

**1990 TDRI Year-End Conference on  
Industrializing Thailand and Its Impact on the Environment**

**Deforestation and Poverty: Can Commercial and  
Social Forestry Break the Vicious Circle?**

**The 1990 TDRI Year-End Conference**

***INDUSTRIALIZING THAILAND AND  
ITS IMPACT ON THE ENVIRONMENT***

**Session: Natural Resources for the Future**

**Research Report No. 2**

**Deforestation and Poverty: Can Commercial and  
Social Forestry Break the Vicious Circle?**

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**December 8-9, 1990  
Ambassador City Jomtien, Chon Buri**

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Policy research is a team effort. The names of researchers mobilized to undertake the various studies in preparation for the 1990 TDRI Year-End Conference and their respective topics of responsibility are listed below:

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**Theme:** Natural Resources for the Future

**Synthesis Paper #1:** Natural Resources for a Sustainable Future: Spreading the Benefits

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**Synthesis Paper #2: Mining, Environment and Sustainable Land Use: Meeting the Challenge**

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**Synthesis Paper #3: Industrialization and Environmental Quality: Paying the Price**

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**Research Report #5: The Greening of Thai Industry: Producing More and Polluting Less**

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## List of Institutional Supporters

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2. United States Agency for International Development (USAID), under the project *Privatization for Natural Resources Development*.
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## สรุป

วัตถุประสงค์ของรายงานวิจัยฉบับนี้ เพื่อจะแสดงให้เห็นถึงความเชื่อมโยงระหว่างการเข้าทำกินในเขตป่าและความยากจน โดยมีข้อสมมุติฐานว่า เริ่มจากรายได้จากการเกษตรต่ำ อาจจะทำให้ดินเสื่อมคุณภาพ มีที่ทำกินขนาดเล็กและโอกาสที่จะหารายได้จากข้างนอกมีจำกัดจำเป็นต้องหาที่ทำกินใหม่ แต่เมื่อเข้าไปทำกินในเขตป่าแล้ว แม้ว่าจะเป็นที่หมู่บ้านและเป็นชุมชน แต่โครงสร้างพื้นฐานไม่อำนวยความสะดวกเมื่อทำกินไปชั่วระยะหนึ่ง ผลผลิตต่อไร่ก็ลดลง เพราะโอกาสที่จะลงทุนและใช้ปัจจัยบำรุงดินมีจำกัด รายได้ก็จะลดลง สุดท้ายก็ต้องแสวงหาที่ทำกินใหม่อีก ซึ่งถ้ามองจากรัฐพยาบาลไม่ที่มีมองจากปัญหาความยากจนในชนบท และมองจากปัญหาการกระจายรายได้ ปรากฏการณ์เหล่านี้จะต้องแก้ไขโดยเร็ว นอกจากนี้ยังได้พิจารณาว่านโยบายป่าไม้ในส่วนที่เกี่ยวข้องกับป่าเศรษฐกิจและป่าชุมชนว่าจะมีความเป็นไปได้แค่ไหน ทั้งในแง่ของการเพิ่มรายได้และการอนุรักษ์ทรัพยากรป่าไม้

เนื้อหาอาจสรุปแบ่งเป็นหกตอนคือ (1) ภาพรวม (2) ความยากจนและการบุกรุกทำลายป่า (3) ฐานะและความเป็นอยู่และรายได้ของครัวเรือนที่ทำกินในเขตป่าสงวน (4) นโยบายการปลูกป่า : ป่าเศรษฐกิจ (5) นโยบายการปลูกป่า : ป่าชุมชน (6) สรุปและข้อเสนอแนะ

### ภาพรวม

การพัฒนาและการเติบโตของระบบเศรษฐกิจเพิ่มขึ้นเพราะटकตวงใช้ประโยชน์จากรักษากรรมมากกว่าการเพิ่มผลผลิตต่อไร่ หรือเพิ่มประสิทธิภาพการผลิต เมื่อทรัพยากรของชาติยังอุดมสมบูรณ์ การเติบโตของเศรษฐกิจสาขาหลักคือสาขาเกษตรก็มีอัตราการขยายตัวที่สูง แต่เมื่อทรัพยากรเสื่อมโทรมทั้งในเรื่องป่าไม้ และความอุดมสมบูรณ์ของที่ดิน อัตราการขยายตัวก็ลดลงผลตอบแทนจากการปลูกพืชซึ่งเป็นสาขาเกษตรหลักลดลง ขณะที่แรงงานในสาขาเกษตรยังมีอยู่มากเพราะการขยายตัวความต้องการแรงงานของสาขาอื่นมีจำกัด ปัญหาความยากจนและการกระจายรายได้ก็ตามมา ซึ่งประมาณว่าใน พ.ศ. 2531 คนในชนบทที่มีรายได้ต่ำกว่าระดับความยากจน คือประมาณคนละ 4,100 บาท มีถึงร้อยละ 31 ของคนในชนบท

ซึ่งถ้าไม่สามารถแก้ไขปัญหาความยากจนได้ โอกาสที่ทรัพยากร โดยเฉพาะป่าไม้ซึ่งมีน้อยกว่าระดับที่ควรจะเป็นอยู่แล้วจะถูกบุกรุกทำลายมากขึ้น อย่างที่เป็นอยู่ในปัจจุบัน (2533) การบุกรุกทำลายป่าก็ยังคงมีอยู่แม้จะเป็นเขตป่าอนุรักษ์ การยกระดับรายได้ของเกษตรกรที่เข้าทำประโยชน์ในเขตป่าสงวนอยู่แล้ว ซึ่งมีจำนวนอย่างน้อยก็เกือบ 10 ล้านคน จึงเป็นนโยบายสำคัญที่เร่งด่วนที่สุดที่ต้องตัดสินใจ

ความยากจนและการบุกรุกทำลายป่า

จากข้อมูลของกรมป่าไม้แสดงว่าเนื้อที่ป่าไม้ได้ลดลงโดยตลอด เนื้อที่ป่าทั้งประเทศ ลดจาก 171 ล้านไร่ใน พ.ศ.2504 เหลือประมาณ 110 ล้านไร่ใน พ.ศ.2521 และเหลือเพียง 90 ล้านไร่ใน พ.ศ.2531 แม้ว่าจะยอมรับกันโดยทั่วไปว่าการสูญเสียเนื้อที่ป่ามีหลายสาเหตุแต่ที่สำคัญก็คือ ประชากรเพิ่มขึ้นจึงต้องการที่ทำกินเพิ่มขึ้น โดยพิจารณาเฉพาะในภาคตะวันออกเฉียงเหนือ ซึ่งเป็นภาคที่คนในชนบทยากจนที่สุด และมีการสูญเสียเนื้อที่ป่าสูงสุดเพราะเนื้อที่ป่าลดลงจาก 44 ล้านไร่ ใน พ.ศ.2504 เหลือ 20 ล้านไร่ใน พ.ศ.2521 และเหลือเพียง 15 ล้านไร่ใน พ.ศ.2531

ผลการประมาณค่าพบว่าประมาณร้อยละ 75 ของการสูญเสียเนื้อที่ป่าสามารถอธิบายได้โดย ปัจจัยต่างๆ เรียงตามความสำคัญคือ (1) รายได้เฉลี่ยของคนในจังหวัด (2) การเพิ่มขึ้นของประชากร (3) ราคาพืชไร่ซึ่งใช้ราคาหัวมันสำปะหลังแทน ปัจจัยอื่น ๆ ที่มีความสำคัญรองลงไปก็มีมูลค่าของป่าไม้ และผลผลิตที่นำออกจากป่า (รวมทั้งการทำป่าไม้ ตัดฟันและเผาถ่าน) การสร้างถนนในชนบท โดยสรุปปัจจัยหลักที่สำคัญที่สุดก็คือรายได้ การที่รายได้จริงของคนในจังหวัดลดลง 1,000 บาท จะทำให้เนื้อที่ป่าลดลง 100,000 ไร่ โดยเฉลี่ยโดยไม่พิจารณาปัจจัยอื่นๆ เพราะเมื่อคนมีรายได้ต่ำ โอกาสที่จะต้องหารายได้เพิ่มมีมากขึ้น วิธีหนึ่งที่ทำได้ง่ายก็คือ ถางป่าปลูกพืชไร่ และถ้าพืชไร่มี ราคาดีก็จะต้องทำให้การทำลายป่าจะยิ่งเพิ่มขึ้น

ฐานะความเป็นอยู่และรายได้ของครัวเรือนที่ทำกินในป่าสงวน

เป็นที่รู้กันโดยทั่วไปในเขตพื้นที่ป่าสงวน ได้มีผู้เข้าไปทำกินอยู่เป็นจำนวนมากไม่ว่าจะ พิจารณาจากเนื้อที่และจากครัวเรือน และมีเป็นจำนวนไม่น้อยที่ประกาศเขตป่าสงวนทีหลัง หลังจากที่ เกษตรกรได้เข้าไปทำกินอยู่แล้ว และโดยเฉลี่ยแล้วอย่างน้อยในทุกเขตป่าสงวนมีคนเข้าไปทำกิน อย่างน้อยก็ 15 ปีขึ้นไป และบางพื้นที่เข้าไปทำกินมานานมากกว่า 30 ปี

การเก็บข้อมูลที่แสดงฐานะและความเป็นอยู่ของครัวเรือนที่ทำกินในเขตป่าสงวน รวมทั้งที่ยัง ไม่ได้ประกาศอย่างน้อยได้มีการสำรวจมาแล้วโดย 3 หน่วยงาน คือ สำนักงานเศรษฐกิจการเกษตรได้ สํารวจในเขตป่าสงวนภายใต้โครงการปรับปรุงการจำแนกประเภทที่ดิน สํารวจครัวเรือนตัวอย่างใน ระหว่าง พ.ศ.2526-2529 กรมพัฒนาที่ดินสํารวจครัวเรือนที่เข้าไปทำกินในเขตป่าถาวรเพื่อเตรียมการ ประกาศเป็นป่าสงวนโดยทำการสำรวจในช่วงระยะเวลาเดียวกันและภายใต้โครงการเดียวกัน และ ข้อมูลส่วนหนึ่งเก็บรวบรวมโดยคณะกรรมการพัฒนาชนบทแห่งชาติ เป็นการสำรวจข้อมูลพื้นฐานระดับ หมู่บ้าน (กชช.2 ค) ซึ่งได้สำรวจมาแล้ว 3 ครั้ง คือ พ.ศ.2527, 2529 และ 2531 ซึ่งมีใช้เป็น

การสำรวจหมู่บ้านในเขตป่าสงวนโดยตรงแต่พอจะแยกข้อมูลต่างๆ ของหมู่บ้านทั้งที่ตั้งอยู่ในเขตป่าสงวน และตั้งอยู่ข้างนอก ซึ่งสามารถจะพิจารณาข้อมูลที่เกี่ยวข้องได้ ถ้าได้แบ่งข้อมูลออกเป็นของหมู่บ้านและครอบครัวที่ทำกินในเขตป่าสงวนและที่ทำกินนอกเขตป่า

การวิเคราะห์ในส่วนนี้ได้อาศัยข้อมูลที่สำคัญจากสองแหล่ง คือจากการสำรวจข้อมูลระดับหมู่บ้าน เพื่อจะสรุปภาวะเศรษฐกิจและสังคมโดยทั่วไป และการวิเคราะห์รายได้ของครัวเรือนได้อาศัยข้อมูลจากการสำรวจของสำนักงานเศรษฐกิจการเกษตร ทั้งจากอาชีพรายงานที่จะเผยแพร่แล้ว และจากแบบสอบถาม

### ภาวะเศรษฐกิจและสังคมของครัวเรือนที่ทำกินในเขตป่าสงวน

ข้อมูลจากการสำรวจระดับหมู่บ้านแสดงว่ามีหมู่บ้านประมาณร้อยละ 22 ของหมู่บ้านทั้งหมดที่ตั้งอยู่ในเขตป่าสงวน จากข้อมูล พ.ศ. 2531 ประมาณว่าร้อยละ 33 และร้อยละ 28 ของหมู่บ้านในภาคเหนือและภาคใต้ที่ตั้งอยู่ในเขตป่าสงวน ประมาณร้อยละ 21 ในภาคตะวันออกเฉียงเหนือ และภาคเหนือ และประมาณร้อยละ 8 ของหมู่บ้านในภาคกลาง ซึ่งถ้าเปรียบเทียบกับข้อมูลใน พ.ศ. 2527 ปรากฏว่ามีสัดส่วนเพิ่มขึ้น ส่วนหนึ่งแสดงว่ายังมีการเข้าทำกินในเขตป่าสงวนอยู่และส่วนหนึ่งเพราะมีการประกาศจัดตั้งหมู่บ้านของชุมชนที่เข้าไปทำกินอยู่ก่อน ขนาดของหมู่บ้านพิจารณาจากจำนวนครัวเรือน และจากจำนวนคนในแต่ละหมู่บ้านแสดงว่าหมู่บ้านในเขตป่าสงวนมีขนาดใหญ่กว่าหมู่บ้านข้างนอก แต่ขนาดของครัวเรือนจะเล็กกว่าบ้างเล็กน้อย

พิจารณาแหล่งน้ำทั้งน้ำดื่มและน้ำใช้รวมทั้งไฟฟ้า หมู่บ้านในเขตป่าสงวนมีความขาดแคลนมากกว่าข้างนอก ทำให้โอกาสที่จะปลูกพืชครั้งที่สอง และพืชฤดูแล้งมีน้อยกว่า ในเรื่องที่ทำกินปรากฏว่าครัวเรือนในเขตป่ามีที่ของตนเองมากกว่า เท่ากับว่าเนื้อที่เข้าม้น้อยกว่าครัวเรือนข้างนอกและถ้าพิจารณาเอกสารสิทธิ์ก็มีน้อยกว่าครัวเรือนข้างนอก หมู่บ้านที่เนื้อที่ทำกินไม่มีเอกสารที่ดินอะไรเลย (ไม่ว่าออกโดยกรมที่ดินและโดยกรมป่าไม้) ของหมู่บ้านในเขตป่ามีมากกว่าหมู่บ้านข้างนอกเกินครึ่งหนึ่งของหมู่บ้านในเขตป่าที่พื้นที่ส่วนใหญ่ไม่มีเอกสารอะไรเลย เปรียบเทียบกับเพียงร้อยละ 7 ของหมู่บ้านข้างนอก

การใช้ประโยชน์จากที่ดินที่ถือครองว่ามีการใช้ประโยชน์เต็มที่แต่ไหนก็ปรากฏว่าครัวเรือนในเขตป่าสงวนมีการใช้ประโยชน์ที่ดินน้อยกว่าครัวเรือนข้างนอก ส่วนหนึ่งมาจากความอุดมสมบูรณ์ของ

ที่ดิน และขาดปัจจัยโครงสร้างพื้นฐาน ทำให้ส่วนใหญ่ต้องปลูกพืชครั้งเดียว ขณะที่ครัวเรือนข้างนอกมีโอกาสมากกว่า แต่หมู่บ้านในเขตป่ามีขนาดที่สาธารณะที่สามารถใช้เลี้ยงสัตว์มากกว่าหมู่บ้านข้างนอก แต่โดยเฉลี่ยแล้วการเลี้ยงสัตว์เพื่อขายมีน้อยกว่าครัวเรือนข้างนอก

ครัวเรือนที่อาศัยในเขตป่าสงวนมีโอกาสออกไปทำงานข้างนอก (นอกตำบล) น้อยกว่าครัวเรือนข้างนอก ทำให้จำนวนสมาชิกในครัวเรือนที่ออกไปทำงานข้างนอกโดยเฉลี่ยแล้วน้อยกว่าข้างนอก แม้ว่าไม่อาจจะสรุปเกี่ยวกับรายได้ได้โดยตรงแต่ก็น่าจะสรุปได้ว่าโดยเฉลี่ยแล้วภาวะความเป็นอยู่ครัวเรือนในเขตป่าจะต่ำกว่ากว่าครัวเรือนข้างนอก ทำให้มีผลต่อภาวะโภชนาการและอนามัยไม่ว่าจะพิจารณาจากน้ำหนักของเด็กแรกเกิดซึ่งมีน้ำหนักน้อยกว่า หรือการเสียชีวิตของเด็กแรกเกิดซึ่งปรากฏว่ามากกว่าสำหรับครัวเรือนที่อาศัยในเขตป่าสงวนเมื่อเปรียบเทียบกับครัวเรือนข้างนอก

ปัจจัยที่มีผลต่อรายได้ของครัวเรือนที่อาศัยในป่าสงวน

รายได้ของครัวเรือน การอธิบายรายได้ของครัวเรือนในเขตป่าสงวนได้อาศัยข้อมูลพื้นฐานจากรายงานผลการสำรวจภาวะเศรษฐกิจและสังคมของเกษตรกรผู้ทำกินในเขตป่าสงวนแห่งชาติในเขตป่าสงวน 24 ป่าใน 24 จังหวัดจากภาคตะวันออกเฉียงเหนือ 11 ป่า จากภาคเหนือและภาคกลาง 13 ป่า

ถ้าจะเปรียบเทียบรายได้ของครัวเรือนในเขตป่าสงวนและรายได้เฉลี่ยทั้งจังหวัด ไม่อาจจะสรุปได้ว่ามีรายได้ต่ำกว่าแต่จะแตกต่างกันไป สูงกว่าก็มี ต่ำกว่าก็มี ขึ้นกับลักษณะของพื้นที่ป่า ขึ้นกับความอุดมสมบูรณ์ของที่ดิน โครงสร้างพื้นฐานที่มีในแง่ที่ สภาพดินฟ้าอากาศ โอกาสที่จะปลูกพืชหลายชนิด โอกาสที่จะนำพืชใหม่ๆ เข้าไปปลูก และยังขึ้นกับปีที่สำรวจ

ปัจจัยที่มีผลต่อรายได้ รายได้เงินสดของครัวเรือนในเขตป่าสงวนในช่วง พ.ศ. 2526-2529 มีรายได้จากแหล่งคือ ร้อยละ 54 จากพืช จากไม้ผลและสัตว์ร้อยละ 15 จากการที่สมาชิกในครอบครัวส่งให้อีกร้อยละ 16 จากรับจ้างร้อยละ 13 และอื่กร้อยละ 2 จากขายผลผลิตจากป่า

จากการวิเคราะห์พอจะพิจารณาว่ามีปัจจัยสำคัญอะไรบ้างที่อธิบายรายได้ของครัวเรือนและเพื่อต้องการที่จะให้คำตอบว่า ความยากจนและการบุกรุกทำประโยชน์ในป่าเกี่ยวข้องกับวงจรรายหรือไม่ นั่นก็คือ เมื่อเข้าทำประโยชน์ในป่าชั่วคราวระยะหนึ่ง เมื่อรายได้จากการปลูกพืชลดลงเพราะผลผลิตต่อไร่ลดลงจนไม่คุ้มที่จะทำกินต่อ จะผลักดันให้มีการบุกรุกเข้าทำประโยชน์ต่อไปหรือไม่ โดยแยกพิจารณารายได้จากการเกษตร รายได้จากการรับจ้าง และรายได้จากการขายผลผลิตป่า



ปัจจัยสำคัญที่มีผลต่อรายได้จากการเกษตรที่อาศัยข้อมูลจาก 24 ปากคือ ปัจจัยการผลิตที่ครัวเรือนที่มีคือ เนื้อที่ถือครอง แรงงานของครัวเรือน และการใช้ปัจจัยการผลิต (พิจารณาค่าใช้จ่ายในการผลิตที่เป็นเงินสด) ปัจจัยอื่นๆ ที่สำคัญที่มีระยะเวลาที่เข้าทำกินเขตป่า ขนาดพื้นที่ป่าที่เข้าทำกิน ระยะทางจากตลาด และระดับการศึกษา เมื่อค่าของตัวแปรเหล่านี้เพิ่มขึ้นทำให้รายได้จากการเกษตรสูงขึ้น นอกจากนี้จากจำนวนที่เข้าไปทำกินในป่าคือเข้าทำกินสนามไป โดยเฉลี่ยจากตัวเลขของ 24 ปากทำให้รายได้ลดลง

รายได้จากการรับจ้างจะเพิ่มขึ้นถ้าจำนวนแรงงานที่ไปรับจ้างและอัตราค่าแรงในจังหวัดเพิ่มขึ้น การที่สมาชิกในครัวเรือนได้รับการศึกษาสูงขึ้นก็ทำให้รายได้จากการรับจ้างเพิ่มขึ้นเช่นเดียวกัน และถ้ารายได้จากการเกษตรต่ำลงก็ยิ่งสร้างความกดดันให้ครัวเรือนต้องการรายได้จากการรับจ้างมากขึ้น

ในส่วนของรายได้จากการขายผลผลิตจากป่าแม้จะมีจำนวนไม่มาก (เฉลี่ยครอบครัวละ 305 บาท) แต่ก็มีความสำคัญถ้าจะพิจารณาถึงมูลค่าผลผลิตที่นำมาบริโภคและใช้สอยในครัวเรือนทั้งในรูปของวัสดุก่อสร้างและเชื้อเพลิง ผลการวิเคราะห์พบว่าถ้าขนาดของปามีพื้นที่มากขึ้นและเข้าไปทำกินในป่านานเข้ารายได้จากการขายผลผลิตจากป่าเพิ่มขึ้น (แต่ในที่สุดจะลดลงเมื่อผลผลิตจากป่าลดลงและเนื้อที่ถูกรุกมากขึ้น) และมีแรงกดดันที่จะหารายได้จากผลผลิตจากป่ามากขึ้นเมื่อรายได้จากการเกษตรลดลง

โดยสรุปถ้าจะพิจารณาเฉพาะรายได้จากการเกษตรและจากรับจ้างปัจจัยที่สำคัญ และสามารถพิจารณานิยายได้ก็คือ การลงทุนในภาคเกษตร (พิจารณาจากรายจ่ายเงินสด) และระดับการศึกษา เพราะถ้าให้เกษตรกรได้ใช้ปัจจัยสมัยใหม่โดยการลงทุนมากขึ้นจะทำให้ได้รับผลตอบแทนจากการเกษตรสูงขึ้น ปัญหาว่ามีปัจจัยการผลิต และวิธีการผลิตที่จะให้เกษตรกรลงทุนมากขึ้นแค่ไหน และความสามารถของเกษตรกรที่จะมีเงินเพื่อจะใช้จ่ายในส่วนนี้ ในส่วนของการศึกษาก็มีความสำคัญมากทั้งในแง่ของเพิ่มรายได้จากการเกษตรและเพิ่มโอกาสที่จะทำงานรับจ้างข้างนอก

นโยบายการปลูกป่า : ป่าเศรษฐกิจ

นโยบายการปลูกไม้ของชาติได้กำหนดให้พื้นที่ป่าที่ประเทศอย่างน้อยร้อยละ 40 ของพื้นที่และกำหนดให้พื้นที่ป่าร้อยละ 15 เป็นป่าอนุรักษ์ และร้อยละ 25 เป็นป่าเศรษฐกิจ ในส่วนนี้ได้สนับสนุนให้เอกชนปลูกไม้โตเร็วและไม้ผล รวมทั้งสนับสนุนองค์กรของประชาชนในท้องถิ่นร่วมกับปลูกป่าชุมชน

ในการศึกษาพยายามที่จะให้ได้คำตอบว่าการปลูกป่าโดยเอกชน โดยเฉพาะเกษตรกรรายย่อยมีทางเป็นไปได้แค่ไหนที่จะช่วยเพิ่มรายได้ของครอบครัว การศึกษาได้อาศัยการสำรวจครัวเรือน 103 ตัวอย่างที่ปลูกยูคาลิปตัส 37 ตัวอย่าง และไม่ปลูก 66 ตัวอย่าง และบริษัทเอกชนปลูกป่าในจังหวัดฉะเชิงเทราสำรวจในต้นปี พ.ศ. 2533 ไม้ที่ปลูกทั้งหมดเป็นยูคาลิปตัส

ผลการศึกษาสรุปได้ว่าการปลูกยูคาลิปตัสไม่ได้ให้ผลตอบแทนคุ้มสำหรับเกษตรกรรายย่อย และจะยังไม่คุ้มสำหรับเกษตรกรขนาดเล็ก ซึ่งมีที่ทำกินประมาณ 26 ไร่ สาเหตุที่ไม่คุ้มเนื่องจากต้องใช้เวลานานกว่าจะตัดฟันได้ (4-5 ปี) ค่าใช้จ่ายด้านการลงทุนและถ้าต้องกู้ยืมมาในอัตราดอกเบี้ยปกติ ค่าใช้จ่ายจะสูง ดอกเบี้ยอาจจะต่ำถ้าได้รับการอุดหนุนเรื่องดอกเบี้ย ยิ่งไปกว่านั้นการปลูกยูคาลิปตัส (รวมทั้งไม้ชนิดอื่นๆ) ต้นทุนในการจัดการจะต่ำลงถ้าเป็นแปลงใหญ่ การที่เกษตรกรจะปลูกเช่นรายละเอียด 5 ไร่ จึงทำให้ต้นทุนสูง ดังนั้นเกษตรกรขนาดเล็ก (เช่นมีที่ดิน 26 ไร่) จะขาดทุน และถึงแม้ผลผลิตและราคาไม้จะสูงขึ้นบ้างก็ยังไม่ได้ไปกว่าการปลูกมันสำปะหลัง

แต่สำหรับเกษตรกรรายใหญ่หรือที่ดำเนินการในรูปบริษัทปลูกสร้างสวนป่า จากไม้ยูคาลิปตัสที่ตัดได้ต่อไร่และจากราคาที่ขายได้ในปัจจุบัน (2533) จะมีกำไรไร่ละ 1,400 บาท และอาจจะถึงไร่ละ 2,000 บาท ถ้าผลผลิตต่อไร่และราคาสูงขึ้น เหตุผลสำคัญก็คือพื้นที่ปลูกมีขนาดใหญ่ขึ้น ทำให้ค่าใช้จ่ายต่างๆต่อไร่ลดลง ผลผลิตต่อไร่สูงขึ้น และได้รับราคาดีกว่า ดังนั้นสำหรับบริษัทปลูกสร้างสวนป่าจึงเป็นธุรกิจที่มีกำไร แม้ว่าจะไม่ได้รับการส่งเสริมใดๆในเรื่องลงทุนและไม่ได้รับอนุญาตให้เข้าทำประโยชน์ในเขตป่าสงวนที่เสื่อมโทรมและเสียค่าเช่าในอัตราที่ต่ำ (เช่นไร่ละ 10 บาทต่อปี) และแม้จะคิดค่าธรรมเนียมเพื่อชดเชยกับการที่ทำให้สภาพแวดล้อมเสื่อมสภาพในอัตราไร่ละ 100 บาท ก็ยังจะมีกำไรจึงเห็นว่าควรจะมีค่าธรรมเนียมเพื่อชดเชยในส่วนที่น้อยอย่างน้อยไร่ละ 25 บาท จริงอยู่แม้จะคิดว่าเกษตรกรรายย่อยจะได้มีงานทำกับบริษัทปลูกสร้างสวนป่าและได้รับค่าแรงสูง แต่มองทางด้านการทำงานได้เพียง 61 คน-วัน แต่ถ้าปลูกมันสำปะหลังจะรองรับแรงงานได้ไร่ละ 75 คน-วัน

โดยสรุปการสนับสนุนให้ปลูกไม้โตเร็ว โดยเฉพาะยูคาลิปตัส ถ้ามองจากเกษตรกรรายคนหรือมองจากเศรษฐกิจส่วนรวมจะไม่ช่วยในการแก้ปัญหาความยากจนและปัญหาการกระจายรายได้ และการอนุญาตให้ปลูกป่ารายใหญ่เข้าปลูกป่าในเขตป่าสงวนที่เสื่อมโทรม จะทำให้เกิดปัญหาความยากจนมีมากขึ้นแทนที่จะช่วยลด

นโยบายการปลูกป่า : ป่าชุมชน

การแสดงความคิดเห็นเรื่องป่าชุมชนมีมากขึ้น เมื่อกรมป่าไม้อนุญาตให้เอกชนรายใหญ่ ส่วนมากในรูปของบริษัท เข้าปลูกป่ารวมทั้งใช้ประโยชน์อย่างอื่นในที่ดินป่าสงวนซึ่งเสื่อมสภาพแล้ว แต่ในสิ่งที่ดังกล่าวได้มีเกษตรกร เข้าไปทำกินอยู่แล้ว จึงต้องผลักดันให้เกษตรกรออกจากพื้นที่โดยได้รับค่าชดเชยบ้างเล็กน้อยจากผู้ได้รับสิทธิเข้าทำประโยชน์ สร้างความเดือดร้อนให้เกษตรกรที่เคยอาศัยอยู่เดิม จึงมีความคิดว่าการป่าไม้ น่าจะอนุญาตให้ชาวบ้านรวมกันเป็นชุมชนและทำการปลูกป่าเสียเอง ประกอบกับ เชื่อว่าชาวบ้านในพื้นที่น่าจะสามารถรักษาทรัพยากรป่าในสิ่งที่ไว้ได้ เพราะวิถีชีวิตของคนในชนบท แยกจากป่าไม่ออกอยู่แล้ว ป่าไม้เป็นทั้งที่แหล่งทำกิน แหล่งต้นน้ำ และอาหาร ดังนั้น ชาวบ้าน น่าจะเป็นผู้ดูแลรักษาป่าไว้ได้ ในการศึกษาเรื่องนี้ก็ได้พยายามดูในประเด็นที่สำคัญๆ เช่น ป่าชุมชน เกิดขึ้นได้อย่างไร มีบทบาทในการเพิ่มรายได้ให้กับชุมชนมากน้อยแค่ไหน และโอกาสที่จะดูแลรักษาต่อไปในอนาคต โดยจะแยกพิจารณาว่ากรณีของป่าชุมชนที่อนุรักษ์ป่าธรรมชาติ ในกรณีของภาคเหนือ และการปลูกสร้างสวนป่าในภาคตะวันออกเฉียงเหนือ อย่างไรก็ดีข้อสรุปที่ได้ยังมีข้อจำกัดที่สำคัญก็คือ เป็นตัวอย่างเฉพาะพื้นที่ซึ่งไม่อาจนำไปปรับใช้ต่างพื้นที่ได้ ยิ่งไปกว่านั้นว่าการทำความเข้าใจเรื่องนี้ จะต้องลงไปในรายละเอียดและใช้เวลา ซึ่งออกจะเป็นข้อจำกัดที่สำคัญ

ป่าชุมชนตามความหมายทั่วไปหมายถึง ป่าซึ่งประชาชนหรือชุมชนรักษาไว้เพื่อประโยชน์ของชุมชน เป็นรูปแบบของการจัดการป่าไม้ที่นำองค์ประกอบของความต้องการของประชาชนในชุมชนเห็น เข้าร่วมในการวางแผนจัดการ ประโยชน์ที่จะได้รับมีมาก เช่น การใช้ประโยชน์จากไม้ และใช้สอยร่วมกัน รวมทั้งประโยชน์เพื่อการอนุรักษ์ การปลูกป่า การแก้ปัญหาความยากจน รวมทั้งเพื่อให้เกิดประโยชน์สูงสุดและให้ระบบได้ยั่งยืนตามความต้องการของชุมชน

ข้อมูลที่ได้ในกรณีป่าธรรมชาติ ได้จากการลงไปศึกษาอย่างละเอียดในหมู่บ้าน ในจังหวัดเชียงใหม่ และลำพูน ทั้งหมู่บ้านที่ดูแลรักษาป่า และหมู่บ้านข้างเคียง ในส่วนของการปลูกสร้างสวนป่านั้น ได้ข้อมูลมาจากการเชื่อมโยงพื้นที่ แต่ส่วนใหญ่จากเอกสารและพูดคุยกับหน่วยงานที่รับผิดชอบ

การรักษาป่าธรรมชาติ : ป่าชุมชนในภาคเหนือ

จากการศึกษาป่าชุมชนใน 3 หมู่บ้านในภาคเหนือสรุปได้ว่า ประการแรกการรักษาธรรมชาติมีมานานแล้ว บางหมู่บ้านเริ่มมาตั้งแต่ พ.ศ. 2460 อีก 2 หมู่บ้านประมาณ พ.ศ. 2490 และได้กำหนดระเบียบ หรือกฎเกณฑ์ในการดูแลรักษาป่ารวมอยู่ในสัญญาเหมืองฝายในชลประทานระบบ

เหมืองฝาย นอกเหนือจะได้กำหนดหน้าที่และความรับผิดชอบของสมาชิกผู้ใช้น้ำและหัวหน้าเหมืองฝายแล้ว ในบางเหมืองฝายได้กำหนดบทลงโทษผู้ที่ตัดไม้ในป่าที่ถือว่าเป็นป่าต้นน้ำ

ประการที่สอง แต่ละหมู่บ้านเคยได้รับความเดือดร้อนจากการขาดแคลนน้ำในการเพาะปลูกมาก่อน อาจจะจากหมู่บ้านเดิม ซึ่งเคยมีน้ำอุดมสมบูรณ์แต่ภายหลังขาดแคลนจนต้องอพยพมาทำกินในหมู่บ้านปัจจุบัน หรือบางหมู่บ้านเคยได้รับน้ำอย่างพอเพียงต่อเมื่อมีการตัดไม้ทำลายป่าในบริเวณป่าต้นน้ำทั้งที่ตัดโดยผู้ได้รับสัมประทาน หรือตัดโดยชาวบ้านในหมู่บ้านนั่นเอง ทั้งเพื่อต้องการที่ทำกินและตัดไม้ขาย และสังเกตว่าปริมาณน้ำมีน้อยลงทำให้น้ำเพาะปลูกขาดแคลนจึงมีแรงกดดันที่จะรักษาป่าต้นน้ำ

ประการที่สาม หมู่บ้านที่มีบทบาทมากที่สุดจะเป็นหมู่บ้านที่อยู่ใกล้ป่าต้นน้ำ แรงกดดันจากหมู่บ้านข้างล่างที่จะดูแลรักษาป่าเองมีน้อยมาก แม้ว่าจะต้องอาศัยน้ำจากลำห้วยเดียวกัน อาจจะเพราะหมู่บ้านที่อยู่ใกล้สะดวกที่จะดูแล และเมื่อยังได้รับน้ำตามปกติ (เพราะหมู่บ้านข้างบนช่วยกันรักษาป่า) แรงกดดันที่จะให้หมู่บ้านข้างล่างเข้ามามีส่วนร่วมจึงมีน้อย หรือถ้ามีปัญหาขาดแคลนน้ำขึ้นมาอีกอาจจะผลักดันให้หมู่บ้านข้างบนดูแลแทน

นอกเหนือจากที่กล่าวมาแล้วยังปรากฏว่า ชาวบ้านดูแลเฉพาะพื้นที่ป่าต้นน้ำที่เป็นแหล่งน้ำที่สำคัญ ขณะที่ป่าต้นน้ำส่วนอื่นซึ่งเป็นป่าแปลงเดียวกันก็ไม่ได้กำหนดระเบียบดูแลไว้ รวมทั้งป่าแปลงอื่นที่อยู่ห่างออกไป ชาวบ้านก็ยังเก็บหาประโยชน์อยู่อย่างเดิม และความสำเร็จส่วนหนึ่งในการดูแลรักษาป่า เพราะได้รับความร่วมมือจากทางราชการ ในพื้นที่เก็บอย่างดี ในส่วนการที่จะมีรายได้โดยตรงจากป่าที่ชาวบ้านดูแลก็ปรากฏว่ามีน้อยมาก นอกจากเก็บพืชผลในช่วงฤดูฝน และส่วนใหญ่ก็เพื่อบริโภคในครัวเรือน

การพิจารณาต่อไปก็คือ หมู่บ้านเหล่านี้จะสามารถดูแลรักษาป่าเหล่านี้ไว้ได้หรือไม่ เพราะมีการเปลี่ยนแปลงเกิดขึ้นในหมู่บ้านและในชุมชน สมาชิกในครัวเรือนไปทำงานข้างนอกมากขึ้น รายได้มิได้มาจากการปลูกพืช นอกจากนี้ยังมีการเปลี่ยนมือในการถือครองที่ดิน จากการพิจารณาประวัติความเป็นมาของตัวอย่างป่าชุมชนในภาคเหนือ พอจะเชื่อว่าความสามารถในการรักษาป่า ขึ้นกับระดับการพึ่งพาป่าไม่มาก ทั้งการขายเนื้อที่ทำกินและการเก็บผลผลิตจากป่า ทั้งเพื่อสร้างบ้านและขายเป็นเงินสด เชื่อว่าโอกาสที่รักษาป่าหรือป่าชุมชนในช่วงนี้จึงมีน้อย แต่เมื่อเวลาผ่านไปได้ระดับหนึ่ง เมื่อมีรายได้จากการเกษตรเพิ่มขึ้นในระดับที่ได้ดูลกับรายได้จากการเกษตรจะมีสัดส่วนลดลง ถาลดลงถึงระดับหนึ่ง ความจำเป็นที่ต้องดูแลรักษาป่าชุมชนจะน้อยลงด้วย

นโยบายในส่วนนี้โดยสรุปก็คือ ในช่วงที่เกษตรกรต้องพึ่งพารายได้จากการเกษตรซึ่งจะมีผลทำให้การตัดไม้ทำลายป่ามากขึ้น ทางแก้ก็คือให้เกษตรกรมีรายได้นอกการเกษตรเพิ่มขึ้น แต่เมื่อรายได้นอกการเกษตรเพิ่มมาก ความจำเป็นที่จะดูแลรักษาป่าจะลดลงสิ่งที่รัฐบาลจะทำได้อาจจะให้ความสนับสนุนชุมชน เพื่อจะได้มีแรงจูงใจในการดูแล

### การปลูกป่าชุมชน

การปลูกป่าของชุมชนเพิ่งจะริเริ่มมาไม่นาน นอกเหนือจากการดำเนินงานของกรมป่าไม้ซึ่งไม่อาจจะเรียกว่าป่าชุมชน แต่เป็นการปลูกสร้างสวนป่า เริ่มโดยการปลูกป่าโดยอาศัยชาวบ้านที่เอาแบบอย่างมาจากประเทศพม่า หลังจากนั้นก็หน่วยงานต่างๆส่วนใหญ่โดยกรมป่าไม้ส่วนมากเป็นการทดลองหรือเป็นโครงการนำร่องและรวมทั้งเพื่อเป็นการสาธิต มีโครงการปลูกป่าไม้พื้น ปลูกป่าไม้ใช้สอย ปลูกป่ากิน ปลูกป่ากินชุมชน ส่วนใหญ่ปลูกในขั้นที่สาธารณะ หรือป่าสงวนที่เสื่อมโทรมแล้ว แต่ยังไม่มียุทธศาสตร์ในแง่ความหมายของป่าชุมชนที่แท้จริง

องค์กรเอกชนที่มีบทบาทอยู่มากในทุกกิจกรรมที่เกี่ยวข้องกับป่าไม้ รวมทั้งป่าชุมชนองค์กรหนึ่ง คือสมาคมพัฒนาประชากรและชุมชน ซึ่งได้ริเริ่มโครงการป่าชุมชนในภาคตะวันออกเฉียงเหนือ ซึ่งถ้าจะได้ปรับปรุงแก้ไขโดยยึดความต้องการของชาวบ้านเป็นหลัก ก็จะเป็นทางเลือกหนึ่งในการส่งเสริมปลูกป่าชุมชน

โดยสรุปโอกาสที่จะให้ป่าชุมชนที่ชาวบ้านร่วมกันดูแลรักษาป่าธรรมชาติให้มีมากขึ้นคงจะทำได้ไม่ง่าย เพราะป่าธรรมชาติ (นอกเหนือจากที่มีอยู่แล้ว) มีน้อย ปัญหาว่าทำอย่างไรชุมชนจึงจะรักษาป่าเอาไว้ได้ขณะที่ในชุมชนเองและข้างนอกชุมชนมีการเปลี่ยนแปลงตลอดเวลา ทำให้ส่วนหนึ่งก็โดยการที่สังคมหรือรัฐบาล จะต้องให้การอุดหนุนแก่ชุมชน เพื่อจะได้เป็นแรงจูงใจในการบำรุงดูแลก็เท่ากับว่ารัฐบาลต้องให้ความสำคัญของชุมชนในการดูแลรักษาป่าเพิ่มขึ้น รวมทั้งการป้องกันดูแลป่าอนุรักษ์ ในส่วนของการปลูกป่าในขั้นที่ป่าเสื่อมโทรมก็จะจัดการกันอย่างไรจึงจะตรงกับความต้องการของชุมชนในขั้นนี้ แต่ถ้าสังคมเห็นถึงความจำเป็นในการปลูกป่าแล้ว ก็อาจจะต้องให้ความสนับสนุน โดยเฉพาะในการที่ชุมชนไม่ได้พึ่งพาป่าที่จะปลูกขึ้นใหม่

