the women's claim for the construction delay. On the other hand, training courses were mostly planned and provided by the Study Team and degree of involvement of women's group was low, and some of the courses had a poor reputation. Beneficiaries should therefore be involved not only in the planning stage of the project, but also all the process of implementation stage.*

5. *For the development of income generating activities in ASAL areas, diversification is necessary to stabilize certain level of income, considering unreliable resources over years.*

表 5.2.10 村落給水 (Upper Mukutani)

<p>1. Background <i>Delineation of the territories between Il Chamus and Pokots in the north edge of Upper Mukutani has been a cause of strife between the two ethnic groups. They share the natural resources around the border including an unprotected spring located at the side Il Chamus territory, which is one of the main water sources of domestic use and livestock for both ethnic groups.</i></p>														
<p>2. Subject to Verify <i>To examine if the development can contribute to social stability where two tribes compete for the same source.</i></p>														
<p>3. Input <i>1. Materials (pipes, cements, Sand, culverts, plumbing accessories etc.): 1,200,000Ksh (10% borne by community)</i> <i>2. Tools (Mattock, Shovel, Pipe cutter, Hand saw etc.): 60,000Ksh (Grant by Study Team)</i> <i>3. Skilled Labor: 240 man-day: 216,000Ksh (Grant by Study Team)</i> <i>4. Unskilled Labor: 1,210 man-day (100% borne by community): 109,000Ksh</i> <i>5. Transportation: 254,000Ksh (Grant by Study Team)</i></p>														
<p>4. Implementation Process <i>1. Construction started from July 11, 2001 and completed on September 22, 2001.</i> <i>2. The community completed digging work for the pipeline trench (from July 11 to July 21, 2001).</i> <i>3. Pipe-carrying by the community was completed (from August 1 to August 2, 2001) and pipefitting by skilled worker was completed by mid of August, 2001.</i> <i>4. Training to 35 community members in organizing self-help operation and maintenance group by Department of Social Services was conducted on August 6, 2001.</i> <i>5. Construction of intake structure and cattle trough by skilled worker was completed on August 11, 2001.</i> <i>6. Outlet was completed on September 7, 2001 (earthwork by community from July 28 to August 3, construction by skilled worker from August 4 to September 7).</i> <i>7. Appurtenant work by skilled worker was completed (from September 18 to September 22, 2001).</i></p>														
<p style="text-align: center;">Water Source (Spring)</p>														
<p>5. Output (originally expected/programmed) <i>1. Construction of water supply system completed (intake, pipeline, storage tank and out let, stand pipe and taps, two cattle troughs.</i> <i>2. The spring located in IlChamus territory has been well protected and clean water is available from the outlet located at the Mukutani center (territory of Pokots).</i> <i>3. Some 80 households or 400 people were estimated to be drawing water from the two water supply taps daily with two villages cutting water fetching distance by 2 Km.</i></p>														
<p>6. Evaluation (in a rating of 1-5)</p> <table border="1"> <tr> <td>1) Efficiency</td> <td>3</td> <td>Construction was completed with little delay due to much rain. Long distance from town raised transportation cost. Otherwise the water supply facility has been used immediately after the completion of the construction.</td> </tr> <tr> <td>2) Effectiveness</td> <td>3</td> <td>Community people can fetch cleaner water from the outlet and distance for fetching water was shortened by 2km.</td> </tr> <tr> <td>3) Relevance</td> <td>4</td> <td>Because the project is related to BHN, the relevance of the project is rated high.</td> </tr> <tr> <td>4) Sustainability</td> <td>3</td> <td>Since the project only recently was implemented, it is too early to make a conclusion.</td> </tr> </table>			1) Efficiency	3	Construction was completed with little delay due to much rain. Long distance from town raised transportation cost. Otherwise the water supply facility has been used immediately after the completion of the construction.	2) Effectiveness	3	Community people can fetch cleaner water from the outlet and distance for fetching water was shortened by 2km.	3) Relevance	4	Because the project is related to BHN, the relevance of the project is rated high.	4) Sustainability	3	Since the project only recently was implemented, it is too early to make a conclusion.
1) Efficiency	3	Construction was completed with little delay due to much rain. Long distance from town raised transportation cost. Otherwise the water supply facility has been used immediately after the completion of the construction.												
2) Effectiveness	3	Community people can fetch cleaner water from the outlet and distance for fetching water was shortened by 2km.												
3) Relevance	4	Because the project is related to BHN, the relevance of the project is rated high.												
4) Sustainability	3	Since the project only recently was implemented, it is too early to make a conclusion.												
<p>7. Capacity Building <i>1. Organization of newly established operation and maintenance group still seems weak.</i> <i>2. Sense of ownership of the community is challenging like other verification project sites. Although at the first time 50 men participated in the communal earthwork, the number of participants decreased and roamed around 10 since they knew that the Study Team would not pay for their work.</i></p>														
<p>8. Impact and Outcome (other than originally expected/programmed) <i>1. The community located near the hills would like a similar project using another spring called Lerlerai.</i> <i>2. Competition for water with 7 irrigating farmers could rise particularly during dry season, although the community members including the farmers agreed to control water before the commencement of the project.</i></p>														
<p>9. Verification Result <i>Though the project only recently implemented and it is too early to make a conclusion one way or the other, so far the facility has been well used by Il Chamus and Pokots and no significant conflict between the two ethnic groups has occurred.</i></p>														

10. Way Forward

1. *The operation and maintenance group should be mobilized with the assistance of GOK and it is expected that the community members will learn some maintenance work and the Department of Water Development will transfer routine plumbing tools to the Committee.*
2. *In the area, people do not prepare cash at anytime, but save their property as a form of livestock. Therefore the operation and maintenance cost borne by the community should not be charged in a short cycle with small amount but one or two times per year with as much as the price of a goat.*



Outlet

表 5.2.11 Marigat Youth Polytechnic(MYP)の強化

<p>1. Background <i>“Youth polytechnics”, which were referred to as “Village polytechnics” at the beginning, were started so as to provide training with a view to assist the youth to become self employed or even secure employment. Many “Youth polytechnics” receive substantial support from the GoK and other sponsors, but MYP was a purely a community owned institution with no more regular support from the GoK or other sponsors. Also there is a high demand in the community for better quality products, and for skill training.</i></p>																																																						
<p>2. Subject to Verify <i>To find out whether MYP can become a hub of network in the community. Potential community groups that were identified for networking included the “jua kali” artisans and the Kokoto Women’s group of Kampi Turkana in Marigat.</i></p>																																																						
<p>3. Input</p> <ol style="list-style-type: none"> <i>1. Technical assistance to develop short courses for beginners and short upgrading courses for experienced artisans</i> <i>2. Provision of electrical equipment, materials such as timber and tools for the carpentry workshop</i> <i>3. Training of trainers and a study tour for the management committee, trainees and instructors</i> <i>4. Hiring a carpentry instructor to assist in training in the use of the new equipment and in production of more advanced products</i> 																																																						
<p>4. Implementation Process</p> <ol style="list-style-type: none"> <i>1. MYP started short courses in June 2000 and forty men and women joined the courses, however, only two registered with money for registration and they transferred to the full 2-year course. For the moment, short courses have been put on hold.</i> <i>2. MYP started renting the equipment to Jua Kali artisans and Kokoto women group from summer of 2000.</i> <i>3. MYP opened a showroom in the town to sell their products in February 2001.</i> <i>4. Relationships between the carpentry instructor and the manager turned sour and the contract for the carpentry instructor was not renewed.</i> 																																																						
<p>5. Output (originally expected/programmed)</p> <ol style="list-style-type: none"> <i>1. The carpentry workshop was re-organised and is functioning very well although a saw blade was broken and long left unchanged.</i> <i>2. Benefits to the community includes benefits through linkages between MYP and Kokoto Women group which hires tools and have received training in handling ballast and bookkeeping. “Jua kali” artisans also benefit from the use of the new and advanced MYP equipment that has brought such essential services closer and financial status of MYP improved.</i> <i>3. A showroom was opened to sell and display furniture and clothes produced at the polytechnic by trainees and instructors.</i> <i>4. Enrolment increased from 14 and 17 trainees in 1998 and 1999 respectively to 33 and 34 in the year 2000 and 2001. However, MYP still registered relatively low enrolment for its two-year courses, and a very poor response to its planned short courses.</i> <i>5. Total income of MYP increased from Ksh150 thousands to more than Ksh250 thousands.</i> 																																																						
<div style="text-align: center;"> <p>Trend of MYP income and income sources from 1997 to 2001 August</p> <table border="1"> <caption>Estimated Data from Trend of MYP income and income sources from 1997 to 2001 August</caption> <thead> <tr> <th>Year</th> <th>School fees</th> <th>Skopping</th> <th>Production</th> <th>Farm</th> <th>Fundraising</th> <th>Jua kali training</th> <th>Others</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>1997</td> <td>100,000</td> <td>20,000</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> <td>170,000</td> </tr> <tr> <td>1998</td> <td>100,000</td> <td>20,000</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> <td>170,000</td> </tr> <tr> <td>1999</td> <td>100,000</td> <td>20,000</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> <td>170,000</td> </tr> <tr> <td>2000</td> <td>100,000</td> <td>20,000</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> <td>170,000</td> </tr> <tr> <td>2001 (up to August)</td> <td>100,000</td> <td>20,000</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> <td>170,000</td> </tr> </tbody> </table> </div>	Year	School fees	Skopping	Production	Farm	Fundraising	Jua kali training	Others	Total	1997	100,000	20,000	10,000	10,000	10,000	10,000	10,000	170,000	1998	100,000	20,000	10,000	10,000	10,000	10,000	10,000	170,000	1999	100,000	20,000	10,000	10,000	10,000	10,000	10,000	170,000	2000	100,000	20,000	10,000	10,000	10,000	10,000	10,000	170,000	2001 (up to August)	100,000	20,000	10,000	10,000	10,000	10,000	10,000	170,000
Year	School fees	Skopping	Production	Farm	Fundraising	Jua kali training	Others	Total																																														
1997	100,000	20,000	10,000	10,000	10,000	10,000	10,000	170,000																																														
1998	100,000	20,000	10,000	10,000	10,000	10,000	10,000	170,000																																														
1999	100,000	20,000	10,000	10,000	10,000	10,000	10,000	170,000																																														
2000	100,000	20,000	10,000	10,000	10,000	10,000	10,000	170,000																																														
2001 (up to August)	100,000	20,000	10,000	10,000	10,000	10,000	10,000	170,000																																														
<ol style="list-style-type: none"> <i>6. Awareness of MYP in the Study Area has increased significantly.</i> <i>7. New designs of furniture have been made, though to a limited scale.</i> <i>8. A machine operator and an accounts clerk were hired to serve clients and to streamline activities in the workshop.</i> 																																																						