สรุปและข้อเสนอแนะ

สรุป

การศึกษาเรื่องนี้ต้องการที่จะแสดงให้เห็นว่า การบุกรุกทำลายป่าและความยากจนเกิดขึ้นเป็นวงจร คือ เมื่อขยายที่ทำกินเข้าไปในเขตป่า อาจจะเพราะ ไม้ที่ทำกิน หรือที่เดิมมีไม้เพียงพอ หรือที่ทำกินเดิมดินเสื่อมคุณภาพ ผลผลิตต่อไร่ลดลง ไม้ค้ำที่จะทำกินอีกต่อไป จึงต้องเข้าไปทำกินในป่าแล้ว วงจรเก่าก็เกิดซ้ำไปเรื่อย ๆ จนกระทั่งต้นทุนในการแสวงหาที่ทำกินใหม่สูงมากจน ไม้ค้ำก็จะทำให้สภาพความเป็นอยู่ คนกลุ่มนี้เลวลง ปัญหาความยากจนและการกระจายรายได้ก็ตามมา

การพิจารณาถึงปัจจัยที่มีผลกระทบต่อการบุกเบิกป่า ก็พบว่าความยากจนหรือรายได้เป็นปัจจัยสำคัญ ตามด้วยประชากร และราคาพืชไร่ เมื่อเข้าไปทำกินในป่าแล้ว ภาวะเศรษฐกิจและสังคมทั้งในการประกอบอาชีพและความเป็นอยู่ โดยเฉลี่ยแล้วต่ำกว่าครัวเรือนที่อยู่ข้างนอก ซึ่งเท่ากับว่าพื้นที่ที่ครัวเรือนมีรายได้สูงก็มี ขึ้นกับสภาพพื้นที่ สภาพดินฟ้าอากาศ ความอุดมสมบูรณ์ของดินและโอกาสที่จะปรับการผลิต

ปัจจัยสำคัญที่มีผลต่อรายได้ของครัวเรือนที่เข้าไปทำกินในเขตป่าก็มี การใช้ปัจจัยการผลิตพิจารณาเฉพาะรายได้จากการเกษตร โดยเฉพาะจากตัดไม้ป่าในภาคตะวันออกเฉียงเหนือ ซึ่งส่วนใหญ่แล้วคุณภาพดินต่ำและสภาพฝนทิ้งช่วง ประกอบกับขาดการอนุรักษ์ดิน ทำให้ผลผลิตต่อไร่ของพืชเดิมลดลง มีผลทำให้รายได้จากการเกษตรลดลงเมื่อเข้าไปอยู่นานเข้า

นโยบายการปลูกป่าเศรษฐกิจโดยหวังจะเพิ่มรายได้ของเกษตรกรขนาดเล็กเป็นไปได้ยาก เพราะขนาดเนื้อที่มีจำกัด ต้องลงทุนสูงใช้เวลาหลายปีกว่าจะตัดได้รวมทั้งห่างไกลจากแหล่งรับซื้อทำให้ ไม้ค้ำ แต่สำหรับผู้สร้างสวนป่าใหญ่จะมีกำไร และกำไรสูงพอโดยที่รัฐบาลไม่ต้องให้ความสนับสนุน ในส่วนของป่าชุมชนถ้าเป็นการดูแลรักษาป่าธรรมชาติ จะไม่มีผลมากต่อการเพิ่มรายได้ของครัวเรือน นอกเหนือจากใช้บริโภคผลผลิตจากป่า แต่ถ้าจะให้ชุมชนดูแลรักษาในฐานะที่เป็นป่าอนุรักษ์เพื่อรักษาสภาพแวดล้อมและป่าต้นน้ำลำธารก็เป็นอีกเรื่องหนึ่ง การปลูกป่าของชุมชนยังเร็วเกินไปที่จะสรุปเพราะเพิ่งจะ วิเริ่มแต่ก็มีโอกาส ถ้าจะให้ความเข้าใจกับชุมชน ซึ่งจะแตกต่างกันและเปลี่ยนแปลงตลอดเวลา และให้ชุมชนได้ตัดสินใจเองในทุกเรื่อง และตรงกับความต้องการของชุมชน และถ้าชุมชนยังต้องพึ่งพาป่า โอกาสที่จะประสบความสำเร็จจะมีมากขึ้น การให้เอกชนรายใหญ่เข้าไปใช้พื้นที่ปลูกป่าและให้เกษตรกรที่ทำกินอยู่เดิมต้องอพยพออกมีแต่จะทำให้ปัญหาความยากจนมีมากขึ้น

### ข้อเสนอแนะ

จากผลการศึกษาและข้อสรุปข้างต้น ข้อเสนอแนะด้านนโยบาย มีดังนี้

1. เป็นที่ยอมรับว่าในสิ่งที่เกษตรกรเข้าไปทำประโยชน์ในสิ่งที่ป่าสงวน จะต้องให้ทำกินต่อไป ทำอย่างไรจึงจะเพิ่มรายได้ของครอบครัวทั้งจากการเกษตรและการรับจ้าง จึงเป็นประเด็นนโยบายหลัก ในส่วนนี้ก็ต้องให้เอกสารสิทธิ์และพัฒนาโครงสร้างพื้นฐานในพื้นที่ที่จำเป็นและมีศักยภาพ เพื่อจะได้มีโอกาสเพิ่มผลผลิตของที่ดินของที่ใช้ทำกิน

2. รัฐบาลจะต้องลงทุนมากขึ้นทั้งในส่วนของโครงสร้างพื้นฐาน และการค้นคว้าวิจัยเพื่อให้ได้มาซึ่งเทคโนโลยีที่เกษตรกรในพื้นที่เหล่านั้นนำไปปรับใช้ได้ รวมทั้งการศึกษาและการส่งเสริมเผยแพร่ และการจัดหาปัจจัยการผลิตที่จำเป็นรวมทั้งสินเชื่อ การให้การศึกษาน่าจะถือเป็นเรื่องสำคัญ เพราะนอกจากจะช่วยยกระดับรายได้ของครัวเรือนที่ทำกินอยู่ในพื้นที่แล้ว ยังจะเพิ่มโอกาสให้สมาชิกในครอบครัวได้ทำงานรับจ้างข้างนอกเพิ่มขึ้น และยังจะลดแรงกดดันในเรื่องพื้นที่ทำกิน

3. นโยบายการปลูกป่าเศรษฐกิจจะไม่ช่วยเกษตรกรขนาดเล็ก (เช่น มีเนื้อที่ถือครอง 26 ไร่) แต่จะได้ประโยชน์กับบริษัทสร้างสวนป่า และผู้ที่มีเนื้อที่ถือครองขนาดใหญ่ ซึ่งจะได้รับผลตอบแทนสูงพอ โดยที่รัฐไม่ต้องให้ความสนับสนุน ไม่ว่าในเรื่องการลงทุนหรืออนุญาตให้ใช้พื้นที่โดยเสียค่าเช่าต่ำ และการปลูกป่าโดยเอกชนรายใหญ่ไม่ช่วยแก้ปัญหาความยากจน ปัญหาความยากจนแก้ได้ก็โดยเพิ่มรายได้จากพื้นที่ทำกินอยู่แล้ว โดยเฉพาะพื้นที่ ๆ มีศักยภาพ

4. ควรจะให้ความสำคัญกับนโยบายป่าชุมชนมากขึ้น และให้มีบทบาทมากขึ้นในการดูแลรักษาป่าอนุรักษ์ ที่สามารถปะสานลำธาร (รวมทั้งอุทยานแห่งชาติ และเขตอนุรักษ์) อาจจะได้ให้ความสนับสนุนในด้านต่าง ๆ เพื่อจะให้ชุมชนเห็นประโยชน์ของการอนุรักษ์ เพราะจริง ๆ แล้วผลประโยชน์ที่จะได้มิใช่เป็นของชุมชนในพื้นที่ แต่เป็นของสังคมส่วนรวม ซึ่งในปัจจุบันโอกาสจะให้ชุมชนปลูกป่าเพื่อได้ไม้ไว้ใช้สอยยังไม่เป็นสิ่งที่จูงใจ เพราะยังยากจนควรจะมองในแง่ของการเพิ่มรายได้ และให้ชุมชนได้ประโยชน์จากป่า แต่ถ้าชุมชนไม่มีความจำเป็นต้องพึ่งพาป่า และยังเห็นว่าจะต้องปลูกป่า หรือรักษาป่าธรรมชาติ สังคมส่วนรวมจะต้องให้ความสนับสนุน

**Deforestation and Poverty: Can  
Commercial and Social Forestry Break  
the Vicious Circle?**



## Chapter 1

# Introduction

During the past 30 years, Thailand has achieved remarkable progress not only in industrialization but also in the alleviation of poverty. The percentage of people living below the poverty line was reduced from 30 percent in 1976 to 25 percent in 1988 (see Table 1). Yet, there are still 14 million people living in absolute poverty, 80 percent of whom live in rural areas. Equally significant is the widening inequality between the rural/agricultural and urban/industrial income groups. The national income share of the top 20 percent of the population increased from 49 percent in 1976 to 56 percent in 1988. By contrast, the share held by the bottom 20 percent dropped from 6.1 percent in 1976 to 4.5 percent in 1988 (see Table 1).

Widening inequality accompanying growth is characteristic of the development stage that Thailand's economy is undergoing today; it is expected to be reversed at a later stage of development. This U-shaped relationship between growth and inequality (known as the Kuznets Curve) had been one of the common trends in the economic history of developed countries. The magnitude of the income gap and its predominantly rural character is particularly worrisome in the case of Thailand. It is projected that without policy countermeasures, the total agricultural income in the year 2010 would be only 8 percent of the nonagricultural income. Taiwan—which is now in a development stage that Thailand will achieve in 20 years—has an agricultural income equivalent to 50 percent of its nonagricultural income.

Paralleling the persisting sizable pockets of poverty and widening inequality, there has been a drying up of the traditional sources of rural income and poverty alleviation. Thai agriculture's spectacular growth and the alleviation of much of rural poverty in the past were accomplished not through land reform and productivity growth—as was the case in Taiwan—but through the expansion of agricultural land into the national forest reserves. The forestland's abundance, wide distribution, and low cost

of clearing ensured a low production cost and low levels of landlessness, which translated into agricultural growth and poverty alleviation. Between 1950 and 1988, 108 million rai of forest land were cleared, 90 percent of which was converted to agriculture. Consequently, the amount of crop land tripled between 1950 and 1988, from 52 million rai to 148 million rai. Almost 40 percent of the 96-million-rai increase went to cash crops such as cassava, maize, and sugarcane; the balance went to rice and tree crops, most notably, rubber.

Given the very low and nearly perfectly elastic supply price for agricultural land, it is not surprising that landlessness remained low despite the fact that the population more than doubled, and that agricultural profitability remained high despite a virtual stagnation in crop yields. However, the land frontier is not infinite. With the forest cover having shrunk from 62 percent in 1950 to 25 percent today, there is little land left for agricultural expansion. Fifty-three percent of the remaining forest has already been declared protection forest, including national parks, wildlife sanctuaries, and critical watersheds, all of which are incompatible with agriculture. National disasters linked to deforestation and the public's growing environmental awareness are creating pressure for more effective protection and expansion of protection forests to cover most or all of the remaining natural forests. This raises the effective supply price of forest land to agriculture, even in private terms. Encroachers of protection forests are more likely to be apprehended and evicted than are encroachers of forest reserves or of the more recently declared economic forests.

The supply price of forest land to agriculture has been rising for other reasons as well. As good land is exhausted, increasingly less accessible and more marginal land has been opened up for cultivation. While the quality and sustainable productivity tend to be lower than that of previously opened crop land, the land clearing costs are just as high if not higher because of steeper slopes. Low accessibility and remoteness may also cause higher transportation costs and lower farmgate prices. For all these reasons, the supply price of land to agriculture in effective terms (i.e., adjusted for quality) is rising, even though it is still below the social supply price which includes the foregone value of the forest resource as well as the resultant environmental impacts.

Thus, the traditional sources of agricultural growth and poverty alleviation no longer exist, and while the land frontier has not abruptly disappeared, unencroached good agricultural land is increasingly harder to find and more costly to clear and farm. Thus, while the cultivated land per agricultural worker rose from under five rai per worker in

the early 1960s to over seven rai per worker in the late 1970s, it declined to six rai per worker in the mid-to-late 1980s. This is reflected in both a slowdown of agricultural growth (from 4-5 percent in the 1970s and early 1980s to 2-3 percent in the late 1980s) and an increase in poverty. The percentage of the population living below the poverty line declined from 30 percent in 1976 to 23 percent in 1981, but rose to 25.2 percent in 1986. The land constraint began to bind in the early 1980s. Yet, there are no indicators of increasing productivity in the agricultural sector.

The stagnation of average crop yields in the past resulted from averaging growing yields in irrigated areas with lower yields in newly opened forest land. At present, the stagnation of yields is the result of falling productivity on lands that were opened up in the 1970s. Due to the poor infrastructure, insecure land titles, and lagging investment and modern inputs in these largely rainfed areas, yields can be sustained only as long as the original productivity of the forest land lasts. This trend is evidenced most dramatically by cassava, a crop that is grown almost exclusively in encroached forest lands: the yield per rai dropped from 2,528 kg per rai during 1980-84 to 2,258 during 1985-89, an 11 percent decline.

The above trends suggest a future with slower agricultural growth and increasing inequality—if not poverty—and continued forest encroachment. However, three important mitigating factors should also be taken into consideration. First, population growth has been drastically reduced—from over 3 percent in the early 1960s to 1.5 percent in the late 1980s. The impact that the slowdown in population growth in the 1970s has had on the labor force is only now being felt. Between 1971 and 1985 the labor force grew by 3.5 percent, reflecting both the higher population growth of the 1960s and increased labor force participation, especially by females.

The second mitigating factor has been industrialization and the resulting migration from rural areas to Bangkok and other urban centers. However, despite the documented economic responsiveness and mobility of the Thai labor force, the number of migrants has been relatively modest considering the country's rapid industrial growth (8 percent per annum in the 1970s and over 10 percent in the 1980s). The reasons range from the rural labor force's low level of education to the government's policy of subsidizing highly capital-intensive industries, which therefore require less labor.

Despite the rapid structural change that saw the share of agriculture in GDP fall from 30 percent in the late 1960s to 15 percent today (1990), over 60 percent of the labor

force is still engaged in agriculture. Between 1971 and 1985 the number of agricultural workers increased at the rate of 2.7 percent per year, which is slightly lower than the 3.5 percent growth rate for the labor force as a whole. In the future, the nonagricultural sector, especially industry, is expected to make a larger contribution to employment than it did in the past. For example, the employment elasticity of manufacturing is estimated to be 0.63; thus, a 10 percent increase in industrial GDP increases industrial employment by 6.3 percent. While this is lower than the unitary elasticity estimated for comparable countries such as Taiwan, it does imply a higher labor absorption than in earlier years.

A third mitigating factor of stagnating agricultural incomes and growing inequality is the increased availability of off-farm agricultural employment in the irrigated areas, especially the Central Plains, where relatively intensive agriculture is being practiced. This off-farm employment is mainly seasonal employment occurring during planting and harvesting. However, while off-farm agricultural employment does augment the income of agricultural workers in the Northeast, it does not narrow the sectoral income gap. The increasing availability of nonagricultural employment in rural towns does help reduce the agriculture/industry income gap. It is estimated that 30 percent of Thai farmers' income is generated from nonagricultural employment. This is still very small compared to countries such as Taiwan, where over 60 percent of farmers' income is generated from nonagricultural employment. Although more industries have begun to move to rural areas, their motivation may be related more to the infrastructural, congestion, and pollution problems of Bangkok and its satellite cities than to the benefits of using lower-cost rural laborers who often lack the necessary education and skills for industrial employment. Yet, rural industrialization is bound to enhance the nonagricultural employment opportunities for agricultural laborers, especially those with better access to educational opportunities.

Despite the three mitigating factors outlined above, the most likely scenario for the 1990s is the following:

1. A further reduction of absolute poverty (assuming a 7-8 percent growth rate for the economy as a whole).
2. A further widening of income inequality between the agricultural/rural and the industrial/urban sectors although the sectoral boundaries will be more blurred because of increased rural industrialization and seasonal off-farm employment.

3. The income share of the bottom 20 percent of the population will continue to decline even as the percentage of the population below the poverty line declines.
4. Forest encroachment is likely to continue, albeit at a slower rate, because of the rising (private) supply price of converting forest land to agricultural land.

In conclusion, poverty and reforestation will continue to reinforce each other unless considerable growth of agricultural productivity of off-farm employment is achieved, especially in encroached areas within the national forest reserves.

The objective of this study is fourfold:

(1) To identify the linkages between rural poverty and deforestation, (2) to describe and analyze the socioeconomic conditions and income levels of farmers living in forest reserves, (3) to assess the economic and social profitability and distributional implications of commercial plantations of fast-growing species promoted by the government as an instrument of the national forest policy, and (4) to explore the prospects of social forestry as an instrument of forest protection and poverty alleviation by identifying the conditions under which successful community forestry has been practical. The study concludes with policy implications and recommendations.

## Chapter 2

# The Relationship Between Rural Poverty and Deforestation

While not all people who live in encroached forests are poor nor are all poor people engaged in forest clearing, poverty and deforestation are locked in a vicious circle of mutual reinforcement. Landless and small-scale farmers, among others, encroach on forest reserves in search of a better livelihood. They either clear the land themselves, usually following legal or illegal loggers, or they purchase the land from influential persons who claim control over large areas of forest reserves. During the first few years after encroachment, crop yields are relatively high because of the nutrients in the slashed-and-burned forest land. Once these nutrients are exhausted yields begin to drop. Had the farmers gained secure ownership of the land and access to credit, they could have considered land improvement and the use of fertilizers to maintain or even raise yields. However, the very act of encroachment deprives farmers of a legal title, and therefore of any collateral for credit. Moreover, infrastructure, agricultural extension, and other forms of assistance are usually less accessible to farmers in forest reserves than to farmers outside.

In response to falling agricultural incomes, farmers increase their dependence on forest products from nearby forests and on off-farm agricultural and nonagricultural employment. Further encroachment is also likely if unencroached forestland is available nearby. Except in areas where off-farm employment is abundant, farmers sooner or later are forced by declining productivity to move deeper into the forest in search of new, more productive land. The unsustainability of farming on fragile marginal land without adequate investments in soil conservation and fertilizers ensures the perpetuation of both poverty and deforestation in a mutually-reinforcing vicious circle.

To test the hypothesis that poverty, the demand for agricultural land, and the harvest of forest products are major causes of deforestation, we have specified a

deforestation function for Northeast Thailand, a region where both poverty and deforestation have been most prevalent. We hypothesize that the area of deforestation or forest loss in a province between LANDSAT surveys is determined by the following factors:

- Population growth
- Income level
- Size of forest
- Price of cassava
- Road network
- Harvest of forest products

All of the above factors except income level are expected to contribute positively to deforestation. By pooling cross-sectional data for the 17 Northeastern provinces with a time-series for five LANDSAT surveys and related socioeconomic variables, a sample of 79 observations was generated. This sample is employed to estimate deforestation functions. The objective is to explain (1) changes in forest area (forest loss) between LANDSAT surveys, and (2) variations across provinces.

The models are estimated using provincial data on forest area as reported from LANDSAT surveys in 1973, 1976, 1978, 1982, 1985, and in 1988. It is hypothesized that variations in deforested area in each province between two LANDSAT years are explained by the above six variables. A summary of data used is shown in Table 2. Detailed estimation results are shown in Table 3. One of the estimated equations is as follows:

$$\text{DEF} = -222.526 - 0.099 \text{ INC} + 17.829 \text{ PRC} + 0.439 \text{ VFP} + 0.133 \text{ FORS} + 178.547 \text{ R}$$

$$\begin{array}{ccccccc} (1.382) & (3.281) & (2.990) & (1.835) & (5.558) & (2.117) \end{array}$$

$$\text{Adjusted } R^2 = 0.751 \quad \text{DW} = 2.217$$

where

DEF = deforested area in the province, in 1,000 rai

INC = income per capita approximated by provincial gross domestic product per capita, at 1972 prices in baht

PRC = producer price received for cassava root, in satang per kilogram

VFP = value of forest products harvested, in 10,000 baht

FORS = size of the remaining forest area in the province, in 1,000 rai

R = rural roads constructed during the last five years

D = dummy variable equal to 1 for provinces with deforested area over 800,000 rai

The hypothesized causes of deforestation have been found to explain over 75 percent of the deforestation that took place between 1973 and 1988 in Northeast Thailand. The detailed results are reported in Table 14, and the significant findings are summarized below:

1. The addition of 1,000 kilometers of rural roads results in a loss of 179,000 rai of forest per year. In other words, a 10 percent increase in the rural road network results in a 2.8 percent increase in forest loss.
2. The harvest of forest products valued at 10,000 baht results in the loss of 44 rai of forest or 1 rai for every 227 baht. Alternatively, a 10 percent increase in harvested forest products results in a 1.4 percent increase in forest loss.
3. An increase in the (real) price of cassava root by one satang per kilogram results in the loss of 18,000 rai of forest. In terms of percentage, a 10 percent increase in the price of cassava brings about a 16 percent increase in forest loss. This is a very powerful response to economic incentives that goes a long way toward explaining deforestation in Northeast Thailand over the past 15 years to 20 years.
4. An increase in the real income per capita by 1,000 baht (in 1972 prices) results in reduction of deforestation by 100,000 rai. Thus, the forest loss could be cut in half by simply raising the provincial income per capita by 50 percent, this is not a difficult task in a country with a 10 percent real growth rate.
5. The forest loss is greater where the forest is large, primarily because there is a larger perimeter to encroach upon. For every additional 1,000 rai of forest, 133 rai are deforested. In other words, provinces with 10 percent larger forests have a 9 percent higher rate of deforestation, all other factors being constant. This should be a sobering finding for those who simply advocate faster reforestation as a means for attaining the desired area of forest cover.
6. The population growth was tested in a separate model because it was strongly correlated with the rural road network and the harvesting of forest products. The provinces with a one percent higher population growth than the average have an additional 5,700 rai of forest loss, all other things being equal. This corresponds to an elasticity of 0.33, that is, a 10 percent higher population growth rate, results in a 3.3 percent increase in deforestation.
7. Several provinces in the Northeast experienced exceptionally high rates of deforestation (over 800,000 rai each) during 1973 to 1976 including Chaiyaphum, Nakhon Phanom, Maha Sarakham, Surin, and Sisaket; and two other provinces, Chaiyaphum and Sakhon Nakhon expanded the problem during 1976 to 1978. These high rates were specific to these provinces during these years.
8. On the positive side, autonomous deforestation (that is unrelated to the above factors) was found to be on the decline since 1976. All other things being equal, deforestation in the Northeast decline by an average of 75,000 rai per year during 1973 to 1976. Autonomous deforestation was highest during the early 1970s, and it slowed by 40,000 rai per year during 1976-1978, by 38,000 rai per year



during 1978-1982, by 70,000 rai per year during 1982 to 1985, and by 95,000 rai per year during 1985 to 1988. Thus, we observe a deceleration of deforestation not attributable to any particular cause. Therefore, policy changes that aim to contain the causes of deforestation identified would be reinforcing underlying trends.

In summary, the main historical causes of deforestation in order of priority have been (1) poverty, (2) population growth, and (3) the price of cassava.<sup>1</sup> Population growth has contributed to deforestation primarily through harvesting of forest products and through agricultural forestland clearing, both of which have been made easier by the expansion of the road network. These results corroborate an earlier study (Panayotou and Sungsuwan 1989) which identified population, price of forest products, poverty, rural roads, irrigation infrastructure, and crop price as the main causes of deforestation in Northeast Thailand. Remote locations and high rice yields help to contain deforestation. Northeast Thailand is the poorest, most populous, and most deforested region of Thailand. The resource base is too weak and degraded to supply the inhabitants with the means for escaping poverty. Rehabilitation of the resource base is possible, but this requires halting deforestation and accelerating reforestation. These actions, however, mean preventing farmers from further encroaching on the remaining forests for land and forest products and from sustaining the declining production from their current farmholdings by opening up new land for cultivation. It also means taking some land out of crop production before it is fully degraded and reverting it to forests. This is a luxury that poor farmers cannot afford, and any attempts to halt deforestation and to accelerate reforestation must deal with poverty first, or at least concurrently. Otherwise, they are bound to fail.

## Endnotes

<sup>1</sup> The ranking is based on the beta coefficients.

## Chapter 3

# Living Conditions and Incomes of Farmers in Forest Reserves

### SOCIOECONOMIC CONDITIONS OF FARMERS IN THE FOREST

According to figures released by the Ministry of Interior in August 1990, 35 million rai, or 22 percent of the 159 million rai of forest reserves and national parks surveyed, have been encroached. In addition, almost half of the 6 million rai of communal land has been encroached, as have 2.4 million rai of the 4 million rai of protected forests surveyed. As a result of this massive encroachment, almost 1.7 million families, or 8.7 million people, live and farm in the forests. In principle, settlements in national forest reserves are illegal and are not entitled to infrastructure or government services, although several of the older settlements have grown into towns and sites of *Amphoes* (such as Pak Chong).

In general, there is very little information available on the socioeconomic conditions of the millions of people who live (illegally) in the national forest reserves. Recent village surveys under National Rural Development - 2C (NRD-2C or Kor Chor Chor - 2 Khor) provided the first insights into the socioeconomic conditions of farmers in the forest. This village-based information is important not only because it has been collected in recent years but also because it has served as the basis for implementing rural development programs, especially infrastructural ones. This section draws heavily on the 1988 survey.

The survey shows that 12,400 villages, or 22 percent of the country's 56,000 villages, are located inside national forest reserves (NFR). Most forest encroachment appears to have taken place in the North, where 33 percent of the villages are inside the forest reserves, and the least in the Central Region, where only 8 percent of the villages are in NFRs. However, this is more a reflection of where the forest reserves are than of other regional differences, though the availability of irrigated land and of off-farm

employment in the Central Region must have played some role. The South is a close second, with 28 percent of its villages in forest reserves due to the rapid expansion of rubber cultivation into NFRs in recent years. In the Central, Eastern, and Northeastern regions, encroachment either remained roughly constant or increased only slightly between 1984 and 1988. The North and the South experienced 43 and 33 percent increases in the number of villages, respectively. In total, 2,094 new villages were established mostly in forest reserves between 1984 and 1986, and 1,433 were added during 1987-1988 (see Table 4). This suggests that encroachment continued in the late 1980s, although at a slower pace, presumably due to the diminishing availability of land for encroachment (rising supply price), and the rapid economic growth since 1986 which increased the availability of nonagricultural employment.

Villages in the Northeastern Region are smaller in size than those of other regions, averaging 116 households compared to 140-148 households in the other regions. Villages inside the forest reserves are generally larger than those outside, averaging 140 households compared to 120 for villages outside the forest. The average family size ranges between 4.9 and 5.5 persons, but variations are more significant between regions than between villages inside and outside the forest (see Table 5). Based on these figures, it is estimated that 8.7 million people or 1.7 million households, live in the forest reserves. This may be an underestimate, since the survey shows only the number of villages that have been officially registered. Many more villages that have not yet been recognized exist in forest reserves. In 1989 a total of almost 1,000 new villages were announced.

Villages inside the forest reserves generally have less infrastructure than villages outside, partly because they are the result of forest encroachment and partly because they have been set up more recently. Table 4 shows a larger percentage of households in the forest having inadequate water for domestic use compared to households outside. With the exception of the Central Plains, villages inside the forest had little access to water for a second rice crop. Except for 5 percent of the households in the North, villages inside the forest had virtually no access to irrigation water. Surprisingly, 75 percent of the households inside the forest reserves had electricity compared to over 90 percent for the villages outside (see Table 6).

It is interesting to note that a larger percentage of farmers inside than outside the forest reserves were in possession of land that they called their own; correspondingly, land tenants were less common inside than outside the forest reserves. This is true in all

regions except in the Northeast (see Table 7). No figures were available on land titles except the percentage of area in the village having land documents. It showed that secure titles were less prevalent inside than outside the forest reserves as expected, 52 percent of land occupied in the forest reserve had no documents whatsoever compared with only 7 percent outside (see Table 8). As one would expect, the rate of land utilization (percentage of landholding planted) was lower inside the forest reserves than outside, because of both larger landholdings and lower sustainable productivity partly due to insufficient infrastructure and, therefore, more need for keeping land fallow (see Table 9).

Seventy-two percent of the Northeastern households inside the reserves grew rice (once a year) compared to only 56 percent in the Northern, 40 percent in the Central, and 38 percent in the Southern regions. Significantly higher percentages of farmers outside the forest reserve grew rice and dry season crops. Income from second crops grown in the dry season was, on average, higher for those living in the reserve than for those living outside (Table 10). However, more villages in the reserves had communal grazing plots (also of a larger size) than did villages outside the reserves, as one would expect. But this was not reflected in livestock raising activities (see Table 11); the percentage of households raising commercial livestock was higher outside. This was probably due to greater accessibility to the market. By contrast, fewer households (13 percent) in the forest engaged in off-farm employment than did households outside (22 percent), see Table 12. This may be the result of lower education, fewer employment opportunities, and less information on job availability for those living in the reserves than those outside.

Reflecting the less favorable socioeconomic conditions of households in forest reserves, a smaller percentage of newborn infants in the forest weighed over 3.00 kg. In the North and in the Northeast the newborn infant mortality rate was twice as high in households living inside the forest reserves (see Table 13).

## **EXPLAINING INCOME VARIATIONS WITHIN FOREST RESERVES**

The income information in the NRD-2 survey requires considerable processing and refining before income figures can be obtained. As an alternative, we used the results of farm household surveys by the Office of Agricultural Economics (OAE) conducted in forest reserves throughout the country between 1983 and 1986, described in more detail below. The information we used in this study is organized in 24 forest sites,

in 24 provinces—including 11 in the Northeast, 7 in the Lower North, and 6 in the Central Plains Region.

For comparison across provinces, we converted all figures into 1976 prices. The highest family cash incomes were found in Kamphaeng Phet (30,365 baht), followed by Prachuap Khiri Khan (25,655 baht), Lob Buri (24,740 baht), and Petchabun (23,497 baht). The lowest cash incomes were found in Nong Khai, Loei, Nakhon Phanom, and Sakon Nakhon—about 7,500 baht per household per year. In between, there is considerable variation, with relatively high incomes in the Central Plains and low incomes in the Northeast and the North (see Table 14).

To obtain a rough measure of the relative income positions of farmers in the forest reserves vis-a-vis the population at large, we compared the net cash incomes in current prices with the provincial average net cash income from the OAE's 1982/83 and 1986/87 Farm Household Income and Expenditure Survey. Half the sampled forest reserves had net cash incomes below the provincial average, and half were above it. This suggests that farmers in forest reserves are not necessarily worse off (or better off) than farmers in general; it depends on the specific forest reserve and province in which they live. In the Central Region, farmers in forest reserves were worse off than the average farm family in the province, while in the North the reverse was true. The situation in the Northeast was mixed with six provinces—notably Khon Kaen and Chaiyaphum—being better off and five provinces—notably Nong Khai and Nakhon Phanom—being worse off (see Tables 15 and 16).

In order to formulate policy recommendations for increasing the income levels of households living in the forest reserves, and for stemming further encroachment and deforestation, it is important to first understand the sources of these income variations. For this purpose, we have formulated a number of hypotheses pertaining to the three main sources of income for households in forest reserves.

#### **Cash Income From Forest Products**

Farmers moved into the forest to obtain a piece of land for growing crops. However, many of the necessities for living depend on the collection of forest products; from lumber, both for sale and for housing construction, to vegetables and animals, both for family consumption and cash. With the passage of time, the supply of forest products drops. The rate of decline depends on the size and the richness of the forest and the number of settlers. However, as soil fertility and farm incomes decline, settlers are

forced to collect more forest products for both family consumption and cash. Another variable that is hypothesized to affect income from forest products is access to markets, which usually depends on the location of the sites relative to urban centers.

### Cash Income From Agriculture (Farm Income)

The livelihood of households in the NFRs in the earlier years of settlement depends on the income from agriculture. Agricultural income, in turn, depends on the size of the holdings, the family labor force, and cash expenses for production inputs and for hired labor. Other variables that are hypothesized to influence income from agriculture include education, distance from market, size of the forest, security of land ownership, and time elapsed since land clearing. This last variable is critical, because with the passage of time the fertility of the land declines, as the original nutrients are either exhausted or leached in the absence of soil conservation and fertilizer use.

### Wage Income

In addition to the cash income from forest products, off-farm income is comprised of wages, salaries, and remittances from family members and relatives. Wage income, which accounts for 20 percent of the off-farm income, was hypothesized to depend on the distance from the market, the wage rate, the generated employment activities in the province or in nearby areas, the number of family members working for wages, and the number of years since encroachment.

#### 1. Cash income from forest products

$$Y_f = f(Y_{nf}, Y_{tf}, Y_o, Y_c, Y_r, H_a, H_f, D)$$

#### 2. Cash income from agriculture

$$Y_a = f(H_a, E_a, L_{fm}, Y_r, D, E_d, L_v)$$

#### 3. Wage income

$$Y_w = f(L_w, W, D, V_{pc}, Y_a, Y_c, Y_r, E_d)$$

where

$D$  = Distance from Bangkok, in kilometers

$E_a$  = Cash farm expenses, in baht

$E_d$  = Percentage of labor force with compulsory or higher level of education percentage

$H_a$  = Size of holding, in rai

$H_f$  = Size of forest per settler, in rai

$L_{fm}$	=	Number of family members working
$L_w$	=	Percentage of family members working as hired labor
$L_t$	=	Percentage of land with different types of land documents
$Y_a$	=	Family cash income from agriculture, in baht
$Y_c$	=	Family cash income from crops, in baht
$Y_f$	=	Family cash income from selling forest products, in baht
$Y_{nf}$	=	Family income excluding income from forest products, in baht
$Y_o$	=	Off-farm family income, in baht
$Y_{ff}$	=	Total family cash income, in baht
$Y_w$	=	Family wage income, in baht
$Y_r$	=	Number of year since encroachment
$W$	=	Wage rate, in baht
$V_{pc}$	=	Value of provincial GDP per capita, in baht

### Data

To test these hypotheses, we used survey data from the Office of Agricultural Economics (OAE). The surveys were carried out under the Land Reclassification Program for the purpose of collecting information on the socioeconomic factors of households residing in NFRs. A total of 58 forest sites in 56 provinces with a total forest area of 14.2 million rai were covered, and a sample of 18,697 households were drawn from a total 144,401 households residing in the forest under RFD's STK (usufruct rights) program. The surveys were carried out between 1983 and 1986. A report was prepared for each forest site.

Information used in this study is based on 24 final reports on 24 forest sites in 24 provinces: 11 in the Northeast, 7 in the Lower North, and 6 in the Central Region. Basic information of the study sites sampled by the OAE survey is given in Tables 17 and 18.

Data on income and expenditures were obtained by surveys of different areas in different years between 1983 and 1986, and were made comparable through conversion into constant 1976 prices. Size of landholdings and planted areas in various provinces



were adjusted for quality by "deflating" them with a productivity index.<sup>2</sup> Data used for the 24 forest sites are shown in Table 14.

### Empirical Estimates

The three models that embody our hypotheses have been specified in both linear and Cobb-Douglas forms and estimated using ordinary least squares techniques. The Cobb-Douglas functional form performed best for farm income, and the linear function performed best for forest products and wage income. Tables 19, 20, and 21 report the results of these regression models. Between 62 percent and 93 percent of the variation in incomes from different sources was explained, which is surprisingly high for cross-sectional data. All explanatory variables included in the final models have signs consistent with prior expectations and economic theory.

The estimated models are shown in Tables 19, 20, and 21. Below we report the result from one model for each source of income, from forest products, from agriculture and from wages:

#### From forest products:

$$(1) \quad Y_f = 37.737 Y_r + 0.390 H_f - 10.090 Y_a - 0.298 D + 502.926 D_m$$

$$\quad \quad \quad (6.203) \quad (2.632) \quad (2.516) \quad (1.962) \quad (3.112)$$

$$\quad \quad \quad \text{Adjusted } R^2 = 0.648 \quad \quad DW = 2.145$$

#### From Agriculture:

$$(2) \quad \ln Y_a = 2.883 - 0.750 \ln Y_r + 0.403 \ln H_a + 0.559 \ln E_a - 0.137 \ln H_f$$

$$\quad \quad \quad (6.002) \quad (3.145) \quad (3.081) \quad (6.342) \quad (3.132)$$

$$\quad \quad \quad - 0.105 \ln D + 0.037 \ln L_{fm} - 0.305 \ln D_m$$

$$\quad \quad \quad (1.167) \quad (0.371) \quad (4.245)$$

$$\quad \quad \quad \text{Adjusted } R^2 = 0.937 \quad \quad DW = 1.892$$

#### From Wages:

$$(3) \quad Y_w = 15.524 E_d + 45.060 W - 0.032 Y_c + 1684.439 D$$

$$\quad \quad \quad (4.271) \quad (2.635) \quad (1.808) \quad (5.395)$$

$$\quad \quad \quad \text{Adjusted } R^2 = 0.769 \quad \quad DW = 2.202$$

Up to 65 percent of the variation in cash income from selling forest products can be explained by the variables included. Explanatory variables include the number of years since encroachment, size of the forest per settler, and family income from all other

sources (excluding income from forest products). All variables included are statistically significant at acceptable levels (see Table 19). Our hypothesis that income from forest products is positively related to the size of forest per settler and the number of years since encroachment were "accepted" (not rejected), as were our hypotheses that income from forest products is negatively related to income from other sources and to distance from markets. These results have significant implications.

We anticipate an increase in the dependence on forest products over time as the fertility of the encroached land diminishes. Since the highest rates of encroachment were observed during the 1970s and early 1980s, an increasing dependence on forest products is likely to be observed in the coming years, especially in the face of a rising supply price of land for agriculture to replace exhausted lands. Our findings suggest that for every year that passes after encroachment, the average household seeks 28 baht more from the sale of forest products. While this seems small, it amounts to 48 million baht for the 1.7 million households estimated to live in forest reserves. This is likely to be only the "tip of the iceberg", since farmers depend on the forest for much of their non-cash income as well (such as fuelwood, vegetables, and fruits, etc.).

Income from agriculture is derived mainly from crops, but in many survey sites income from livestock and fruits is also important. Almost 90 percent of the variation in family cash income from agriculture was explained by six variables. Three of the explanatory variables are the factors of production (land, labor, and capital), which are positively related to farm income (as expected). The other three explanatory variables are the number of years since encroachment, the size of the forest per settler and the distance from the market (Bangkok); all three make negative contributions to agricultural income as hypothesized. All six variables are statistically significant at the 5 percent level or higher.

The output (income) elasticities of the three production inputs are reasonable. For example a ten percent increase in the average landholding, which stood at 14.4 rai per household, would result in a 4.0 percent increase in farm income, or 442 baht. This implies a gross income of 400 baht per rai at the margin, which is what we found to be the income from cassava in a recent survey of farmers in a forest reserve in Chachengsao Province. By comparison, a 10 percent increase in labor per farm would increase income by 0.4 percent, which amounts to 44 baht per worker per year. This is rather low but labor supply in forest reserves is abundant for most of the year, except during planting, weeding, and harvesting. Small holdings, low soil fertility, and low use of

supplementary production inputs result in low returns to family labor in farming. Yet additional labor is hired during planting and harvesting which is included as part of the farm expenditures variable.

Farm expenditure is very productive: a 10 percent increase in input expenditures increases output (income) by 5.6 percent in one model and 6.7 in another. This implies that an increase in working capital by 1,000 baht would increase income by almost 700-800 baht. Since most models we ran gave a very robust output elasticity for farm expenditures, higher than 0.6, it is reasonable to conclude that one baht of expenditures on farm inputs raises output by 1.35 baht, a 35 percent return, which is about the level of interest in informal rural markets. Considering that most farm expenditures in forest reserves are on variable rather than fixed inputs, and that most farmers plant only one crop a year, the return on farm expenditures is probably double the informal rate of interest.