Provided Equipment


6. Evaluation (in a rating of 1-5)		
1) Efficiency	3	Procurement of equipment for the carpentry workshop was relatively too large compared with institution development portion of the verification project.
2) Effectiveness	4	Income of MYP and “jua kali” artisans increased significantly by the verification project.
3) Relevance	4	MYP, a community owned institution, could be a hub of community networking.
4) Sustainability	3	Unless more parents can afford paying school fees, it is not so easy for MYP to sustain with present enrolment rate, production sales and “jua kali” services.
7. Capacity Building		
<ol style="list-style-type: none"> 1. MYP instructors started to prepare detailed training plans that include lesson plans and timetables. 2. MYP workshop became cleaner with instruction and safety measures on the wall. 3. MYP management board became to have meeting regularly with attendance of the senior chief of Marigat. He had never been to MYP before the verification project started. 4. In the past, record keeping in general was poor, but this has improved since the beginning of the verification project. In particular, the records in the carpentry workshop are very well kept and updated on daily basis. 5. MYP instructors started to prepare updated balance sheets of MYP. 		
8. Impact and Outcome (other than originally expected/programmed)		
<ol style="list-style-type: none"> 1. Improvement of record keeping has brought transparency and accountability of MYP management. 2. Large-scale production of “jua kali” artisans, such as orders for school desks and benches, can now be undertaken competitively and swiftly. 3. Hiring of the carpentry instructor brought in salary differentials, confusion in the line of reporting, authority and eventually poor relationships. 4. Although conflicts among the management board members have arisen in the past, it seems that they have accumulated to reach an unprecedented high level in 2001. 		
9. Verification Result		
The polytechnic can serve as network for the larger community, in particular the “jua kali” artisans. However, like many other polytechnics in the region, it is not easy to achieve the financial sustainability of the polytechnic on training only. Therefore, a showroom was opened to sell and display furniture and clothes produced at the polytechnic by trainees and instructors.		
10. Way Forward		
<ol style="list-style-type: none"> 1. Like many other polytechnics in the region, it is difficult to achieve the sustainability of the polytechnic on training only. Some form of sponsorship, fund-raising, subsidisation and income generation activities are necessary to achieve this financial sustainability. It is needed to understand the over all situation of polytechnics in the district and the country as a whole. It is also needed to understand the effects of dependency on subsidies by the community and how this is related to enrolment in educational institutions in general. 2. Achieving a higher enrolment should always remain the key focus of all MYP stakeholders because training is their core business. In this respect, MYP should intensify awareness creation efforts and ensure that advertisements are posted on the right time to the right target – primary and secondary students on their final year. 3. In order to streamline the work of the management and the executive committee, and to guard against misuse of authority, it is necessary to formulate a constitution and to develop clear procedure and systems. 		
		Visitors to MYP