That farmers do not spend enough on inputs such as fertilizers and soil conservation to maintain their yields is evidenced by our finding that for every year that passes from the time of land clearing, farm income drops by 400 baht, or 70 baht per rai. Thus, it takes only a decade for farm income at the margin to drop to zero. Of course, farming stops long before that. Finally, as farmers encroach more and more remote forests, farm incomes drop even further. Increase in the distance from market reflects a lower price rather than a lower quality land, since we have already made adjustments for quality.

We have also tested the hypotheses that education and land titles were significant determinants of agricultural income. Education turned out to be significant at the one percent level, but the distance from Bangkok became insignificant because of collinearity with education; the more remote the forest and the more dispersed the settlers, the lower the settlers' level of educational attainment. The contribution of education to agricultural income proved significant in all models without distance and size of forest per settler. A 10 percent increase in the working members with education at or above the compulsory level increases farm income proportionately. Alternatively, the attainment of compulsory or higher education by one more working member of the household increases farm income by 4,560 baht per year (or 317 baht per rai) without a change in landholdings and other inputs.

Since very few farmers have secure land titles (Chanod, NS3, NS3K), the only test is for an STK. STKs, which are not legally transferable, were found to have some impact on agricultural income. A 10 percent increase in such titles results in a one percent increase in farm income. The value of an STK to farmers was confirmed for the province of Roi Et using a sample of 180 farmers. However, when the sample was divided into farmers living both inside and outside the forest area the STKs were found to be significant only to farmers living outside the forest and claiming land in the forest. One possible explanation is that for farmers living outside the forest, STKs increase the security of possession which cannot be ensured through their physical presence. The farmers living in the forest tend to regard STKs as limiting their land "holding" to 15 rai, and confirming state ownership over land which they already possess (Feder et al.).

The two linear models for wage income explained about 77 percent of its variation across the 24 forest sites (see Table 21). Education was by far the most significant explanatory variable, followed by the wage rate. A one percentage point increase in the working members that attain the compulsory level of education increases the wage income by 15.5 baht. Alternatively, the attainment of the compulsory level of education (or higher) by an additional working member results in an increase in the household's wage income by 610 baht per annum, without a change in the wage rate or agricultural income. Presumably, this results from more employment opportunities becoming available to the household during the dry season.

An increase in the average wage rate in the province by one baht per day increases the wage income of the household in the forest by 45 baht per year. Since the average household supplies about 260 days of labor for wage (and a backward supply curve for labor is unlikely at such a low income level), the transmission of wage increases in the provincial center to the farmers in the forest is significantly less than one (0.2 at most).

Finally, while higher farm incomes reduce the pressure to seek wage employment, the two sources of income for farmers in the forest are hardly substitutes. An increase in farm income by 1,000 baht reduces wage income by only 32 baht. This is partly because of the very low level of income of households inside the forest reserves and partly because wage employment during the dry season does not conflict with farm activities.

## CONCLUSIONS AND POLICY IMPLICATIONS

From the statistical analysis of the sources of farmers' incomes in forest reserves, the following pattern emerges. In the first few years following settlement in the forest, land is relatively fertile, and the growing of cash crops is profitable even with little cash input. Most daily living necessities are derived from forest products, which also serve as supplementary sources of cash income. As time passes, usually after 10 years of growing the same cash crops, declining yield is unavoidable. This lowers the income from cash crops and increases the dependence on forest products, both in cash and in kind.

In response to these trends, farmers normally try to diversify and intensify crop production. But this is limited to the areas with relatively good soils, reliable rainfall, and proximity to markets. Others compensate for their declining crop income through agricultural and nonagricultural off-farm employment. But this is more available to those family members with some educational background. Moreover, wage employment in the forest is scarce and the majority still depend on growing cash crops. If the yields continue to decline to a level at which farming becomes unprofitable, the land will be left unused, and the households will search for new land for cash crops. This would ultimately result in more deforestation and repetition of the same cycle of unsustainable development.

A solution is also suggested by the analysis. Second-round encroachment could be prevented if income levels in the original sites could be maintained in real terms and gradually improved, or if farmers could be lured out of the forest altogether by alternative sources of income. As we have seen, the three main sources of cash income (remittances aside) are income from agriculture, income from wage employment, and income from forest products.

While a number of factors were found to determine farm income not all can be manipulated by policy.

1. While the size of the landholding is important, it cannot be increased without further forest encroachment, which we seek to contain.
2. The number of years since the time of encroachment cannot be reduced without further encroachment.
3. The family labor engaged in farming is binding only during planting and harvesting; it can be increased either through having a larger family (which may worsen rather than improve living standards) or by hiring wage labor, which requires an increase in farm expenditures.

4. Although an increase in farm expenditures not only for hired labor during planting and harvesting but more notably for fertilizers, improved seed, and water and soil conservation are cost-effective means for increasing farm incomes, the farmers will consequently face a capital constraint. The government can help relax this cash constraint by making institutional credit available to farmers in reserve forests. This, in turn, requires two policy changes; eliminating interest rate ceilings that dry up rural credit, and providing farmers with secure land titles to use as collateral.
5. Secure land titles are rare among farmers in forest reserves; however even STKs, which provide limited security, have been found by our study to make some contribution to farm income especially for farmers living outside the forest reserve but occupying land inside the reserve. More secure and transferable titles are expected to have a far greater impact (see Fedder, Onchan, Chalamwong and Hongladarom 1988).
6. Improved accessibility to markets through improved infrastructure were also found to contribute to farm incomes through higher prices for outputs and lower prices for inputs.
7. Education is the policy intervention that will have the greatest impact, since it apparently improves farming and marketing decisions to the extent that farm incomes nearly double!

Education is also the most significant determinant of wage income since it increases access to both wage employment and the level of effective wage. Except during the farming season, the labor market in the forest reserves appears to be soft; the amount of family labor available for wage employment did not significantly affect labor income. Moreover, increases in the average wage in a province were only partially transmitted to forest reserves. The government can help reduce further forest encroachment by increasing the availability of agricultural and nonagricultural off-farm employment, and by raising the education level of households in forest reserves. Better infrastructure and rural industrialization would also help, as would migration. There are already too many people depending on meager and fragile resources; especially in the Northeast.

Improved education, secure land titles, and access to credit are all likely to increase mobility out of forest reserves; at the same time, they would increase farm and off-farm incomes on-site for those who stay. That some farmers receiving full titles to encroached land would sell and move on is plausible and desirable. That they would move into the forest to continue encroachment is both less plausible and less desirable. Education, off-farm employment, and help with raising farm productivity and incomes are critical in ensuring that people either stay on their farms or migrate to take up nonagricultural employment. Evidence suggests that those who migrate out of the rural areas are those who are better off and those who have attained more education. Because

of the long gestation period of education, temporary (5-year) restrictions on the transferability of land titles may allay fears of further encroachment, while providing farmers with the collateral they need for long-term credit. Full and immediate transferability combined with transfer taxes would be preferable in attaining the same objectives, because they would not unduly constrain those facing profitable opportunities outside agriculture.

In the past, the activities of rural development, forest protection, and reforestation have been carried out with little recognition of their inherent interdependence. As a result, they achieved only limited success, although some notable exceptions did recognize the inseparable nature of the two problems. In recent years, however, the interdependence between rural poverty and deforestation is increasingly being recognized, and policies and projects are being formulated to deal with these two problems integrally and holistically. Two of the instruments being advocated and experimented with are commercial plantations of fast-growing trees and community, or social forestry.

The premise of commercial plantations is that the energies and resources of the private sector can be mobilized to reforest large areas of encroached and degraded forestland with fast-growing species. In this manner, it is hoped, the national forest policy target of 40 percent forest cover could be attained in a few years. Under this scenario poor farmers would obtain employment in industrial plantations, and some may even plant their own lands with fast-growing species for which a ready market would exist. The domestic processing of logs into woodchips for export, and pulp and paper for domestic use would increase value added, earn foreign exchange, and ultimately create benefits for the country, including the rural poor.

The premise of community forestry is that local people know best how to protect and manage the resources around them and will provide the optimal forestry management when their rights to these resources are fully recognized and not infringed upon by outsiders. Local participation in resource management, and even local control of resources, is deemed critical to the success of social forestry. Advocates including environmental groups, nongovernmental organizations (NGOs), and rural communities point to traditional communities that have conserved their resources in the past and to a few cases of community forestry in operation today. They advocate the rejuvenation of traditional management systems throughout Thailand and the reliance on community forestry for forest protection and reforestation. The rural poor would benefit by retaining

access to forest protection and reforestation. The rural poor would benefit by retaining access to forest products while excluding outsiders; by managing these resources for sustainable yields; by enhancing these resources through replanting; and by protecting the environment around the community, and other forest-related resources such as soil and water.

In the next two chapters Thailand's commercial and social forestry practices are assessed in order to answer the following questions: Can commercial forestry help break the vicious circle of deforestation and rural poverty? What are the financial, economic, and social profitability and distributional implications of commercial plantations? Is community forestry a realistic alternative? What types of social forestry have been successful in Thailand, and under what conditions? What is the scope for expansion of community forestry beyond the few existing cases today?



## Chapter 4

# Commercial Plantation Forestry: Can It Break the Vicious Circle of Deforestation and Poverty?

The national forest policy introduced in 1985 aims to raise the country's area under forest cover from 28 percent (1988) to 40 percent; 15 percent for protection forests and 25 percent for economic forests. The Royal Forestry Department (RFD), recognizing the difficulty of accomplishing this target on its own, has been promoting the involvement of the private (mostly corporate) sector in reforestation. Many incentive measures such as BOI privileges, rights to lease public land at relatively low prices, etc., have been given to companies and individuals who are interested in the reforestation scheme. Among the promising fast-growing species recommended by Thai forestry experts eucalyptus *camaldulensis* has become a dominant commercial species. The government policy of using private eucalyptus plantations as a means of reforestation has created many controversial issues. Some of these are: Can eucalyptus be considered a forest? Do eucalyptus plantations have net positive environmental impacts? Can eucalyptus plantations be used as a means of rural development and income distribution improvement? Can eucalyptus be used as a means of protecting the remaining natural forests?

To shed some light on these issues TDRI has carried out field research and analysis specifically focused on (1) the determinants of eucalyptus adoption *vis-a-vis* the average Thai farmers' conditions, (2) private profitability of eucalyptus *vis-a-vis* the public interest.

Data were obtained from a field survey of 103 households in 19 villages in the Sanamchaiket, Plangyao, and Panomsarakam districts of Chachoengsao province. This is the country's first and prime eucalyptus growing area, with sufficient scale and experience to obtain information on economic, social, and environmental impacts.

Moreover, this area was identified by TDRI (1989) and the Asian Development Bank (1989) as a physically appropriate area for eucalyptus plantations, but with the caveat that a socioeconomic survey should be carried out prior to eucalyptus promotion. This survey is a response to the need for such an assessment.

### FACTORS AFFECTING EUCALYPTUS ADOPTION

Non-corporate eucalyptus plantations range between 5 and 1,000 rai. Small-scale eucalyptus planters (less than 100 rai) are, on average, younger in age yet more educated and experienced in growing tree crops than non-planters. Our findings support the general belief that tree planting is usually a business for relatively wealthy farmers who have large enough landholdings and capital to diversify their farming activities and experiment with new crops (see Table 22). Small-scale farmers, with an average holding of 14 rai (adjusted for quality), find it difficult to adopt tree growing because of the trees' lengthy gestation period (4 to 5 years) and high initial establishment costs. The lack of capital and large landholdings make it impossible for small farmers to diversify their cropping patterns. Larger holdings, more farm assets, higher off-farm income, and access to low-cost credit allow larger farmers a better chance to accept the risk of adopting new crops with relatively long gestation (see Table 22).

Probit analysis of eucalyptus adoption among the sampled households indicates that the adopters of eucalyptus are usually younger farmers with larger holdings and substantial farm assets who have access to credit and experience in tree planting and multiple cropping as reported in Table 23, and summarized below:

$$AD = -0.293AG + 3.346EX - 4.672LH + 0.003FA + 0.750NC - 0.445ED$$

(2.92)	(4.60)	(1.79)	(2.57)	(2.49)	(1.91)
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$$\text{Adjusted } R^2 = 0.662$$

where: AD = adopters of eucalyptus  
 AG = age of adopter  
 EX = experience in tree planting  
 LH = labor per landholding  
 FA = farm assets  
 NC = number of crops  
 ED = level of education

The negative role of education in adoption of eucalyptus is somewhat surprising, especially since adopters on average had a higher level of education (Table 22). However, once we control for all the other variables, it becomes clear that, all other things equal, those with better education are more reluctant to adopt eucalyptus than those with lower education. This is understandable when the unprofitability of eucalyptus for small planters, who form the majority of planters, is considered (see the discussion of profitability below).

Medium-scale planters (over 100 rai) are mainly landlords and most of them have other businesses besides eucalyptus planting. These businesses rank from selling eucalyptus saplings, to small farming, to nonagricultural activities such as operating gas stations, grocery stores, hotels, etc. Before entering the eucalyptus business they rented out their land to small or landless farmers at the rate of 150-200 baht per rai. This fairly low opportunity cost of land, and the fact that part of such land is occasionally encroached upon and occupied illegally by farmers nearby, make planting eucalyptus the best option for land management and use for large landowners.

Large-scale or corporate planters (over 1,000 rai) are large companies which usually (but not always) lease encroached forest land from the RFD at a nominal fee to plant eucalyptus for processing into woodchips or pulp for domestic use and export. They are usually vertically integrated, controlling planting, harvesting, processing, and exporting of intermediate or finished products. Corporate planters often apply for and obtain promotional incentives and other privileges from the Board of Investment (BOI) for both their planting and processing operations.

## **FINANCIAL AND ECONOMIC PROFITABILITY OF EUCALYPTUS PLANTATIONS**

The profitability of eucalyptus planting by individual farmers varies with farmgate prices and yields of the trees, which in turn depend on the quality of the soil, the spacing, and the technology of production. Information obtained from the field survey indicates that there are significant differences in production technique, input use, and cost of production between the companies, the medium-scale planters, and the small-scale planters. Representative average financial costs per rai of each group exhibit a positive relationship between cost and yield. The existing market system for eucalyptus wood affords a greater benefit for larger scale planters through higher prices from buyers (mainly related industries such as woodchip and fiberboard plants). Corporate eucalyptus

planting also has the added advantage of economies of scale in nursery and planting operations, and in research and development. Scale economies are not available to farmers with small holdings.

To determine the private and social profitability of eucalyptus plantations we carried out cost-benefit analyses under current and likely future yields, costs, and prices. Eucalyptus planting is treated as a 12 year project (3 harvesting cycles of 4 years each). The present value of costs were deducted from the present value of revenues (benefits) to obtain the net present value, or net benefit from eucalyptus plantations:

$$NPV = \left[ \sum_{t=1}^T (B_t - C_t) \right] 1/(1+r)^t$$

where:

NPV = net present value

$B_t$  = benefits at time  $t$

$C_t$  = costs at time  $t$

$r$  = interest rate (rate of discount)

$t$  = time

$T$  = end of project (12<sup>th</sup> year)

Three types of analyses have been carried out. First, a financial cash flow analysis was performed from the private investors' (farmers) point of view to determine the financial viability of the enterprise. A second economic analysis, again from the point of view of the planter, was carried out to determine the private profitability of eucalyptus plantations, this differed from the previous financial analysis in that any implicit opportunity costs of factors owned by the planter, such as land and family labor, were costed and deducted from the revenues. The third and final type of economic analysis was performed from the society's point of view to determine whether the eucalyptus plantations are socially profitable, i.e., whether they increase rather than reduce national welfare. This differs from the private economic analyses in that the market prices of inputs and outputs have been adjusted (shadow-priced) to net out distortions and social and environmental costs and benefits to the extent that they are quantifiable.

The financial cash flow analysis indicates that the large-scale or corporate (over 1,000 rai) plantations are quite profitable, generating a net financial flow of 1,400 baht

per rai per year under current yields and prices; over 1,800 baht per rai under 33 percent higher yields; and over 2,000 baht per rai with the same yield but 28 percent higher prices, which are achievable in the near future. In contrast, small-scale planters (less than 100 rai) earn only 204 baht per rai compared to 500 baht from cassava under present conditions; 405 baht under 50 percent higher yields; and 526 baht under 43 percent higher yields, which is about the most that can be expected in the foreseeable future. Small farmers, who do not have access to institutional credit and borrow in informal markets at an average 36 percent (31 percent real) interest rate, would incur a financial loss of 517 baht per rai per year if they adopted eucalyptus planting. Medium-scale planters (100-1,000 rai) earn approximately one-half the income of corporate planters per rai per year (see Tables 24 and 25).

In terms of social profitability (for which taxes, subsidies, and other distortions are netted out, and inputs and outputs are shadow-priced at their social opportunity costs), we found that small-scale eucalyptus plantations are socially unprofitable unless the price of eucalyptus logs is increased by 40 percent, or yield increased by 100 percent. Medium- and large-scale plantations are socially profitable, even if we deduct 100 baht per rai of eucalyptus for environmental damage. For the calculations of social profitability, we deducted 25 baht per rai as an environmental cost of large-scale plantations reflecting a possible impact on water supplies.

## DISTRIBUTIONAL IMPLICATIONS

Commercial plantations are clearly not profitable to the small-scale planter (under 100 rai of plantation), much less to the small farmer (under 26 rai of farmholding) who can hardly spare any land for perennial crops, other than a few fruit trees. Eucalyptus plantations require large landholdings and access to long-term credit because of economies of scale, long gestation periods, and relatively high risks. These conditions are more suited to large-scale farmers and the corporate sector than to small farmers (less than the average agricultural landholding), who can ill-afford planting their small holdings with eucalyptus and waiting for 4-5 years to receive a return. Small farmers are less likely to adopt eucalyptus and when they do they suffer losses unless they receive ALRO assistance; even then their income is marginal. This feature suggests that eucalyptus cannot be considered as a means for alleviating poverty or improving income distribution, and should not be promoted as such.

It is possible that with the new high-yielding eucalyptus clones currently being developed by the corporate sector, eucalyptus planters in the future will be able to obtain a higher yield. It is also possible for them to receive a higher farmgate price, if the domestic processing of eucalyptus into woodchip and pulp proves profitable, and competitive conditions prevail among the buyers of eucalyptus logs. (At present the industry, with less than 5 large buyers, is oligopsonistic.) With higher yield and higher price, the planters' incomes would improve (if costs do not rise proportionately). This, however, could not possibly alleviate poverty or improve income distribution since the beneficiaries would be wealthy farmers with large landholdings, substantial farm assets, and access to low-cost credit who are typically the eucalyptus adopters. Even with higher expected incomes (Table 25), small farmers, especially those without secure land titles, would continue to face cash flow problems and high subjective risk because of their lack of capital to fund consumption during the 4-5 years that it takes eucalyptus to generate income.

However, small farmers may benefit indirectly from larger scale commercial plantations by (1) receiving a higher price for their land than they would otherwise receive, and (2) obtaining more off-farm employment at a higher wage. The effect on land prices is ambiguous; a higher demand for land results in higher prices, but the threat of eviction or of siege by eucalyptus plantations may lower the price of land. Some farmers do receive higher prices, while others complain of having been forced out. This problem arises mainly with regard to encroached land in forest reserves. The farmers hold on to their land in anticipation of receiving a secure title one day, which could double the price of the land (see Table 26). When they are offered a somewhat higher price than they would otherwise receive for untitled land, they are tempted to sell and move to obtain land elsewhere. They may regret the sale later when they realize that new land is hard to find or more costly to purchase, while they see their previous land improved by commercial interest.

Off-farm employment is one of the supposed benefits from large-scale eucalyptus plantations. While plantation companies do pay a somewhat higher wage than the prevailing rural wage (60 baht per day compared to 40 baht per day), the employment generated (61 man-days per rai) is less than the employment displaced (75 man-days per rai) for cassava (see Table 27).

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## **ENVIRONMENTAL IMPACTS: LOCAL PERCEPTIONS VERSUS SCIENTIFIC EVIDENCE**

Most small-scale farmers including small-scale eucalyptus planters complain about negative environmental impacts of eucalyptus, such as damage to their crops, reduction in soil moisture, and drop in water supply in the vicinity of eucalyptus plantations. However, they think that the land used for planting eucalyptus can still be used for other crops after the stumps are removed (see Table 28). Farmers do not think that eucalyptus will help to improve soil, climate, and water conditions. So far they can only see the adverse effects of eucalyptus, and therefore want the government to promote other tree species rather than eucalyptus in reforestation projects.

Local people perceive eucalyptus as having economic rather than ecological benefits, and complain that such economic benefits go to the companies and the more wealthy farmers.

It should be noted that farmers' perception of environmental impacts of eucalyptus on soil and water are quite consistent with the findings of existing scientific research.

The main conclusions of scientific research, both Thai and international, are that eucalyptus trees, like Acacia and a number of other tree crops, reduce the water table and affect neighboring crops where moisture and nutrients are in short supply. Eucalyptus is not recommended for protection of watersheds or regulation of water flows, or as a crop for good soil. Eucalyptus is suitable for degraded areas; it should be planted in small plots blocked by other species. When planted on a large scale, agroforestry practices should be used and the environmental and social impacts should be assessed (for more details see Boxes 1 and 2).



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**Box 1. Environmental Impacts of Eucalyptus: Conclusions of the International Literature**

1. The effects of eucalyptus on *soil* depend on the state of the soil in which they are planted: beneficial in degraded sites, probably not so when replacing indigenous forest. Where eucalyptus are planted in bare sites, there is an accumulation and incorporation of organic matter. However, the cropping of eucalyptus on short rotation, especially if the whole biomass is taken, leads to rapid depletion of the reserve of nutrients in the soil. There is no evidence of podsolization or *irreversible* deterioration of soil.
  2. The strong surface roots of some eucalyptus species mean that they compete vigorously for water with ground vegetation and *with neighboring crops* in situations where water is in short supply.
  3. Eucalyptus are not good trees for *erosion control* because under dry conditions ground vegetation is suppressed by root competition.
  4. There is evidence that *some eucalyptus species* produce *toxins* that inhibit the growth of some herbs.
  5. Young, rapidly growing eucalyptus plantations consume more water, and *regulate flow* less well, than natural forests. However, they consume less water than pine do.
  6. When eucalyptus plantations are planted where no trees existed previously, the *water yield* of catchments is reduced and the *water table* is drawn down. Other trees would probably produce comparable effects.
  7. FAO recommends that "eucalyptus should not be planted, especially on a large scale, without a careful and intelligent assessment of the social and economic consequences, and an attempt to balance advantages against disadvantages".
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Source: United Nations Food and Agriculture Organization

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**Box 2 Environmental Impacts of Eucalyptus: Conclusions of the Thai Literature**

1. Eucalyptus, when planted in previously open areas, result in a significant drop in the water table, but a similar drop is observed with *Acacia auriculiformis* (Kratinnarong) (Petmak et al. 1987). A more recent study (Homjun et al. 1989) found the water table under eucalyptus plantations is significantly lower than that under non-eucalyptus areas.
  2. Yields of upland crops intercropping with eucalyptus are not affected by root competition during the first two years, but they are affected when the trees are three years old and older (Petmak et al. 1987).
  3. Eucalyptus have no long-term harmful effects on soil such as soil poisoning, but they deplete the soil nutrients as other monoculture practices do (Petmak et al. 1987).
  4. Based on a 4-year rotation period, net annual nutrients (N,P, Ca, Mg) uptake of eucalyptus is lower than that of *Acacia auriculiformis*, which are nitrogen-fixing trees (Petmak et al. 1987). There are many studies which indicate that eucalyptus consume less nutrients than do cassava (Petmak 1983, Chote et al. 1986, Sittibusaya et al. 1987, and Klintong 1985).
  5. Witthawatchutikul and Jirasuktaveekul (1987) found no negatively allelopathic effects of eucalyptus on the seed germination rates of *Vigna radiata* linn. (mungbean), *Vigna munggo* linn. (black been), and *Impomoea reptans* (Parkboong), while Homjun et al. (1989) has found significantly negative effects on the seed germination of maize, sorghum, sesame, soybean, mungbean, peanut, and leucaena (Kratin).
  6. The Thai literature concludes that eucalyptus should not be planted in good soil, in watershed and conservation areas, or in areas with insufficient soil moisture and rainfall. It should be planted in small plots or blocked with other species. Large-scale plantations should be established only with agroforestry practices (intercropping with other species) and intensive management (Bhumibhamon 1989, Petmak et al. 1987).
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## PUBLIC PROMOTION VERSUS THE PUBLIC INTEREST

Eucalyptus plantations receive generous incentives from the BOI, such as duty exemptions on imported machinery and raw materials and various tax holidays and tax exemptions for extended periods (see Box 3). These incentives put eucalyptus at an advantage vis-a-vis other agricultural crops, including perennials, which receive no such promotion. The presumption is that eucalyptus is a forest crop that, unlike other crops, has positive environmental impacts which benefit the public and thus ultimately pay for this promotion. This presumption is reinforced by the concessionary lease (at 10 baht/rai/year compared to a market rental of 150-200 baht/rai/year) of reserved forest land to companies and individuals for eucalyptus plantations. While companies are often forced to buy the land from squatters, an element of public subsidy to eucalyptus plantations is still involved, since untitled land is bought for half to one-third of its full-title price (see Tables 27 and 29).

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### **Box 3 Current BOI and RFD Incentives for Eucalyptus Plantations and Related Industries**

#### **BOI Privileges**

1. Exemption from, or 50 percent reduction of, import duties and business taxes on imported machinery and raw materials for 1 year.
2. Exemption from corporate income taxes for 3 to 8 years, with permission to carry forward losses and deduct them as expenses for up to 5 years.
3. Allowance to deduct from the taxable corporate income the amount equivalent to 5 percent of an increase in income derived from exports over the previous years, excluding costs of insurance and transportation for 10 years.
4. Exclusion from taxable income of dividends derived from promoted enterprises during the income tax holiday period for 5 years.
5. Exemption from withholding tax on goodwill, royalties, or fees remitted abroad for up to 5 years.

#### **RFD's Promotion Scheme**

Leasing degraded forest reserve land at the concessionary rate of 10 baht/rai/year for at least 15 years.

No requirement for stump removal (an implicit subsidy).

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A second element of hidden subsidy is the implicit "guarantee" or perception that goes with the lease that land will not be taken away by RFD. This is evidenced by the fact that no stump removal is required of the leaseholder at the end of the 15-20 year lease; alternative uses of land, even for eucalyptus plantations, would require such stump removed at the cost of about 1,500 baht per rai (1990 prices). There is a certain inconsistency between the leaseholder's expectation for eventual ownership of leased/purchased land and the RFD's expectation of repossession of encroached land by proxy.

In our survey and analysis we found little evidence of public benefit from eucalyptus plantations not captured by private entrepreneurs through the market that would justify government promotion and subsidy. Therefore, direct and indirect subsidies for industrial plantations, whether duty exceptions on equipment and tax holidays from the BOI, or leasing out public land at token rates from the RFD, are unnecessary and distortional since the private return from eucalyptus plantations exceeds the social return. At the same time, we found little evidence of documented negative environmental impacts that exceeded those of any regulation unless large-scale plantations were involved. In light of current scientific evidence and local observations, we propose the following measures for large-scale (over 1,000 rai) monocultures of eucalyptus and other similar species:

1. A detailed environmental impact assessment that should be made public, especially to neighboring farmers and villages.
2. Restrictions on the proximity of eucalyptus plantations to neighboring crops and sources of water supply.
3. An annual environmental charge of 25 baht per rai to account for residual environmental costs of large-scale plantations.

These measures are socially warranted and affordable by the industry in light of our finding of profits in excess of 1,000 baht per rai per year.

## CONCLUSIONS AND POLICY IMPLICATIONS

In conclusion, the private reforestation policy (in pursuit of the 40 percent forest cover target) does not appear to be an effective means for alleviating poverty, improving income distribution, or halting forest encroachment. The reason is the failure to address the root cause of rural poverty: the lack of secure resource entitlements. Insecure land ownership, declining yields, limited off-farm employment opportunities, no access to

institutional credit, and poor education do not add up to a sustainable livelihood. To the extent that large-scale eucalyptus plantations further undermine the resource endowment of farmers in the forest reserves either through displacement, or through perceived negative environmental impacts, rural poverty and encroachment might worsen. This is not to imply that eucalyptus plantations on private land are not economically viable or beneficial to the country. Commercial plantations are beneficial to the country, as our social analysis shows, but they should be planted on private land without subsidies. Eucalyptus is a potentially profitable crop for large-scale agroindustry, especially for vertically integrated operations. It is also a potentially appropriate crop for rehabilitating degraded land overrun by grass-imperata that has no viable alternative uses even under secure ownership and improved management. Commercial plantations could also be beneficial to farmers through a system of contract farming, provided that farmers have secure ownership over their lands, and commercial companies provide them with improved technology, credit, and guaranteed prices.

Since there is no convincing evidence that eucalyptus has either *net* negative or *net* positive environmental or social impacts, there is no justification for promoting it as a reforestation crop or regulating it except when large-scale monocultures are involved. Given their lack of the essential forest functions of biological diversity and watershed protection, and their controversial impact on water flows, eucalyptus plantations should not be treated as forests. Pending more solid evidence on its environmental impacts, eucalyptus should be considered just as any other agricultural crop that warrants no subsidy of any kind, direct or indirect. Therefore, the current promotional incentives for corporate eucalyptus plantations by the Board of Investment (BOI) and the concessionary lease (10 baht per rai) of forest land by the Department of Forestry amount to an inadequately justified subsidization of a private sector activity. Positive externalities from corporate plantations such as research and development of high yield clones of eucalyptus should be directly supported, but the planting of eucalyptus on a large scale should be subject to a credible environmental impact assessment and a modest environmental charge.

In managing enclosed forest reserves, the burden of responsibility lies with the government. The present practice of relying on the private sector to secure large plots of encroached land prior to seeking official permission is not acceptable and may lead to future conflicts with farmers. With the availability of new technologies of remote sensing and geographic information systems, it is possible for the government to identify

degraded forest reserve land (outside watershed areas) which is potentially suitable for eucalyptus plantations based on purely physical characteristics. Socioeconomically, however, eucalyptus may not be the best possible crop for three reasons. First, these areas may be too remote and inaccessible for a bulky crop like eucalyptus logs to be profitable. Second, these areas are already occupied by farmers who lack the capital and the size of landholding necessary to establish sufficiently large eucalyptus plantations to be profitable. Third, much of the encroached land is artificially degraded for lack of capital to invest and incentives to practice proper management, problems which arise from insecure land ownership. Under more secure ownership and access to capital, other crops such as fruit trees may very well turn out to be more profitable than eucalyptus and cassava in many of these areas.

At present neither the government nor the squatters have anything close to secure ownership over these lands, even though both consider them rightfully theirs. The introduction of the corporate sector as a third actor, without first clarifying the status of these lands and effectively protecting the remaining natural forests, has further clouded their ownership status and compounded insecurity and uncertainty. The efforts of the Royal Forestry Department to reclaim the encroached forest land *through* the corporate sector as proxy owners, and *through* eucalyptus plantations as proxy forest are understandable in light of the 40 percent forest cover policy, widespread encroachment, and enforcement difficulties. However, the clouded ownership of this land cannot possibly lead to efficient and equitable outcomes, but instead to continuous conflicts. Eucalyptus, an otherwise promising agroindustrial crop, has become the scapegoat because it is being used as an instrument of land and forest policy, for which it is not suitable. The time may be ripe to critically reexamine the objectives and instruments of national forest policy.

Indeed, the problem lies less in the private reforestation policy than in the forest policy itself. The target of 40 percent forest cover includes some 35 million rai to 40 million rai which have already been encroached and are currently being farmed by nearly 1.6 million households. The private reforestation effort was conceived as a compromise, but with the emphasis placed on reforestation rather than on property and income distribution. As it stands, large-scale commercial forestry does not alleviate poverty since it fails to distribute the benefits of the enterprise to the local population. Nor does it recognize traditional rights or any interest or capability on the part of local communities to manage the resources around them. An alternative approach advocated by environmental groups and rural communities, and currently being considered by the

government as a supplement to the private reforestation policy, is social or community forestry.

# The Promise of Social Forestry: Evolution and Sustainability

## OVERVIEW

Community forestry is a set of forestry activities in which the members of a given community are involved in the decision making process and the benefits accrue to the community. It is in contrast to commercial forestry in which the decisions are made by and the benefits accrue to a private enterprise. While conventional forestry is usually practiced on state owned and managed forest under a concession granted by the state forest service to a private company subject to specified terms and conditions, community forestry is usually found in communal property with or without the government's awareness and consent. The essential elements of "social forestry", in addition to local participation and control may include (according to FAO):

- Generation of income and stable employment for the local people
- Production sustained basis of forest products such as fuelwood, construction wood, fodder, and food for the community
- Control of local ecological degradation and maintenance of land productivity
- Strengthening of rural community institutions

Community forestry is viewed as a means to reduce forest encroachment, to promote afforestation, to reduce rural poverty through forestry, and to promote sustainable agricultural and forestry production through environmentally sound land use.

Community or social forestry has been practiced in Thailand for many years. The community-initiated *muang fai* system of protecting local watersheds by the community is one of the earlier forms of social forestry which survives today in Northern Thailand.



Another early form of social forestry was the introduction of the *taungya* system from Myanmar (Burma), by the Royal Forestry Department (RFD) in a forest plantation in Phrae province in 1906. In 1967, the Forest Industry Organization (FIO) expanded the *taungya* system with the creation of forest villages in its teak plantations. More recent forms of social forestry initiated by the government include village woodlots, the STK land usufruct certificate program, forestry extension projects, and the Isan Khiaw (Green Northeast) Project coordinated by the military. In addition, the Agricultural Land Reform Office (ALRO) is expected to set aside as community forests 20 percent of all the degazetted reserve forest lands, but little progress has been made.

The involvement of non-governmental organization (NGOs) is a recent phenomenon that gathered momentum in the late 1980s. Yet, their total area of coverage both in number of villages and area planted may already exceed the combined area of government programs (RFD and FIO) that date back many decades. It is estimated that 200 NGOs work at present on forestry-related issues that involve local communities. The best known NGOs in this area are the Population and Community Development Association (PDA), the Project for Ecological Recovery, the Thai Farmers' Association of Thailand, the Catholic Relief Services, and Save the Children.

The primary purpose of social forestry programs is to resolve the conflict between national policy and the use of land and forests on the one hand, and the needs of the local population for land and forest and tree products, on the other. The true measure of success or failure of social forestry in Thailand is in how well it resolves the conflict and meets both national and local needs. If successful, it can contribute significantly to curing the ills of poverty, deforestation, and environmental degradation. Otherwise, no matter how successful individual projects or programs may be, social forestry activities would be little more than a palliative, giving an illusion of solving the problems while having no real impact on them.

While it is beyond the scope of this study to assess in detail the various government and NGO social forestry projects, certain conclusions emerge from their review that have a bearing on social forestry projects as instruments to curb deforestation and alleviate poverty. They are therefore briefly reviewed below.

#### *FIO Forest Villages*

The main purpose of the **FIO forest villages** is to ensure a steady and low-cost supply of labor for its forest plantations. FIO provides villagers with a combination of

wage employment on the plantations and an opportunity to plant crops on small agricultural plots of 5 rai per household. Since employment is irregular and the plots too small to earn a livelihood, villages engage in illegal logging, sometimes of the very trees they planted, thus generating both additional income and additional employment. The FIO forest village hardly qualifies as community forestry since the local people are neither involved in the decision making nor are they sharing in the profits of the plantation.

#### *RFD's Forest Villages*

Poverty alleviation and reforestation are the dual objectives of RFD's forest villages. There have been good results in a few locations where manpower and resources were concentrated and coordination among agencies was achieved. However, the operating costs and staff requirements for each village are too high to spread the program beyond its current 90 locations. Only 44,342 hectares have been covered thus far, a miniscule 0.2 percent of the total forest area. Moreover, while the villagers enjoy most of the benefits of the forest village, they are rarely involved in the decision making.

#### *Village Woodlots*

The village woodlot program was established under the RFD forestry extension services to supply villages with fuelwood and timber products for both cash and home consumption (see Table 30). RFD regulations, however, stipulate that only RFD personnel are entitled to cut the trees in the woodlot even though the woodlot were established to benefit the rural communities. The energy orientation of the woodlots program is another drawback, since fuelwood production is rarely the primary reason why farmers grow trees. While the village woodlots do not qualify as community forestry under RFD regulations, they have the potential of developing into a successful community forest program only if the project recipients are given more management rights including more flexibility in the use of the trees.

#### *STK Land Certificates*

The STK land certificates issued by RFD to forest encroachers, while successful as a census activity, provide little security of ownership to their holders because they are both temporary by regulation but permanent by practice, and non-transferable except by inheritance. A World Bank study (Feder et al.) found that the supply of institutional credit to STK holders was not different from the supply to squatters without STKs. As the land remains a property of the state while restrictions are imposed on the size of holdings and on the use of the land, many farmers perceive greater risk of eviction with STKs than without them. Otherwise, farmers continue to rent and sell their STK

holdings regardless of the law. The ALRO usufruct certificates are clearly superior because they allow larger holdings and indefinite tenure and provide credit and infrastructure. ALRO requires that 20 percent of the total holdings is put to community forestry, though there is still little evidence of this happening. While neither of these programs strictly qualifies as social forestry, the objective is clearly to address poverty and deforestation with a common forestry-related instrument.

### *PDA's Forestry Projects*

The offices of PDA's forestry projects are located on rural developments in Northeast Thailand; social forestry is used as an instrument to improve the living standards of villages. PDA's philosophy is that rural development efforts will work if there is social cohesion in the community and if the community gains enough experience to manage communal projects on their own. PDA's community forestry projects take the form of 30 rai woodlots of fast growing trees which are harvested and sold and the revenues deposited in the village revolving funds. Soon, villagers enticed by the quick return adopt the tree planting activity and form a committee to manage the project. Thus, the communal forest serves as a means to build up social cohesion and cooperation. In this sense, PDA projects qualify as community forestry, as do the projects of several other NGOs, but on a smaller scale. The great advantage of NGOs is their flexibility to meet local needs unrestricted by government regulations which constrain RFD. There is considerable scope for collaboration between NGOs and the RFD forestry extension through which NGOs act as community organizers and facilitators while RFD plays a supportive role in terms of material, training, and expertise.

### *Traditional Community Forestry*

Among the most successful community forestry projects are those initiated by the communities themselves. There are five basic types of **traditional community forestry**; watershed forest, wildlife sanctuary, recreation area, communal woodland, and sacred forest. In Northern Thailand, the communal forest has a long tradition and it is an integral part of the daily life of the community. In the Northeast, locally-initiated community forests are a recent development (since 1985) in reaction to the National Forest Policy's promotion of eucalyptus in degraded areas and forest reserves. It is, therefore, premature to assess their performance.

## COMMUNITY PROTECTED FOREST: AN EXAMPLE FROM THE NORTH

Since the controversy over community forestry centers on the rural community's role in forest management, particular attention was paid to locally-initiated community forestry projects in Northern Thailand where they have a long history. TDRI carried out a field study and analysis of communities in Northern Thailand with locally-initiated community forestry projects and several neighboring villages without such initiatives. The survey has focused on **community protected forests**, which do not involve any replanting. However, the findings regarding the factors contributing to the establishment and success of community forestry have wider relevance and applicability to other forms of community forestry, including those initiated by the government and NGOs and involving reforestation activities are as follows:

1. Community protected forests are established when a resource (land, forest, or water), vital to the community, is being threatened. In Northern Thailand the entire *muang fai* system of irrigation and protected communal watershed forests was established in response to threats from deforestation to water supply which is vital to paddy cultivation. However, communities do not conserve the forest until the level of resource decline actually threatens their survival.
2. There must be a direct link between the threatened resource and the forest, and between the forest and the actions of the community. Of the three neighboring villages studied in San Kamphaeng District in Chiang Mai, only Ban Don Sai has a community protected forest because it is situated next to its main water supply source. The other two villages, who depend on the same source, are too far from the watershed forest to initiate and implement community protected forest. Even Ban Don Sai has chosen to conserve only that part of the watershed forest that has the greatest bearing on its water supply. In other parts of the watershed forest, there are no community regulations governing its use.
3. The threat to the resource must be internal to the community or if external, manageable by the community. Internal threats are generally easier to handle since the community is dealing with its own members who operate within the norm of that society and understand and obey its rules. Traditional community institutions such as the *muang fai* and the village elders are sufficient agents of enforcement. Rules governing the use of communal forest evolve in response to the ever-changing nature of threats. For example, when Ban Tung Yao first established the Pa Nam Cham protected forest in the mid-1920s the head of the Muang Fai and the village headman were managing the forest. By the mid-1940s when extensive deforestation was threatening the communal forest, fines were introduced and subsequently increased and the villages had to endorse written rules.
4. As external threats replace internal threats, traditional community institutions alone do not have the power to enforce forest conservation measures, particularly without government recognition and support. When traditional community institutions resist outsiders' claims, their

powers of enforcement are often discredited and challenged since they are not legally recognized by the government. For example, as long as Ban Pong Tham was isolated, an implicit agreement among the villagers was sufficient to conserve the communal forest. Once the Payao Lampang road was built in 1986, the outside threat of encroachment induced the formal establishment of a community protected forest managed by the village committee which is a legally recognized political structure established by the government. When the government itself asserts state ownership over forests, grants concessions to outsiders, or fails to protect them from outside threats, the villages feel that their land has been usurped. Being helpless, they join in the race for a quick profit by liquidating the very forest they have traditionally conserved.

5. While any forest clearance is strictly prohibited in the community protected forest, there are usually no regulations governing the use of forest outside the community protected forest. These "outside" forests serve as a source of fuelwood, construction poles, cash income from charcoal, and land for cultivation. The availability of other forests to be exploited and cleared has enabled many communities to initiate and implement their own community protected forests.
6. Today, when few forests are left to be exploited, the major factor enabling communities to protect the forest is the availability and access to off-farm employment opportunities in nearby towns. With more cash income available, villagers purchase charcoal, gas stoves, bricks, and cement which are substitutes for products previously extracted from the forest.
7. The protection of the communal forest ultimately depends on the balanced interdependency of the community and the forest. Communities that protect their forest are dependent on the forest and the land sufficiently to conserve it, but not to the point of threatening its survival. A heavy dependence on land and forest by poverty-stricken villagers actually threatens the forest because of the heavy discounting of future benefits from conservation when survival is at stake. At the other extreme, insufficient dependence on land and forest can similarly threaten the forest for lack of motivation to conserve it. When villages are no longer dependent on the land they are likely sell it, along with the communal forest land. The five villages studied which had community protected forest were all relatively well-off, with sufficient purchasing power to buy goods that they had previously obtained freely from the forest. Yet, they continue to plant rice for home consumption and food security which has maintained their dependence on the watershed forest as an indispensable source of water supply. By comparison, many if not most rural communities in Thailand are either too dependent or not dependent enough on the forest to preserve it.

Off-farm employment, industrialization, and urbanization reduce the dependence on land, water, and forest. For some communities this means increased ability to practice community forestry, while for others it means reduced interest in conservation.

### **Implications of the Findings**

These findings can help address questions often asked about community forestry such as the following. Can the villages be trusted to conserve the forest? Is community

forestry an effective tool in curbing deforestation and alleviating poverty? Does community forestry have a future ten to twenty years from now?

*Much of the controversy surrounding community forestry arises from failure to understand the heterogeneity and special circumstances of each community and to recognize that the relationship of the community to the forest is not static, but rather a dynamic one determined by the community's changing dependence on the forest.*

To answer the above questions about the prospects of community forestry, the following community-specific questions must be answered. What are the basic means of livelihood of the community? How do the community's current land use patterns fit within this scenario? How will the community's livelihood evolve and how will its evolution affect land use patterns, particularly forest conservation? What is the community's current level of forest dependency? Given the community's profile, what appropriate measures can be introduced to achieve an optimum level of forest dependency (conducive to forest conservation)?

The underlying premise is that rural communities do not exist in a purely subsistence economy, but in a combination of a cash and a subsistence economy. As the rural communities are developed, they are increasingly incorporated into the cash economy until they are fully submerged in it. A community's forest utilization pattern is a function of its level of dependency on the forest, which ranges from total dependence to total independence. The level of forest dependency is determined by the types of income-generating activities open to the community, of which there are two: land-bound and nonland-bound activities. Land-bound activities are agricultural and forestry activities, nonland-bound activities are off-farm nonagricultural employment.

There are three stages of forest dependency determined by the relative importance of land-bound and nonland-bound income-generating activities (see Figure 1). Stage I is maximum forest dependency and is dictated by the community's maximum dependence on land-bound income-generating activities for its livelihood. At this stage, nonland-bound activities are insignificant. There is a wide gap between the level of land-bound and nonland-bound activities. This is detrimental to the forest. Farmers in search of land will clear the forest for farmland and supplement their incomes through other forest-based and land-based activities, i.e., logging, making charcoal, and cultivating cash crops. Forest clearance is abundant and the existence of the forest is due to the low population.

As rural development in the community increases, there will be more job opportunities in nonland-bound income-generating activities as the level of nonland-bound activities rises and the significance of land-bound activities declines. The community becomes increasingly dependent on nonland-bound activities and less dependent on land-bound activities (Stage II). This is the case of community protected forests of northern Thailand (Figure 1).

As industrialization in rural areas continues, nonland-bound income-generating activities will eventually eclipse land-bound activities, and the gap between the two types of income-generating activities widens again. The importance of the forest as the natural resource base of the community declines. The rising opportunity costs of forest protection (in terms of the foregone profit from selling the land and of the labor and time costs of forest protection which could be spent in other lucrative activities) discourage forest protection. The forest area around the community declines. In the first scenario greater industrialization brings forth more land speculation. With a substantial profit to be made from selling land, more agricultural land and illegally claimed forest land, i.e., field plots without title deeds, will be sold, increasing the pressure on the forest. Farmers who have sold their land but have not yet been absorbed by the job-market will encroach further into the forest. In addition, as the urban population becomes more affluent it will seek luxury goods, including resorts, many of which are located in forest reserves.

In the second scenario, as certain rural populations become less dependent on the forest and increasingly engaged in off-farm employment, they will become less vigilant of their communal forest. This loop-hole enables other rural groups who are in search of land to encroach into the communal forest.

Communities with community protected forest are not poverty-stricken, but are fairly operative with a wide array of income-generating activities (many of them nonland-bound) to choose from. In these communities there is a balance between forest dependent and nonforest-dependent activities.

Given the above observations on the relationship between the forest and the community, recommendations are made as follows:

1. To facilitate communities' progression from Stage I to Stage II, off-farm employment opportunities should be promoted to alleviate the pressure on the land. This alone will not immediately lead to the establishment of communal forest. Other ingredients include adequate dependence on the forest, proximity to the forest, and existence of informal village

organization. Special emphasis should be given to achieving and maintaining the equilibrium of forest dependency. Land/forest based means of production should be promoted in combination with nonforest/nonland-based activities, i.e., greater off-farm employment opportunities.

2. Once a community reaches Stage II, it is unlikely it will remain there forever. It will likely graduate to Stage III where the importance of the forest to the community declines as the result of industrialization. There will be less forest protection. In anticipation of this, there ought to be mechanisms to promote forest conservation, that is, to make the benefits from forest conservation greater than not conserving the forest. The government could consider subsidizing rural communities which initiate and practice community forestry projects. In doing so, the state should examine the local social organization to determine which organization would be the best manager of the community protected forest (Figure 1).

The forest may directly serve the surrounding communities, but Thai society as a whole claims that it attaches a value to the forest and the benefits indirectly stemming from it, for example, water supply. If the Thai society indeed believes that the forests are vital to its well-being, it should be willing to pay for the cost of forest conservation, at least by subsidizing communities that make genuine efforts to conserve the forest.



## **Endnotes**

- <sup>1</sup> This chapter draws heavily from "Social Forestry in Thailand: Solving or Sustaining Rural Poverty?" by Dr. Charles Mehl and "Community Forestry in Thailand: A Case Study From the North," by Ketty Faichampa, which are annexed to this study.

## Chapter 6

# Conclusions and Policy Recommendations

### CONCLUSIONS

Rural poverty was found to be a major cause of deforestation. Deforestation was found to be a major source of rural poverty. Evidently, these two critical problems of Thailand in the 1990s are locked in a mutually reinforcing vicious circle, that cannot be broken unless the two problems are addressed simultaneously. Commercial plantations in encroached forest lands and community or social forestry are two recent attempts to address deforestation and rural forestry holistically. Our analysis has concluded that while both approaches have some useful features and can make a positive contribution under certain conditions, neither is an adequate response. As practiced today commercial plantation forestry may, in fact, have the reverse effect, exacerbating both poverty and deforestation, while social forestry is of limited relevance and effectiveness, unless certain rather stringent conditions are met.

The reason lies in the failure of both commercial and social forestry to address the root cause of rural poverty which is the lack of secure resource entitlements. Insecure landownership, declining crop yields, limited off-farm employment opportunities, lack of access to institutional credit, and poor education do not add up to a sustainable livelihood. Commercial plantation forestry and social forestry—especially as practiced by the Forest Industry Organization (FIO) and the Royal Forestry Department (RFD)—focus more on trees than on people. Deforestation is a mere symptom of an underlying human condition and behavior; focusing on trees alone does not bring about more trees.

The vicious circle of rural poverty and deforestation can be turned into a virtuous circle if the root cause is identified and dealt with effectively. Encroachment and

deforestation would cease if they were no longer profitable. This could happen for three reasons: (a) no forestland remains to encroach on; (b) the cost of encroachment is raised or its benefits lowered through vigorous law enforcement and severe punishment of violators, or (c) better alternatives are made available. The first is feasible but not desirable. The second is desirable but not feasible. In fact, it may not even be desirable since it does not address rural poverty; it may also exacerbate social conflict and political instability. In any case, it has been tried and it failed. This leaves the third option as the only option both desirable and feasible. It is feasible because such alternatives exist aplenty in the Thailand of the 1990s. Manufacturing, construction, tourism, and a variety of other services are booming. The scope for raising agricultural productivity from the current very low levels is considerable. The Thai population is known to be easily trainable, very mobile, and responsive to economic opportunities. The labor market functions well. Yet, a fifth of the Thai population depends on encroachment and soil "mining" of marginal forestlands for a living, a clearly unsustainable activity, for lack of better alternatives.

Agricultural productivity can be raised but this requires farm investments which are neither attractive nor possible in the absence of secure land ownership. Industrial and service employment opportunities do exist but they require a higher level of education and skills than most forest dwellers possess. Insecure land ownership, lack of capital, and low education level are not very conducive to occupational and geographic mobility. All these constraints can be relaxed through policy interventions whose benefits exceed their costs. Not only can farmers in the forest be given access to more lucrative employment and income opportunities outside the forests but there is also a forest specific alternative to encroachment for which farm dwellers have an undisputable comparative advantage: protecting the forest from encroachment. By their very presence, intimate knowledge of the forest, and vested interest, forest communities and individuals are in the best position to protect the forest if they are given the right incentives.

It is safe to assume that one rai of forest is worth to the society at least as much as one rai of cassava, otherwise we would not want to preserve all the remaining forest. One rai of cassava generates an average annual income of 500 baht. Therefore, the remaining 80 million rai of forest are worth at least 40 billion baht annually to the Thai society. At a fraction of that amount (say 10 percent, which is only 0.4 percent of GDP) it should be possible to alter the incentive structure and hence the behavior of communities and individuals in the vicinity of the remaining natural forest, from being

forest encroachers to being forest guards. Again, the rural poor would be offered better alternatives than they face today.

This or any other scheme aiming to halt deforestation must focus on the remaining unencroached natural forests, which should be scientifically demarcated and declared protected or conservation forest. It would be a major accomplishment if Thailand could preserve all remaining forests (25 percent of the country's total land area).

## POLICY RECOMMENDATIONS

The demarcation and declaration of the remaining natural forest as "protected" forest is an important first step, but not sufficient to halt the continuing forest loss. The following measures should be taken concurrently:

1. The root causes of encroachment and deforestation must be dealt with effectively. Our findings suggest that the large and growing rural population dependent on land for its livelihood, insecure land ownership, sagging agricultural productivity, and rural poverty are major causes of encroachment and deforestation. The clouded property rights regime over vast areas of encroached forest lands and the dependence of nearly 10 million people on forest encroachment for survival provide a smoke screen for forest encroachment by others, such as illegal loggers and land speculators. *There simply can be no successful forest policy unless the issue of land ownership over encroached forest lands is clarified and settled.* Land and forest policies are opposite sides of the same coin and must be addressed integrally and concurrently. Similarly, the alleviation of poverty of farmers in the forest and hence rural development is key to the success of forest protection from further encroachment and plundering.

*Land reform programs that improve the security of land ownership as well as provide infrastructure and development assistance are therefore of critical importance to halting deforestation and protecting the remaining natural forests.* It is encouraging that the government is doubling its land reform effort to cover as much as 4 million rai of mostly degraded forest reserves annually throughout the Seventh Plan. Presently two forms of land titles are most prevalent in encroached forest lands. The usufruct certificate (Sor Tor Kor) issued by RFD and the partial land title (Sor Por Kor 4-01) issued by the Agricultural Land Reform Office (ALRO). However, neither is acceptable as collateral for long-term credit. To be acceptable as collateral for long-term credit, and to encourage farm investment, land documents must be secure, indefinite, and

transferable. It is, therefore, recommended that *the issuing of land titles to farmers over the land they occupy be accelerated and such titles be as secure and unconstrained (unattenuated) as possible. To alleviate fears that farmers might sell the land and continue forest encroachment, land titles could be made subject to a substantial transfer tax.* Farmers are unlikely to sell productive land if they must surrender a good part of its sale price to the government as transfer tax, unless they can invest the remainder in a very profitable activity.

2. Land titling would go a long way toward improving both incentives and access to credit for both the small farmers and squatters in forest reserves. According to a World Bank study (Feder et al.1989), land titling, if secure and transferable, would increase agricultural productivity between 10 percent and 30 percent. But this is hardly sufficient to alleviate poverty let alone to narrow the rural/urban income gap. Land titling is a necessary, not a sufficient condition for addressing poverty and deforestation. To prevent deforestation, additional measures are needed to protect the remaining forests: *To alleviate poverty and improve income distribution, additional measures are needed to raise agricultural productivity.*

Agricultural production is found to be quite responsive to increases in agricultural investment. *A doubling of the current low levels of farm investments and purchases of farm inputs would increase farm income by as much as 60 percent.* However, farmers face a formidable capital constraint which land titling would only partially help alleviate. As long as interest rate ceilings are in effect, small farmers in remote areas would face a scarcity of institutional credit for the simple reason that they are relatively "costly" borrowers. Either the interest rate ceilings must be removed, or the government should provide loan guarantees to financial institutions on behalf of small farmers. The recent increase in the interest rate ceiling is a move in the right direction. Access to long-term credit is particularly important if the farmers are to undertake tree planting and soil conservation investments. *But credit can only help if it is "guided by the criterion of economic viability for ultimately the poor can benefit only if the projects are viable"* (Siamwalla 1990).

*The most potent measure for raising both farm and wage income was found to be the level of education of household members.* Better educated farmers make better farming decisions which raise farm incomes. Education enhances (1) access to off-farm employment, possibly at a higher wage rate, and (2) occupational and geographical mobility which improves access to employment opportunities outside the area.

Our analysis suggests that a 10 percent increase in educational attainment increases farmers' incomes by 9.5 percent, a very potent response. **Given the very low secondary school enrollment in rural areas, there is considerable scope for improving educational attainment, thereby raising farm and nonfarm income.** According to Myers (1989) policy options for upgrading rural education and increasing enrollment include the following:

- Reducing the opportunity costs of secondary school attendance by altering the academic calendar and/or school hours to free students for periods of peak demand
- Subsidizing direct costs to the poorer households by providing an allowance per child attending
- Providing "opportunity vouchers" for gifted, talented rural children backed by government, communities, and the private sector
- Providing incentive pay for high-performing teachers
- Improving the quality of rural schools and of secondary school curricula to emphasize cognitive skills which according to empirical evidence (Knight and Sabot 1990) are what employers seek and what enhances productivity and income (for more details see Myers and Sussangkarn, and Sussangkarn 1990)

Given the potentially powerful contribution of education to rural incomes and the equally powerful contribution of higher incomes to the reduction of deforestation, *expenditures to improve the rural educational system could be treated as forest protection investments* as well as investments in human capital and poverty alleviation. Since deforestation itself affects agricultural productivity, education also has further positive effects on agricultural incomes.

3. *A limited resource base, especially one that suffers from past abuse, cannot unendingly accommodate increasing numbers of people with rising aspirations for a higher standard of living.* For example, the forest, land, and water resources of Northeast Thailand, already under intense pressure, cannot be reasonably expected to provide the means for raising the living standards of approximately one-third of the Thai population to the level enjoyed by other regions, much less to that of Bangkok. The combination of nonresource-related off-farm employment and seasonal and permanent migration to other regions helps relieve some of the pressure on the resource base. However, much more needs to be done to encourage and increase the inflow of industry and the outflow of people to restore a sustainable equilibrium between the supply of and demand for rural natural resources.

The pressure on the rural resource base can be reduced through a three-pronged strategy incorporating elements as follows:

- **Educational and land reforms** (described above): These reforms encourage geographical and occupational mobility. Low educational attainment and lack of secure land ownership or restrictions on the transferability of land titles are major obstacles to mobility and to occupations and areas of greater economic opportunity.
- **Continued efforts to control population growth:** A combination of family planning and economic incentives such as increased education and employment opportunities for women will help bring about a better balance between people and resources in densely-populated, resource-poor regions such as the Northeast.
- **Expansion of employment opportunities:** Employment opportunities can be expanded by promoting the development of labor-intensive, nonresource-based industries and by increasing the labor intensity of the industrial and service sectors. Towards this objective, the government should *reduce the promotional privileges and hidden subsidies for capital-intensive sectors, provide stronger incentives for labor-intensive, nonresource-using sectors,* and promote the regional dispersion of industry, with due consideration for competitiveness, market potential, and economies of scale in the provision of public infrastructure. *Expanded nonresource-based employment opportunities combined with increased occupational and spatial mobility would help attract increasing numbers of people out of the natural resource-intensive sectors.* This would be another potent force helping to contain forest encroachment.

4. *The reforestation policy is urgently in need of revision. The policy of granting public forestland for commercial plantations should be discontinued because it leads to conflicts with the farmers already occupying this land.* Once the remaining natural forest is adequately protected and the issue of land rights is settled, commercial plantation forestry should be set on an equal footing with other land uses that involve tree cover, it should not be promoted as a means of either reforestation or poverty alleviation.

*Large-scale commercial plantations are privately and socially profitable as long as they are planted on private land and measures are taken to mitigate possible negative environmental impacts of extensive monocultures. Cheap public land, capital subsidies, and tax holidays are neither necessary nor warranted.* A modest environmental charge of 25 baht to 50 baht per rai per year would internalize the impact on the water table made by large-scale plantations (over 1,000 rai) and would create a fund for helping affected communities with their water supply. Other impacts, such as those on neighboring crops, could be dealt with by placing restrictions on proximity to crops and sources of water supply. An environmental impact assessment (EIA) should also be

required of large-scale plantations. Contract farming should be promoted as a means of encouraging small farmers to engage in tree planting when a good market exists and the only constraints are long gestation periods and economies of scale.

To increase the area under tree cover additional incentives could be provided to individual farmers and other landowners, such as land tax rebates, long-term credit, free seedlings, and crop price guarantee for a variety of species.

5. *Local communities should be given a larger role and greater responsibility in managing communal forests, reforesting local watersheds, and protecting conservation forests. Rural people, by their very presence and intimate knowledge of the forest, are in the best possible position to protect forests in their vicinity. They should not, however, be expected to do this at their own expense. In some cases, most notably in Northern Thailand, where people are sufficiently (but not overwhelmingly) dependent on a communal forest or a local watershed, communities undertake, on their own initiative, to protect communal forests. In other cases, especially in the Northeast, a scarcity of fuelwood, an outside threat, or a catalytic input from an NGO or the government are sometimes sufficient to induce local communities to engage in forest protection and reforestation. In many cases, however, local communities are either too dependent or not dependent enough on the forest to conserve it or recreate it. In other cases, communities may have the right interest and motivation, but outside threats are overwhelming for traditional community institutions that are not legally recognized and backed by the powers of the state. Therefore, community forestry cannot be a blanket prescription for all communities. It depends on the area and even on the individual community. As such, it requires an enormous amount of information at the local level—hence the critical importance of the NGOs. The government can help by instituting the following measures:*

- Recognizing and protecting traditional community rights against outside threats.
- Helping to improve local incomes and reduce the excess dependence on the forest by poor communities
- Working closely with NGOs to identify communities suitable for social forestry activities and to provide material, training, and expertise where needed.

Community forestry cannot solve all communities' problems. Many communities, especially those in close proximity to urban or industrial centers, have little direct dependence on nearby forests to practice community forestry, even with outside



input. These cases will multiply as nonland-based activities are spread in the rural area as part of the development process. In these cases, either the RFD would have to be directly responsible for their protection and management, or communities and individuals would have to be paid to protect forests in their proximity on behalf of the society.

### **Preparing Rural Thailand for NICdom**

Thailand will become a newly industrialized economy before the end of this decade. But rural Thailand—the Northeast in particular—will not be an integral part of such an economy unless one or more of the following changes take place:

- Land productivity, especially in rainfed areas, rises steadily and substantially.
- Farmholdings per farmer increase steadily and substantially; since additional land is not available this implies increased mobility of labor out of the agricultural-rural sector.
- Rural real wage rates rise steadily and the share of rural income from nonfarm activities also rises.
- Farmers receive increasing amounts of resource transfers from the nonagricultural sector.

While there is scant evidence that some of these changes are beginning to take place, the pace of change is so slow and uncertain, and certainly no match for the galloping advance of the nonrural sectors. If present trends continue, the rural/urban gap will grow wider, and NIC status will be applicable to only part of the country. It is hardly befitting a newly industrialized country to have one-fifth of its population dependent on illegal forest encroachment for its livelihood while other parts of the country are bustling with industry and commerce.

The recommendations made in this paper aim to integrate the rural sector into the industrializing economy of Thailand through policies that would cost relatively little, but would have powerful effects on rural/urban dynamics. These policies are:

1. *Land policy reforms* that would grant full, indefinite, and transferable land titles to farmers occupying untitled land, including farmers in encroached forest reserves.
2. *Strategic public investments* in agricultural research for rainfed areas, soil conservation, and water use efficiency.
3. *Nondistortionary agricultural policies* that would neither tax nor subsidize the agricultural sector, directly or indirectly.
4. *Imaginative new approaches* to conserve Thailand's remaining natural forest, an irreplaceable national asset, by giving rural communities and

individuals the incentives and the means to protect and enhance what they now encroach and plunder.

5. *Educational reforms* that would improve the quality and relevance of rural schools and curricula and increase attendance among rural children.
6. *Industrial policies* that would enhance the range of employment opportunities available to the rural population.

Whether and when Thailand becomes a truly industrialized country depends less on attaining a certain share of industry in GDP, than on integrating the different parts of the economy and the country into a centripetal economic and social structure which unites the nation's energies, preserves its values and diversity, and spreads prosperity throughout the Kingdom.

**Table 1 Absolute and Relative Poverty in Thailand, 1976-1988**

Year	Poverty line (baht/head/yr)		Percent of people below poverty line		Income share (percent)	
	Rural	Urban	Rural	Total	Top 20%	Bottom 20%
1976	1,981	2,961	36.2	30.0	49.3	6.1
1981	3,454	5,157	27.3	23.0	51.5	5.4
1986	3,823	5,834	35.8	29.5	55.6	4.6
1988	4,141	6,324	30.6	25.2	55.5	4.5

**Source:** Chalongphob Sussangkarn, "Income Distribution and Long-term Development : A Summary" TDRI, 1989.

**Table 2 Summary of Basic Data Used in the Models Explaining Deforestation in the Northeastern Provinces, 1973-1988**

Variables	Mean	S.D.
Deforestation (1,000 rai)	261.101	349.981
Income per cap (baht)	2589.089	681.449
Price of cassava root (Satang per Kg.)	23.24	3.52
Size of Forest (1,000 rai)	1358.604	1140.979
Rural Road (1,000 km.)	0.408	0.248
Population growth (percent)	15.241	12.007
Value of Forest Products (10,000 baht)	87.154	83.271

**Source:** (1) Deforestation and size of forest from Royal Forestry Department  
 (2) Income based on provincial GPP at constant price  
 (3) Price of cassava from OAE deflated by 1976-based price index  
 (4) Rural road from Office of Accelerating Rural Development  
 (5) Population from Ministry of Interior

**Table 3 Regression Coefficients and Related Statistics Explaining Variations of Deforestation in Northeastern Provinces**

Variables	Model 1	Model 2	Model 3
Constant	-222.526 (1.382)	-228.720 (1.503)	--
Income per capita (baht)	-0.099*** (3.281)	-0.084*** (2.879)	0.056 (1.263)
Price of cassava (satang/kg)	17.830*** (2.990)	17.247*** (3.024)	9.055*** (2.813)
Value of forest products (10,000 baht)	0.440* (1.835)	--	0.430 (1.742)
Size of forest (1,000 rai)	0.133*** (5.558)	0.130*** (5.650)	0.174*** (8.309)
Rural road network (1,000 km in last 5 years)	178.547** (2.117)	--	163.635* (1.812)
Population growth (% during last 3 years)	--	5.694*** (3.473)	--
Dummy (for deforestation over 800,000 rai)	379.510 (3.951)	486.489*** (5.320)	--
1976-1978	--	--	81.651 (1.348)
1978-1982	--	--	-150.966** (2.089)
1982-1985	--	--	211.467** (2.277)
1985-1988	--	--	189.869* (1.913)
Adjusted R squared	0.751	0.767	0.750
Durbin Watson	2.217	2.029	2.210
Degrees of freedom	70	71	69

*Note:* \*\*\* Significant at 1 percent  
 \*\* At 5 percent  
 \* At 10 percent

**Table 4 Percentage of Villages Located in National Forest Reserve  
as Reported under NRD survey, 1984, 1986, and 1988**

Regions	1984		1986		1988	
	Total number of villages	Percent in NFR 1/	Total number of villages	Percent in NFR 1/	Total number of villages	Percent in NFR 1/
Whole country	52,169	20	54,863	22	56,296	22
Central	9,224	6	9,582	8	9,580	8
East	3,636	19	3,751	20	3,793	21
Northeast	22,513	21	23,373	22	24,320	21
North	10,727	23	11,186	31	11,569	33
South	6,069	21	6,976	29	7,034	28

**Note:** 1/ Percentage based on villages having this information, number of villages with no information for the whole country were 181, 749, and 802 for 1984, 1986, and 1988 respectively.

**Source:** TDRI, NRE-GIS Data Files

**Table 5 Comparison of Households and Population per Village  
in NFR and Outside, 1988**

Items	NFR	Outside
<b>Northeast (7 provinces)</b>		
(1) No. of villages	1,858	7,970
(2) HH per village	116	112
(3) Pop per village	626	613
(4) HH size	5.4	5.5
<b>North (10 provinces)</b>		
(1) No. of villages	2,655	8,064
(2) HH per village	148	136
(3) Population per village	720	672
(4) HH size	4.9	4.9
<b>Central (10 provinces)</b>		
(1) No. of villages	1,030	4,680
(2) HH per village	145	101
(3) Population per village	741	527
(4) HH size	5.1	5.2
<b>South (8 provinces)</b>		
(1) No. of villages	1,212	3,260
(2) HH per village	140	125
(3) Pop per village	735	675
(4) HH size	5.2	5.4

*Source:* TDRI, NRE-GIS Data Files

**Table 6 Situation of Water Supply and Electricity in the Villages Within NFR and Outside, 1988**

Items	Inside NFR	Outside
<b>Percentage of HH not having sufficient water for domestic use</b>		
Northeast	30	27
North	28	20
Central	37	19
South	32	22
<b>Percent of villages having enough water for 2nd rice crop</b>		
Northeast	1	5
North	5	4
Central	2	17
South	2	7
<b>Percentage of villages having electricity</b>		
Northeast	78	85
North	78	95
Central	73	95
South	75	94

*Source:* TDRI, NRE-GIS Data Files



**Table 7 Average Percentage of Households with Totally Owned Land, Partially Rented Land and Totally Rented Land in the Villages Inside and Outside NFR, 1988**

Regions	Province covered	Inside NFR			Outside NFR		
		Total number of HH	% Owning all their land 1/	% Renting all their land 1/	Total number of HH	% Owning all their land	% Renting all their land
Northeast Range of %	7	219,549	77 71-92	7 2-9	870,799	78 69-90	6 2-9
North Range of %	10	381,306	64 45-82	11 5-13	789,835	49 39-68	14 9-18
Central Range of %	10	150,286	68 37-79	9 1-25	466,034	44 28-81	12 2-27
South Range of %	8	174,588	82 62-95	4 2-8	415,550	71 60-81	6 3-9

**Note:** HH = households  
1/ Percentage of all owned and rented for example in the Northeast added to 84 percent, the remaining percentage is for both owned and partial rented.

**Source:** TDRI, NRE-GIS Data Files

**Table 8 Land Documents Inside and Outside the Forest Reserve, 1988**

Type of Title	Inside		Outside	
	No of villages	Percent	No of villages	Percent
Chanode	211	1.7	10,267	24.2
NS 3	1,331	10.8	7,811	18.4
NS 3 K	2,577	21.0	19,054	45.0
Bai Jong	840	6.8	840	2.0
STK	879	7.2	1,379	3.2
None	6,434	52.3	3,126	7.4
<b>Total</b>	<b>12,272</b>	<b>100</b>	<b>42,477</b>	<b>100</b>

*Source:* TDRI, NRE-GIS Data Files

**Table 9 Percentage of Planted Area to Total Village Holdings of the Villages in NFR and Outside, 1988**

Region	Inside NFR			Outside		
	Total Vill. 1/	75% and over	Less than 50%	Total Vill. 1/	75% and over	Less than 50%
Northeast	1,853	75	7	7,943	77	5
North	2,643	41	37	5,392	64	15
Central	1,028	59	18	4,657	72	8
South	1,104	44	23	3,050	61	10

**Note:** 1/ Based on the number of villages provided the information which is less than the total number villages in the province covered.

**Source:** TDRI, NRE-GIS Data Files

**Table 10 HH Planting Rice, Dry Season Crops and Income in NFR and Outside, 1988**

Items	Regions			
	Northeast	North	Central	South
<b>Total HH (thousand)</b>				
Within NFR	219.5	381.3	150.3	159.7
Outside	870.8	789.8	466.0	415.5
<b>Percent of HH growing paddy</b>				
Within NFR	72	56	40	38
Outside	86	62	45	57
<b>Percentage of Only one crop a year 1/</b>				
Within NFR	98	93	94	93
Outside	96	86	74	89
<b>Percentage of growing dry season crops</b>				
Within NFR	8	17	3	5
Outside	13	22	7	8
<b>Avg. HH Cash income from dry season crops (Baht) 2/</b>				
Within NFR	101(8)	100(17)	465(12)	160(9)
Outside	94(13)	131(28)	385(26)	130(11)

*Note:* 1/ Based on households growing paddy

2/ Based on households growing dry season crops only, average income for all households shown in parenthesis.

*Source:* TDRI, NRE-GIS Data Files

**Table 11 Villages Having Common Pasture Plot and Livestock Raising Activities, 1988**

Items	Regions 1/					
	Northeast		North		Central	
	Within	Outside	Within	Outside	Within	Outside
<b>Common pasture land</b>						
% villages reported	22	13	9	7	15	7
Avg. area per village reported (rai)	539	401	894	639	479	198
Avg. area for all village (rai)	116	53	78	42	76	14
<b>Percentage of HH With commercial Livestock raising</b>						
Cow	62	68	45	50	38	83
Buffalo	8	9	3	1	1	2
Pig	5	8	14	14	2	6
Poultry	18	15	10	12	5	10

*Note:* 1/ Due to irregularity of information, Southern region is not included in this table.

*Source:* TDRI, NRE-GIS Data Files

**Table 12 Household Members Sent to Work Outside Tambol  
(Comparing Villages Within NFR and Outside, 1988)**

Items	% HH sent out	Number of people sent out for work	
		Total	per HH
<b>Northeast</b>			
NFR	21	84,599	1.8
Outside	29	445,614	1.8
<b>North</b>			
NFR	12	77,822	1.7
Outside	18	245,067	1.7
<b>Central</b>			
NFR	7	18,671	1.7
Outside	21	228,865	2.3
<b>South</b>			
NFR	12	35,190	1.6
Outside	18	142,527	1.9
<b>Whole country</b>			
NFR	13	-	1.7
Outside	22	-	1.9

*Source:* TDRI; NRE-GIS Data Files

**Table 13 Birth Weight and Infant Mortality Among HH Residing in NFR and Outside, 1988**

Items	Inside NFR	Outside
<b>Percentage of newborns weight</b>		
<b>Over 3,000 g</b>	1/	1/
Northeast	70(61,596)	72(180,738)
North	58(43,091)	63(68,977)
Central	66(16,679)	73(54,316)
South	70(26,114)	71(56,258)
<b>Percentage of newborn mortality</b> <b>(newborn one-year old)</b>		
Northeast	2.1	1.2
North	1.8	0.8
Central	0.9	0.7
South	1.1	0.9

*Note:* 1/ Number of newborn

*Source:* TDRI, NRE-GIS Data Files

**Table 14 Basic Data on an Average of Samples in 24 Selected National Forest Reserves, 1984-1986**

Location	Years since settlement	Adjusted land holdings	Forest sites per settlers	Income from agriculture 1/	
				Off-farm Income 1/	
			rai	baht	
Khon Kaen	7	24.25	31	16,212	5,417
Chai Yaphum	15	19.40	21	12,716	4,358
Maha Sarakham	13	17.85	21	9,212	5,230
Buri Ram	11	10.00	21	4,325	4,899
Nong Khai	19	6.76	55	3,059	4,250
Si Sa Ket	22	5.28	7	3,389	9,203
Kalasin	11	16.65	21	10,859	2,437
Nakhom Phanom	12	6.44	29	2,219	5,406
Sakon Nakhon	13	8.61	57	4,305	3,478
Loei	12	7.67	110	5,103	2,412
Udon Thani	14	12.37	50	8,628	6,304
Phitsanulok	12	12.74	110	13,425	4,781
Uttaradit	14	12.00	26	9,018	3,969
Sukhothai	10	15.82	133	12,798	5,029
Kanphaeng Phet	11	18.58	44	26,959	3,406
Phetchabun	12	17.57	82	20,100	3,397
Nakhon Sawan	10	15.30	84	15,893	3,871
Uthai Thani	11	10.76	55	17,028	3,712
Lop Buri	12	11.70	95	20,197	4,310
Kanchanaburi	12	7.89	985	3,492	4,722
Chai Nat	13	7.87	49	9,959	4,378
Ratchaburi	12	16.19	115	9,397	9,096
Phetchaburi	15	14.30	80	7,038	10,243
Prachuap Khiri Khan	11	48.32	584	20,019	5,636
Mean	12.67	14.35	119.37	11,056.25	4,979.70
S.D.	2.99	8.71	216.09	6,638.46	1,990.05

*Note:* 1/ Deflated by 1976-based price index.

*Source:* Office of Agricultural Economics, "Socio-Economic Survey of Farmers Living in National forest Reserves", various issues



Table 14 (cont.)

Location	Family cash income 1/	Income from crop 1/	Income from forest products 1/	Income from wage 1/
	Baht			
Khon Kaen	21,629	14,309	146	1,979
Chaiyaphum	17,074	10,121	28	1,339
Maha Sarakham	14,442	6,439	211	1,614
Buri Ram	9,224	3,151	366	1,632
Nong Khai	7,309	1,387	823	1,597
Si Sa Ket	12,592	1,696	664	3,241
Kalasin	13,296	10,119	401	1,929
Nakhom Phanom	7,625	959	98	3,072
Sakon Nakhon	7,783	2,726	358	1,298
Loei	7,515	3,991	95	1,114
Udon Thani	14,932	6,490	0	2,210
Phitsanulok	18,206	11,020	204	964
Uttaradit	12,987	7,274	88	1,319
Sukhothai	17,827	10,856	125	1,485
Kanphaeng Phet	30,365	22,579	60	1,449
Phetchabun	23,497	18,091	48	1,310
Nakhon Sawan	19,764	13,557	46	1,659
Uthai Thani	20,740	14,600	170	1,553
Lop Buri	24,507	13,051	364	2,073
Kanchanaburi	8,214	2,802	708	1,735
Chai Nat	14,337	6,765	440	2,186
Ratchaburi	18,493	5,684	870	4,432
Phetchaburi	17,281	2,341	560	4,538
Prachuap Khiri Khan	25,655	16,317	436	3,366
Mean	16,054	8,597	305	2,046
S.D.	6,392	5,944	263	980

Note: 1/ Deflated by 1976-based price index  
2/ No information

Table 14 (cont.)