表 5.2.12 Marigat Health Center (MHC)の強化

<p>1. Background <i>PHC is a strategy to achieve "Health for All" as the ultimate goal. Past PHC was weak in interactions between a health institution and a community. Often the distances are so far (physically, socially as well as psychologically) that health staffs, particularly those who are engaged in public health, are demoralized to communicate with a community. In this context, the interaction between the Marigat Health Centre and the communities has become a major focus of PHC in Baringo.</i></p>														
<p>2. Subject to Verify <i>To examine if the comprehensive PHC concept can be achieved with effective mass media.</i></p>														
<p>3. Input</p> <ol style="list-style-type: none"> 1. Provision of equipment for laboratory enforcement: binocular microscope, water quality multi-parameter kit etc.: 2.5millionKsh 2. Motorbike: 350,000Ksh 3. Information Billboards 110,000Ksh 														
<p>4. Implementation Process</p> <ol style="list-style-type: none"> 1. Equipment for laboratory was provided in June 2000. 2. Information billboards to send the health information to community were put up in 20 sites in September 2000. 3. 4 kinds of slides for health promotion were developed by the collaboration of MHC staffs from different sections (Clinic, Laboratory and Public Health) and the Study Team. 4. Health promotion slideshow in order to motivate health staffs to communicate people was carried out in 11 sites in June and November 2000. 														
<p>Marigat Health Centre</p> <p>Health Services ; medical care, vaccination, meat inspection, Lab test (Malaria, TB), health promotion, etc,</p> <p>Community</p> <p>Joy!</p>														
<p>Figure: conceptual overview of PHC interaction</p>														
<p>5. Output (originally expected/programmed)</p> <ol style="list-style-type: none"> 1. 11 slideshows have been performed. 4 slideshow programmes have been developed. 2. People's health knowledge enriched (40% of 154 interviewee answered that they saw the slideshow and among those who saw the slideshow, 55% acted something like boiling water more frequently than before.). 3. Diarrhoeal diseases reduced. 														
<p>6. Evaluation (in a rating of 1-5)</p> <table border="1"> <tr> <td>1) Efficiency</td> <td>4</td> <td>Laboratory is functioning well after development. Cost of slideshow is as small as 500 prints of health promotion poster.</td> </tr> <tr> <td>2) Effectiveness</td> <td>4</td> <td>Strengthened laboratory is more contributing to people's health and with slideshow people have got more knowledge about health.</td> </tr> <tr> <td>3) Relevance</td> <td>4</td> <td>Because the Study Area has a lot of cases of cholera, malaria, yellow fever etc., PHC strategy is possible way of stopping outbreak of above diseases.</td> </tr> <tr> <td>4) Sustainability</td> <td>3</td> <td>Financial stability of Government will constrain MHC activity.</td> </tr> </table>			1) Efficiency	4	Laboratory is functioning well after development. Cost of slideshow is as small as 500 prints of health promotion poster.	2) Effectiveness	4	Strengthened laboratory is more contributing to people's health and with slideshow people have got more knowledge about health.	3) Relevance	4	Because the Study Area has a lot of cases of cholera, malaria, yellow fever etc., PHC strategy is possible way of stopping outbreak of above diseases.	4) Sustainability	3	Financial stability of Government will constrain MHC activity.
1) Efficiency	4	Laboratory is functioning well after development. Cost of slideshow is as small as 500 prints of health promotion poster.												
2) Effectiveness	4	Strengthened laboratory is more contributing to people's health and with slideshow people have got more knowledge about health.												
3) Relevance	4	Because the Study Area has a lot of cases of cholera, malaria, yellow fever etc., PHC strategy is possible way of stopping outbreak of above diseases.												
4) Sustainability	3	Financial stability of Government will constrain MHC activity.												

7. Capacity Building

1. Incubator was missing in the laboratory, but finally MHC staff improvised an unused refrigerator to function as incubator. Through this improvisation, MHC staff became more confident.
2. Through the development of health promotion program and holding the slideshow, multi-sectoral collaboration (clinic, laboratory and public health) was promoted. (Picture on right hand is the preparation of slideshow in a village.)

**8. Impact and Outcome (other than originally expected/programmed)**

Not observed

9. Verification Result

1. It was recognized that mass communications (slideshow etc.) are vital component to fulfill MHC's responsibility. (in order to serve community's health)
2. The staffs in Marigat Health Centre are well motivated and keep their strong will to have close interaction with respective communities.

10. Way Forward

1. Maintaining PHC policy with emphasis on the comprehensive PHC concept will be needed.
2. In order to continue these communication activities, further external assistance is preferable in the form of slideshow equipment and computer training particularly for digital graphics.
3. Collaboration with Ministry of Water will be needed for both health promotion and water resource development.