Location	Expenditure on agr. (baht)	Number of family labor force	Wage rate  (baht)	Percent of labor force with high education (%)	Percent of land with N.S.3 (%)	Percentage of land with STK	Distance  (km.)
Khon Kaen	6,780	3.29	17	86.40	6.42	10.57	503
Chaiyaphum	5,210	3.24	16	85.00	3.51	2.26	376
Maha Sarakham	2,697	3.25	15	96.10	5.24	3.75	482
Buri Ram	1,565	3.08	14	72.40	1.10	5.40	477
Nong Khai	1,132	2.77	12	89.10	5.23	1.00	66
Si Sa Ket	1,864	3.18	12	92.40	2.58	3.53	630
Kalasin	2,610	3.32	15	77.00	0.00	1.31	571
Nakhom Phanom	581	2.99	12	76.20	0.10	3.40	701
Sakon Nakhon	891	3.15	12	79.10	0.10	4.55	751
Loei	2,100	3.36	15	75.50	0.10	1.91	656
Udon Thani	2,079	5.20	12	78.10	1.10	1.00	697
Phitsanulok	4,005	3.27	18	63.50	0.10	4.35	535
Uttaradit	4,236	3.34	17	64.20	2.87	5.98	544
Sukhothai	5,850	3.09	18	69.10	1.79	1.55	440
Kanphaeng Phet	10,923	3.58	19	77.40	0.75	2.04	413
Phetchabun	8,579	3.89	17	65.50	0.60	3.46	136
Nakhon Sawan	5,610	3.11	18	72.10	0.10	1.00	252
Uthai Thani	6,656	3.45	25	73.80	0.10	4.80	252
Lop Buri	10,074	3.33	24	73.20	0.10	1.00	193
Kanchanaburi	6,902	2.57	22	66.50	0.10	2.35	186
Chai Nat	8,117	3.27	30	80.90	0.10	1.72	266
Ratchaburi	4,174	3.27	32	74.50	0.10	3.36	120
Phetchaburi	2,248	3.14	31	78.10	0.10	1.00	146
Prachuap Khiri Khan	11,982	3.20	30	74.20	0.10	1.00	308
Mean	4,907.21	3.31	18.87	76.70	1.35	2.97	417
S.D.	3,286.68	263.00	6.48	8.49	1.94	2.22	197

**Table 15 Annual Family Net Cash Income of Households Residing in Forest Reserves Compared with Net Income of Farm Families in the Province, Northeastern Region**

Provinces	Family net cash income (baht)		
	Study sites	1982/83	1986/87
Khon Kaen	27,976	16,136	18,368
Chaiyaphum	22,351	16,905	14,201
Maha Sarakham	22,151	11,163	16,586
Buri Ram	14,437	19,708	17,585
Nong Khai	16,637	19,411	30,769
Si Sa Ket	20,211	7,021	18,856
Kalasin	19,100	11,841	17,581
Nakhon Phanom	13,423	21,215	22,415
Sakon Nakhon	12,784	29,031	13,768
Loei	10,445	13,284	12,138
Udon Thani	23,489	26,279	24,311

*Source:* Provincial Average data from Office of Agricultural Economics, "Farm Households Income and Expenditure Surveys 1982/83; 1986/87"

**Table 16 Average Annual Family Net Cash Income of Households Residing in Forest Reserves Compared with Provincial Average, Lower North and Central Regions**

Provinces	Family Net Cash Income (Baht)		
	Study Sites	1982/831/	1986/871/
Phitsanulok	26,937	17,594	17,756
Urraradit	15,752	18,047	-3,412
Sukhothai	21,775	19,444	21,786
Kamphaeng phet	36,687	25,206	32,333
Phetchabun	26,853	16,570	24,541
Nakhon Sawan	25,732	21,849	27,425
Uthai Thani	26,689	20,118	17,373
Lop Buri	27,395	36,545	41,480
Kanchanaburi	13,795	50,786	36,091
Chai Nat	16,262	20,556	23,884
Ratchaburi	26,661	26,866	43,706
Phetchaburi	27,993	12,340	8,389
Prachuap Khiri K	25,458	37,315	19,312

*Source:* Provincial Average data from Office of Agricultural Economics Farm Households Income and Expenditure Surveys 1982/83; 19986/87

**Table 17 Basic Information of Surveyed Sites and of Sampled of Households in Forest Reserves in the Lower North and Central Regions**

Province	Year announced as forest reserve	Year of survey	Sample size	Years since settlement	Size of holding (rai)	% in the reserve area
Pitsanulok	1985	1986	283	12(55)	35	88
Uttaradit	1959	1983	388	14(59)	32	62
Sukhothai	1966	1984	371	10(42)	28	82
Kamphaeng Phet	1979	1986	614	11(56)	43	81
Phetchabun	1978	1983	435	12(56)	48	73
Nakhon Sawan	1958	1984	893	10(39)	38	97
Uthai Thani	1973	1986	372	11(55)	47	85
Lop Buri	1969	1986	655	12(58)	43	86
Kanchanaburi	1978	1984	85	12(42)	30	90
Chai Nat	1963	1986	133	13(59)	38	66
Ratchaburi	1962	1985	190	12(50)	38	68
Phetchaburi	1975	1985	292	15(65)	29	59
Prachuap Khiri Khan	1968	1985	275	11(43)	37	67

*Note:* 1/ Percentage of households with settlements 11 years and over

*Source:* Office of Agricultural Economics, "Socio-Economic Survey of Farmers Living in National Forest Reserve", various issues

**Table 18 Basic Information of Surveyed Sites and Sampled Households in National Forest Reserves in the Northeast**

Province	Year announced as forest reserve	Year of survey	Sample size	Years of settlement	Size of holding (rai)	% in the reserve area
Khon Kaen	1968	1984	85	7(63)	36	78
Chaiyaphum	1959	do	274	15(65)	40	77
Maha Sarakham	1965	do	540	13(54)	35	60
Buri Ram	1972	do	210	11(52)	25	84
Nong Khai	1967	do	110	19(80)	31	87
Si Sa Ket	1974	do	80	22(91)	15	47
Kalasin	1961	1985	610	11(40)	30	60
Nakhon Phanom	1980	do	220	12(65)	36	89
Sakon Nakhon	1969	do	548	13(62)	30	97
Loei	1974	1986	336	12(56)	29	76
Udon Thani	1981	1986	778	14(62)	33	97

*Note:* 1/ Percentage of households with settlements 11 years and over

*Source:* Office of Agricultural Economics, "Socio-economic Survey of Farmers Living in National Forest Reserve", various issues

**Table 19 Regression Coefficients and Related Statistics  
Explaining Variations in Cash Income from  
Selling Forest Products**

Equation no.	1	2	3
Year	28.483*** (7.116)	40.043*** (5.921)	37.737*** (6.203)
Size of forest	0.443** (2.904)	0.393** (2.600)	0.390** (2.632)
Income from crops	-13.000** (2.822)	--	--
Family cash income	--	-9.134** (2.331)	--
Agricultural income	--	--	-10.000** (2.516)
Distance	--	-0.295* (1.906)	-0.298* (1.962)
Dummy	553.272*** (3.373)	540.708*** (3.261)	502.926*** (3.112)
Adjusted R squared	0.619	0.635	0.648
F-ratio	12.936	10.572	11.149

*Note:* Values in parenthesis are t-ratio  
 \*\*\* Significant at 1 percent level  
 \*\* Significant at 5 percent level  
 \* Significant at 10 percent level

**Table 20 Regression Coefficients and Related Statistics Explaining Variations in Cash Income from Agriculture**

	Model 1	Model 2	Model 3
Constant	2.883*** (6.002)	--	--
Year	-0.750**** (3.145)	-0.970*** (3.276)	-0.871** (2.887)
Land holding	0.403*** (3.081)	0.215 (1.588)	0.235* (1.743)
Land document	--	--	0.096 (1.300)
Cash expenses on agr.	0.559*** (6.342)	0.659*** (9.770)	0.671*** (9.992)
Size of forest	-0.137*** (3.132)	--	--
Education	--	1.269*** (6.107)	1.169*** (5.342)
Family labor	0.037 (0.371)	0.125 (1.083)	0.094 (0.811)
Distance	-0.105 (1.167)	--	--
Dummy	-0.305*** (4.245)	0.083*** (4.941)	-0.434*** (5.176)
Adjusted R squared	0.915	0.886	0.889
F-ratio	42.313	45.610	37.788

*Note:* \*\*\* Significant at 1 percent  
 \*\* Significant at 5 percent  
 \* Significant at 10 percent



**Table 21 Regression Coefficients and Related Statistics  
Explaining Variations in Wage Income**

Equation	1	2
Education	15.524*** (4.271)	15.524*** (4.204)
Wage rate	45.060** (2.635)	46.148** (2.557)
Income from crop	-0.032* (1.808)	
Income from agr.		-0.027* (1.630)
Dummy	1,684.439*** (5.395)	1,719.359*** (5.497)
Adjusted R squared	0.769	0.763
F-Ratio	26.507	25.633

*Note:* \*\*\* Significant at 1 percent  
 \*\* Significant at 5 percent  
 \* Significant at 10 percent

**Table 22 Socioeconomic Characteristics of Eucalyptus Planters  
Compared to Non-Planters, Chachoengsao Province, 1990**

	Unit	Eucalyptus planter	Non-planters
No. of cases		37	66
<b>Background information</b>			
-Age of hh's head	years	48.0	53.0
-Education level	level	3.1	2.7
-Exp. in tree crops	%	59.5	37.9
<b>Off-farm income</b>			
-Ag. activities	baht	2,408.0	2,503.3
-Non-ag. activities	baht	2,998.5	2,119.0
-Remittances	baht	2,449.0	1,080.0
<b>Land holdings</b>			
-Size of land holdings	rai	107.2	62.3
-Eucalyptus	rai	14.6	-
<b>Land use pattern</b>			
-less than two crops	%	35.1	80.3
-more than two crops	%	64.9	19.7
Value of farm assets	baht	144,074.0	59,761.0
Average of loans/hh.	baht	61,135.0	16,455.0
Loans with interest rates less than or equal 13%	%	73.0	44.7
Loans with interest rates more than 13%	%	27.0	55.3

*Source:* TDRI Survey Data

**Table 23 Explaining Adoption of Eucalyptus  
in Chachoengsao Province, 1990**

Determinants of adoption	Model 1	Model 2
Age	-0.3104 (3.41)	-0.293 (2.92)
Experience in tree planting	3.005 (5.00)	3.346 (4.60)
Labor per landholding	-4.949 (1.97)	-4.672 (1.79)
Farm assets per landholding	0.002 (1.78)	0.003 (2.57)
Number of crops	0.321 (1.93)	0.750 (2.49)
Education	-	-0.445 (1.91)
Adjusted R squared	0.660	0.662
Number of observations	101	101

**Source:** Estimated using probit analysis of survey data on 101 households in Chachoengsao Province sampled by TDRI in 1990

**Table 24 Cost-Benefit Analysis of Eucalyptus Plantations  
in Chachoengsao Province, 1990**

Unit: Baht per rai

Scale of operation: costs and benefits	Financial cash flow	Private profitability	Social profitability
<b>Small-scale planter (&lt;100 rai)</b>			
Cost (12 years)	6,583	11,281	12,003
Benefits (12 years)	9,028	9,028	9,028
Net benefits (12 years) or NPV (12)	2,445	-2,253	-2,975
Net benefits (1 year) or NPV (1)	204	-188	-248
<b>Medium-scale planter (100-1,000 rai)</b>			
Cost (12 years)	6,331	9,463	9,748
Benefits (12 years)	15,154	15,154	15,154
Net benefit (12 years) on NPV (12)	8,823	5,691	5,406
Net benefits (1 year) or NPV (1)	735	474	451
<b>Corporate planters (&gt;1,000 rai) (with subsidy)</b>			
Cost (12 years)	8,736	11,868	12,858
Benefits (12 years)	25,702	25,702	25,737
Net benefits (12 years) or NPV (12)	16,966	16,966	12,879
Net benefits (1 year) or NPV (1)	1,414	1,414	1,073
<b>Corporate planters (&gt;1,000 rai) (without subsidy)</b>			
Cost (12 years)	9,285	12,417	-
Benefits (12 years)	25,702	25,702	-
Net benefits (12 years) or NPV (12)	16,417	13,285	-
Net benefits (1 year) or NPV (1)	1,368	1,107	-

*Note:* Calculations reflect net present values

**Table 25 Financial, Private Economic, and Social Profitability of Eucalyptus Plantations under Alternative Price, Yield, Interest Rate, and Land Cost Scenarios**

Alternative scenarios	Financial cash flow	Private profitability	Social profitability
<b>Base Case</b>			
Small-scale	204	-188	-248
Medium-scale	735	474	451
Corporate	1,414	1,153	1,073
<b>Alternative Price(600 baht/ton)</b>			
Small-scale	526	135	75
Medium-scale	1,085	824	800
Corporate	2,004	1,743	1,664
<b>Alternative Yield</b>			
Small-scale (y=10,15,15)	405	13	-47
Medium-scale (y=15,20,20)	960	699	676
Corporate (y=20,40,40)	1,864	1,603	1,162
<b>Alternative Real interest rate</b>			
Small-scale (31%)	-517	-932	-917
Small-scale (8%)	292	-107	-102
Small-scale (15%)	11	-373	-366
Medium-scale (15%)	483	227	206
Corporate (15%)	1,248	832	743
<b>Alternative Land cost</b>			
Small-scale (OC=200 baht/rai)	204	-101	-139
Large-scale (OC=200 baht/rai)	735	561	550
Corporate (LP=4,000 baht/rai)	1,081	1,081	924

**Remark:** Base Case Values are assumed unless otherwise stated. They are as follows:

Price = 470 Baht per ton  
 Yield = Small-Scale 10,10,10  
           Medium-Scale 15,15,15  
           Corporate 20,30,30  
 Real Interest Rate = 10%  
 Land Cost = 300 baht per rai

**Note:** Y = Yield  
 OC = Opportunity cost of land  
 LP = Price of encroached forest land

**Source:** Analysis of TDR1 Survey Data, Chachoengsao Province (1990)

**Table 26 Land Price Index**

Land title	Province			
	Buri Ram	Roi Et	Chaing Mai	Lampang
Chanod	170	-	346	176
NS 3 K	113	111	292	133
No title	100	100	100	100
Forest reserve	18	62	99	83

*Source:* Chalamwong and Feder (1988)

**Table 27 Labor Requirements for Cassava and Eucalyptus Per Rai**

	Cassava (5 years)	Eucalyptus (5 years)
Labor requirements (man-days)	a 75	b 61
Wage (baht/man-day)	c 40	c 60
Earnings (baht)	3,000	3,660

a

*Source:* Office of Agricultural Economics (1988)

b

Tingsabat (1989)

c

TDRI survey

**Table 28 Local Perception of Eucalyptus Plantations,  
Chachoengsao Province, 1990**

	Eucalyptus planters		Non-planters	
	Number	%	Number	%
<b>1. Do eucalyptus trees lower other crops' yields nearby?</b>				
Yes	34	85.0	53	84.1
No	4	10.0	6	9.5
Don't know	2	5.0	4	6.4
<b>Reason for answering Yes</b>				
They compete for water	20	58.8	35	66.0
They compete for nutrients	4	11.8	6	11.3
Don't know	10	29.4	12	22.6
<b>2. Do you think that eucalyptus trees use much more water than other crops do?</b>				
Yes	39	97.5	58	92.1
No	1	2.5	1	1.6
Don't know	-	-	4	6.3
<b>3. Do you think that land will be usable for planting other crops after eucalyptus trees are removed?</b>				
Yes	28	70.0	37	60.7
No	4	10.0	10	16.4
Don't know	8	20.0	14	23.0

*Source:* TDRI Survey Data



**Table 29 Net Social Benefit of Having Full Land Title**

Province	Return as % of Pnt	Social Cost as % of Pnt	Net Social Benefit as % of Pnt
Nakhorn Ratchasima	82.9	3.3	79.6
Khon Kaen	80.5	3.5	77.0
Chaiyaphum	41.3	5.6	35.7
Average	68.2	4.1	64.1

*Note:* Pnt is the price of non-titled land.

*Source:* Feder (1987)

**Table 30 Royal Forestry Department's Village Woodlot Project,  
Number of Target Villages, 1987-1990**

Region	1987	1988	1989	1990	Total
Northern	148	80	85	76	38
Northeastern	200	238	238	231	907
Central	37	57	63	71	228
Southern	-	16	6	14	36
Total	385	391	392	392	1,560

**Source:** National Forest Land Management Division, RFD

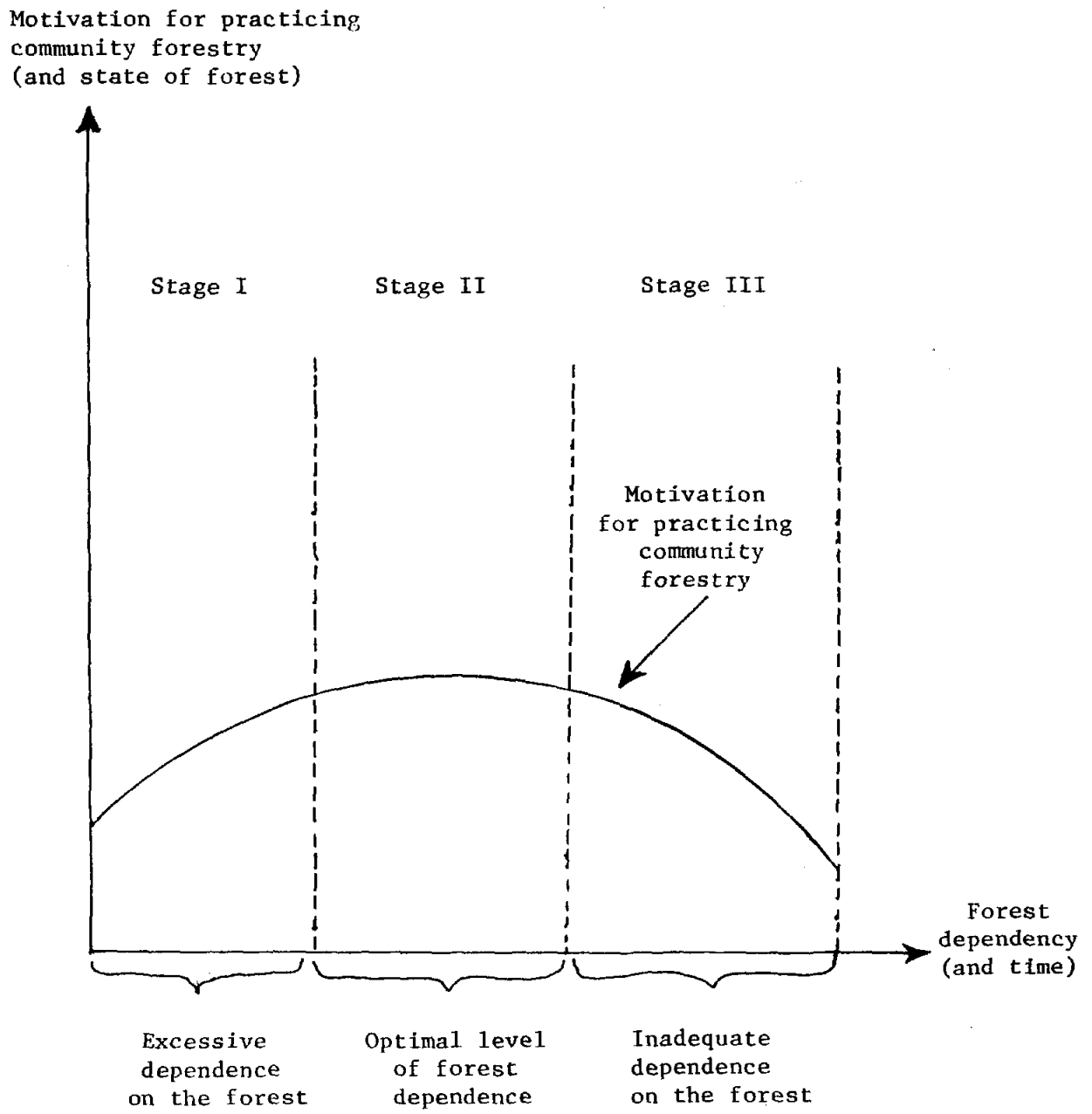


Figure 1 Motivation for Practicing Community Forestry: A Function of the Community's Dependence on the Forest

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## **Annex 1**

# **Social Forestry in Thailand: Solving or Sustaining Rural Poverty?**

## Annex 1

# Social Forestry in Thailand: Solving or Sustaining Rural Poverty?

by Charles B. Mehl<sup>1</sup>

### INTRODUCTION

**S**ocial forestry is often viewed as a means to reduce forest encroachment, to promote afforestation through tree planting by rural communities or individuals, to reduce rural poverty with forestry, agroforestry, or other tree-related development, and to contribute to sustainable agricultural and forestry production through more environmentally-sound land use. The forests will not be replanted in their original form, but trees will increase in the landscape, mixed among the fields and villages. By producing their own tree products, people should no longer exploit the remaining forests. This should then allow for easier protection and replanting of the natural forests.

The "success or failure" of social forestry is all too often evaluated by separate projects—a process common to most rural development activities. Yet, a truer measure of social forestry's success or even of its potential is an evaluation of its role within the broader process of the country's social, economic and environmental transformation. Only then can the social forestry program be viewed as a component of social and economic progress or revealed as a palliative that postpones or simply masks the cycle of rural poverty and land and forest degradation.<sup>2</sup>

The range of programs referred to as social forestry have been defined by the Food and Agriculture Organization of the United Nations (FAO) as:

...forestry activity It embraces a spectrum of situations ranging from woodlots in areas which are short of wood and other forest products for

local needs, through the growing of trees at the farm level to provide cash crops and the processing of forest products at the household, artisan or small industry level to generate income, to the activities of forest dwelling communities. It excludes large-scale industrial forestry and any other form of forestry which contributes to community development solely through employment and wages, but it does include activities of forest industry enterprises and public forest services which encourage and assist forestry activities at the community level. The activities so encompassed are potentially compatible with all types of land ownership. While it thus provides only a partial view of the impact of forestry on rural development, it does embrace most of the ways in which forestry and the goods and services of forestry directly affect the lives of rural people.<sup>3</sup>

The social forestry program should be evaluated in the context of national development and natural resource management priorities. If sustainable forest and land use management is a top priority, then the achievements of the social forestry program should be measured partly in terms of meeting that goal. If reducing forest encroachment, watershed protection, and increasing forested area are important national goals, the effective contribution of social forestry programs to meeting these goals can also indicate its relative success or failure. If rural development is a top priority, social forestry should be evaluated primarily in the context of its contribution to the livelihood and welfare of the participants in its programs.

Its ultimate success, however, lies in meeting the social and economic needs of the rural poor—the expected beneficiaries of social forestry. It should provide adequate welfare, security, resources, and livelihood for participants in the program. In the long run, the social forestry program should not be limited to a few areas or a few projects that require large outlays of manpower, budget and other resources by implementing agencies. Social forestry activities should be able to expand and sustain themselves without continuous subsidies.

## THE RATIONALE FOR SOCIAL FORESTRY

Commercial or industrial forestry, one of the traditional forms of forestry, is rarely considered to be a form of social forestry, even though it involves employment, profits for companies or the state, taxes, and usually national or corporate ownership of the resources—all of which benefit certain groups or segments of the society. Ideally, if the government benefits through profits and taxes, the entire society, including the population living near the resource, should benefit from the services provided by the government. More often than not, the importing countries and the commercial or state logging enterprises gain the most. Their workers are brought from outside the area. Government uses its revenues to provide goods and services mainly for a typically urban-



based elite. The rural population living near the forests is left with no legal access to the resource, a degraded environment, little or no additional employment, and few goods or services provided by the government or the industries. This was the pattern of forestry in North Thailand from the late nineteenth century until recently.<sup>4</sup>

Commercial or industrial forestry in Thailand has included few social forestry activities, and these were provided only marginally. Forest villages were established to supply labor for commercial forest plantations. A few farm and community forestry programs encourage villagers to supply products to tree-based industries. As will be discussed toward the end of the chapter, a viable commercial and industrial forestry in Thailand's future may well require greater involvement from the local rural communities.

Conservation or protection forestry—another traditional forestry activity not normally included under the umbrella of social forestry—tends to involve people as visitors to parks and wildlife reserves, as researchers, or as employees of the park or forest service. Protecting watershed areas will benefit those living downstream. Until recently, there has been little attempt in Thailand to involve local communities in protection forestry. As with commercial forestry, a viable protection forestry program can, and may in fact need to have greater involvement by local communities to help protect the remaining natural forests and to preserve the critical watershed areas where they live.

Poverty and deforestation are inexorably linked in much of the world. It is the poor who clear the forests for new farms no matter how marginal the land, the poor who use most of the fuelwood, and the poor who depend on forest products for their livelihood. Most studies cite fuelwood consumption as a major cause of forest degradation and destruction, contributing to over 80 percent of the total roundwood removed from tropical Asian forests. Most of the rural population in South Asia and well over half in Southeast Asia use wood or charcoal as their main, if not only, cooking fuel.<sup>5</sup> In a survey of the tree and forestry use practices of 256 households in eight communities in North, Central and Northeast Thailand, all households were found to use fuelwood or charcoal (Table 1). Even the 8 percent of households that used alternative fuels also used fuelwood or charcoal for some cooking.<sup>6</sup>

Perhaps the most important cause of forest destruction in Thailand directly linked to poverty has been the expansion of agriculture. The general pattern finds settled agriculture moving into the forests after they have been logged over, where the rudimentary logging roads enable access to lands that were previously hard to encroach.<sup>7</sup>

Construction of new roads has had a similar effect, evident in the rapid spread of settled agriculture into the forests of Pak Chong and Pak Thong Chai districts in Nakhon Ratchasima province after national highways were built through the forests.

Table 2 shows deforestation in Thailand in recent years. In 1975 slightly more than 40 percent of the country's total area of 513,115 square kilometers, or 209,200 square kilometers, remained under forest. By 1988 the proportion of forest had dropped to 28 percent. Over the same period, agricultural area grew from 35 percent of the country's total area in 1975 to 46 percent in 1988.

While nearly all new agricultural area is obtained by clearing forests, it is important to note that only recently—from 1982 to 1988—did the new agricultural area equal and then surpass the area of forest loss. In the years before 1982, forest loss far exceeded the forest area converted to farmland. However, this does not minimize the importance of forest destruction caused by the spread of settled agriculture.

Not all the conversion of forests to farmland is done by poor farm households; agricultural companies, large dairy farms, and plantations clearing forests are also contributors. But by far, the vast majority of forest encroachment is done by poor, landless rural families. They are forced to move into marginal agricultural lands because they have no other viable options. Because the land in their home villages is no longer available, they are faced with three options: to stay behind as landless agricultural laborers, to move to the cities, or to move in search of land they can clear to start their own homesteads.

Due to the drastic depletion of forest area, the traditional forest management systems of commercial and conservation forestry have come into conflict with the land and forest needs of the rural people. The proliferation of social forestry programs throughout the developing world during the last two decades coincides with rapid depletion of the forests and a growing concern over environmental issues by planners and policy makers. Social forestry appears under a variety of guises—community forestry, agroforestry, farm forestry, village woodlots, home gardens, and so on. Most programs share similar basic social, economic, and environmental goals—often based on widely held assumptions, at least among forestry planners and development implementors—about the nature of social and economic conditions in the countryside.

The main purpose of social forestry programs is to check, if not reverse, deforestation. It is commonly assumed that the growing rural population needs more

agricultural land and more fuelwood. As the extraction of fuelwood from the natural forests and the expansion of agriculture into forest lands continue unabated, the remaining forest area and the remaining stock of fuelwood, timber and other forest products dwindle to critical levels. Many of the countries in Africa and South Asia provide stark examples of the serious environmental consequences of deforestation: desertification where rains are limited; devastating floods where rains are plentiful. Analysts predict severe fuelwood shortages for hundreds of millions in Africa and Asia, with serious nutritional and health consequences due to insufficiently cooked food.<sup>8</sup> Most social forestry programs are designed to both meet the needs for agricultural land and fuelwood and to attempt to reduce forest destruction. Major goals often include encouraging farmers to grow their own trees for fuel and other products<sup>9</sup> and to adopt agroforestry practices that are expected to combine an agricultural livelihood with environmental protection by maintaining a tree cover.

## THE FORMS OF SOCIAL FORESTRY

All social forestry involves some form of collaboration between the state and the community or individual participants. Other implementing agencies and forest industries are often, though not necessarily, involved. The forms of land and tree tenure and the management system used in each program reflect a combination of the preferences of the government and the existing local patterns of tenure and management.

It is easiest to describe first the various arrangements possible between the state and the community.<sup>10</sup> "Community" refers to any of several levels of social organization. These levels range from an individual or a household, to a group of individuals or a group of households, to a more formal village community, a group of villages, or a collection of any of the smaller groups. While each level of "community" will of course have its own characteristics and dynamics (some of which will be discussed later) the important factor is the relationship with the state, which is similar no matter what the level of "community."

### State Owned and Managed

In the first form of social forestry, the state owns the forest, provides most management inputs, makes the management decisions, and supervises activities in the forest. The community or communities around the forest are allowed to extract tree products and other forest goods, with the amounts controlled or supervised by the state. The community often pays for the products it extracts—either as cash payment or more

commonly as labor—to help the state replant and maintain the forest. The tree products the state allows the community—fuelwood, tree fodder, some timber—are expected to meet household needs.

In essence, the communities are allowed use of a portion of the forests or of certain forest products in order to protect the bulk of the forest area and resources for state use. Only the state has the right to enter into contracts with logging companies or other forest industries to exploit the forests. In this State Owned and Managed form, the state-industry relationship is a traditional forestry arrangement: the state owns and manages the forest for commercial purposes, grants concessions or other contracts to companies to extract forest resources, and is paid by the companies for the concessions and for the goods extracted either directly or through taxes.

The State Owned and Managed form is common to government agencies that are reluctant to relinquish their control over the forest resources and land. It was the basis of most Thai government directed social forestry until recent years. The use of natural forests and afforested areas in the government's Forest Village programs fits this form of social forestry. The Community Forestry Project of Sri Lanka includes examples of this form, in which the state uses local (community) manpower to plant woodlots and fuelwood plantations on state land. The community is also involved in managing and harvesting the woodlots, but the management decisions remain with the state.<sup>11</sup>

Another variation of this form was introduced in the Bengal State in India. The State Forest Department arranged to have local villagers protect natural sal (*Shorea robusta*) forests from extensive fuelwood cutting. In return, the villagers were to receive 25 percent of the revenues from the department's sale of firewood, poles and timber. The villagers were also allowed to collect non-wood forest products, which proved to be a major source of their incomes.<sup>12</sup>

The *taungya* system as found in the FIO Forest Villages (described in the next section under Existing Village Practices) is another example of this form. Though the villagers are given land to grow crops, their use is restricted to the first few years until the cover from the plantation trees blocks sunlight to the crops or until the crops and trees otherwise compete with each other. The state's forest trees take priority, and the villagers need to shift their crop production to a new plot of land allocated by the state agency. The state owns the land and forest resources, makes the management decisions regarding their use (except short-term decisions regarding the crops grown by the villagers), and the

state alone has the full right to exploit the forest resources or to enter into agreements with other parties to use the resources.

### **Joint Management System**

In the second form of social forestry, the state owns and supervises the forest. Management decisions on use of the forest, however, are split between the state and the community. The division of management responsibilities is often spatial: the community is given part of the forest area to manage while the state manages the rest. The community may have access to the state controlled area for minor forest products. The division can also be made between types of products: the state maintains control over the trees while the community is allowed to manage the rest, often for agriculture or pasture. The community is often allowed residual products, such as fallen branches or leaves, from the state's trees.

In the Joint Management form, the state maintains its right over commercial exploitation of the forest or of the commercial trees. As with the State Owned and Managed form, it is the state that can enter into commercial agreements with logging companies and to profit from those agreements.

The Social Forestry program in Java exemplifies the division between state control of the trees and community decision making over the area between the trees. The state owns the land and expects to use it for tree plantations, yet it recognizes that communities now using that land for agriculture could hinder (destroy) any tree plantations if they are not allowed to continue farming in the area. The state then plants its trees with wide spacing, and it allows the farmers to grow crops in the spaces between the trees. The state is now planting its trees at wide enough intervals to enable the farmers to practice year-round agriculture, even when the state's trees reach maturity.<sup>13</sup>

### **Community Concession**

The state remains the owner of the forest in the third form, but it grants concession rights to the community (or individual) to manage and oversee it. In this form, the state maintains regulatory control and has the power to revoke the concession if the community uses the forest or land in ways contrary to the state's regulations. While the state can also provide technical and management assistance, the community determines whether or not to accept the assistance. Under this form, the community has right to enter into commercial relations with companies.

Thus far, only a variation of this form exists in Thailand, with individuals granted the right to use degraded forest land under the STK program (described in the next

section under Government Programs). Another variation has been introduced in the Philippines through the Integrated Social Forestry Program. The Bureau of Forest Development grants renewable stewardship agreements of 25 years to individuals in project communities or to the entire communities, depending upon the local forms of land tenure. The individuals or communities are to practice agroforestry or some other form of non-shifting cultivation promoted by the state. The state can revoke the agreement if the individual or community does not practice the recommended forms of cultivation.<sup>14</sup>

#### **Private Owned/State Regulated**

Nearly all forms of community forestry using private land are included in this form. The community (again, the term "community" includes individuals) owns the land, manages it, and profits from its use. The community has the right to enter into contracts with companies or other organizations. The state may provide technical assistance (extension). More importantly, the state regulates tree production and the marketing of tree products.

Farm forestry, agroforestry, and home gardens all center on the individual or household as controller and manager of the resources. Agencies implementing social forestry work with individual farmers or households to promote tree growing on farms or homesteads. They promote private initiative and private tenure or security in the land. A major assumption behind these variations of private forestry is that individual, rather than community, control and management will promote more beneficial decision making and use of the resources.

Community and village forestry incorporate the broader community in the program—whether it is a tribe, a village, a group within the village, or a larger sociopolitical or socioeconomic group. In rare cases, the forest is on communal land, and all control, decision making, management, and use lie with the community. In general, though, some form of collaborative control, decision making and management exists among the state, the local community, and individuals in the community.

The community forestry program in Nepal has moved from a State Managed and Owned form to a Private Forestry/State Regulation form, with the broader community as the "owner," manager, and user of the forests. Forests were local communal resources in Nepal until the Forest Nationalization Act of 1956. The subsequent rapid depletion of the forests led the state to realize the need to reintroduce local community control. The Panchayat Forestry Acts of 1978 and 1980 allocated 40 percent of national forest land to management by the local village administrative units, called the *panchayat*. The program

met with only limited success for at least two reasons. First, the actual users of the forests often differed from the local administrative groups who were to manage it. Second, the state still required a substantial portion of any profits from the sale of panchayat forest products. Recent changes in the program give greater recognition to the actual forest user groups, with more of the forest management devolved to them. The state has also eased its claims to a share of the profits from the forest products. The state, however, maintains some control over the forest resources by keeping a major decision-making role through collaborative government/community planning of use of the community's forest resources. The Nepalese government also provides technical assistance through its regular district forestry offices and through foreign assistance projects.<sup>15</sup>

#### **Community Owned and Managed**

A fifth form may be of interest, though it is not relevant to Thailand. This is when the Community owns the forest, manages and, most important, has regulatory control over it. The community alone has the right to enter into commercial arrangements with the State or industries, granting the right to use the forest. The community regulates use of the forest and can revoke the agreements if the State or companies are found to breach the community's regulations. It is essentially the reverse of the State Owned and Managed form, with the roles of the State and the Community switched. This form can be found in Papua New Guinea and in some South Pacific societies.

### **SOCIAL FORESTRY IN THAILAND**

From the mid-nineteenth century until late in this century, the Thai government's agricultural policies encouraged farmers to expand their agricultural area by clearing the forests.<sup>16</sup> Despite recent government policies prohibiting forest encroachment, Thai farmers continue the practice of migrating to clear new land when the agricultural area in their home communities is exhausted.<sup>17</sup> Shifting cultivation practiced by hilltribes in North Thailand has also been blamed for extensive forest degradation.<sup>18</sup>

Many analysts point to fuelwood gathering as "the most important cause of forest degradation."<sup>19</sup> This is a common assumption in Thailand, with nearly all rural households and over half the urban households in Thailand using either wood or charcoal as their major cooking fuel.<sup>20</sup> There is certainly a fuelwood shortage in the most deforested parts of Thailand, but the role of fuelwood gathering and charcoal making in Thailand's deforestation is debatable, especially when compared to the massive

deforestation caused by excessive logging and extensive clearing of new farm land.<sup>21</sup> While villagers regularly obtain timber, food and other products from the forests, their use is rarely considered an important cause of forest destruction.

The government's role in forestry shifted over the past century along with changing forest and socioeconomic conditions. From the mid-to-late nineteenth century, the central government of Siam used forestry to extend its control over tributary principalities in the North. Western powers wanted access to the teak forests. The central government collaborated with them to gain control over the teak trade and to eventually gain total Siamese control over the region. The establishment of the Royal Forest Department (RFD) in 1896 marked the culmination of Siamese efforts to wrest control of the forests from local princes and place it firmly under the central state. At the same time, the central state restricted the local populace's access to the resource.<sup>22</sup>

For the next half-century, forestry in Thailand involved RFD regulation and taxation of foreign concessions and an increasingly active role by RFD in managing and harvesting the forests. By the middle of the twentieth century, the government established the Forest Industry Organization (FIO) first as a forest production and harvesting unit of the RFD and later as an autonomous government enterprise. The government's main concern throughout this period was to extract valuable timber for export. Forestry was gradually nationalized by 1960, when the last foreign concession ended. The passage of the 1954 Land Act, which provided the legal bases for de facto ownership of all land utilized for agriculture; the demarcation of half, later 40 percent, of the Kingdom as forest reserves under the Forest Act of 1941; and the Reserved Forest Act of 1964 laid the foundation for forest-agricultural land use conflicts.<sup>23</sup> With plenty of forests and a relatively sparse population living mainly in lowland rice-growing areas, there was little conflict between commercial forestry and the needs of the rural population, and thus no need then for a comprehensive social forestry program.

#### **Existing Village Practices**

A survey of 256 households in eight villages in North, Northeast and Central Thailand showed farmers used tree products for a range of uses, the most important of which were fuel, food, and timber. Table 3 shows the major species used by villagers and the types of products obtained from each species. Table 4 shows the location or source of the species—whether on state land, community land, various types of agricultural systems on the farmers' own land, or purchased. As can be seen, most of the villagers obtain their tree products from state forests or from their own farms. A review



of the data at the village levels showed that, not surprisingly, those living near state forests are most likely to get their tree products from those forests. Those living far from the forest tended to get most of their products from their own farms or were willing to purchase the wood products. Those who obtain the goods from their own farms tend to get the tree products from their home gardens or from trees scattered in their farms. It is perhaps most revealing that few in these villages got their tree products from community lands and few practiced agroforestry or some other intentional system of tree farming.

It is significant that many farmers were willing to purchase tree products for fuel or for timber. Table 1 shows the location of trees or the source of products used for fuel by the villagers in the study, by farm size. The total number of cases comes to more than the 256 households surveyed because many households had more than one source for their fuel. Most of the households using state forests were in the North, in villages located near the forests. Those in the North also tended to use trees from their home garden, although the practice was most extensive among households in one Central and one Northeastern village. Most households using trees scattered in their farms tended to be from the Northeast, although a number of households in newly settled villages in the Central Region also followed this practice. Many of these new settlers came from the Northeast. All villages had households purchasing tree products or purchasing substitutes for fuelwood, though as would be expected, this was most common in the Central Region and in one village in the Northeast, where commercial activities were most extensive.

It is significant to note that Thai farmers rarely practice agroforestry or tree farming. Villagers tend to prefer growing fruit trees or other species with clear economic uses (*neem* and *nun*). If farmers are willing to purchase tree products such as fuelwood or timber, they are not likely to grow trees (and use what is most probably limited land and labor) to produce those goods only for household use. Evaluations of social forestry programs in Thailand have shown that villagers need an adequate economic incentive to plant trees. The incentive can come from the sale of tree products (timber, fruit, poles, medicinal products) or goods associated with the trees (honey from bees raised with certain trees, mushrooms or other fungi, silk cocoons).<sup>24</sup>

This is not to imply that social forestry in Thailand must of necessity be oriented to the individual commercial producer. There are numerous cases of villagers cooperating to manage common resources, including forestry resources. Though the community's forest resources are rarely managed *systematically or intensely*, the existing

arrangements can provide the basis for the future development of cooperative community forestry systems.<sup>25</sup> Yet as with individuals, the members of the community must see clear benefits to their participation in community-level forestry activities. However, as Charit points out, these can be quite different from the more immediate benefits preferred by individuals acting alone.

Innovations requiring a longer time frame for the realization of benefits might be better managed at the community level. There are many reasons for this. First, resource mobilization at the community level may produce a total resource input that is greater than that possible by an individual. Second, a common resource previously overexploited but unmanaged, according to the typical "tragedy of the commons" argument, may be brought under more productive management, thus increasing the productivity of the resource under the command of the community. In these cases, an individual would gain from having more of a resource at a lower cost than if he were to acquire it himself. Third, a community may take into account the interest of its future generations better than would an individual, by means of having a lower rate of time preference and placing equal or greater values on future rather than on present benefits. Fourth, a strong community can prevent the "free rider" from benefitting from the project without making the necessary contributions, so that the costs are shared commensurately with the benefits. Finally, mobilizing common resources for community needs, such as festivals and village development projects, also reduces the necessity to demand individual contributions on each occasion; thus, it acts as insurance against risks in resource availability.<sup>26</sup>

## **Government Programs**

### ***1. Forest Villages***

The first of what might be called social forestry activities in Thailand started with the establishment of a forest plantation in Phrae in 1906, using the *taungya* system introduced from Burma. The FIO expanded the system in 1967 through the creation of forest villages within its teak plantations. The primary purpose of these forest villages was to provide a regular labor supply for the plantations. While socioeconomic development of the forest villages was also a stated goal, it received less emphasis.

The growing rural population and the expansion into upland field crops spread agriculture further into reserved forest land. These factors—coupled with extensive illegal logging and the military's intentional clearing of forests in the mid-1970s to destroy communist insurgent sanctuaries—pushed forest cover to well below 40 percent

of the national area by 1978.<sup>27</sup> Faced with dwindling and degraded forests, the RFD responded by expanding its national parks, wildlife reserves, and watershed management programs and by establishing the National Forest Land Management Division to work in degraded and encroached reserve forests.<sup>28</sup>

The sudden, brief burst of open democracy after the overthrow of the military dictatorship in 1973 led to a flow of information and greater awareness by policy makers about the conditions of the rural poor. Concern over land tenure and landlessness led to the creation of the Agricultural Land Reform Office in 1975. The RFD introduced a forest village program in 1975, its first major social forestry activity, as the initial effort of the National Forest Land Management Division.<sup>29</sup> This program's objective is to improve the social and economic conditions of generally poor reserve forest occupants and to resolve conflicts between their needs and the national forest policy.<sup>30</sup>

Table 5 shows the extent of the Royal Forest Department Forest Village program. There are three major types of Forest Village projects: 1) regular projects, which are the most numerous; 2) national security projects; and 3) Royal projects. All are intended as integrated development projects, providing roads, irrigation and water control facilities, electricity, and other services to the villages.

Though often grouped together, the forest village programs of FIO and RFD are very different in their intent and nature. The forest village program of the FIO is clearly an example of the State Owned and Managed form of social forestry. The state keeps ownership of the forest, makes the major decisions regarding its management, and retains the right to exploit it. The villagers' use of land for agriculture is at the discretion of the state. The main purpose of the FIO forest villages is to provide steady and cheap labor for its forest plantations. In this regard, the FIO forest villages can be considered successful.

A second, and apparently secondary, goal of the FIO forest villages is to improve the social and economic conditions of the local population through employment on the plantations and provision of land for household agricultural production. The FIO's villages fail to meet this goal in two ways. First, FIO provides insufficient resources for its forest village residents to earn an adequate, regular livelihood. As planned, the villagers earn enough from a combination of wage labor on the plantations and the produce from their agricultural plots. Employment on the plantation, however, is often not regular. Once all the plantation has been planted, FIO's labor requirements are

significantly reduced. Produce from the small agricultural holdings (5 rai) provided each household on marginal lands plus the irregular low-paying wage labor cannot support a household. Residents in two FIO forest villages visited by the author supplemented their income by illegal logging of the trees they helped plant. In addition to the money they earned for felling and transporting the trees, they increased their legal workload by clearing new areas to replant. Though an ingenious reaction to their inadequate incomes, it did not speak well of the FIO's commitment to social and economic development of the forest village residents.

The FIO forest villages also fail in providing employment to local people. Each forest village is planned for 100 households, with poor local residents expected to move into these new villages. Most residents of the forest villages in North Thailand did not come from the region, but rather were migrants from the Northeast.<sup>31</sup> The only FIO forest village in Lampang in 1983 with its full complement of 100 households consisted almost entirely of temporary migrants from the Northeast. They moved to the village to earn some cash for a few years, then moved on to areas where they could clear their own agricultural land or find steady employment as agricultural wage laborers.

Although RFD Forest Villages have the same goals of reforestation and socioeconomic development, the priorities appear reversed. Improving the social and economic conditions of the forest village residents tends to be the main concern of RFD's community development program. Reforestation for productive, locally controlled forestry is as much a means of socioeconomic development as it is an end in itself.

In terms of control over forest resources, the RFD Forest Villages also tend to fit the State Owned and Managed form. The forest remains state property, managed by the state agency. At the same time, a variation of the "Community Concession" form has been introduced, with individuals given the right to use designated plots (generally, 15 rai, or 2.4 ha) for agriculture. The state maintains the right to revoke the "concession" if the individual does not abide by the regulations governing use of the land.

The RFD Forest Village program is a mixed success. After only 14 years of operation, it remains an evolving program. There have been generally good results in the few locations where manpower and resources are concentrated. Much of the success comes from coordination with other government departments. Unfortunately, the operating costs and staff requirements for each village are too high to spread the RFD Forest Village program beyond its nearly 90 locations. Total area covered by RFD Forest Villages amounts to 44,342 hectares. This amounts to only about 0.2 percent of

the total forest area—far too limited to have major impact on the forests or on the livelihood of most forest occupants. In order for the RFD Forest Village program to be a success beyond the confines of a few communities, the government would have to be willing to transfer a major portion of its budget to subsidizing the afforestation and community development activities of the program.<sup>32</sup>

Special mention of the Royal Projects is necessary because of the high profile and considerable success of the projects. These Royal Development Projects under His Majesty the King's patronage and direction are implemented under the umbrella of the Royal Projects Office. They are usually implemented in areas with the most critical problems, where special, concentrated treatment is needed, with coordinated assistance from many agencies. Forestry services for these projects are provided by RFD and the Kasetsart University Faculty of Forestry. It must be stressed that the success of these projects is due mainly to the extensive resources used intensively in only few locations. Government agencies that normally act independently are more than willing to cooperate with each other in a project under His Majesty the King's patronage. While the achievements of the Royal Projects cannot be denied, it is virtually impossible to duplicate them because of the lack of coordination among government agencies when not under such prestigious, and neutral, direction.<sup>33</sup>

## *2. The STK Land Usufruct Certificate Program*

High cost and intensive manpower requirements of the forest village program limited its effective reach to only a few villages throughout the country. By 1989 there were 181 forest villages under all government programs.<sup>34</sup> In 1982, RFD started the STK Land Usufruct Certificate program to try a more rapid and widespread approach to help the millions of poor occupants in reserve forest areas.<sup>35</sup> Some claim RFD initiated the STK program to counteract the loss of reserve forest lands to the Agricultural Land Reform Office (ALRO). Degraded reserve forests that are best suited for agriculture were degazetted, and jurisdiction over these areas was turned over to ALRO for provision of usufruct land rights to the occupants. While the ALRO program recognizes the existence of agricultural holdings in areas best suited for agriculture, the STK program attempts to address the issue of agricultural production in areas where forest cover is a more appropriate land use. More cynical critics of the STK program claim it was started by RFD to maintain jurisdiction over the degraded reserve forest lands—and with the forest land, it kept its substantial staff and budget—rather than have the land, staff and budget shift to other government agencies.

Under the STK program, RFD grants usufruct rights of 2.4 ha (15 rai) of land to each household of forest occupants. The land remains property of the state. It can be inherited by direct descendants, but not sold, rented, given away, or mortgaged.<sup>36</sup> By granting usufruct rights, the farmers are expected to gain a sense of secure possession of the land. This in turn should give them an incentive to settle on it permanently and to invest in their holdings. They are expected to switch from short-rotation field crop monocropping, with its short-term financial gains but long-term environmental loss, to a more sustainable, ecologically sound agricultural system that includes tree growing. By inducing permanent, sustainable agroforestry systems, the STK program is expected to halt further forest encroachment by reducing the need for migration to clear new, productive agricultural land.<sup>37</sup> Recent data from RFD show that 702,426 forest occupants in 61 of the country's 73 provinces have been granted usufruct rights over 822,061 plots, totalling more than 1.12 million ha (7 million rai).<sup>38</sup>

As a "census" activity in the reserved forests, the STK program can be considered a success. As a mechanism to stem forest encroachment or to provide greater security of landholding to the forest occupants, the program has little to show in its favor.

In the years since the start of the STK program, forest encroachment continues unchecked. If current trends continue, the end of encroachment will come when the remaining forest area is inaccessible for agriculture and not because of any legal recognition of farmers utilization of reserve forest lands.<sup>39</sup>

The STK Certificates provide little, if any, security to the holders. To begin with, the certificates are temporary, being valid for only five years. This gives the farmers little confidence in their right to use the land. Even if the certificates were for an indefinite period, the land remains property of the state, and the farmers would still lack the security of assured tenure that would encourage them to invest in the land and consider it a permanent holding.<sup>40</sup> As pointed out in a World Bank study on land ownership security in Thailand, "the possession of an STK certificate does not have an effect on the supply of institutional credit, as the supply of credit to squatters who received an STK was not different from the supply available to other squatters, holding other attributes constant."<sup>41</sup> Nor was there any indication that possession of these documents "enhances farmers' security of tenure, and would thus positively affect their incentive to invest and their productivity."<sup>42</sup>

Under the STK program, public lands granted to farmers for their use remain under the control of the state. STK holders can pass the land on to their children as inheritance, but they cannot buy, sell, rent, or give it away it legally.

Farmers tend to ignore these prohibitions. They continue to make land transactions as they please. Officials administering the areas seldom interfere because the farmers keep them ignorant of the transactions. It interesting to note that farmers in Phetchabun given STK certificates told one of the authors they had a greater fear of eviction from their lands now than they did before they were given the certificates. They felt there were now more legal restrictions to what they could do with their land and more government officials around who would take actions against them if they made illegal land transactions.<sup>43</sup>

In addition, the STK certificates provide farmers with the right to use only up to 2.4 ha (15 rai), while an additional 3.2 ha (20 rai) is considered a lease from the state (for a total of 5.6 ha, or 35 rai). Most farmers complained that the 15-rai limit gave them too little land to meet even the basic needs of their families. The status of their farmland over 15 rai was not made clear to them. Many feared they would eventually be left with only the 15 rai of marginally productive agricultural land.<sup>44</sup>

To date the STK program does not even compare well with the similar ALRO program of providing usufruct certificates to occupants in degazetted degraded reserve forest land. The ALRO certificates are for an indefinite period, the holdings can be up to 8 ha (50 rai), and provision of usufructuary rights comes as part of a development package that includes institutional group credit, technical agricultural assistance, infrastructure development, market support, and training in non-agricultural skills.<sup>45</sup> It should be stressed that the relative success of ALRO lies in the additional development support and not in any differences between the land usufruct certificates. The high cost and high manpower requirements of ALRO's intensive development program have limited its effective coverage thus far. Between 1975 and 1988, certificates for only 632,000 ha (3.95 million rai), or 60 percent of the total Agricultural Land Reform areas of nearly 1 million ha (6.2 million rai), were allocated, compared with the allocation of certificates for over 1.12 million ha (7 million rai) under the STK program between 1982 and 1987.<sup>46</sup>

### *3. Village Woodlots*

Around the same time that RFD introduced the STK program, the National Energy Administration and RFD initiated a collaborative, USAID-funded village woodlot

project in Northeast Thailand. The project, lasting from 1981 until 1984, involved planting *Eucalyptus camaldulensis* on 42 sites in fuelwood deficit areas in 7 provinces. Major objectives were to provide a sustainable supply of fuelwood within the villages, thus reducing the rate of forest degradation by reducing the need for people to obtain fuelwood from forests and other state land. Most of the plots were planted on public lands, some in temple and school grounds. Seedlings were also distributed to farmers to plant on their own holdings. The project included agroforestry training for these farmers. Results of the initial project are presented in Table 6. The program was conceived as a model for nationwide implementation of village woodlots.<sup>47</sup> RFD adopted aspects of the village woodlot project as an integral part of its forest extension program. The number of target villages for recent implementation of the village woodlot program is presented in Table 7.

#### **4. Forestry Extension**

In 1979, RFD initiated a pilot forestry extension project based on "fuelwood plantations in combination with agroforestry and resettlement" with FAO-UNDP funding. The pilot project had four major objectives: forest rehabilitation through communal and individual tree planting, socioeconomic development through an integrated forestry-related scheme, staff development for RFD community forestry personnel, and infrastructure development in the project site.<sup>48</sup> The project continued until 1986 and provided the basis for a broader forestry extension project initiated in 1987, also with FAO-UNDP support. Initial project activities include identifying villagers' species preferences by type of land, strengthening RFD staff capacity in extension work, developing a skeletal forestry extension infrastructure, and testing innovative methods of community forestry extension.

A Ford Foundation-funded project provides additional support to the evolution of a community forestry extension program by the Forestry Extension and Development Section of RFD. In collaboration with the Kasetsart University Faculty of Forestry and two regional universities—Chiang Mai University and Khon Kaen University—the RFD initiated a series of pilot projects to develop "practical field methods for RFD-local community collaboration in developing land use management plans and activities which meet both local needs and the objective of national resource management policies."<sup>49</sup> The project aims to develop RFD capacity for flexibility in dealing with the large variety of social, economic, and environmental conditions of forest communities.

The Forestry Extension and Development Section of RFD continues its regular community forestry program, based on the objectives of the Sixth National Economic



and Social Development Plan. The mainstay of this program is the village woodlot scheme derived from the Village Woodlot Project described earlier. The two primary goals of the project are to promote reforestation and to provide local, sustainable wood production for fuel and other purposes. Original plans called for 0.8 ha (5 rai) lots of 2,000 trees in 392 villages. RFD increased the target area to 8 ha (50 rai), or a total of 20,000 trees throughout each community. The program includes training in a variety of forestry-related community development skills, introduction of improved stoves and charcoal kilns, and education on watershed management and forest conservation.<sup>50</sup>

This most promising of the government's social forestry programs is just starting. The pilot project was very successful, due largely to the efforts of the project staff and the technical advisor. It is difficult to duplicate the personal efforts that contributed to the success of a single project, but enough was learned to be adopted for general use.

The spread of the forest extension program remains limited by budget and manpower constraints. At present, it can reach only 392 villages in the entire country. At that rate of expansion, it is estimated that the entire country can be covered by a forestry extension program in about 800 years.

It is clear that the potential of the RFD forestry extension program lies in its links with other government agencies, NGOs, and private enterprises. Once forestry extension establishes its credentials as an effective program for social and economic development, it should then be possible for RFD to provide logistic, material, and subject-matter support to the other groups.

A possible drawback of the current program is the wood-energy-oriented approach of the village woodlots. Because of the fuelwood shortages in many areas where the community forestry program is implemented, the wood-oriented approach can be a useful entry for discussions with villagers about the potential benefits of growing their own trees. Yet fuelwood production is rarely the primary reason why farmers will grow trees. As evaluations of the Village Woodlots Project show, a broader approach to wood production will reach a wider audience. Trees from one village woodlot grown under the project were sold to a major pulp and paper mill in the Northeast. Wood from others was used for poles and other products. In another village, the woodlot is kept as a symbol; it may never be harvested. Although the original intention was to grow trees for fuel, their use for other purposes shows the wide potential for tree planting in Northeast Thailand. If the wood energy approach is adhered to doggedly by the forestry extension workers, they are bound to meet with frustration. However, if they use it as an entry for

s62 discussions while maintaining a flexible approach in management and use of the trees, their potential for success will be all the greater.<sup>51</sup>

### *5. Isan Khiaw (Green Northeast)*

One of the most recent programs with a major forestry component is Isan Khiaw (Green Northeast), an attempt by the military to coordinate among various concerned agencies the water, land, and forest resource development in the Northeast.

It should be pointed out that the Isan Khiaw program is highly decentralized. Each province has its own Isan Khiaw Foundation office, and each administrative level involved in the program has its own committee, which helps to plan and to implement the program. This can be seen as a strength of the program, as it allows decentralized planning relevant to the locality. Yet this also means that the success of the program is uneven, being highly dependent on the ability and motivation of the military leaders, government officials and other participants in each province and at each locality. Another strength of the program is the ability of the military to encourage provincial and district level government agencies to cooperate more than they do normally.

The forestry component of Isan Khiaw includes both reforestation of state forest lands and tree planting in villages. The original goal was for half of all tree planting under the program to be done through community forestry.<sup>52</sup>

The reforestation of state lands has been carried out by the military and the RFD, with soldiers planting seedlings supplied by the RFD. The provincial forestry officials are then responsible for maintaining the replanted areas.

The community forestry program includes numerous types of village and private tree planting. Trees are planted along roadsides, along waterways and ponds, in school yards and temple grounds, and in other community lands. Village woodlots like those initiated by the RFD are planted. Villagers are encouraged to plant trees in their homesteads and on their farms. Seedlings for the woodlots and community lands tend to come from RFD. Villagers prefer to plant fruit trees on their homesteads and farms; these seedlings are obtained from the Department of Agricultural Extension.

Isan Khiaw is still too recent to be judged as either a or failure. A spokesman for Isan Khiaw recently announced that one million rai (160,000 ha., or 1,600 km<sup>2</sup>) of trees have been planted under the Isan Khiaw program.<sup>53</sup> This, however, is not the survival rate. Nor was it stated where these trees were planted and whether this was part of the reforestation of state lands or part of the community forestry program. Assuming that the

original goal of half the forestry component being through community forestry (an optimistic assumption) has been met and assuming that the survival rate for trees planted in villages and on farms has been 50 percent (another very optimistic assumption), the area covered by village and farm level forestry under the Isan Khiaw program can be estimated to be about 40,000 ha.<sup>54</sup>

Even though a substantial number of trees have been planted and may have survived under the program, this focus on the numbers or area of trees planted as a major goal is a weakness of the Isan Khiaw program. The *number* or *area* of trees planted takes precedence over the *purpose* of planting the trees. If reforestation is to be the major goal, a mix of species that can help regenerate indigenous natural forests would be preferable to the fast-growing exotics generally being planted.

Planting massive amounts of eucalyptus or acacias may well lead to very undesirable consequences. Without an effective marketing scheme, the planting of these species (whether on many small holdings or on large tracts of state land) will flood the market when the trees mature. The fast-growing tree species favored by the Isan Khiaw project will mature in five to seven years. Where will the tens of thousands of hectares of eucalyptus or acacias be sold?

The participation of many of the villagers has also been tenuous. They have planted trees because they are encouraged to do so by government officials or the military, not because they themselves want to plant them. They are given free seedlings and are organized to plant the trees on village lands or on their farms. Yet there is little incentive to assure the trees' survival on community land. There is more incentive for villagers to assure survival of the trees on their own land if (as already stated in the section on existing practices) they can see a clear economic benefit from doing so. Even so, they may well face a flooded market and disastrously low prices when they want to sell their mature trees at the same time that all the other hundreds of thousands of trees are being sold. Though the market for fruit is much more flexible, farmers may well face similar problems of a flooded market and low prices when their trees mature if most expect to sell the fruit.

#### **6. Other Government Social Forestry Programs**

Few government social forestry programs are implemented by agencies other than RFD and FIO. The National Energy Administration undertakes its wood energy projects in collaboration with RFD. The Agricultural Land Reform Office is expected to set aside

as community forests 20 percent of all the degazetted reserve forest lands, but little effort is made to attain that target.

### *Non-Government Organizations*

Until recently, few NGOs were active in social forestry programs. This has changed over the past few years, as their development efforts turned to the poorest of the rural population living in the highlands. Sustainable, environmentally-sound development programs tend to include agroforestry, community forestry, or some other form of social forestry component. By 1987, an FAO review of Thai NGOs involved in forestry listed 20 organizations. Though most of their activities started only since the early to mid-1980s, their total area of coverage, both in numbers of villages and in area planted, at the very least matched that reported by the Royal Forest Department and the Forest Industry Organization.<sup>55</sup>

Even more striking are the number of NGOs working on forestry and related environmental issues registered with the NGO Coordinating Committee for Rural Development. At last count, there were well over 200 NGOs working on some forestry-related issue, most of which are involved in some way with social forestry.<sup>56</sup> With the proliferation of Thai NGOs working in forestry, it is not possible to review all of their activities. A sample of the leading NGOs and several of the smaller organizations should give an adequate picture of the type and extent of their activities.

#### *1. Project for Ecological Recovery*

The Project for Ecological Recovery (PER), established in 1986, provides leadership to the NGO community on forestry and other ecological issues. Rather than trying to conduct its own independent program, PER provides information and assistance to other NGOs working on social forestry.<sup>57</sup>

PER established two pilot projects on upland agriculture to advise farmers in North Thailand on alleycropping and to encourage them to plant more trees in their fields. The pilot projects are intended as a means of technical support for other NGOs and to provide examples of possibilities for their own work.

PER has also organized networks of villagers involved in environmental issues, including those concerned with forestry. Through these networks, PER helps the villagers share information as well as visit sites where they can learn from each others' experiences.

The effectiveness of PER lies in its capacity to provide information and technical support to many small, often regional NGOs rather than its own direct implementation. Its support of networks of villagers working on ecological issues gives them needed encouragement and the understanding that they are not alone in their efforts. PER's role as "advisor" and "trainer" of other NGOs is crucial for the effective promotion of social forestry by the growing number of NGOs in the country.

### ***2. Population and Community Development Association and the Local Development Assistance Program***

One of the best known NGOs in Thailand is the Population and Development Association (PDA). In 1983 PDA implemented a village woodlot program, planting trees in degraded community lands in villages in the Northeast and the lower North. In the past six years PDA has worked with people in 355 villages to plant nearly 800 hectares of trees. The woodlots were originally planted for fuelwood. PDA distribute seedlings and provides training to the villagers at its field offices. Although PDA has encouraged villagers to select their own species in recent years, it remains dependent on the RFD as its source of seedlings. The RFD nurseries tend to provide *Eucalyptus camaldulensis*, *Acacia auriculiformis*, *Acacia mangium*, and other fast-growing trees, even though the farmers prefer *Azadirachta indica* (sadao), *Cassia siamea* (khilek), (noon), *Albizia samans* (chamchuri), and several types of fruit trees.<sup>58</sup>

The PDA helps villagers set up a village forest committee for making all management decisions regarding their woodlot. The committees are composed of village leaders as well as villagers who are most likely to use produce from the lots. The PDA also provides training—taking villagers to well-established and well-managed woodlots to show by example how they can maintain their own woodlots—and technical support on request.

The village committees decide what to do with their woodlots when the trees have reached maturity. Some decide to keep the woodlots for their village's own use, but many decide to sell the wood. The PDA provides marketing support, helping to find buyers for the wood and helping to make the contractual arrangements. The PDA expects to assist the communities in marketing their wood products for the first few harvests, until a firm relationship has been established between the community and the buyer. The profits from these sales are kept in a village development fund, to be used for community development activities to assist the poorest of the village households.

PDA's effort is limited thus far to trees on private or community land, where ownership of the land and, consequently, ownership of the trees is clear. The small size of the woodlots also allows for effective control and protection of the trees.

The social forestry activities of the PDA—its help in establishing village forest committees, its training and technical support, the crucial marketing support for the tree products, and the mechanism for community use of the profits from sales—show the potential for more commercial community forestry activities such as those we will recommend below.

### *3. Tree Farmers' Association of Thailand*

The Tree Farmers' Association of Thailand started by promoting eucalyptus planting for about 200,000 families in Chachoengsao, Chonburi, and Rayong provinces. It helped farmers get loans and assisted them in marketing the harvested trees. The association later moved to organize contract tree farming in the lower Northeast Region in order to sell wood chips to Japanese companies for paper production.<sup>59</sup>

The association has recently met with financial problems because of the uncertain government policy toward private tree farming. The logging ban and recent controversies over private tree plantations have left many forestry officials, wood industries, and banks unclear about the policies and indeed the legal basis for private tree farming. Banks are reluctant to give farmers loans to plant trees unless there is a certain market. Foresters are reluctant to grant permission to harvest the trees unless there is a clear policy about private tree farming. There are now before Parliament four drafts (three by political parties and one by the RFD) of a Tree Farming Act that should help clarify the situation somewhat.

### *4. Catholic Relief Services*

The Catholic Relief Services (CRS) is typical of many NGOs that have started to include agroforestry and other forms of social forestry in their rural development efforts. CRS recently proposed an agroforestry project in several districts of Buriram Province. One of the main goals of CRS is "to encourage the participation of rural poor in the protection of environment. . . [and the] improvement of their earning capacities." The specific goals of the project and means of implementation remained uncertain, largely dependent on the economic needs of the villagers and the land and forest resource protection required.<sup>60</sup>

### *5. Save the Children*

Save the Children has an agroforestry program centered in Nakhon Sawan Province. Like CRS, Save the Children's rural development activities now include efforts to support sustainable resource use by the villagers. In addition to working with individual farmers, Save the Children is supporting community forestry through village community forestry groups.

Save the Children/Thailand also plans to establish an agroforestry/community forestry information center for villagers and NGOs in and near Nakhon Sawan.<sup>61</sup>

### *6. Smaller NGOs*

Two other NGO programs are shown in Tables 8 and 9 below. One, the Lions Club Project, is implemented in a few provinces throughout the country; while the other, the Green Earth Project, is centered in Chachoengsao province southeast of Bangkok. Both of these programs are coordinated through the Royal Forest Department, while many other NGO programs conduct their work independent of the RFD. As is evident from the tables, the area covered by most individual NGO programs remains limited, due to the small size of most organizations and their limited manpower and financial resources. Yet when the many dozens of program are combine, their are of coverage is impressive.

The greatest success of NGOs comes with their being able to provide a crucial element lacking in government programs: a large number of dedicated people willing to work for little pay and for the long term in the villages. Their role is that of community organizer, or facilitator, in order to encourage and assist the villagers in their forestry efforts.

The growing interest of NGOs in social forestry has the greatest potential for local development. The NGOs are relatively flexible in meeting local villagers' needs because they are not as restricted by government regulations or policy as is the RFD. If NGO activity in social forestry continues to expand, it is likely that the RFD forestry extension program could play a supportive role, providing materials, training, and expertise to the NGOs. Unfortunately, most NGOs now have an adversarial relationship with the RFD, making a cooperative arrangement between the RFD and NGOs unlikely in the near future.

Among their drawbacks, though, is that most NGO efforts seem directed toward promoting community forestry or agroforestry in order to meet subsistence needs. As

already mentioned several times, villagers tend to plant trees if they can see clear economic benefit, and for most Thai farmers that implies *production for cash sale*. The NGOs need to explore more innovative forms of social forestry with greater commercial potential, such as the PDA woodlot program. At the same time, the NGOs cannot simply promote commercial tree production, giving little consideration of the crucial marketing needs and mechanisms. As already mentioned in the review of the Isan Khiaw program, an effective marketing scheme is needed to assure that the commercial planting of trees (again, whether on many small holdings or on large tracts of state land) will not flood the market and depress prices when the trees mature.

### **Private Enterprises**

The development of large-scale wood-based industries and increasing urban and industrial demand for charcoal has encouraged private tree plantations in recent years.<sup>62</sup> The Tree Farmers' Association of Thailand exemplifies the move to private farm forestry. They generally are larger farmers, with holdings in areas near the industries. With most industries being located in the Bangkok Metropolitan Area and the Eastern Seaboard Development Zone, it is not surprising that many commercial tree farmers are in Chachoengsao, Chonburi, and Rayong. Even with supplies from local farmers, some companies have started shifting to their own tree production on their own land: frequently large tracts purchased (illegally) in forest reserves or other state lands.

Phoenix Pulp Mill in Khon Kaen is a major exception. The eucalyptus needed for its paper pulp comes from a variety of sources, including medium to large private farmers, *village woodlots and other community forests*. Its approach could well be emulated by other companies, if proper policies (of both government and industry) were effected.

### **NATIONAL POLICY VERSUS LOCAL NEEDS**

The primary purpose of social forestry programs is to resolve the conflict between national policy and use of land and forests on the one hand, and the needs of the local population for land, and forest and tree products on the other. The true measure of the success or failure of social forestry in Thailand is in how well it resolves the conflict and meets both the national and local needs. If successful, it can *contribute significantly to curing the ills of poverty, deforestation, and environmental degradation*. Otherwise, no matter how successful individual projects or programs may be, social forestry activities



would be little more than a palliative, giving an illusion of solving the problems while having no real impact on them.

### **Land Use and Management**

Sustainable land use and management is a primary goal of the government. This includes limiting if not halting forest encroachment, reforestation of degraded forest areas, watershed protection, allocation of productive agricultural land to farmers, and support for appropriate agricultural and forestry management systems.

In general, social forestry as practiced thus far in Thailand has failed to meet the objective of sustainable land use and management. Reforestation under all forestry programs recovers only a fraction of the loss. Land being used for agriculture is allocated to farmers, but many continue to use soil depleting practices. When the land loses productivity, they migrate to clear new farmland. The century-long pattern of rural-rural migration and forest clearing continues so long as forest land remains. Forest destruction continues at an alarming rate. Although the Royal Forest Department announced that forest destruction has decreased drastically following the suspension of forest concessions (logging ban) in 1988, forestry officials in the field working to protect the remaining forests say privately that little has changed since the logging ban—illegal logging continues and forest clearing for new farms continues at about the same rates as before.<sup>63</sup>

### **Land Security**

A major cause of farmers' soil depleting practices in the uplands is the lack of secure possession of their farmland. As discussed above in the evaluation of the STK program, simple provision of usufruct rights in the land are inadequate. Even without security of their holdings, people continue to buy and sell their land, rent it, and mortgage it (to informal money lenders). They will not, however, have adequate incentive to abandon short-term, exploitative land management and instead invest in the land and practice long-term sustainable land management unless they are given sufficient control over the land and its produce.

Although many view individual land title as the preferred form of secure landholding, it is not necessarily the best land tenure system for forest management. Land security can cover a range of tenure and management forms, including communal property, state or community ownership with long-term individual leases, state ownership with community management, and forms of corporate ownership and management.

Although secure land holding can contribute to more stationary agriculture, it will not in itself end the flow of rural-rural migration and forest clearing. So long as there is a growing rural population largely dependent on household agricultural production, the additional rural labor force needs new land to farm.

### **Social and Economic Development of the Rural Poor**

At the micro-level of the RFD forest village, the Royal Projects, NGO efforts, and other programs, social forestry has contributed to improved social and economic conditions for the rural poor. But these have been limited to a handful of communities and have had little impact on rural society in general.

A major assumption that small-scale agricultural production should be the core of rural development hinders the potential for social forestry programs to break out of their limited development role. Tree production and utilization do not have to fit in the model of the small-scale semi-subsistence, semi-commercial farm.

There is a need for innovation to look for commercial possibilities in tree production by small-scale producers. Village woodlots could supply the materials for small-scale local industries. The development of the local industry can also provide alternative employment for the poor forest occupants. To encourage small-scale, local level tree production and industries, the government should provide subsidies to smaller, provincial and district level entrepreneurs and farmers rather than to large-scale industries that tend to be concentrated in Bangkok and the Eastern Seaboard.

The problems of rural poverty and deforestation go hand-in-hand. Alternatives to semi-commercial, household agriculture are needed to help the rural poor break out of the cycle. Forestry offers several potentials for alternative employment, even with the traditional systems of commercial and conservation forestry. The possibility, for example, of employing forest occupants in tourist-related activities in and around national parks and wildlife reserves has frequently been discussed.

### **Government Commitment to Social Forestry: Rhetoric Versus Action**

Government policy remains a profusion and confusion of contradictory laws and regulations. Forest concessions are ended, yet few resources are available to prevent illegal logging. The government wants to end forest encroachment, yet promotes the allocation of agricultural land in forest areas as a major means of rural development. Forest protection and reforestation are given top priority in development plans, but RFD has woefully inadequate funds or manpower to protect or reforest the existing reserve forest and park lands. One estimate of the scale of effort required has all 12,120 RFD

staff working full-time (40 hours a week) on nothing but tree planting for 41 years in order to reforest the existing deforested reserves.<sup>64</sup>

The strength of a social forestry program should lie in its ability to respond to the specific forestry needs and conditions of an area. As such, it can be (and in fact is proving to be) a cure for problems of conflicting demands by the state and villagers on forest resources in specific areas. But social forestry can never be a cure for the entire problem of deforestation and poverty. For each particular area, each specific conflict, more diagnosis is required to determine the symptoms of the problem and possible means to help. Adequate flexibility is needed to use appropriate treatments for each problem. Most critical is the need for trained manpower to implement a flexible program, as has been shown in test cases sponsored by the Ford Foundation and the FAO.

At present, social forestry in Thailand can only be a palliative against deforestation, because of the multiple, deep rooted problems contributing to deforestation: poverty, illegal logging, inadequate management, unclear policies and regulations, etc., all of which require massive efforts to alleviate. Social forestry can contribute to the cure by helping resolve conflicts between people and the state over the use of forest resources. But it can contribute only if properly administered. The Royal Forest Department alone cannot handle adequately the need for flexible programs and extensive, trained field workers.

While the efforts of the NGOs go far to help spread agroforestry and other social forestry practices throughout the country, their vision is all too often limited to small improvements in the existing farm and resource management systems. While better land and resource management may well be needed, they do little to help alleviate the poverty endemic to much of the country. Small incremental improvements with the adaptation of agroforestry or similar practices may help many villagers tread water to keep from drowning in abject poverty. Yet the means to substantial improvement of villagers' lives cannot come from simply trying to meet their subsistence needs. Maintaining subsistence production, whether of agricultural or forest products, is merely a way of sustaining rural poverty.

A new approach that could provide the flexibility, the needed manpower, and the technical expertise would be increased coordination between three groups: the Royal Forest Department and universities, NGOs and existing extension services (Agricultural Extension and Community Development), and the villages. The RFD and universities

can provide the policy guidance and technical expertise in forestry, other biophysical sciences and the social sciences. The existing extension services and NGOs provide the extensive manpower and flexibility, similar to "barefoot doctors" who can turn to trained "physicians", the RFD and universities, for expertise and specialized treatment when needed. Finally, the villages play the crucial role of traditional "doctors", whose indigenous "medicine" and knowledge of local conditions are often most appropriate to help cure the problems of the specific area.

It is clear that alternatives are needed if social forestry is to meet both the national goals of reforestation and sustainable resource use as well as the needs of the rural poor for improved social and economic conditions. If reforestation is the goal, then the government should stop mixing its plans with empty rhetoric about rural development. But if rural development remains a major goal, the government should work with NGOs and local entrepreneurs to find the means to encourage forest production and forest-related development without government having to subsidize it as heavily as it has in the past.

Even where most successful, social forestry as it is now practiced can be seen as simply a stop-gap measure. Farmers involved in forestry projects are not as destructive of their immediate environment, for the time being. With no significant change in social and economic conditions, the pressures on the resources will intensify with the next generation and the conflicts between the state and villagers will multiply. Extensive rural poverty will remain, and the degradation and deforestation will continue as the growing population seeks more farmland, more fuel, more fodder.

While increased production of the forest products on the farm or in the village may be a necessary stop-gap measure, the ultimate solution is to try to eliminate the root social, economic and environmental causes of degradation and deforestation. It is necessary to get people away from subsistence or even simple commodity agriculture, and away from their dependence on subsistence forest product use. Our planning should not be constrained by the existing conditions or the resource constraints of the locale. Instead, planning should be motivated by the potentials of resource use and by the dynamics of change of the community, the region, the entire society. It may make much more sense to view the forests as a base for non-farm production, the development of wood-based industries, that can get people away from agriculture, out of the mire of poverty, and that can help provide the basis for more sound land use and afforestation.

As a possible alternative to encourage reforestation and local level production and use, the government should consider granting forest concessions to local communities. The communities would be responsible for production and harvesting of the trees, and profits would go to community development programs (skill training, job diversification, small business loans). The state can maintain its ownership of the forest land, while the community is given secure tenure to manage the forests for its own use and profit. Development of local industries can be encouraged (subsidized?) to use and process the forest and tree products. Alternative employment can be made available, both through the local forestry-related industries and the community development programs.

Several crucial changes in regulations, policy and even laws are needed for this form of commercial social forestry to take hold in Thailand.

Existing laws and regulations are major hindrances to the small-scale commercial production by individuals or village groups. Regulations on harvesting and sale of tree products are not clear. Passage of any one of drafts of the Tree Farming Act should alleviate this problem.

Even more critical are the laws on what constitutes a legal entity; that is, the organization or person that can enter into commercial contracts. This is a major constraint to village or farmer groups organizing commercial production, because at present the only legal entities under Thai law are foundations, corporations, cooperatives, associations, and individuals. While cooperatives might seem at first glance the most reasonable form of farmer organization, the laws on cooperatives stipulate that they all fall under the regulation and control of the Department of Cooperative Development. The history of government-controlled farmer cooperatives in Thailand is dismal at best. Some other form of legal organization would be needed for the village groups that would carry out the commercial forestry. Whether they could be organized under the current definitions and regulations of corporations or associations would need to be explored. If not, the provision of another legal entity might be needed.

Even if they can organize as legal entities, support would still be needed to help villagers organize into the effective groups that can control the land needed to produce trees. Support would be needed, at least initially, to help establish and manage the community forests, and help would be needed to market the tree products, at least until marketing arrangements become established and known to the village groups. This is

perhaps best done through NGOs, with their large number of volunteers who can serve as community organizers.

Financial support and technical support also needed for the village groups or for individual farmers to be able to compete adequately in the commercial forestry market. This would probably be done best through the BAAC (to provide financial support) and through the RFD and FIO (to provide technical support), in coordination with NGOs. The role of an organization like PER would still be needed to provide information and channel the technical support to the many NGOs, and perhaps to act as an umbrella organization to channel financial support.

If there is to be adequate technical support for this form of commercial social forestry, then forestry research needs to be redirected to include the small-scale commercial production that would be carried out in village- or farm-level forestry. The research needs to include forest products, management, and marketing that would be unique to these systems, in contrast to the usual research directed to the needs of large-scale plantations and large-scale forest exploitation. There has been some shift in recent years in the research conducted by the RFD and by the Thailand Institute for Scientific and Technological Research to explore the species—such as *Albizia samans* (Jamjuri, or raintree)—used by villagers and investigate existing farm and village forestry practices. Other research is being conducted on types of farm and community forestry arrangements possible in Thailand. Yet this sort of research that might be relevant to a community-managed commercial forestry remains a minor part of the forestry research conducted by these and other agencies.

Innovations such as these are clearly needed if social forestry in Thailand is to be a cure for the ills of poverty and deforestation, rather than merely a temporary palliative. New efforts and directions are needed to help protect and maintain the country's land and forest resources. At the same time they should provide an adequate and equitable means for villagers to escape the sea of poverty.

## Endnotes

- <sup>1</sup> Research Fellow, Chulalongkorn University Social Research Institute.
- <sup>2</sup> See for example John W. Mellor, "The Intertwining of Environmental Problems and Poverty" in *Environment*, Vol. 30, no. 9 (November 1988), pp. 8-30.
- <sup>3</sup> FAO, Forestry for Local Community Development, FAO Forestry Paper No. 7 (Rome: FAO, 1978), p.1.
- <sup>4</sup> See James C. Scott, *The Moral Economy of the Peasant: Rebellion and Subsistence in Southeast Asia* (New Haven, Yale University Press, 1976), pp. 136-137; Paul Baran, *The Political Economy of Growth* (New York, The Monthly Review of Books, 1957), pp. 180-187; Banasopit Mekavichai, *The Teak Industry in North Thailand: The Role of a Natural Resource Based Export Economy and Regional Development* (Unpublished Ph.D. dissertation, Cornell University, Ithaca, N.Y., 1988), pp. 250-266.
- <sup>5</sup> FAO/UNEP, Tropical Forest Resources Assessment Project. *Forest Resources of Tropical Asia*, (FAO, Rome, 1981).
- <sup>6</sup> Information collected from the Village Summaries of the Thai communities in the Farm and Village Forestry Database of the Forestry/Fuelwood Research and Development Project, Kasetsart University, Bangkok. Data from these communities were collected in 1989.
- <sup>7</sup> ESCAP, "Tropical Deforestation in Asia and the Pacific: Where Have All the Green Trees Gone," (unpublished paper, Environmental Co-ordinating Unit, ESCAP, Bangkok, 1986). pp.18-21
- <sup>8</sup> Zainul Abedin, "Household Fuel Availability and Homegardens in Some Locations of Bangladesh" (Winrock International-F/FRED and FAO-Wood Energy Project, Bangkok, 1989); John Raintree, "Agroforestry, Tropical Land Use and Tenure" in *Land, Trees and Tenure*, p. 36.
- <sup>9</sup> Harry W. Blair, "Social Forestry: Time to Modify Goals?" in *Economic and Political Weekly*, Vol. 21, No. 30, July 26, 1986, pp. 1317-1319; Fortmann and Bruce, *Whose Trees?*, pp. 183-84, 200-201, 218.
- <sup>10</sup> Our thanks to Dr. David Thomas for introducing us to this basic "taxonomy" of community forestry.
- <sup>11</sup> K.P. Sri Bharathie, "Stabilization of Rural Communities Through Community Forestry in Sri Lanka" in *Community Forestry: Socio-Economic Aspects*, edited by Y.S. Rao, Napoleon T. Vergara, and George W. Lovelace (Bangkok: FAO-RAPA, 1985), p. 403.
- <sup>12</sup> Mark Poffenberger, *Joint Management for Forestry Lands: Experiences from South Asia* (Delhi: The Ford Foundation, 1990). pp. 10-11.
- <sup>13</sup> Discussions with Winrock International staff working with the Java Social Forestry program, November 1989.
- <sup>14</sup> S. Fujisaka and A. Doris Capistrano, "Upland Development in Calminoe: The Roles of Resource Use, Social System, and National Policy" in *Man, Agricultural and the Tropical Forest: Change and Development in the Philippine Uplands*, edited by S. Fujisaka, P. Sajise and R. del Castillo (Bangkok: Winrock International, 1986), p. 235.
- <sup>15</sup> Discussion with Nepal forestry officials and advisors, October 1989; Mark Poffenberger, *Joint Management of Forestry Lands*, p.33.
- <sup>16</sup> Charles Mehl, "Social and Cultural Aspects of Land Inheritance and Other Land Transactions in Thailand" (discussion Paper Report No. ARU52, Research Unit, Agricultural and Rural Development Department, World Bank, Washington, D.C., 1986).
- <sup>17</sup> TDRI, *Thailand Natural Resources Profile*, pp. 81-82.
- <sup>18</sup> TDRI, *Thailand Natural Resources Profile*, p. 80.
- <sup>19</sup> United Nations. ESCAP, *Tropical Deforestation in Asia and the Pacific: Environmental and Socio-economic Aspects of Tropical Deforestation* (Environmental Co-ordinating Unit, ESCAP,

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- <sup>20</sup>Based on a National Energy Administration household energy survey in 1980, reported in Sompongse Chantavorapap, "Fuelwood Issues and Potions [sic]: Thailand Case" in *International Training in Social Forestry, Volume 1: Lectures* (Kasetsart University Faculty of Forestry, Bangkok, 1988), pp. 14-1 - 14-3.
- <sup>21</sup>See Opart Panya, et al., *Charcoal in Northeast Thailand* (FAO, Regional Wood Energy Development Programme in Asia, 1988), and Sukaesinee Subhadhira, et al., "Fuelwood Situation and Farmers' Adjustment in Northeastern Thai Villages" in *Proceedings of the 1985 International Conference on Rapid Rural Appraisal* (Rural Systems Research and Farming Systems Research Projects, Khon Kaen University, Khon Kaen, 1987), pp. 299-324, for thorough analyses of fuelwood needs and use in the most deforested region of Thailand. Both make clear that fuelwood shortages are critical in the most deforested parts of the region, but the deforestation was due to other causes, mainly logging and the spread of agricultural area.
- <sup>22</sup>Banasopit Mekavichai, *The Teak Industry in North Thailand: The Role of a Natural Resource Based Export Economy and Regional Development* (Unpublished Ph.D. Dissertation, Cornell University, Ithaca, N.Y., 1988); Komon Pragtong and David E. Thomas, "Evolving New Forest Management Systems in Thailand" (draft chapter for *Forests and Farmers: Land Management Alternatives in Southeast Asia* (Westview Press, Boulder, forthcoming), p. 2.
- <sup>23</sup>Komon and Thomas, "Evolving New Forest Management Systems in Thailand", pp. 4-5.
- <sup>24</sup>Charit Tingsabadh, "Farmers' Response to Multipurpose Tree Species at the Small Farm level: Observations from Northeast Thailand" in *Multipurpose Tree Species Research for Small Farms: Strategies and Methods* (Bangkok: Winrock International-F/FRED, 1990), pp. 108-109; Jacques Amyot, "Agroforestry and Smallholder Financial Viability" in *Multipurpose Tree Species for Small Farm Use* (Arlington, Va.: Winrock International, 1988), pp. 186-187.
- <sup>25</sup>See, for example, Prasong Sanguantam, et al., *Multi-Resource Inventories in Dong Mun Forest Communities, Northeast Thailand*, KU/Ford Working Document 3 (Bangkok: Kasetsart University Faculty of Forestry, 1988) and Lert Chuntanaparb, et al., *Multi-Resource Information for the Development of Tab Lan Forest Communities, Soeng Sang, Nakhon Ratchasima, Northeast Thailand*, KU/Ford Working Document 6 (Bangkok: Kasetsart University Faculty of Forestry, 1988), for descriptions of land and forest resources in selected communities in Northeast Thailand. These studies show the remaining forests consist mainly of small trees and shrubs. These still are important to the villagers as a source of fuelwood, medicines and food. There is little replanting of these forests.
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- <sup>27</sup>Royal Forest Department. Planning Division, Forest Statistics Sub-Division. *Sathiti kanpamai khong Prathet Thai pi 2530 (Forestry Statistics of Thailand 1987)* (Royal Forest Department, Bangkok, 1988), p. 27.
- <sup>28</sup>Komon and Thomas, p. 6.
- <sup>29</sup>Komon Pragtong, "Helping Rural People Help Themselves: A Report on Thailand's forest villages" in *Community forestry: Lessons from Case Studies in Asia and the Pacific Region*, Y.S. Rao, et al., ed. (FAO Regional Office for Asia and the Pacific, Bangkok, and Environment and Policy Institute, East-West Center, Honolulu, n.d.), pp. 205-206.
- <sup>30</sup>David E. Thomas, "Community Forestry in Rural Development: Examples from Northeast Thailand" in *International Training in Social Forestry, Volume 1: Lectures* (Kasetsart University Faculty of Forestry, Bangkok, 1988) p. 7-24.
- <sup>31</sup>For an interesting comparison of the nature of FIO and RFD forest villages, see Nisit Prinya Tho Phak Wicha Wanawatcrwithaya, *Mahawithayalia Kasetsart* (Kasetsart University, Silviculture Department Masters' Degree Students, Mu Baan Pa Mai (Forest Village), (Masters' Students, Silviculture Division, Kasetsart University Faculty of Forestry, Bangkok,



1987), a collection of papers on forest villages based on studies using the same questionnaire. Most RFD forest village residents lived in the area prior to their community being made a forest village, while few FIO forest village residents came from the area near the village.

<sup>32</sup>Komon Pragtong, "Helping Rural People Help Themselves."

<sup>33</sup>See Komon Pragtong, "Helping Rural People Help Themselves," pp. 215-216, for a concise summary of the differences between an RFD forest village project and a King's project forest village. Most striking are the number of collaborating agencies (41 for the King's Project, 0 for the RFD), average income (much more egalitarian and generally higher in the King's Project site), and extent of infrastructure development (again, much higher in the King's Project site).

<sup>34</sup>Komon, *Helping Rural People Help Themselves*, p.206.

<sup>35</sup>The acronym STK or So. To. Ko. is derived from the Thai term "Sithi tham kin" (Right to earn a living, or right to farm) for the usufruct certificates provided reserve forest occupants under this program.

<sup>36</sup>Gershon Feder, et al., *Land Ownership Security, Farm Productivity, and Land Policies in Rural Thailand (The World Bank and the Center for Applied Economic Research, Bangkok, August 1986)*, pp. 162-163.

<sup>37</sup>Sun wichai Pa mai, Khana Wanasat, Mahawithyalai Kasetsart (Center for Forest Research, Faculty of Forestry, Kasetsart University), *Kansuksa phonkrathop khong Khrongkan Oak Nangsu Anuyat hai mi Sithi tham kin chuakhrao (So. tho. kho.)* (Evaluation of the STK Land Usufruct Certificate Program) (Kasetsart University Faculty of Forestry, September 1985), pp. 4-6; TDRI, *Thailand Natural Resources Profile*, p. 87.

<sup>38</sup>Unpublished mimeograph from the Royal Forest Department, 1988?

<sup>39</sup>Royal Forest Department, Planning Division, *Forestry Statistics of Thailand 1987*, Table 9; TDRI, *Thailand Natural Resource Profile*, p. 81; TDRI, *Land Policy Study, Final Report* (TDRI, Bangkok, 1986), p. 115.

<sup>40</sup>Sun Wichai Pa Mai, *Kansuksa Phonkrathop khong Khrongkan Ook Nangsu hai mi Sithi Tham Kin Chuakhrao (So. Tho. Ko.)*, p. 49.

<sup>41</sup>Gershon Feder, et al., *Land Ownership Security, Farm Productivity, and Land Policies in Rural Thailand*, p. 159.

<sup>42</sup>*Ibid*, p. 162.

<sup>43</sup>Mehl, "Social and Cultural Aspects of Land Transactions in Rural Thailand," p. 48.

<sup>44</sup>Feder, et al., p. 163; Mehl, p. 48.

<sup>45</sup>FAO, *Forestland for the People*, p. 11; C. Mehl's personal experience working in Agricultural Land Reform Areas.

<sup>46</sup>TDRI, *Land Policy Study, Final Report* (Bangkok: TDRI, 1987), pp. 103, 115; TDRI, *Policy on Agricultural Land Reform in Thailand* (Bangkok: TDRI, 1989), p. 54; Unpublished mimeograph from the Royal Forest Department, 1988?

<sup>47</sup>Royal Forest Department, National Forest Land Management Division, *The Village Woodlot: Its Implication in Thailand* (National Energy Administration, Bangkok, 1984).

<sup>48</sup>FAO, *Forestland for the People: a forest village project in Northeast Thailand*, pp. 11-12.

<sup>49</sup>Komon and Thomas, p. 14.

<sup>50</sup>"Railla-iat Khrongkarn Phattana Pa Mai Chumchon tam Phaen Phattana Setthakit lae Sangkhom haeng Chat chabap thi 6" (Details about the Community Forestry Development Project following the 6th National Economic and Social Development Plan (Unpublished mimeograph from the Royal forest Department, 1988?), pp. 1-3.

<sup>51</sup>David E. Thomas, "Community Forestry in Rural Development: Examples from Northeast Thailand," pp. 7-32 - 7-33; RFD, National Forest Land Management Division, *The Village Woodlot: Its Implementation in Thailand*, pp. 137-144; Harry W. Blair, "Social Forestry: Time to Modify Goals?," pp. 1318-1320.

<sup>52</sup>Conversations with forestry officials, early 1988.

<sup>53</sup>"Tho. Bo. Khui Isan Khiaw Phem Raidai Chao Ban Lod". *Matichon*, 29 October 1990, Year 13, Issue 4619, p. 21.

<sup>54</sup>A forester who wishes to remain anonymous gave what he called a highly optimistic survival rate of 50%, based on experience of forestry plantations and village woodlots. He expected the actual survival rate to be lower.

<sup>55</sup>Y.S. Rao, "NGOs and Forestry" in *Tiger Paper*, vol. 14, 1987.

<sup>56</sup>Personal communication with NGO-Coordinating Committee staff.

<sup>57</sup>Information on PER obtained from PER staff and from others familiar with its activities, October 1990.

<sup>58</sup>Information obtained from discussions with PDA staff and others familiar with its activities, September 1990.

<sup>59</sup>Information obtained from people familiar with the Association's activities, October 1990.

<sup>60</sup>Information from Y.S. Rao, "NGOs and Forestry" in *Tigerpaper*, Vol. 14, 1987, p. 12; and from those familiar with CRS activities.

<sup>61</sup>Discussions with Save the Children staff, September 1990.

<sup>62</sup>For information on the urban and industrial demand for wood fuels in Thailand, see Sompongse Chantavorapa, "Fuelwood Issues and Options [sic]: Thailand Case"; and Opart Panya, *et al.*, *Charcoal in Northeast Thailand*.

<sup>63</sup>From private discussions with forestry officials.

<sup>64</sup>Komon Pragtong and David E. Thomas, "Evolving New Forest Management Systems in Thailand," p. 11.

**Table 1 Source of Fuelwood and Charcoal, by Farmsize Category, in Selected Sites in Thailand, 1989**

	Farmsize Category			Total Cases	Total of Households 2/	% of Total Households	Location of Most Cases
	Landless	Small 1/	Medium 1/ Large 1/				
Households in each farmsize category	20	119	77	40			
State Forests	6	39	34	21	88	34.4	North
Private Forests	0	2	1	1	3	1.2	
Community Forests or Other Community Land	2	4	10	2	12	4.7	North/Northeast
Homesteads	9	44	24	7	63	24.6	North/NE/Center
Agroforestry	0	0	1	0	1	0.4	
Tree Farms	0	3	0	1	3	1.2	
Scattered Trees, in Farm	2	80	34	24	91	35.5	Northeast/Center
Purchased Tree Products	8	24	21	16	65	25.4	North/NE/Center
Non-Tree Products	0	9	7	4	20	7.8	Northeast/Center

*Notes:* 1/ Farmsize categories were determined separately in each community. Landless neither owned nor rented farm land. Small-farm households had less land than needed to earn adequate income from their farm alone. Medium-farm households had land adequate to live from their farms alone. Large-farm households had enough land to make a regular profit from agricultural production.

2/ Number of reported cases will exceed number of households because some households use the same source for both fuelwood and charcoal.

*Source:* Database for the Regional Study on Farm and Village Forestry, F/FRED Project

**Table 2 Forest and Agricultural Area in Thailand, 1975-1988**

Year	Forest Area (sq.km)	Total Area %	Annual Change %	Agricult. Area (sq.km)	Total Area %	Annual Change %
1975	209,200	41	-	179,538	35	-
1978	175,224	34	-5.7	186,306	36	1.3
1982	156,600	31	-2.8	197,738	39	1.5
1985	149,053	29	-1.6	205,766	40	1.3
1988	143,803	28	-1.2	236,481	46	4.7

**Source:** Center for Agricultural Statistics, Agricultural Statistics of Thailand:  
 Crop Year 1983/84 (Office of Agricultural Economics, Bangkok, 1984),  
 Agricultural Statistics of Thailand: Crop Year 1988/89  
 (Office of Agricultural Economics, Bangkok, 1989), Forest Statistics Subdivision,  
 Forestry Statistics of Thailand 1987 (Royal Forest Department, Bangkok, 1987)

Table 3 Recorded Uses of Species in Thailand Study Villages, by Type of Use

Species: Scientific Name	Thai Name	English Name	Type of Use										TOTAL			
			1	2	3	4	5	6	7	8	9	10				
<i>Annona squamosa</i>	Noi na	Custard Apple		7	3	25										35
<i>Artocarpus heterophyllus</i>	Khanun	Jack Fruit		4	4	51								1		60
<i>Azadirachta indica</i>	Sadao	Neem		14	11	5					2					32
<i>Bambusa natans</i>	Phai bong	Bamboo		3		37	4	3	14					3		64
<i>Bambusa, Arundinaria, Dendrocalamus, Gigantochloa spp.</i>	Phai (various types)	Bamboo		6		2	5		18	14		3		16		64
<i>Ceiba pentandra</i>	Nun	Cotton Tree		2	4	4		9	2	2				49		72
<i>Cocos nucifera</i>	Maphraow	Coconut		1		37						2				40
<i>Combretum quadrangulare</i>	Sakae	N.A.		17	12											29
<i>Dendrocalamus asper</i>	Phai tong	Bamboo				21			1							22
<i>Dimocarpus longan</i>	Lamyai	Longan		19	2	1										22
<i>Diospyros rhodocalyx</i>	Tako na	Ebony		12	9							1				22
<i>Dipterocarpus alatus</i>	Yang na	Yang		6	2		6		1	6	45	3				69
<i>Dipterocarpus obtusifolius</i>	Yang hiang	Yang		6	10		23		7	1	19	2				68
<i>Dipterocarpus tuberculatus</i>	Yang phluang	Yang		19	27		46		18	2	44	8				164
<i>Irvingia malayana</i>	Krabok	N.A.		16	30	1	2					2				51
<i>Lagerstroemia calyculata</i>	Tabaek daeng	"Myrtle"		1	1		1		11		13					27
<i>Lagerstroemia cuspidata</i>	Tabaek	"Myrtle"		7	4		2				15	1				29
<i>Mangifera indica</i>	Mamuang	Mango		21	10	81	2			2	3	1				120
<i>Musa sapientum</i>	Kluay nam wa	Banana	2			20										22
<i>Pithecellobium dulce</i>	Makham thet	Madras Thorn		9	10	2						1				22
<i>Pterocarpus macrocarpus</i>	Pradu	N.A.	1	12	7		6		5	4	23	4				62
<i>Samanea (Albizia) saman</i>	Jamjuri	Raintree		14	10		1		2	3	10	1				41
<i>Shorea obtusa</i>	Teng	Burma Sal	1	111	62		72	1	9	1	63	13				333
<i>Shorea siamensis</i>	Rang	N.A.	2	79	31		55	2	3		33	4				209
<i>Tamarindus indica</i>	Makham	Tamarind		51	46	26		5	2							130
<i>Tectona grandis</i>	Sak	Teak		5			43			1	3					52
<i>Xylia xylocarpa</i>	Daeng	Iron Wood	1	47	18		52		6	4	52	3				183
<i>Zizyphus mauritiana</i>	Phutsa	Indian jujube		5	7	3										15
TOTAL FOR EACH USE			7	494	320	316	320	20	99	42	332	109				2059

## CODES FOR USES:

1=Fodder, 2=Fuelwood, 3=Charcoal, 4=Fruit/Other Food, 5=Timber/Construction Materials,  
6=Industrial Uses, 7=Handicrafts, 8=Other Regular Use, 9=House Construction, 10=Other Occasional Use

Source: Farm and Village Forestry Database, Winrock International-F/FRED Project, Bangkok, 1989

Table 4 Recorded Uses of Species in Thailand Study Villages, by Location of Tree

Species: Scientific Name	Thai Name	English Name	Location of Tree										TOTAL			
			1	2	3	4	5	6	7	8	9	10				
<i>Annona squamosa</i>	Noi na	Custard Apple					33			2						35
<i>Artocarpus heterophyllus</i>	Khanun	Jack Fruit					48		1	6	4	1				60
<i>Azadirachta indica</i>	Sadao	Neem			1	1	6		2	21	1					32
<i>Bambusa natus</i>	Phai bong	Bamboo	36		3	1	8			6	10					64
<i>Bambusa, Arundinaria, Dendrocalamus, Gigantochloa spp.</i>	Phai (various types)	Bamboo	2			2	37		1	5	17					64
<i>Ceiba pentandra</i>	Nun	Cotton Tree				2	57		2	1	10					72
<i>Cocos nucifera</i>	Maphraow	Coconut					37		1	2						40
<i>Combretum quadrangulare</i>	Sakae	N.A.		4		5	4		1	15						29
<i>Dendrocalamus asper</i>	Phai tong	Bamboo	5				2			15						22
<i>Dimocarpus longan</i>	Lamyai	Longan				1	19				2					22
<i>Diospyros rhodocalyx</i>	Tako na	Ebony				4	4		1	13						22
<i>Dipterocarpus alatus</i>	Yang na	Yang	1				1			31	36					69
<i>Dipterocarpus obtusifolius</i>	Yang hiang	Yang	12			2				47	7					68
<i>Dipterocarpus tuberculatus</i>	Yang phluang	Yang	39		1	3	2			92	27					164
<i>Irvingia malayana</i>	Krabok	N.A.	8	1						34	8					51
<i>Lagerstroemia calyculata</i>	Tabaek daeng	"Myrtle"	5			1				13	8					27
<i>Lagerstroemia cuspidata</i>	Tabaek	"Myrtle"	1							23	5					29
<i>Mangifera indica</i>	Mamuang	Mango				1	91	1	3	18	6					120
<i>Musa sapientum</i>	Kluay nam wa	Banana					22									22
<i>Pithecellobium dulce</i>	Makham thet	Madras Thorn					20				2					22
<i>Pterocarpus macrocarpus</i>	Pradu	N.A.	11			2	2			36	11					62
<i>Samanea (Albizia) saman</i>	Jamjuri	Raintree			2		32				7					41
<i>Shorea obtusa</i>	Teng	Burma Sal	131	3	3	6	7		1	115	67					333
<i>Shorea siamensis</i>	Rang	N.A.	87	2	2	4	6		1	54	53					209
<i>Tamarindus indica</i>	Makham	Tamarind	4		1	6	72		5	28	14					130
<i>Tectona grandis</i>	Sak	Teak	19		2		1				30					52
<i>Xylia xylocarpa</i>	Daeng	Iron Wood	57		2	3	2			56	63					183
<i>Zizyphus mauritiana</i>	Phutsa	Indian jujube		1			6			8						15
TOTAL FOR EACH USE																
SOURCE			418	11	17	44	519	1	19	641	388	1				2059

## CODES FOR SOURCES/LOCATIONS OF SPECIES:

1=State/Government Forests, 2=Private Forests, 3=Common Forests, 4=Other Commons, 5=Homesteads/Homegardens, 6=Farm, Plot w/ Only Trees, 7=Farm, Agroforestry System, 8=Farm, Scattered Trees, 9=Purchased Tree Products, 10=Non-Tree Products

Source: Farm and Village Forestry Database, Winrock International-F/FRED Project, Bangkok, 1989

Table 5 Forest Village Management, Through Fiscal Year 1989

Type of Project	No. of Project	No. of Villages	No. of Families	Project Area (ha)	Area of Woodlots (ha)	Roads Constructed (km)	Dams Built (number)	Electricity Provided (no. of project areas)
Regular	65	135	21,990	22,080	1,252	1,150	31	11
Security	19	29	11,197	19,020	521	278	4	7
Royal	17	17	2,004	3,242	196	64	-	3
Total	101	181	35,191	44,342	1,969	1,492	35	21

Source: National Forest Land Management Division, Royal Forestry Department

**Table 6 Village Woodlot Project, 1981-1984**

	1981		1982		1983		1984		Total Area (ha.)
	Sites	Area (ha.)	Sites	Area (ha.)	Sites	Area (ha.)	Sites	Area (ha.)	
Mahasarakha	-	-	1 village (1 plot)	24.0	4 villages 2 schools 1 college (7 plots)	92.8	2 villages 1 college 1 temple (4 plots)	72.0	188.8
Yasothon	-	-	6 villages (5 plots)	70.4	6 villages 6 schools 2 temple (14 plots)	87.7	3 villages 3 schools	44.9	203.0
Roi Et	-	-	3 villages	40.0	3 villages 4 schools (7 plots)	84.8	2 villages 3 schools (5 plots)	28.8	153.6
Sisaket	1 village (1 plot)	12.8	2 village (2 plots)	32.0	3 villages 8 schools (10 plots)	80.2	6 villages (6 plots)	62.4	187.4
Khon Kaen	-	-	-	-	4 villages (4 plots)	88.0	1 villages (1 plot)	16.0	104.0
Kalasin	-	-	-	-	5 villages (4 plots)	96.0	2 villages (2 plots)	32.0	128.0
Suri	-	-	-	-	3 villages (2 plots)	32.0	1 villages (1 plot)	16.0	48.0
<b>Total</b>	<b>1 plot</b>	<b>12.8</b>	<b>10 plots</b>	<b>166.4</b>	<b>48 plots</b>	<b>561.4</b>	<b>23 plots</b>	<b>272.2</b>	<b>1,012.8</b>

**Source:** Derived from Royal Forest Department, National Forest Land Management Division, "The Village Woodlot: Its Implementation in Thailand" (National Energy Administration, Bangkok, 1984)



**Table 7 Royal Forest Department Village Woodlot Project,  
Number of Target Villages, 1987-1990**

Region	1987	1988	1989	1990	Total
North	148	80	85	76	38
Northeast	200	238	238	231	907
Center	37	57	63	71	228
South	-	16	6	14	36
Total	385	391	392	392	1560

*Source:* National Forest Land Management Division, RFD

**Table 8 Reforestation in Public Lands Under the Lions Club Project, 1986-1988 (area in hectares)**

Region	1986	1987	1988	Total
North	-	8	24	32
Northeast	16	8	-	24
Central	16	16	-	32
Total	32	32	24	88

**Table 9 Reforestation in Public Lands Under the Green Earth Project, Chachoengsao Province, 1985-1989**

Unit: Hectares

Year	Area Planted	Cumulative Area
1985	16	16
1986	16	32
1987	8	40
1988	16	56
1989	16	72

*Source:* National Forest Land Management Division, RFD

## **Annex 2**

# **Community Forestry in Thailand: A Case Study from the North**

# **Community Forestry in Thailand: A Case Study from the North**

by **Ketty Faichampa**

## **OVERVIEW OF THE CONCEPTS OF COMMUNITY FORESTRY**

**T**he past three decades have witnessed growing global concern over tropical deforestation. While the forests were often viewed solely as a source of revenue for the state in the past, by the early 1980s they had been recognized for their ecological functions. Asian countries began reorienting their forestry policies, at least in theory, to address deforestation. Novel concepts of forestry included sustainable use, conservation, and local community participation in forest management. In 1981 the Seventeenth International Union of Forestry Research Organization (IUFRO) Congress recommended a revision of research priorities "to reflect the significant shifts in forestry programmes in developing countries toward activities designed to meet the basic needs of rural people, to improve rural income, and to combat ecological decline."<sup>1</sup>

This was a recognition that the livelihood of the rural population and the state of the forest are intricately woven. Any attempts to conserve the forests must take this relationship into consideration. At least in theory, local involvement in forest management is being sought as a means of conserving the remaining forests and reforesting degraded areas. Community forestry has gained some ground with agricultural and conventional forestry institutions such as forestry departments, forestry and agricultural research institutions, and international aid agencies working on agricultural/forestry issues (which were used in collaborating with governmental and/or large institutions rather than directly with local populations).

Community forestry is defined as any forestry activities established primarily to benefit the local community and in which the project recipients are involved in the decision making process.<sup>2</sup> In this regard community forestry is different from conventional (commercial) forestry practices, which are business enterprises usually practiced on state-managed forests under the jurisdiction/auspices of the state's forestry service and in which the benefits/profits accrue to the private company. Community forestry is usually found on communal land, either with or without the government's knowledge.

The Food and Agriculture Organization (FAO), one of the international institutions advocating community forestry, envisions community forestry as a means to:

- generate income and stable employment opportunities for poor rural people
- stabilize rural communities and local institutions
- produce on a sustainable basis fuelwood, construction wood, fodder, green manure, and food for local consumption
- minimize ecological degradation and maintain the productivity of the land<sup>3</sup>

Since the early 1980s forestry institutions have become increasingly engaged in community forestry.<sup>4</sup> In 1982 the Australian Centre for International Agricultural Research (ACIAR) was established to conduct and support research in the agriculture and forestry of developing countries.<sup>5</sup> The Canadian International Development Agency (CIDA), the Danish International Development Agency (DANIDA), the Food and Agricultural Organization (FAO) of the United Nations, and the Nitrogen-Fixing Tree Association are some of the international institutions promoting forestry research in the region.<sup>6</sup> Most of these, however, are directed toward technical and conventional forestry research rather than attempting to promote the local community's role in forest management.

Other international institutions have made the crossover, integrating forestry with agricultural and social issues. These include the Ford Foundation, the International Council for Research in Agroforestry (ICRAF), and the FAO.<sup>7</sup>

These international organizations promote community forestry in the Asia-Pacific region through collaborative work with state institutions such as the forest services and national research institutions. The underlying assumptions are that the state institutions

represent the rural population and that government policies reflect the needs of the rural population. These underlying assumptions must be questioned. The government and rural communities do not often share the same vision of the forest. While rural communities perceive nearby forests as theirs and as sources of land, food, revenue, and bases of production (e.g., watershed areas crucial to rice irrigation) with an immediate bearing on their livelihood, the government perceives the forests as state property to be conserved for the entire nation. Governmental policies may be in the best interests of the entire country, but not in the best interests of nearby communities. Forest reserves and other protected areas are established for all citizens, but communities adjacent to these areas may be barred from using them. While policies may be formulated with the best interests of the recipient communities in mind, they may not reflect the needs of the recipient communities. This is often the case in community forestry development.

The Royal Forest Department (RFD) and other international agencies involved in forestry issues often attribute a major cause of deforestation in Thailand to fuelwood demand. To deter tree felling for fuelwood, the RFD established village woodlot systems to satisfy the rural population's fuelwood needs.

Extensive research indicates that the expansion of farmland and logging constitutes a more serious cause of deforestation than does fuelwood gathering.<sup>8</sup> Between 1961-1988 the total cultivated area in the kingdom increased by 81.8 million rai—from 66 million rai to 147.8 million rai—while the forest area dwindled by 85.6 million rai—from 175.5 million rai to 89.9 million rai.<sup>9</sup> More than 90 percent of the forest clearance can be attributed to the expansion of farmland and logging.

Fuelwood scarcity is a problem only in the Northeast. A 1983 breakdown of the fuelwood situation by region indicated that the fuelwood demand for the North was estimated at 8.9 million cubic meters for local use and at 1 million cubic meters for export to Central Thailand. The demand was in balance with the sustainable supply. The situation for Southern Thailand was more favorable. The total demand for fuelwood in Southern Thailand was calculated to be 7.7 million cubic meters (4.7 million cubic meters for local use and 3 million cubic meters for export). The level of the sustainable production of wood exceeded the total demand by 1 million cubic meters. For Central Thailand the demand for fuelwood was calculated to be 12.2 million cubic meters, of which 5 million cubic meters was imported. There was a slight deficit between the demand and the sustainable supply. As for the Northeast, the total demand for fuelwood was 16.1 million cubic meters (15.1 million cubic meters for the region and 1 million

cubic meters for export). The sustainable supply was estimated at 7 million cubic meters. This meant a deficit of 9 million cubic meters, which was obtained from over-cutting.<sup>10</sup>

Hence, the premise that fuelwood gathering is a major cause of deforestation and that fuelwood woodlots can alleviate pressure on the forest applies only to certain communities, mostly in the Northeast, and not to the general Thai rural communities.

In Thailand both the RFD and international agencies on the one hand, and the rural communities and non-governmental organizations (NGOs) on the other hand, are advocating community forestry. However, there is much confusion and dissension over the definition of community forestry. The first group envisions it as a means for curbing deforestation and alleviating poverty, in which the project recipients are poor land-scarce farmers. Community forestry is implemented to alleviate the rural population's pressure on the forest. The second group envisions community forestry as a means by which rural communities can exert greater control over their natural resources base (water, land, etc.). In the second scenario, community forestry is not established to alleviate pressure on the forest but to facilitate cash and subsistence production. The forest is treated mainly as a food market and as a source of the water supply crucial for agricultural activities.

The following section examines whether the basic premise of community forestry as a means to curb deforestation and alleviate rural poverty is well-founded; and if so, whether community forestry is an effective tool in addressing either one or both problems, and under what circumstances.

## **ISSUES OF FORESTRY AND COMMUNITY FORESTRY IN THAILAND**

There is a general concensus that the forestry situation has approached a critical stage and that it is time to rehabilitate degraded areas. However, a debate rages over the most appropriate means to reforest denuded areas. The proponents of community forestry are in one camp. They are small, grass-roots, development-cum-conservation, non-governmental organizations (NGOs), who believe that the most effective means for reforesting the kingdom is by accepting and supporting local community rights and their ability to conserve the forest, particularly those communities with proven histories of forest conservation. The other camp comprises the supporters of conventional forestry; policy makers, foresters, and forestry professors. This group is skeptical of the rural community's ability to manage the remaining forests and thus believes that the most effective reforestation efforts can be carried out by the Royal Forest Department, aided



by private forest/reforestation companies that are motivated by commercial gains. The latter camp's ultimate aim of reforestation is to fulfill the goals of the National Forestry Policy (NFP).

The NFP stipulates that 40 percent of the kingdom's total area should be set aside as forest area; 15 percent is to be classified as protected/conservation forest, and 25 percent is to be classified as economic/productive forest.<sup>11</sup> The rationale for the 40 percent figure is based on a 1948 FAO recommendation. The recommendation's argument was that given Thailand's socioeconomic profile, the projected demand for land, and the terrain (31 percent of the total area is covered with 35 percent incline slopes and should therefore be conserved as watershed areas), 38.2 percent of the kingdom's total area should be set aside as forest area. This rationale was supported by the Department of Land, the Electricity Generating Authority of Thailand, and other institutions.<sup>12</sup>

The 1985 National Forestry Policy acknowledges the seriousness of deforestation in Thailand<sup>13</sup> and concedes that the RFD alone cannot cope with the crisis. Active support from the private sector is being sought. The NFP emphasizes the need to expand and promote large-scale forest industries (articles 12 and 13).<sup>14</sup>

The 1985 NFP also stipulates that community forestry should be implemented. The RFD defines community forestry as "forestry management practices based on the local communities' dependency on the forest and in which the recipient communities participate in the decision making process and oversee the project to ensure sustainable use in the best interest of the community."<sup>15</sup> This definition is shared by Thai academicians.<sup>16</sup>

Although the 1985 NFP pays lip service to community forestry (article 12), there are actually no legal channels by which local communities can manage their forests. Governmental regulations and existing structures facilitate large-scale commercial forestry, catering to fast-growing, market-oriented tree species (mostly *Eucalyptus camaldulensis*),<sup>17</sup> over small-scale, even subsistence forestry activities carried out by the rural communities.

The NGOs are very critical of the 1985 NFP. They argue that fast-growing tree species plantation, mostly monocropping, do not constitute reforestation since a forest must be considered in terms of its flora and fauna diversity. Large-scale commercial

forestry does not alleviate poverty, since it fails to distribute the benefits of the enterprise to the local population. Nor does it recognize the traditional rights and ability of local communities to manage and conserve existing pockets of forest for sustainable use.<sup>18</sup>

The NGOs and some academics have called for a revision of the 1985 NFP on the grounds that the policy favors private sector reforestation (which they perceive as monocrop plantation and the monopoly of land, not ecological restoration) and on the grounds that the NFP ignores the local community's dependence on the forest and their history of forest conservation.<sup>19</sup> Critics of the NFP argue that since the forest directly affects the daily livelihood and well-being of the local population, rural communities usually take care of their forest. However, they argue, decision makers often ignore this relationship. Forestry laws and policies are often formulated without the local populations's knowledge, consent, and input, even though such policies directly affect them. Consequently, the local community's ability to conserve the forest is undermined since it does not have the legal means to stop outsiders from deforesting.<sup>20</sup> After the outsider has denuded the forest and moved away, local communities often suffer the consequences of deforestation and are accused of being the culprits.

Despite the lack of government support and other obstacles, certain rural communities have initiated and managed community protected forests on their own.<sup>21</sup> The advocates of locally-initiated community forestry projects argue that the government should recognize and support the rural community's ability and legal rights to conserve existing forests, particularly those communities with a proven history of forests conservation.

In the past year the RFD has begun to respond to suggestions from the NGOs due to rising public pressure for community forestry and increasing public criticism over large-scale reforestation projects. In November 1989 a land/forest dispute arose between a politician from the northern province of Chiang Mai and a group of Chiang Mai villagers over a natural forest (area approximately 1,000 rai). The villagers consider the disputed land a communal forest; the politician claims it is a degraded forest for which concession should be given by the RFD to build a resort. The RFD settled the matter by awarding the villagers the right to manage the forest. However, there are no legal channels for enabling local communities to manage a forest.

Along with increasing public pressure for community forestry, large-scale commercial reforestation schemes were increasingly attacked by the media and the

NGOs. This culminated in January 1990, when workers of a large commercial forestry company were arrested for allegedly encroaching upon a forest reserve in Central Thailand. This incident became a rallying point against commercial forestry and for community forestry. The NGOs expressed fears that commercial forestry was causing more encroachment through the direct violation of the law. This was occurring because farmers were selling their land to the forestry companies and then moving further into the forest reserves in search of new land.<sup>22</sup>

The RFD came under intense pressure to revise its commercial forestry policy and to explore the methods of fully implementing community forestry projects. In response to this mounting pressure, in February 1990, the RFD held an in-house conference to define community forestry, the role of local communities, and the RFD in community forestry, and possible legal channels to facilitate communities that have implicitly practiced these projects.<sup>23</sup> In June 1990 the government appointed a working subcommittee composed of high-ranking RFD officials, forestry professors from Kasetsart University, sociology professors from Khon Kaen and Chiang Mai universities, and representatives of two NGOs to draft a community forestry law.<sup>24</sup>

After three months of deliberation, the subcommittee recommended that any existing community forestry projects under 500 rai that have been initiated and implemented by the villagers should immediately be considered as such by the RFD. Any village having a community forestry project with more than 500 rai but less than 2,000 rai would have to file an application with the governor in order to be considered for such status. Projects of more than 2,000 rai but less than 4,000 rai would have to go to the Director-General of the RFD for consideration. Any project of more than 4,000 rai would have to be considered by the Minister of Agriculture and Cooperatives. The subcommittee decided not to draft a new law but to use the existing forest reserve laws.<sup>25</sup>

There still are some divergent views among the proponents of community forestry over the actual means of governmental recognition. Some lobbied for a social forestry law, others claimed that a social forestry policy—even a guideline—is sufficient. The NGOs have yet to present a clear picture of their definition of community forestry beyond the general, vague demand for greater community participation in forest management. There is a need to elucidate their vision of the RFD's role in community forestry. Moreover, there is a need to address sensitive issues such as the implication and prospect of the government conceding its centralized rights to manage land to local communities; the means of transferring land management rights from the government to

local communities; and, most crucially, the checks-and-balances mechanisms between the local organizations/communities and the governmental agencies that must be established to ensure that once local communities are awarded the legal rights to oversee the forest, they do not abuse it.

## **AN OVERVIEW OF MAJOR TYPES OF COMMUNITY FORESTRY PROJECTS IN THAILAND**

Most local communities living near the forest are dependent on the forest for their livelihood. The nature and degree of dependence differs from one community to another and determine a given community's behavior towards the forest: some conserve the forest while others are heavily engaged in deforestation. There is a link between deforestation and poverty, each one reinforcing the other. (See above chapter by Sopin and Panayotou.) The issue here is the best means for both curbing deforestation and alleviating poverty. To what extent can social forestry serve either or both goals?

This section provides a broad overview of the major types of community forestry projects in Thailand.

### **Outside-Initiated Community Forestry Projects and RFD Projects** *RFD Forest Village System*

The RFD's forest village system is often thought of as a social forestry project. Prior to the forest village systems, the RFD implemented large-scale forest plantations to rehabilitate severely degraded forest reserves. Disputes erupted between forest encroachers, who feared eviction, and the RFD. To avert a growing conflict the forest village system was established to rehabilitate degraded forest. Rural development efforts were incorporated to deter further forest encroachment.<sup>26</sup>

The RFD forest village system is based on the *taungya* system of forest plantation adopted from Burma in 1906. The *taungya* system was established to increase teak production, while tackling the deforestation from shifting cultivation. Shifting cultivators are hired to plant teak saplings. The workers are entitled to grow their own field crops in between the rows of teak. All benefit from these crops accrue to the cultivator.<sup>27</sup> The worker often remains on the given plot to weed and to take care of the teak saplings and his own crops. By the third year, the teak saplings have shaded out the field crops. The worker moves to a new plot to cultivate teak saplings and his field crops. The full rotation cycle takes 50 years before the worker returns to the original site. For each plot

of teak, workers receive a bonus if the teak sapling survival rate is more than satisfactory.<sup>28</sup>

The *taungya* system became the basis of the forest village system that was established in 1975. Under the forest village system the encroachers are resettled in groups in non-watershed areas, each settlement self-administered by elected leaders and a committee. The government allocates a maximum of 15 rai to each family.<sup>29</sup> Land titles are not issued, but user's rights permits (usufruct rights or STKs) are awarded. The property can be inherited by direct descendants of the land holder but cannot undergo any other transaction. The RFD builds houses, roads, schools and health centers and provides vocational training, agricultural credit and cooperatives, and market services.<sup>30</sup>

A 1,000-1,500 rai plantation of fast-growing tree species is established for each forest village. Members of the forest village are given preference in employment opportunities in the plantation, although they are not obliged to work there. They are also permitted to plant their own crops between the rows of fast-growing tree species.<sup>31</sup>

The forest village system does not qualify as a community forestry project, although it aims to curb deforestation and employs rural development efforts. Although the recipients benefit from the project through employment opportunities in the plantation, more secure landholding, more infrastructure, and greater social benefits such as schools, health centers, etc., they are not involved in the decision making process. They are merely wage earners and are only on the receiving end of the project. All decisions are made by the oversee committee comprised of:

- The Governor as Chairman of the committee
- The Sheriff
- The Head of the Provincial Land Department
- The Head of the Provincial Agricultural Office
- The Head of the Provincial Agricultural Cooperative Office
- The District Officer
- The District Forester
- The Provincial Forester
- The Head of the Forest Village System (an RFD Officer)<sup>32</sup>

In actuality the head of the forest village system runs the project;<sup>33</sup> the recipients merely acquiesce.

### *Village Woodlot*

One component of the forest village system that has the potential to be qualified as a community forestry project is the village woodlot system. The village woodlot was established to supply members of the forest village with fuelwood and timber products for both cash and subsistence purposes.<sup>34</sup> Because of RFD regulations, however, the forest woodlot project does not qualify as a community forestry project.

Although it is clearly stipulated that the villagers should participate in the decision-making process and be able to reap the benefits of the woodlot, in reality these two goals are not always achieved. The responsibility for initiating and administrating the projects usually falls on the shoulders of the RFD officials, even though there are local organizations that are capable of running the project or can be trained to run it.<sup>35</sup> Management of the village woodlot must primarily satisfy RFD guidelines which are not always in the best interests of the recipient communities.<sup>36</sup> For instance, RFD regulation stipulates that only those tree species planted in the plantation can be cultivated in the village woodlot. However, villagers often prefer other commercial, fast-growing tree species or fruit trees.<sup>37</sup> Although there are channels allowing the community to benefit from the project, the procedures are cumbersome and lengthy, and they often outright discourage the project recipients from supporting the project. Only RFD personnel are entitled to cut the trees in the woodlot even though the woodlots were established to benefit the rural communities.<sup>38</sup>

The village woodlot system has the potential to become a community forestry project only if the project recipients were given greater management rights. This does not mean that RFD should completely abrogate its involvement. Rather, it means that RFD guidelines should be more flexible to better suit the needs and the situation of each given community. With such improvements, the RFD can then assume a supervisory role—providing technical and legal assistance—while promoting greater self-reliance among the members of the forest village system.

### *Other RFD projects*

Other RFD projects that have the potential of being qualified as community forestry projects include:

- Woodlots in school grounds
- Woodlots in temple areas
- Allocation of 20 percent of redistributed land (under the S.T.K. land reform scheme) as communal woodlots
- Forest areas of not more than 500 rai and not adjacent to forest reserves, national parks, and wildlife sanctuaries can be managed by local organizations such as the tambon council or the village committee.<sup>39</sup>

The above projects are fairly small, scattered, and insignificant. School woodlots are only between 5-50 rai.<sup>40</sup> The school, temple, and S.T.K. communal woodlots are mostly demonstration plots set up to satisfy policy requirements rather than projects that are of any significant benefit to the local community.

As for communal forests under 500 rai and not adjacent to protected areas, very few of these projects probably exist, since almost all existing forest areas are in forest reserves.

### **FIO Projects**

The Forest Industry Organization (FIO) claims that it too supports community forestry through its forest village system. The FIO was found in 1947 as a forest production and harvesting unit of the RFD. In 1956 it became an autonomous public enterprise.<sup>41</sup> In 1967 FIO established the forest villages system, based on the taungya system, and much like the RFD forest village system, within its teak plantations. Infrastructures such as roads, electricity, and water supply were provided along with schools and health centers.

The main objective of the FIO forest village system is to ensure steady and cheap labor for its forest plantations.<sup>42</sup> The secondary objective is "to improve the social and economic conditions of the local population through employment on the plantations and provision of land for household agricultural production."<sup>43</sup>

The FIO's forest villages do not qualify as community forestry, which are forestry activities that involve the local people in the decision-making process and in which the objective/yields of the project are to benefit the recipients. Large-scale industrial forestry and forestry activities that contribute to community development solely through employment and wages such as the FIO's systems, are excluded.<sup>44</sup> Most of the benefits of the FIO forest village system does not accrue to the workers, but to the FIO. The workers are not engaged in the decision-making process; they are merely wage earners.

### **PDA Projects**

The Population and Community Development Association (PDA) is the Country's largest non-governmental organization. Although it is best known for its family planning programs, PDA is heavily involved in rural development efforts. One such effort is the C-Bird project, the Community-Based Integrated Rural Development Project.<sup>45</sup>

PDA's emphasis is on rural development. PDA is not interested in forestry per se, but in forestry as a means to improve the living standard of its targeted recipients. PDA's philosophy is that rural development efforts will work if there is social cohesion in the community and if the community gains enough experience to manage communal projects on their own.<sup>46</sup>

Guided by these underlying assumptions, PDA's community forestry projects take the form of 30-rai woodlots of fast-growing tree species, mostly eucalyptus, acacia, and leucenea, on communal land. PDA has 33 community forestry projects, all in the Northeast. These are run from the three C-Bird centers. The trees are harvested and sold at the market; revenues received are deposited in the village revolving funds. The quick yield of these trees is vital to stimulating cash incentives for the farmers and fulfilling their hopes within a satisfactory time frame. Once the villagers are enticed into planting fast-growing tree species, they will need to form a committee to manage the project. The communal forest serves as a means to build up social cohesion and cooperation, what PDA officials call social infrastructure.<sup>47</sup>

### **Community Initiated and Implemented Social Forestry Projects**

Traditional community forestry is initiated and implemented by local communities and can be roughly divided into the following types:

- Communal forests for religious purposes (usually very small tracts of forest)
- Watershed forests (water from these sources is used to irrigate farmlands)
- Wildlife sanctuaries (usually found in temple ground)
- Recreational areas
- Woodlots, usually found adjacent to the villages<sup>48</sup>

Information on locally-initiated social forestry projects is scarce. Most have been accumulated by the NGOs in the past two years and concern projects in northern and northeastern Thailand.



### **Locally-Initiated Community Forestry Projects in the Northeast**

Locally initiated social forestry projects in the Northeast are relatively new. The majority were formally established in 1985 in reaction to the National Forestry Policy's promotion of *Eucalyptus camaldulensis* plantations in degraded areas and forest reserves, areas that the villagers have claimed and transformed into agricultural fields for their own use. Most villagers perceive the government's eucalyptus project as an invasion of their land. Using the media and "people's power," the local population confiscated the disputed lands from the government. In most cases, they redistributed half the land among themselves and vowed to conserve the other half. This was to prove they are capable of conserving the forest on their own and are therefore entitled to greater management rights and support from the government.<sup>49</sup> The villagers conserve small tracks of forest (less than 100 rai)—isolated woodlots, burial grounds, and sacred groves—to expansive areas of watershed forest (20,000 rai) adjacent to national parks.

Because most formal, locally initiated social forestry projects in the northeast are relatively new and embroiled in land disputes with the RFD, it is unclear how well-established the projects and the social institutions that oversee the management of the projects are. Even among the relatively well-organized ones, their novelty makes any assessment of the project premature and ineffective.

### **Locally-Initiated Community Forestry Projects in the North**

In the North, formal, locally-initiated social forestry projects are much older and are managed by highly experienced local institutions. The communal forest is an integral part of the daily lives of the local community. The rights and responsibilities of those involved, the rules governing the use of the communal forest, and the terms of punishment for breaking these rules are clearly stipulated.

There are five basic types of traditional community forestry: sacred groves, watershed forest, wildlife sanctuaries, recreational areas, and communal woodlots.<sup>50</sup> The section on policy recommendations discusses in detail watershed community forestry in Northern Thailand. These are naturally regenerated, secondary forests. This system is defined as "community protected forest" instead of simply community forestry because it does not involve reforestation nor does the communal forest serve primarily as a woodlot for non-timber products, as envisioned by the RFD, FIO, and even the NGOs and academic advocates of traditional community forestry. The system consists of guarding existing forests with no or minimum harvesting of timber products. Non-timber products such as food and fodder are windfalls of the communal forests and not the primary reason

for forest conservation. The forests are conserved because as watersheds that give rise to streams and rivers that irrigate the field, they are the natural resources base of agricultural production.

There is a current debate between the proponents of traditional forest and the advocates of conventional forestry concerning the role of rural communities in forest management. Hopefully, by focusing on "community protected forests", this research paper will shed light on the most appropriate and realistic role of rural communities in forest management. The study focuses on community protected forests rather than analyzing all types of community-initiated social forestry projects (those that cater to protection of the existing forests; those that cater to reforestation, and those that practice both) because it makes more sense to first determine whether or not preventive measures (i.e., protection of natural forest) are effective before adopting cures (i.e., reforestation efforts).

This paper discusses in detail the forces compelling communities to initiate community protected forest and the factors that enable the community to actually conserve the forest. The discussions are based on research conducted by other institutions, interviews, and case studies based on the author's field work. Case studies are on community protected forests in On Nua subdistrict (1 case) and On Tai subdistrict (1 case), both of San Khampang district, Chiang Mai province; and Pa Sak district (1 case) and Sribuaban district (2 cases) of Muang District, Lamphun province. All five cases are situated inside forest reserves. The study sites lie in a geographical area known as the Chiang Mai-Lamphun Basin.

These five communities are chosen for their unique attributes. Most of rural Thailand will be affected by greater industrialization and urbanization as a consequence of the government's policies. In the process, the livelihood of the rural population—sources of income, off-farm employment opportunities, and greater access to urban centers—and the land utilization patterns will be transformed. It is generally believed that urbanization leads to greater conversion of agricultural land into land for industrial and urban uses. (*See above chapter by Chartchai Parasuk.*) This puts pressure on the forest and leads to greater forest encroachment by farmers who have sold their land but have not yet been absorbed into the industrial job market. Eventually, forest encroachment will taper off as off-farm employment opportunities expand.

The five communities studied fit this scenario because they are already on the path that most rural communities will traverse. These five communities have been able to adapt to the changes and conserve the forest, which is their natural resources base for production. This study will shed light on some of the lessons that other rural communities can learn from these five villages.

Hopefully, the policy recommendations drawn from the analysis will foster a greater understanding of the concepts and practices of community protected forestry and elucidate the proper role of local communities and the RFD.

## COMMUNITY PROTECTED FORESTS IN NORTHERN THAILAND

To understand why community protected forestry exists in Northern communities despite the lack of government support and in the face of legal obstacles, one must first understand the northern communities' basis of livelihood, how their land-management patterns support their way of life, how the livelihood and land-utilization patterns evolve, and how local forest management systems fit within this evolving scenario.

Northern Thai society refers to the society of the northern, lowland—ethnic Thai, not the hilltribes. The study focuses on northern Thai farmers because they constitute the largest group whose behavior greatly affects the northern forest. Although the hilltribes' treatment of the forest (ranging from the Karen's forest conservation practices to the Hmong's more exploitative use of the forest)<sup>51</sup> has great consequences on the northern forest, the analysis of hilltribe community forestry is beyond the scope of this study simply because each of the twelve hilltribes treats the forest differently. To attempt an analysis of hilltribe community forestry, one must first comprehend their diverse treatments of the forest.

### Geography of Northern Thailand

Northern Thailand is known as the kingdom of Lanna or the "land of a million rice paddies." The title underscores the importance of rice production even today amidst the drastic changes and development facing Northern Thai society. Unlike paddy rice production in Central and Northeastern Thailand, that of Northern Thailand is constrained by the rugged terrain.

More than 70 percent of Northern Thailand is covered with mountains. The general topography is divided into highlands, uplands, and lowlands. Highlands are areas with a slope having more than a 40 percent incline; highlands cover 77 percent of the

total Northern territory.<sup>52</sup> There are some agricultural activities in the highlands, mostly rainfed swidden agriculture practiced by the hilltribes. Upland areas are covered with low, undulating hills with slopes between 5-20 degrees. This type of land covers 13 percent of the total Northern area. Field terraces are found in the uplands. Farming in this zone is facilitated by irrigation. The lowland areas are flat terrains with elevations ranging from 100-300 meters above sea level and with slopes between 1-1.5 degrees. Lowland areas covers approximately 10 percent of the total Northern area and are found along the banks of rivers.<sup>53</sup>

The mountainous terrain puts two constraints on the Northern Thai rice farmer: limited cultivable land and a quickly dissipated water supply. The average precipitation rate of Northern Thailand is fairly high; the average annual rainfall is between 1,100 - 1,300 mm<sup>54</sup> and yet the steep slopes mean that most of the water supply quickly flows downstream and southward. Water is collected in the fertile plains of Central Thailand and ultimately flows into the Gulf of Thailand. In the dry season the Northern Thai farmers have to cope with water scarcity; in the rainy season they have to cope with water excesses.<sup>55</sup>

Suitable farmland represents a mere 34 percent of the total Northern area. Almost all of this, or 32 percent of the Northern area, is under cultivation. Rice paddies comprise almost one-third of the total area or 20 percent of the total Northern area.<sup>56</sup> The average farmland area in Northern Thailand, 3.6 rai/farmer, is smaller than that of other regions: 7 rai/farmer for the Northeast, 7.5 rai/ farmer for the West, 10.6 rai/farmer for the Southeast, and 7.2 rai/farmer for the South.<sup>57</sup>

Constrained by limited land-holdings and a largely uncontrollable water supply, the Northern Thai farmers have developed an ingenious water management system, known locally as the *muang fai* system to obtain the highest sustainable yield. Average yield per rai for rice for Northern Thailand has been consistently higher than other parts of the country.<sup>58</sup>

### The Muang Fai System

The *muang fai* system is a diversion irrigation system that draws water from the streams and rivers to the paddy land.<sup>59</sup> The system, established to control water supply, is composed of weirs called *fai* and canals called *muang*. The regulations, rights, and terms of punishment for breaking the *muang fai* rules were codified into law during the reign of Phra Chao Mengrai in the 1200s.<sup>60</sup> The irrigation system is managed by the *muang fai*

committee, which is composed of the paddy rice farmers of a given community. Members of the organization receive water to irrigate their rice fields. In return, they must help build, repair, and maintain weirs and canals. The labor required of each member depends on the amount of water he receives from the *muang fai*. An average farmer usually receives one *tang* of water, an indigenous unit of water measurement. For each *tang* received, a member is obliged to contribute one man-day of labor for each *muang fai* activity. If he cannot provide his labor for a given activity, he must find a substitute. The absentee pays the substitute the going wage to work on his behalf.

The *muang fai* organization is headed by the *kae fai*.<sup>61</sup> Depending on the size of the *muang fai*, the *kae fai* may or may not have assistants, a position known as *puchuai kae fai*. The *muang fai*, however, usually has a secretary, known as *lam nam* who is responsible for coordinating all the *muang fai* activities with the members.<sup>62</sup>

Paddy rice communities are usually located along the banks of a river, each community with its own *muang fai* organization drawing water into its fields from this common water way. *muang fais* of neighboring communities usually coordinate their activities to ensure fair share of water supply. Once an upstream community has received its share of water supply, the water is diverted to the next community downstream, and so on. This cooperation among the various *muang fai* organizations dependent on the same water supply makes up the *muang fai* system of a particular water way.<sup>64</sup>

Today, the allocation of water among various communities is supervised by officials from the Irrigation Department who acts as arbiter in case of water disputes.

#### **Factors Contributing to the Establishment of Community Protected Forest**

NGOs and their academic counterparts depict community protected forests as grazing areas; ceremonial and burial grounds; and vital sources of water, food for subsistence and cash, fuelwood, and timber products.<sup>65</sup> Community protected forest is seen both as a natural resources base for agricultural production (water source for irrigation) and as a welfare institution, a place villagers can turn to for supplementing their income. All decision concerning the communal forest are made by the local institution, with minimum government intervention. However, governmental consent and support is sought.<sup>66</sup>

The RFD and the FAO argue that community forestry is necessary to relieve the rural population's pressure on the forest for fuelwood and timber, for both cash and subsistence.<sup>67</sup>

Upon closely examining the functions of the community protected forests of paddy rice communities, it was found that, contrary to the two scenarios given, these forests do not exist mainly as woodlots but that they are conserved primarily for their watershed value. Other benefits derived from the forest are windfalls, not the major reason for conserving the forest.

#### *The Need to Control Water*

Control over water and protection of water sources are prerequisites to successful paddy rice production. Traditionally, the *muang fai* organizations have adopted forest conservation as one of their major functions. In her book, *Historical Development and Management of Irrigation Systems in Northern Thailand*, Vanpen Suparerk discusses how the *muang fai* organizations in San Khampang district, Chiang Mai province, have formulated written agreements to conserve forest around catchment areas of their major streams.<sup>68</sup>

#### *Proximity to Main Water Source*

Only watershed forests that give rise to the community's main water supply are conserved. We compared villages with community protected forests to similar neighboring communities without such projects.

Take the case of Ban Pae in *tambon* On Tai, San Khampang District. (See map I in Appendix). Ban Pae is located between Ban Pa Pao to the southwest and Ban Wang Than to the northeast. A mountain range lies to the east of these three communities. The three communities depend on Mae Pha Haen stream for their water. Ban Pae has another major water supply for both irrigation and home use. This is Huai Ban Yoop stream, which flows from the mountain to the east directly into the village reservoir and rice paddies. The watershed forest of Huai Ban Yoop is located inside the village boundary, while that of Mae Pha Haen stream is situated outside the village. Proximity to the Huai Ban Yoop watershed forest enables Ban Pae to both exert greater control over the said stream than over Mae Pha Haen stream and to conserve the given watershed forest.

The neighboring communities of Ban Pa Pao and Ban Wang Than, however, do not have streams that flow directly from the watershed into their village. Therefore, they do not yet have the incentive to conserve the watershed forest. As long as the upstream community protects its watershed forest and the downstream communities receive an adequate water supply, the downstream communities do not feel the pressure to partake in forest conservation efforts. It is likely that when the downstream communities do not

receive an adequate water supply due to destruction of the watershed forest, they will start exerting pressure on the upstream community to protect the watershed forest.

Ban Don Sai<sup>69</sup> at On Nua subdistrict, San Khampang District, faces a similar situation. Ban Don Sai is located equidistant between Ban On Luay to the north and Ban On Klang to the south. The three villages are similar and are situated at the foot of the same mountain range to the east. They depend on the same water source: the Mae On stream, which flows from a large dam 10 kms away. Since the Mae On is shared by various communities in the basin, it is administered by the Irrigation Department. Ban Don Sai has another water supply, the Huai Nam Ok Roo stream, which flows directly from the Huai Nam Ok Roo forest at the edge of Ban Don Sai into the community's reservoir. Water from this reservoir is used to irrigate Ban Don Sai's rice paddies.

Of the three villages, only Ban Don Sai has a community protected forest. Unlike its neighbors, Ban Don Sai sits next to its main water supply, an incentive for it to conserve the watershed forest. The other communities are situated too far from the watershed forest of its main water supply to initiate and implement a community protected forest. As in the case of Ban Pae and its neighbors, communities downstream from Ban Don Sai are benefitting from Ban Don Sai's forest/water conservation efforts and therefore do not yet feel the need to partake in watershed forest conservation efforts.

It should be noted that Ban Don Sai chooses to conserve only that part of the watershed forest that has the greatest bearing on its water supply. There are no local regulations governing forest use in less critical areas of the watershed forest.

This does not imply that having the stream from the nearby forest as the community's main water supply alone explains why one village has a community protected forest while its neighboring community does not. There may be other economic, social, and historical reasons prohibiting a community from implementing a community protected forest despite the community's desire to do so. One excuse communities often give is that the forests inside the village boundary have been completely cleared and transformed into farmland. There simply is no forest left for such projects.

### *Threats*

Community protected forests are established first because of the need to ensure and control a water supply provided the community is situated adjacent to the water source, and secondly, in response to threats to the watershed forests.

There are two types of threats to the water supply: internal and external threats. The type of threat determines the organization of the forest conservation committee and the regulations governing forest use.

Internal threats are committed by the members of the community themselves. Trees are felled for either the expansion of farmland or for marketable timber products. Once the area around the watershed forest is cleared, a decline in water supply follows. Water to irrigate the paddies becomes scarce and the groundwater level in the wells drop. However, communities do not conserve the forest until the level of water decline actually threatens their survival.

Ban Huai Mah Kong of Lamphun province experienced a water scarcity, which the villagers attributed to their own doing. According to a former village headman, Ban Huai Mah Kong was heavily engaged in charcoal making and to a lesser extent tobacco cultivation sixty years ago. Trees were felled for charcoal and for fuelwood to feed the tobacco kilns. The water supply declined until the villagers were forced to move out to escape the drought. Ban Huai Mah Kong was fast becoming a ghost town. To save the village, village elders headed by the headman established a community protected forest.

The history of Ban Tung Yao is similar in this respect. The original settlers of Ban Tung Yao were from Ban San Ka Yom. At Ban San Ka Yom they had cleared the forest and had suffered the consequences of a water scarcity. Because the situation at Ban San Ka Yom was beyond remedy, the villagers decided to relocate to Ban Tung Yao, where there was an adequate water supply. This experience convinced the villagers of the vital need for watershed forest and propelled them to conserve 60 rai of the catchment area, a community protected forest known as Pa Nam Cham.<sup>70</sup>

Rules governing the use of the communal forests are established and evolve in response to the ever-changing nature of threats and in accordance with the surrounding circumstances. When Ban Tung Yao established Pa Nam Cham in the mid 1920s, there was a general concensus among the villagers to conserve Pa Nam Cham. There were no written rules. The kae fai and the village headman were responsible for managing the communal forest. By the mid-1940s extensive deforestation in the area was seriously threatening the communal forest. Written rules with clearly stipulated fines were drawn up to facilitate the mangement of the forest. Yet within a decade, the amounts of the fines had to be increased, and the villagers had to endorse the written rules. Later, as people began cutting dead, standing trees, the rules were amended; it was no longer possible to



cut such trees in the communal forest. When the communal forest was threatened by logging in the surrounding area, the communal forest was expanded. Again the fine was increased.

As the community's source of water becomes increasingly threatened by outside force rather than internal force, the organization managing the communal forest also evolves accordingly. Inside threats are generally easier to handle since the community is dealing with its own members, people who operate within the norm of that society, understand, and obey the societal rules because they are still dependent on the community. Traditional community institutions such as the *muang fai* and the village elders were sufficient agents of enforcement.<sup>71</sup>

Although today the *muang fai* organization is still responsible for forest conservation among the villagers, the village committee—a political structure established by the government as a link between the given community and the district office—is increasingly replacing the *muang fai* organization as the chief manager of the forest, particularly when it comes to dealing with external threats.<sup>72</sup> Most community protected forests are in forest reserves and therefore legally belong to the government. In reality, villagers regard these community protected forests as theirs. When the government exert its claim over these lands—either directly or indirectly through the granting of concessions—the villagers regard this as a usurpation of their land. There have been a series of cases in which outsiders received concession from the RFD on a communal forest to the protest of villagers, who sometimes form communities to deal with the threat. As external threats replace internal threats, traditional community institutions alone do not have the power to enforce forest conservation measures, particularly without the government's support. When the traditional community institutions resist outsiders' claims, their powers of enforcement are often discredited and challenged since they are not legally recognized by the government.

The villages of Ban Pae, Ban Don Sai, Ban Huai Mah Kong, and Ban Pong Tham of Lampang Province are examples. As these communities experience greater interaction with the outside world, the responsibility of managing the forest is shifting from the *muang fai* to the villagers at large, under the auspices of the village committee. Until 1986 Ban Pong Tham was fairly isolated. The community had its own forest, although there were no rules and regulations governing its use. The conservation of the forest was done with implicit agreement among the villagers. In 1986 a main road between the provinces of Phayao and Lampang was built. Ban Pong Tham was opened up to the outside world.

One consequence was the greater demand for Ban Pong Tham's logs. A community protected forest was established in 1987; the village committee oversees this forest.

It was noticed that although the members of Ban Pong Tham has established a community protected forest, many of the houses in the village were built of solid, large logs, DBH (diameter at breast height) of approximately 24 inches. It is unclear whether the villagers are engaged in the logging business, although that seems plausible. If that is the case, it is unclear whether forest conservation would be successful, since the villagers themselves may well be heavily engaged in deforestation activities. In this respect, currently the community protected forest merely serves to establish the villagers sole right over forest use.

#### **Factors Enabling the Implementation of Community Protected Forest**

Control of the water source, proximity to the watershed forest, and threats are the motivating forces for the establishment of community protected forests. However, once they are established, there are other factors which enable the community to carry the project through. In determining these factors the research examined the profiles of communities with such projects and their treatment of the communal forest and the surrounding land.

##### ***High purchasing power and job opportunities***

Traditionally, villagers did not purchase fuelwood and timber products (e.g., construction material) from the market but harvested them from the forest. However, once community protected forests with strict rules were established, timber products could no longer be freely harvested from the forest. Field work was conducted in five communities (Chiang Mai province: Ban Don Sai and Ban Pae; Lamphun Province: Ban Tung Yao, Ban Nong Lom, and Ban Huai Mah Kong) where the villagers no longer collected fuelwood and timber for construction from the forest. Fuelwood was cut from trees in their backyards and in their fields. Many villagers purchased charcoal from the market, while others used gas stoves. Similarly, new houses were constructed out of bricks and cement, not timber. This reflected both the dwindling supply of timber and the preference for bricks, an attempt to emulate city people who lived in brick and cement houses.

That the villagers now have to purchase goods they once freely harvested from the forest did not seem to be an issue with them. No one we interviewed complained that the opportunity cost of conserving the forest (in terms of forfeiting timber products) was too high. Many actually preferred brick over wooden houses and gas stoves over

charcoal. This meant that the five villages are relatively well-off. Their purchasing power is high enough for them to afford to purchase necessity goods once freely harvested from the forest. Examining the economic profiles of the communities, it was discovered that the communities achieved a balanced dependency on the forest. They have struck a balance between subsistence and cash economy, and while they are still dependent on the forest, they are not overly dependent to the point of threatening its survival.

These villages cultivate paddy rice for subsistence. By its nature paddy rice production depends on a reliable water supply. Hence, it is in the villagers, best interest to conserve their water supply.

The communities have an array of income-generating activities to choose from. These are essentially divided into two categories: land-dependent activities such as cultivation of cash crops such as tobacco, sugar cane, etc., and nonland-dependent activities such as year-round off-farm employment opportunities (both short-term and long-term) in the towns and cities. There are other income generating activities that fall into both categories such as the lucrative and popular dairy farming.

All five villages are located within a half-hour ride from a major market center. Ban Don Sai and Ban Pae are located less than 15 kilometers from the town of San Khampang. Some of the younger people work outside, either as construction or factory workers. Most villagers interviewed, however, were not enthusiastic about working outside. They argued that although they can earn between 60-120 baht per day, depending on their skill and gender, the associated expenses (such as outside meals, transportation cost, etc.) and the opportunity cost (having to purchase instead of cultivate rice) are relatively high. The best balance is to cultivate paddy rice for subsistence for security and to engage in various income-generating activities.

Overdependency on land, particularly by the poverty-stricken villagers, can actually threaten the forest. By the same token, insufficient dependency on land can also threaten the forest. This statement is made in light of the increasing land speculation taking place around Chiang Mai and Lamphun. If the villagers are no longer dependent on the land, they would most likely sell it, including land on which the communal forest sits.

In the communities studied, the villagers are already selling some land. However, the land they they sell are not their paddies, which they have full title deed over (N.S. 3

or Chanod) or the communal forest, but their upland crop fields—that is, land inside forest reserves that they have claimed but do not have title over.

#### *Community protected forest versus forest reserve*

Villagers have their own land use patterns: paddies, communal forest, and non-communal forest. Each type of land is treated differently. Paddies are land for subsistence, community protected forests are on land that must be conserved to support this subsistence, and the rest of the forest reserve (outside the community protected forest) is land that can be exploited to supplement their income in land-dependent activities. That is, while any forest clearance is strictly prohibited in the community protected forest for the sake of water, there are usually no regulations governing the use of the forest outside the community protected forest. Often, these unprotected areas are completely deforested. They are either transformed and cleared into fields, if the land is cultivable, or logged for fuelwood and timber products for the market and home consumption.

In the past community protected forests were sustained because nearby forests existed to alleviate the pressure off the protected forests. These unregulated forests served either as village woodlots, from which the villagers can harvest timber and non-timber products, or as frontiers to be converted into agricultural fields. Today there are almost no nearby forests left. While the availability of nearby forests in the past enabled the villagers to initiate and implement community protected forests, today off-farm employment opportunities in the towns seem to be a major factor in sustaining community protected forests. There is a shift in balance from the villagers' total dependency on land/forestry activities to an equilibrium dependency on the forest and land. That is, the villagers have struck a balance between dependency on the forest for production and dependency on non-land-bound activities such as off-farm employment.

#### *Harvesting of non-timber foodstuffs: a boon from the forest*

One of the side benefits of the forest—but often cited as a major reason for community protected forest—is the non-timber foodstuffs villagers collect from the forest, mostly bamboo shoots and mushrooms. The villagers collect these products for cash and subsistence. An average person can collect 5 kilograms of mushroom in three hours. If he sells it in the village, the ongoing rate is 10 baht a kilogram. If sold at the market, it is 50 baht a kilogram. Collecting bamboo shoots can be an all-day activity. An average person can collect between 40-60 kilograms of bamboo shoots, which are usually

sold for 4 baht a kilogram in the village and 10 baht per kilogram in the market. There are no figures on the extent of these activities.

Although a fairly lucrative business, the harvesting of these forest food products only lasts for a short duration during the rainy season. These are lucrative supplementary income-generating activities, not the main reason for conserving the forest. Villagers often roam great distances far from their villages, some more than 15 kms, to collect forest food products for the market when they are free. Villagers with community protected forests usually do not mind if people from other villages collect forest food products from their communal forest, as long as they abide by the rules of the communal forest.

## CONCLUSIONS

Among the lowland, paddy rice communities of Northern Thailand, community protected forests are established primarily for their watershed value. However, they are not established until the watershed forests are seriously threatened. Only watershed forests near the upstream community are protected. Rules and organizations governing the communal forests are formulated and evolve in response to the ever-changing nature of threat. Community protected forests are sustained by various factors. Initially, the nearby forests satisfy the community's need for timber products and serve as frontier to be cleared and transformed into agricultural land. As this frontier disappears, there is increasing pressure on the protected forest for land and timber products, both for cash and subsistence. The increasing availability of and access to jobs in the surrounding towns have alleviated the rural communities' dependency on the land and pressure on the forest. This diminishing dependency on land for income, facilitated by rising purchasing power from the array of income-generating activities (both land- and nonland-dependent activities), enables the communities to purchase substitute goods (e.g., gas stoves vs. collecting fuelwood; cement and bricks vs. timber). The communities have achieved an equilibrium dependency on the forest. Their dependency on the forest as a means of production (for subsistence, in this case) is strong enough to propel them to continue to conserve the forest. Yet this dependency is not overbearing to the point that it threatens the forest's survival.

## POLICY RECOMMENDATIONS

Practitioners and advocates of community forestry disagree over the nature of the projects. Although it is generally agreed that community forestry projects are designed primarily to benefit the recipient communities and entail local involvement in the management of forestry activities, there is dissension over what constitutes a "benefit" to the recipient community, "local involvement," and the rural communities' relationship to and utilization of the forest. RFD, FIO, and PDA community forestry projects are designed to curb deforestation by tackling what are believed to be its major causes: fuelwood demand, shifting cultivation, and the search for farmland.

Practitioners and advocates of locally-initiated community forestry (community protected forests) perceive the issue differently. While the RFD and FIO view local communities as threats to the forest, advocates of community protected forests view the rural communities as assets to the forest. They argue that since the lives of the rural communities are so intricately tied to the forest, it is in their best interest to conserve the forest.

To a certain degree, both arguments are correct. The two sides disagree over the rural communities' relationship to the forest (which subsequently determines the nature of community forestry projects) because they are talking about two different rural populations. Certain rural population are indeed more of a threat to the forest than an asset; others are more of an asset than a threat. The pitfall of the two sides' advocacy of community forestry is that they generalize the rural communities' utilization of the forest based on those communities with which they are familiar. Each side fails to recognize that the picture given by the other side may indeed be accurate and may actually complement their scenario of the forest/people relationship. Each side fails to recognize that the rural communities' relationship to the forest is not a static but a dynamic condition determined by the given community's nature and the degree of dependence on the forest. The nature and degree of dependence are amenable to changes and ultimately depend on both external and internal factors. The two sides need to view a given community's relationship to the forest as it is rather than as they preconceive it to be. With some improvements to their respective projects, outside-initiated community forestry projects and locally-initiated projects should be able to complement each other. There should be a range of community forestry projects available from which a selection that best suits a given community can be made.

Advocates and skeptics of community forestry argue over the role of local communities in forest management. Skeptics often ask: Can the villagers be trusted in conserving the forest? Is community forestry an effective tool in curbing deforestation and alleviating poverty? Does community forestry have a future ten, twenty years down the road?

To answer the first question—Can villagers be trusted in conserving the forest?—the following issues must first be clarified for each given community: What are the basic means of livelihood of the community? How does the community's current land-use patterns fit within this scenario? How will the community's livelihood pattern evolve and how will its evolution affect land-use patterns, particularly forest conservation? What is the community's level of forest-dependency? Given the community's profile, what appropriate measures can be introduced to achieve the optimum level of forest dependency (conducive to forest conservation)? The underlying premise is that rural communities do not exist in a purely subsistence economy but in a combination of cash and subsistence economy. As the rural communities are developed, they are increasingly incorporated into the cash economy until they are fully submerged into the economy.

A community's forest utilization pattern is a function of its level of dependency on the forest that ranges from total dependency to nonexistent. The level of forest dependency is determined by the types of income-generating activities open to the community. There are basically two types of income generating activities: land-bound and nonland-bound activities. Land-bound activities are agricultural and forestry activities; nonland-bound activities are off-farm employment.

There are three stages of forest dependency as affected by land-bound and nonland-bound, income-generating activities. Stage I is maximum forest dependency, dictated by the community's maximum dependency on land-bound, income-generating activities for their livelihood. At this stage, nonland-bound activities are insignificant. There is a wide gap between the level of land-bound and nonland-bound activities. (see Figure 1). This is detrimental to the forest. Farmers in search of land will clear the forest for farmland and supplement their income with other forest-based and land-based activities, i.e., logging, charcoal-making, and cultivating cash crops. Forest clearance is abundant, and the existence of the forest is due to low population.

As rural development in the community increases, there will be more job opportunities in nonland-bound, income-generating activities. The level of nonland-bound activities will rise and the significance of land-bound activities will decline. The community will become increasingly dependent on nonland-bound activities and less dependent on land-bound activities. Referring to the diagram, the community will move from point A to point A'. The gap between the levels of land-bound and nonland-bound activities will narrow. The pressure on the forest will drop. The area of forest near the community will rise. The trend will continue until the level of land-bound activities equals that of nonland-bound activities. The community will become as dependent on land-bound activities as on nonland-bound activities. The community will move from point A' to point B and will reach the equilibrium level of forest dependency, Stage II. This is the case in the community protected forests in northern Thailand.

As industrialization in rural areas continues, nonland-bound, income-generating activities will eventually eclipse land-bound activities. There is a shift from point B to point B'. The gap between the two types of income-generating activities will widen again. The importance of the forest as the natural resources base of the community will decline. The rising opportunity cost of forest protection (in terms of the foregone profit from selling the land and of the labor and time costs of forest protection, which could be spent in other lucrative activities) will discourage forest protection. The forest area around the community will decline. The community approaches Stage II, point C, from two possible scenarios.

In the first scenario greater industrialization brings forth greater land speculation, since land is one of the primary factors of production. With the hefty profit to be made from selling land, more agricultural and illegally claimed forest land (i.e., field crops without title deeds) will be sold, increasing the pressure on the forest. Farmers who have sold their land but who have not yet been absorbed in the job market will encroach further into the forest. Also, as the urban population becomes more affluent, it will seek luxury goods such as resorts, many of which are found in forest reserves.

In the second scenario, as certain rural populations become less dependent on the forest and more engaged in off-farm employment, they will become less vigilant of their communal forest. This loophole enables other rural groups who are in search of land to encroach into the communal forest.



Communities practicing community protected forestry are not poverty-stricken but are fairly operative, with a wide array of income-generating activities (many of them nonland-bound) to choose from. In these communities, there is a balance between forest dependent and non-forest-dependent activities.

Given the above observation of the forest/people relationship, the following recommendations are made:

1. To facilitate communities' progression from Stage I to Stage II, off-farm employment opportunities should be promoted to alleviate the pressure on the land. It must be recognized that this alone will not immediately lead to the establishment of a communal forest. Other ingredients such as adequate dependence on the forest and proximity to the forest must also be present. Special emphasis should be given to achieve and maintain an equilibrium forest dependence. Land/forest-based means of production should be promoted, but in combination with non-forest/nonland-based activities, such as greater off-farm employment opportunities.
2. However, once a community reaches Stage II, it is unlikely that it will remain there forever. Probably it will graduate to Stage III, where the importance of the forest to the community declines as the result of industrialization. Consequently, there will be less forest protection. In anticipation of this, there ought to be mechanisms to promote forest conservation, for example, making the benefits from forest conservation greater than those derived from selling or not conserving the forest. Rural communities which now have community forestry projects should be subsidized by the government in their forest efforts. In subsidizing the community protected forest, the state also should examine the social organization of rural communities to determine which local institutions would be the best managers of the community protected forest.

The forest may directly serve the surrounding communities, but Thai society as a whole claims that it attaches a value to the forest and benefits indirectly from it, such as through the water supply. If Thailand indeed believes that the forests are vital to the well-being of the nation, then it should pay for the cost of forest conservation, at least in subsidizing the communities with good track records of forest conservation.

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**Table 1 Rice Production: Yield Per Rai by Region**

Unit: Kilograms

Region	Year										
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
North	378	349	372	416	367	391	398	391	414	368	415
Northeast	189	194	204	192	207	250	251	259	240	223	237
Central	295	307	322	344	358	368	364	364	387	383	389
South	263	300	275	270	283	272	274	260	262	304	296

*Note:* Data for crop years 1982/83, 1985/86, and 1988/89

*Source:* Agricultural Statistics of Thailand

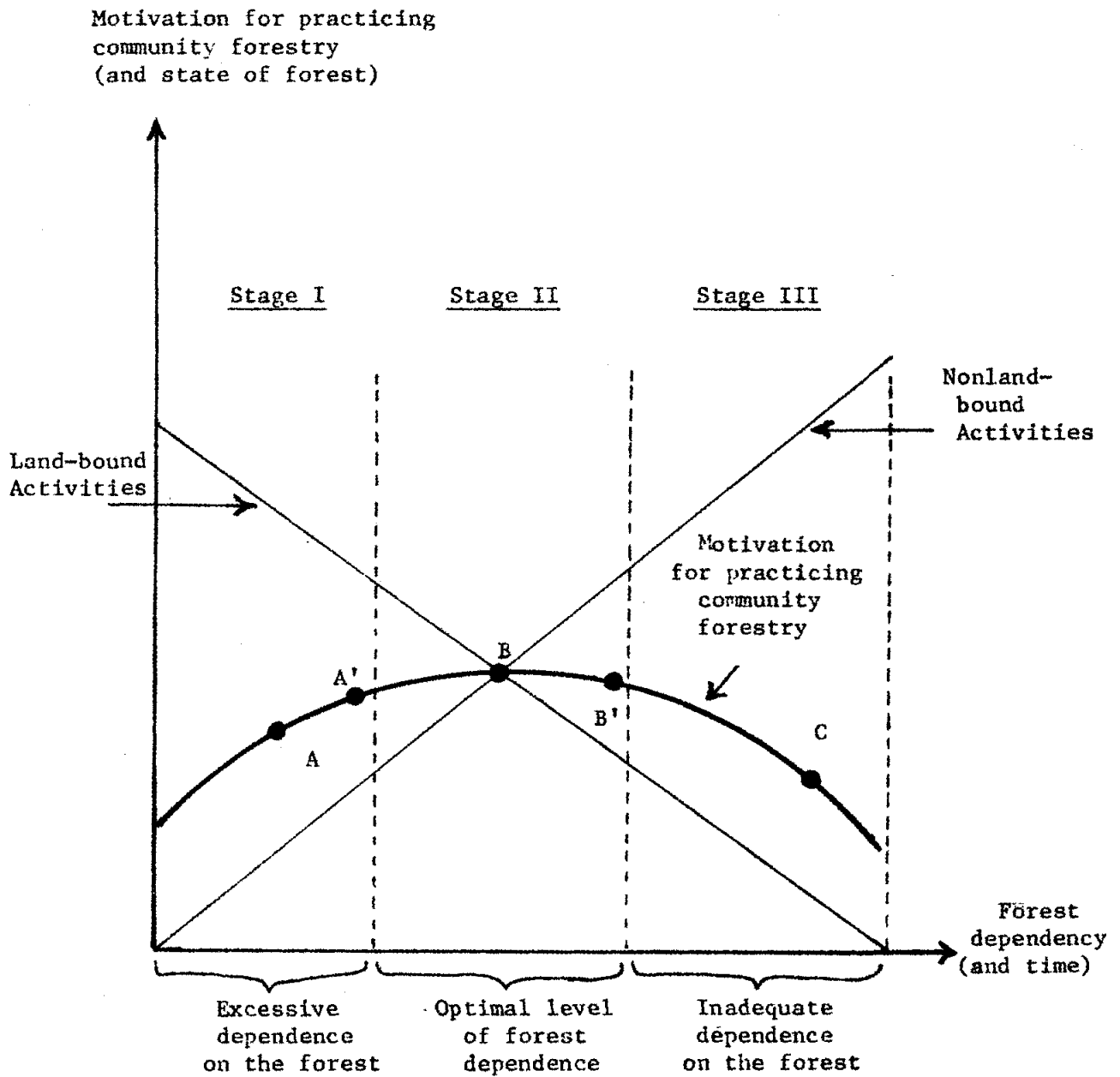


Figure 1 Motivation for Practicing Community Forestry: a Function of the Community's Dependence on the Forest



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- "Locally-Initiated Community Forestry Project." Organized and sponsored by Northnet, Chiang Mai Teachers College. February 13-14, 1990.
- "Environmental 33 Conference." Organized by Thai NGOs, Asia Hotel. January 20-21, 1990.
- "Forest-Land Use Conflict: Crisis and Solution." Organized by Northeastern Chapter of NGO-Cord, and Project for Ecological Recover. July 28-29, 1989. Chulalongkorn University. (In Thai)
- "Community Forestry: An In-house seminar." Organized by the Community Forestry Development Section, Forest Land Management Division, RFD. February 26-March 1, 1990. (In Thai)
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### Interviews

- Interview with Dr.Sanei Jamarik, Chairman, NGO-CORD, Bangkok. December 29, 1989.

Interview with Dr. Anan Kanchanapan, Resources Management and Development Program (RMDP), Department of Anthropology and Sociology, Faculty of Social Sciences, Chiang Mai University. February 12, 1990.

Interview with Professor Somsak Sukwong, Director, RECOFTC, Kasetsart University. June 25, 1990.

Interview with RFD officers responsible for forest village systems in Chiang Mai. July 1990.

Interview with PDA official, community forestry branch. February 1990.

Interview with members of the Association of Northeastern Conservationist, all village headmen of communities with locally-initiated social forestry projects. May 5-8, 1990.

Interview with representatives of villages from Buriram, Yasothon, Kalasin, and Surin provinces.